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SEASONALITY AND CRITICAL DAYS AND PERIODS OF THE YEAR DO NOT INFLUENCE EARLY OUTCOMES OF LUNG CANCER SURGERY IN A COHORT OF 41,920 PATIENTS

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²Statistics and Epidemiology, Besancon University Hospital, Besancon, France,
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⁵Thoracic Surgery, Aix-Marseille University, Marseille, France

Objectives:
The objective of this study was to analyze whether day of the week, vacation periods, academic periods, and/or seasonality had any influence on the early outcomes of lung cancer surgery.

Methods:
We used Epithor, the French national thoracic database, which currently catalogues more than 200,000 procedures. From January 2002 to December 2014, 41,920 patients who underwent major lung resection for primary lung cancer were included. Multilevel logistic models were designed to investigate on the relationships between 30-day mortality, postoperative complications (any type) and length-of-stay with regard to the following time variables: day of the week (Friday vs. Monday-through-Thursday), vacation periods (Christmas, Easter, Summer vs. remaining year), academic year (resident rotations in May and November) or seasons (spring, summer, fall, winter). The two levels considered were the patient and the hospital.

Results:
During the study period, no significant difference was observed in terms of 30-day mortality, not only for the day of the week or the period of vacations but also for the season (p=0.10, p=0.30, p=0.40, respectively). Postoperative complications were not statistically different with regards to the day of the week (p=0.15) or the season (p=0.10) as opposed to period of vacations (4.8% vs. 5.4% during vacations; p=0.03). As for length-of-stay, two of the critical periods concerned, season and period of vacations, were not statistically linked to an increase in its duration (p=0.35, p=0.67, respectively). In contrast, an operation performed on Friday had a significant increase in length-of-stay (13.6 vs. 13.0; p=0.009). May and November effects, when new trainees began their new rotation at teaching institutions, had no significant impact on outcomes.
Conclusion:
In contrast to some other western countries, we did not observe in France neither significant nor clinically relevant worsening of early outcomes at critical time periods following major lung cancer surgery.

Disclosure: No significant relationships.
Keywords: lung cancer, database, outcome, critical period
MONDAY, 30 MAY 2016
08:30 - 10:30
SESSION I: BROMPTON SESSION
B-002

COMPARISON OF SURGICAL APPROACH AND EXTENT OF RESECTION
FOR STAGE I AND II THYMIC TUMORS AMONG EUROPE, NORTH
AMERICA AND ASIA – AN ITMIG RETROSPECTIVE DATABASE
GEOGRAPHIC ANALYSIS

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Objectives:
Surgeons at different regions may have different concept in choosing types of surgery for thy-
mic tumors. It is not known whether these differences have any impact on the outcome of the
patients.

Methods:
A total of 1430 patients with Masaoka/Koga pathologic stage I-II thymic tumors without my-
asthenia gravis and without pretreatment were identified from the ITMIG global retrospective
database and included in this study. Comparison was made among the three major continents
(Europe, North America, and Asia).

Results:
The three continents were comparable in gender, performance status, and percentages of thy-
mic carcinoma. European patients had more paraneoplastic syndromes. North American pa-
tients had the smallest tumor and less adjuvant therapies. Asian patients were younger, had
more stage I disease, and type B3 thymomas. Partial thymectomy was applied significantly
more often in Asia than in Europe or North America (31.7% vs. 2.4% vs. 5.4%, p<0.0001). Me-
dian approach (sternotomy/clamshell) was the major approach in Europe and North America,
while lateral open (thoracotomy/hemi-clamshell) and minimally invasive approaches (VATS/
Robot) was used more often in Asia with no lower complete resection rate (Table). Upon mul-
tivariate analysis, different continent (Asia vs. Europe or North America), surgical approach
(lateral open or minimally invasive vs. median), and tumor size were revealed as predictive
factors for partial thymectomy. Mean tumor size was the largest in lateral thoracotomy group
(7.1cm), followed by median sternotomy (6.4cm), and was the smallest in minimally invasive group (5.1cm). The 10-year overall survivals were 82% for Europe, 78% for North America, and 90% for Asia (p=0.0049).

<table>
<thead>
<tr>
<th></th>
<th>Europe</th>
<th>North America</th>
<th>Asia</th>
<th>p value</th>
</tr>
</thead>
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<td>No. patients</td>
<td>No.</td>
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<td>298</td>
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<td>Age Year</td>
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<td>Performance status 0-1 %</td>
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<td>98.3</td>
<td>97.1</td>
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<td>2.4</td>
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<tr>
<td>Thymoma histology AB %</td>
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<td></td>
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<tr>
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<tr>
<td>Thymoma histology B2 %</td>
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<td>17.2</td>
<td>16.0</td>
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<tr>
<td>Thymoma histology B3 %</td>
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<td>3.6</td>
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<tr>
<td>p-Stage I %</td>
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<td>49.0</td>
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<tr>
<td>p-Stage II %</td>
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<td>51.0</td>
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<tr>
<td>Tumor size cm</td>
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<td>5.6</td>
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<tr>
<td>Surgical approach Sternotomy/Clamshell</td>
<td>75.3</td>
<td>76.6</td>
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<tr>
<td>Surgical approach Thoracotomy/Hemiclamshell</td>
<td>15.1</td>
<td>7.5</td>
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<tr>
<td>Surgical approach VATS/Robot</td>
<td>9.6</td>
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<tr>
<td>R0 resection %</td>
<td>98.0</td>
<td>91.1</td>
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<td>Adjuvant Chemotherapy %</td>
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</tr>
<tr>
<td>Adjuvant Radiation %</td>
<td>24.6</td>
<td>16.1</td>
<td>24.2</td>
<td>0.0108</td>
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**Conclusion:**
This study clearly shows that different philosophies exist in the selection of approach and extent of resection for early stage thymic tumors among geographic regions. This has implications for the interpretation of data from different countries. Further analysis to evaluate the independent impact of the approach and extent of thymectomy are underway.

**Disclosure:** No significant relationships.

**Keywords:** thymic malignancy, surgical approach, resection extent, geographic region
PREVENTIVE APPLICATION OF LIDOCAINE PATCH IN ADJUNCTION TO INTRAVENOUS MORPHINE ANALGESIA FOR MANAGEMENT OF POST-THORACOTOMY PAIN: RESULTS OF A RANDOMIZED, DOUBLE BLIND, PLACEBO CONTROLLED STUDY.

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²Anaesthesia and Intensive Care Unit, Second University of Naples, Naples, Italy

Objectives:
Lidocaine patch is usually used for management of chest-wall pain, thus we supposed that its application at site of thoracotomy before surgery would potentiate the effect of intravenous morphine analgesia and reduce the acute and sub-acute post-thoracotomy pain.

Methods:
This was a single-centre, double-blind, placebo controlled, prospective study. Patients were randomly assigned to receive Lidocaine 5% patch (Lidocaine Group) or a placebo (Placebo Group) before thoracotomy in 1:1 ratio. The patch was placed at the site of thoracotomy three days before operation for 12 hours per day. All patients received intravenous morphine analgesia in the first 48 postoperative hours. Primary end-point was pain relief measured with VAS Scale at rest and after cough. Secondary end-points were the recovery of FEV1 and FVC, the reduction of morphine consumption, and the rate of side effects. In addition, Laser-evoked potentials (LEPs) were measured before and one; three, and six months after operation to quantify the neuropatic pain. Differences were assessed with ANOVA test.

Results:
Ninety patients were randomized of whom 45 allocated to Lidocaine Group and 45 to Placebo Group. Baseline characteristics were comparable. Lidocaine compared to Placebo Group showed reduction of VAS scores at rest (p=0.01) and after cough (p=0.01); increase of FEV1 (p=0.02) and FVC (p=0.02); and reduction of total morphine consumption (p<0.001). The lidocaine patch was not correlated to specific side effects. Regarding LEPs value, Placebo compared to Lidocaine group presented a reduction of N2 (p<0.001) and P2 amplitude (p=0.03) and increase of N2 (p=0.02) and P2 (p=0.03) latency, expressions of persistent pain (Table 1).
### Groups Variables Pre Post-operative

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<th></th>
<th>6 hours</th>
<th>12 hours</th>
<th>24 hours</th>
<th>48 hours</th>
<th>72 hours</th>
<th>96 hours</th>
<th>1 month</th>
<th>3-months</th>
<th>6-months</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAS - rest</td>
<td>-</td>
<td>3.8±0.2</td>
<td>3.7±0.1</td>
<td>3.0±0.1</td>
<td>2.4±0.2</td>
<td>1.6±0.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>VAS-cough</td>
<td>-</td>
<td>4.3±0.6</td>
<td>4.4±0.4</td>
<td>3.8±0.1</td>
<td>3.6±0.7</td>
<td>2.6±0.3</td>
<td>-</td>
<td>-</td>
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<tr>
<td>FEV1</td>
<td>79±3.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>68±2.6</td>
<td>69±2.5</td>
<td>70±2.4</td>
<td>-</td>
<td>-</td>
<td>0.02</td>
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<tr>
<td>VAS - rest</td>
<td>-</td>
<td>4.8±0.5</td>
<td>4.7±0.7</td>
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<td>4.0±0.3</td>
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<td>VAS-cough</td>
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<td>5.3±0.2</td>
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<td>FEV1</td>
<td>85±2.7</td>
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<td>-</td>
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<tr>
<td><strong>Lidocaine</strong></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>FVC</td>
<td>80±3.9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>70±3.7</td>
<td>71±5.7</td>
<td>73±4.4</td>
<td>-</td>
<td>-</td>
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<tr>
<td>FVC</td>
<td>86±2.6</td>
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<td>-</td>
<td>-</td>
<td>62±1.5</td>
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<td>64±5.9</td>
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<td>19±0.4</td>
<td>18±0.3</td>
<td>3.7±0.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>Morphine</td>
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<td>22±0.7</td>
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</tr>
<tr>
<td>N2 Latency</td>
<td>262±8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>271±7.3</td>
<td>265±5.8</td>
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</tr>
<tr>
<td>N2 Latency</td>
<td>257±5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>296±8.9</td>
<td>293±3.8</td>
<td>289±4.3</td>
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</tr>
<tr>
<td>Amplitude</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-31±1.9</td>
<td>-30±1.6</td>
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<tr>
<td>N2 Amplitude</td>
<td>-27±1.9</td>
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<td>-</td>
<td>-</td>
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<td>-50±3.9</td>
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<tr>
<td>P2 Latency</td>
<td>450±7</td>
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<td>-</td>
<td>-</td>
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<td>465±8.3</td>
<td>463±8.6</td>
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<tr>
<td>P2 Latency</td>
<td>455±7</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>495±5.5</td>
<td>485±4.3</td>
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<tr>
<td>P2 Amplitude</td>
<td>9.6±0.7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7.4±0.9</td>
<td>7.7±0.8</td>
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<tr>
<td>P2 Amplitude</td>
<td>11±1.7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3.9±0.6</td>
<td>4.8±0.9</td>
<td>5.6±0.3</td>
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</tr>
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</table>

Two LEP curves measured 6 months after operation. Patient of Placebo group presented an increase of Latency and a reduction of Amplitude compared to that of patient of Lidocaine Group.
Conclusion:
The preventive application of Lidocaine 5% patch is an easy, safe, and effective adjunct to intravenous morphine analgesia for controlling post-thoractomy pain. The benefits are maintained six months after operation.

Disclosure: No significant relationships.
Keywords: preventive analgesia, lidocaine patch, post-thoracotomy pain
B-004

DOES SHORT-TERM PREOPERATIVE EXERCISE THERAPY INFLUENCE LONG TERM LUNG FUNCTIONAL OUTCOME FOLLOWING LUNG CANCER SURGERY?

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⁴Department of Pneumology, Réseau Valais Santé, Sion, Switzerland

Objectives:
Exercise-based rehabilitation programs have been shown to improve both aerobic fitness and quality of life among cancer patients. So far, the long term functional impact of preoperative exercise intervention has not been examined in patients awaiting lung cancer surgery. The aim of this study was to evaluate the effectiveness of a high-intensity training (HIT) program on postoperative functional outcome.

Methods:
Randomized controlled trial, two centers patients scheduled to undergo lung cancer resection were randomized into usual care or rehabilitation arm (UC and Rehab groups). Preoperative rehabilitation was conducted by physiotherapists and consisted in two to three high-intensity interval training (HIT) sessions per week. Postoperative clinical outcome data included postoperative mortality, lung volume, lung diffusion capacity and aerobic fitness parameters (peak oxygen uptake [VO₂peak], and maximal work [Wmax]). To analyze the impact of treatment and time, Student t test, Mann–Whitney or Wilcoxon test U-tests, the Pearson test χ² tests and ANOVA were used.

Results:
Over a three year period, a total of 189 patients were screened, and 151 were analyzed (N=77 in UC group and N=74 in Rehab group). Groups were comparable. The median time delay from enrollment to surgery was 26 days (interquartile 25-75%, 21-33 days). The HIT program prevented the impairment in aerobic fitness parameters in rehabilitated patients before surgery as reflected by significant increases in VO₂peak (median +15 % [IQ25-75, +9 to +22%]) and in maximal power (median +6% [IQ25-75, 0 to +17%]). At one year following lung cancer surgery, there was no significant difference between the two groups regarding mortality rate (9.1% in UC group vs 6.8% in Rehab group), lung pulmonary function tests and aerobic fitness parameters.
Conclusion:
This study indicates that preparing patients with a HIT program enhances aerobic fitness parameters before surgery but failed to improve survival and functional parameters one year following lung cancer surgery.

Disclosure: No significant relationships.

Keywords: high-intensity training, preoperative rehabilitation, functional outcome, lung cancer surgery
SURGICAL THERAPY OF THYMIC TUMORS WITH PLEURAL INVOLVEMENT: AN ESTS THYMIC WORKING GROUP SURVEY


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⁴Department of Thoracic Surgery, Lung Transplantation & Diseases of The Esophagus, Service de Chirurgie Thoracique - HN - APHM, Chirurgie Thoracique - Marseille, Marseille, France,
⁵Thoraxheelkunde, UZ Leuven, Leuven, Belgium,
⁶Thoracic Surgery, The Lister Hospital, London, United Kingdom,
⁷Thoracic Surgery, Guy’s & St Thomas’ Hospital, London, United Kingdom,
⁸Thoracic Surgery, University of Zurich, Zurich, Switzerland,
⁹Thoracic Surgery, University of Turin, Turin, Italy,
¹⁰Cirugía Torácica, Hospital Universitario Puerta de Hierro Majadahonda, Madrid, Spain,
¹¹Thoracic Surgery, University of Montreal, Montreal, Canada,
¹²Thoracic Surgery Department, Salamanca University Hospital, Salamanca, Spain,
¹³Cardiothoracic Surgery, Papworth Hospital NHS Foundation Trust, Cambridge, United Kingdom

Objectives:
The value of surgical therapy for primary or recurrent thymic tumors with pleural involvement is not sufficiently defined yet. The ESTS Thymic Working Group collected retrospective data on patients undergoing surgery for primary and recurrent thymic tumors with pleural involvement.

Methods:
A detailed questionnaire comprising all relevant clinical data was sent out to the members of the ESTS Thymic Working Group. Twelve institutions from eight countries contributed their data.

Results:
From 1977 to 2014 152 patients (50% females) underwent different surgical procedures. In 70.4% cases pleural involvement was present at time of primary intervention. The other 29.6% of cases had surgery for recurrent disease involving the pleura. Pleural involvement resulted from thymoma (89.5%) and thymic carcinoma (TC:10.5%). Type of operation was extrapleural pneumonectomy (EPP):40, total pleurectomy (TP):23 (incl. 4 cases of pleurectomy/de‑cortication), local pleurectomy (LP):88, and pericardial resection in 52 patients. The median follow-up time for the entire patient cohort was 52 months [range:0-265]. Overall survival (OS) for the entire patient population at 1-,3-,5, and 10-years was 96.4%,91.0%,87.2% and
62.7%. Patients with thymomas showed significantly better 10-year OS than TC (p<0.001; TC median: 114 months, thymomas: not reached). One-, 3-, 5, and 10-year OS after EPP was 88.6%, 85.5%, 80.1% and 40.1%; after TP: 94.4%, 85.9%, 85.9% (follow-up 10-years not reached) and after LP: 100%, 94.4%, 90.6% and 72.2%, respectively (p=0.067). Fifty-three percent of patients developed recurrence after pleural surgery after a median of 46 months (local: 22.2%, regional: 51.9%, distant: 13.6%, regional & distant: 9.9%, local & regional: 1.2%, missing data: 1.2%). There was no statistically significant difference regarding freedom-from-recurrence for patients with local or advanced disease undergoing EPP (median: 31 months), or TP (median: 69 months) or LP (median: 46 months; p=0.266). Completeness of resection (R0) was achieved in 76.8% of cases (EPP: 95%, TP: 60.9%, LP: 72.7%). OS was better after complete resection (R0: median survival unreached) compared to incomplete resection (R1+R2: 105 months; p<0.001; figure 1).

Conclusion:
Surgical therapy of thymic tumors with pleural involvement is infrequently performed. Different treatment modalities: EPP, TP and LP yield excellent results regarding OS and freedom-from-recurrence. Prospectively collected data on all patients with thymic tumors and pleural involvement are warranted.

Disclosure: No significant relationships.
Keywords: pleurectomy, thymoma, thymic carcinoma, EPP
THE INFLUENCE OF OPERATING ROOM SCHEDULING ON EARLY OUTCOME FOLLOWING ELECTIVE ANATOMIC LUNG RESECTIONS

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Objectives:
To investigate the effect of operating room scheduling (weekdays vs. weekends and morning vs. afternoon) on the outcome of patients undergoing elective lung resection.

Methods:
The surgical outcome of 420 patients submitted to anatomical pulmonary resection (363 lobectomies, 35 pneumonectomies, 22 segmentectomies) (April 2014-November 2015) was analysed. A total of 92 operations (22%) have been performed during the weekend (Friday or Saturday). Overall 161 patients have been operated in the afternoon (38%). Propensity score matching was performed to account for possible selection bias between the groups (weekdays vs. weekends; morning vs. afternoon). The matched groups were compared in terms of cardiopulmonary complications, major complications (Thoracic Morbidity and Mortality (TMM) grading system>2), 30-days-mortality and length of stay (LOS).

Results:
One hundred and two (24%) patients developed cardiopulmonary complications, 56 (13%) developed major complications. In-hospital mortality was 3.1% (13 patients). Weekday analysis: The propensity score matching yielded two well-balanced groups of 92 pairs (weekends vs. weekdays). No differences in terms of cardiopulmonary complications (22 vs. 24,p=0.9), major complications (14 in both groups), mortality (2 vs. 4,p=0.7) and LOS (7 days vs. 7.5 days, p=0.6) were identified. Time of the day analysis: The propensity score matching yielded two well-balanced groups of 161 pairs (morning vs. afternoon). Cardiopulmonary morbidity (32 vs. 33,p=0.9), major morbidity (17 vs. 19,p=0.7), mortality (7 vs. 4,p=0.7) and LOS (7.2 days vs. 5.9 days, p=0.2) were not different between the groups.

Conclusion:
Operating room scheduling does not affect early outcome following elective lung resections. Specifically, operations performed during weekends or with late starts do not show increased rate of morbidity or mortality. This finding indirectly shows appropriate structural and procedural characteristics of the unit, ensuring consistent quality of clinical care on a 24/7 basis. Moreover, this result can encourage a more effective utilization of facilities and human resources to reduce cancer wait pathways, preserving safety.

Disclosure: No significant relationships.
Keywords: operating room scheduling, weekend effect, lung resection
REFRAINING FROM SMOKING SHORTLY BEFORE LOBECTOMY HAS NO INFLUENCE ON THE RISK OF PULMONARY COMPLICATIONS. A CASE-CONTROL STUDY ON A MATCHED POPULATION

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Objectives:
It has been demonstrated that smoking increases the risk of postoperative pulmonary complications (PPCs) in lung resection patients. Although the best time for quitting remains controversial, some authors recommend an abstention period between 8-12 weeks. In this context, referring patients to the tobacco abstention clinic before surgery would be beneficial. The objective of this study is to evaluate if active smoking at the time of surgery increases the risk of PPCs compared to recent abstention before the procedure.

Methods:
We have conducted a case-control study on 378 consecutive patients who underwent non-extended lobectomy for any indication in our Institution. Cases were active smokers at the time of surgery and controls, patients who quit smoking at any time up to 16 weeks before surgery. All patients received the same perioperative care and surgery was performed through muscle sparing or axillary mini-thoracotomy. The occurrence of PPCs was the considered outcome and it was defined as pneumonia (ATS criteria, 2004) or atelectasis requiring bronchoscopy. Cases and controls were matched according to age, BMI, FEV1%, FEV1/FVC, type of approach and diagnosis of NSCLC. Cases and controls were arranged in 2x2 tables and the odds ratio with 95%CI for PPCs was calculated.

Results:
The overall prevalence of PPCs was 4.7% (18/378); 5.3% (13 out of 244) in the active smokers group, and 3.7% (5 out of 134) in the ex-smokers. After matching, two sets of 134 patients each were compared. The prevalence was 4.5% (6/134) in active and 3.7% (5/134) in ex-smokers (O.R. 1.21 (95%CI: 0.29-5.13, p=0.76).

Conclusion:
In this population of patients strictly matched according to risk criteria for PPCs, smoking at the time of surgery has not been identified as a risk variable. Therefore, the practice of referring cases to the tobacco abstention clinic to decrease the prevalence of PPCs doesn’t seem to be justified.

Disclosure: No significant relationships.
Keywords: lung resection, cardiopulmonary complications, tobacco abstention, postoperative risk
Objectives:
To develop updated models of in-hospital or 30-day mortality and cardiopulmonary morbidity after anatomic lung resections from the ESTS database.

Methods:
Retrospective analysis on 47,960 anatomic lung resections from the ESTS database (July 2007-August 2015) (36,376 lobectomies, 2,296 bilobectomies, 5,040 pneumonectomies and 4,248 segmentectomies). Logistic regression and bootstrap analyses were used to test the association between baseline and surgical variables with morbidity or mortality. Aggregate scores were created by proportionally weighting the regression coefficients. Patients were grouped in risk classes according to their total risk scores.

Results:
Cardiopulmonary morbidity and in-hospital/30 days mortality were 18.4% (8,805 patients) and 2.7% (1,295 patients). The following variables resulted reliably associated with morbidity after logistic regression analysis (c-index 0.68): male gender(p<0.0001), age(p<0.0001), ppoFEV1(p<0.0001), CAD(p<0.0001), CVD(p<0.0001), CKD(p<0.0001), thoracotomy approach (p<0.0001) and extended resections(p<0.0001). All variables had a significant bootstrap frequency>95%. The following scores were assigned to variables: CKD 1 point; CAD and CVD2 2 points; age>65, male gender, thoracotomy, extended resections and ppoFEV1<70% 3 points. Patients were grouped in 6 classes of incremental morbidity risk (p<0.0001) (figure). The following variables resulted reliably associated with mortality after logistic regression
analysis (c-index 0.74): male gender (p<0.0001), age>70(p<0.0001), ppoFEV1(p<0.0001), CAD(p=0.003), CVD(p<0.0001), BMI(p<0.0001), thoracotomy approach(p<0.0001), pneumonectomy (p<0.0001) and extended resections(p=0.002). All variables had a significant bootstrap frequency>80%. The following scores were assigned to variables: ppoFEV1<70%, CAD and extended resections 1 point; Age>65 and CVD 2 points; male gender, Thoracotomy, BMI<18.5 and pneumonectomy 3 points. Patients were grouped in 6 classes of incremental risk of mortality (p<0.0001) (figure).

**Conclusion:**

We developed revised morbidity and mortality models from a large population of lung resection patients registered in the ESTS database. They will be used to risk-adjust outcomes indicators for quality of care auditing purposes (i.e. European Institutional Accreditation). Although they should not be used alone to select patients for surgery, the aggregate scores can assist in stratifying their risk during surgical consultation and shared decision process.

**Disclosure:** No significant relationships.

**Keywords:** morbidity, mortality, risk modelling, outcome, lung resection
SUCCESSFUL ENDOSCOPIC TREATMENT OF SEVERE ISCHEMIC DAMAGE OF THE BRONCHUS AFTER BILOBECTOMY

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Objectives:
The successful endoscopic treatment of a patient with severe ischemic damage of the right main bronchus after lower bilobectomy is reported.

Video description:
A 60 year old woman underwent lower bilobectomy with systematic hilar and mediastinal lymphadenectomy for lung cancer after induction radiochemotherapy. The postoperative course was complicated by the concomitant occurrence of a small dehiscence of the bronchial stump and of a large defect of the posterior wall of the main bronchus due to ischemic necrosis. Endoscopic treatment of the complication was performed. Closure of the bronchial stump dehiscence was obtained with an Amplatzer® Atrial Septal Occluder. Closure of the ischemic bronchial defect was obtained with the placement of a fully-covered self expanding metallic stent with its upper limit in the lower trachea and its distal end in the bronchus intermedius. Ventilation of the residual right lung was obtained by the laser ablation of the polyester cover of the stent at the level of the right upper lobe bronchus. Immediate resolution of the bronchopleural fistula was achieved after the endoscopic procedure with air leak stop and progressive reexpansion of the residual right lung. Postoperative hospitalization was 31 days. Uneventful removal of the stent was possible 3 months after its placement showing complete healing of the posterior bronchial wall with the Amplatzer® occluder in place at the level of the bronchial stump. The patient is alive and in good general condition 6 months after stent removal.

Conclusions:
Treatment of severe ischemic complications of the bronchus after major lung resection can be successfully performed with completely endoscopic procedures. Various technical options should be considered according to the type of bronchial damage.

Disclosure: No significant relationships.
Keywords: bronchopleural fistula, airway complication, bronchial stenting
PLEURECTOMY/DECORTICATION INTENDED AS MACROSCOPICALLY COMPLETE RESECTION FOR RESECTABLE MALIGNANT PLEURAL MESOTHELIOMA: THE VIO SOFT COAGULATOR SYSTEM IS APPLICABLE TO PLEURECTOMY/DECORTICATION

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Objectives:
Surgery in the treatment of malignant pleural mesothelioma (MPM) is debated. After the MARS trial (Lancet Oncol. 2011;12:763-72), pleurectomy/decortication (P/D) has been highlighted because of its less harmfulness than extra pleural pneumonectomy (EPP) and survival benefit in the multimodality therapy. P/D is a complicated procedure with much bleeding and air leakage. We applied the VIO soft coagulator to reduce such operative morbidity.

Video description: A 59-year-old male, MPM biphasic type, c-T2N0M stage II (IMIG) was suspected, eligible for P/D feasibility study. After the 3 course of induction chemotherapy using CDDP 75mg/m2 +PEM 500mg/m2 (PR), surgery was performed. With a posterolateral thoracotomy with large S shaped incision 25cm, we performed P/D in right upper lobe +right middle lower bilobectomy +combined resection of pericardium +reconstruction using Gore-Tex sheet +systematic LN dissection (ND2a-2). In the part of P/D, we grasp the edge of opened visceral pleura using sterilized cotton glove, reverse and insert the fingers at the back side of the decorticated pleura then push up the lung parenchyma. We exfoliate the pleura stroking the part between the elastic layer and the interlobular septa by the VIO soft coagulator with spraying distilled water. Air leakage and bleeding could be minimize using the VIO, even if the tumor invade to the lung parenchyma and cut into there. As a sealant material was dispensable, we used PGA sheet 10x10mm+Beriplast 6ml only. Macroscopic complete resection was achieved. Operation time were 12h29min, 2645g (including effusion), respectively. Pathology showed MPM biphasic type, p-T2 (lung) N0M0 stage II (IMIG), Ef0.

Conclusions:
We performed P/D intended as macroscopically complete resection for resectable MPM. The VIO soft coagulator system was applicable to P/D, and operative morbidity (e.g. leakage, bleeding) could be minimize using the VIO. A sealant material may be dispensable.

Disclosure: No significant relationships.
Keywords: malignant pleural mesothelioma, pleurectomy / decortication, THE VIO SOFT COAGULATOR SYSTEM
V-011

DEVELOPMENT OF NOVEL STABILIZING DEVICE FOR VIDEO ASSISTED THORACIC SURGERY

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Objectives:
The application of video-assisted thoracic surgery (VATS) is now widespread. It is necessary to insert several special devices for VATS to obtain good view via ports. Conventional devices such as endoscopic peanut and grasper may injure the lung because of its fragility and may provide limited view. We propose a novel device which might solve these problems in VATS.

The device which was provided with 20-mm-diameter hemispheric suckers made of silicon (Fuji Systems, Tokyo, Japan). Our objective was to develop a novel stabilizing device for VATS to obtain good view without causing lung injury.

Video description:
Two types of devices were tested; one with a single sucker and the other with three suckers at the end of the devices. These instruments were examined in canine model (beagles) to evaluate their utility and safety. In order to assess the risk of complications related to the procedures, the damage to the lung parenchyma and pleura were microscopically examined after the device were continuously applied to canine lungs under conditions of -300 to -560 mmHg for one hour.

Left lower lobe lobectomy was performed in canine model using these devices. The device with single sucker was detached from the lung easily because of the softness of tissue and limited insertion angle. Device with three suckers showed enough power to stabilize the lung and enable to obtain good view.

After surgery, there were no complications such as hemorrhage, air leak, and the bullae formation. Pathological examination on day 7 showed almost normal lung tissue without damage.

Conclusions:
Although the validation study in clinical settings should be required, the novel sucker device proved to be useful in VATS procedures.

Disclosure: No significant relationships.
Keywords: stabilizer, minimally invasive surgery, instrument, VATS
COMBINED TOTAL VERTEBRECTOMY FOR SUPERIOR SULCUS TUMOR INVADING THE SPINE

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Objectives:
Surgery for primary lung cancer invading the spine remains challenging. Here, we present a case of superior sulcus tumor (SST) with vertebral invasion, successfully resected with total vertebrectomy (Th2) and dissection of involved apical chest wall and the subclavian artery (SCA).

Video description:
A 62-year-old man was referred with the diagnosis of lung squamous cell carcinoma originating from left upper lobe (clinical stage IIIA/T4N0M0) involving the thoracic vertebrae (Th2) as well as the apical chest wall including three ribs (1st, 2nd and 3rd) and SCA. After induction concurrent chemo-radiotherapy, we achieved complete resection by three-step surgical procedures as follows: first, the anterior portion of involved chest wall including SCA was dissected through the trans-manubrial approach (TMA); next, the posterior portion of involved chest wall including ribs was dissected and left upper lobectomy with nodal dissection was performed through posterolateral thoracotomy; finally, total vertebrectomy (Th2) was performed through posterior mid-line approach.

Conclusions:
A strategic surgical approach is important to achieve complete resection for “extensive” SST invading the spine. Surgery may be indicated for SST invading the spine, when complete resection is expected.

Disclosure: No significant relationships.
Keywords: lung cancer, vertebral invasion, vertebrectomy, T4 lung cancer
V-013

BRONCHO-ESOPHAGEAL FISTULA CAUSED BY FOREIGN BODY


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Objectives:
The broncho-esophageal fistula can be caused by esophagitis, especially esophageal candidiasis, esophageal cancer, burns and caustic injury and inhaled foreign body. This is an infrequent condition and few cases caused by foreign body aspiration are described in the literature. This video shows a case of broncho-esophageal fistula caused by inhaled insulin needle.

Video description:
The patient, cocaine and heroin addicted, accidentally inhaled an insulin needle which settled in the main left bronchus. However he remained asymptomatic for almost one year. The needle then caused a fistula between the left bronchus and the esophagus; consequently the patient started to suffer from cough and dysphagia. A first therapeutic approach with an endoscopic clipping device was undertaken, but failed to close the fistula. The patient was then selected for surgical repair. Even if the pre-operative radiological and endoscopic studies demonstrated a narrow fistula tract, the surgical findings showed a large communication between the bronchus and the esophagus. In this case endoscopic clipping would have never closed the esophageal defect because of its dimensions: only surgical repair can ensure a successful and permanent closure. The access to be preferable is a right postero-lateral thoracotomy: through this access the esophagus can be easily isolated and completely exposed. The use of staplers is recommended because it guarantees a reliable esophageal and bronchial suture.

Conclusions:
The broncho-esophageal fistula should be treated by open surgical repair through a right postero-lateral thoracotomy; the use of staplers is preferable to ensure durable suture. The use of endoclips is not recommended.

Disclosure: No significant relationships.

Keywords: broncho-esophageal fistula, inhaled foreign body, thoracotomy
EXTENDED TYPE B BRONCHO-VASCULAR SLEEVE RESECTION OF THE LEFT UPPER LOBE AND THE SUPERIOR SEGMENT OF THE LOWER LOBE FOR LUNG CANCER

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Objectives:
Bronchial sleeve resection merely consisted of 1.3% of lung cancer surgery in Japan. Extended sleeve resection, which is defined as resection of more than one lobe with bronchoplastic procedure is an extremely rare procedure. However this procedure is important for thoracic surgeon to avoid pneumonectomy in modern thoracic oncology.

Video description:
A 61 year old woman had a lung cancer in the left upper lobe invading superior segment of the lower lobe. The tumor invaded hilar pulmonary artery as well. Preoperative biopsy revealed the tumor as adenocarcinoma with negative ALK and negative EGFR mutation. Total atelectasis of the left upper lobe was observed due to the tumor. Clinical stage was T2aN1M0 stage IIA, and preoperative CEA was 6.8 ng/ml. Preoperative FEV1.0 was 1620 cc, and FEV1.0% was 65.3%. Posterolateral incision was used. After hilar dissection, pulmonary artery was cut circumferentially. Backbleeding was controlled with a clamp of the inferior pulmonary vein. Extended sleeve was needed to avoid pneumonectomy for the tumor invaded central portion of the bronchus B6. Bronchoplasty was performed with a hybrid anastomosis using 4-0 Prolene and endo to endo anastomosis of the pulmonary artery was done with 6-0 Prolene. Operative time was 3 hours 35 minutes, and blood loss was 115 cc. Postoperative course was uneventful and the patient was discharged on the 8th postoperative day.

Conclusions:
A rare extended sleeve resection was performed very smoothly. Knack and pitfall will be discussed based on our experience of 25 extended sleeve resections during 8 years.

Disclosure: No significant relationships.
Keywords: sleeve, complications, anastomosis
OBJECTIVES:
To detect factors associated with costs of anatomic lung resection without major complications.

METHODS:
Two hundred and fifty consecutive patients submitted to anatomic lung resection (185 by VATS) in one fiscal year (1 April 2014 – 31 March 2015) were included. Thoracic Morbidity and Mortality (TMM) system was used to grade the severity of complications. We focused our analysis on 210 patients who did not develop major complications (TMM<3). Postoperative costs were retrieved from the Financial Department through an electronic patient-level information system. Multivariable regression and bootstrap analyses were used to test the association of several baseline patient characteristics with costs and obtain an aggregate scoring system to estimate postoperative costs.

RESULTS:
Among the 210 patients, 117 (56%) did not develop any complication and 93 (44%) had minor complications. Their average postoperative cost was 4,040€, significantly lower than the one observed in patients with major complications (13,156€ ,p<0.0001). Multivariable regression revealed that open thoracotomy (p=0.01, bootstrap frequency 66%), DLCO<60% (p=0.001, bootstrap frequency 84%) and coronary artery disease (CAD) (p=0.009, bootstrap frequency 52%) were factors associated with postoperative cost in patients without major complications. Open thoracotomy instead of VATS would increase the cost by 648€, DLCO<60% by 935€ and CAD by 1,043€. According to the regression analysis, if all three factors were present, they would cause an increase of postoperative costs from 3592€ (expected cost of a patient without major complications and without any of the above factors) to 6219€.

CONCLUSION:
We were able to identify clinical factors associated with postoperative costs in patients without major complications, who represent the main population and financial driver after lung resection. Recognising groups of increased cost may lead to specific process analyses aimed at
optimising their pathways of care and ultimately saving money. Moreover, these findings may help administrators to tailor future individualised lung resection reimbursement tariffs based on patient characteristics.

**Disclosure:** No significant relationships.

**Keywords:** financial cost, lung resection, postoperative complication
O-016

COMPARISON OF PLETHYSMOGRAPHIC AND HELIUM DILUTION LUNG VOLUME FOR PLANNING ENDO-BRONCHIAL VALVES TREATMENT OF GIANT EMPHYSEMATOUS BULLAE

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Objectives:
Bulla is defined as “opened” or “closed” depending on whether communicates or not with airway. This difference is crucial because only opened bulla may collapse after endo-bronchial valve (EBV) treatment. Since Helium dilution compared to plethysmography may underestimate lung volumes in presence of severe air-way obstruction, we supposed that the difference between plethysmographic and Helium dilution Residual Volumes (RVs) could help to predict the bulla collapse after EBV treatment.

Methods:
We retrospectively reviewed the data of 27 consecutive patients with giant emphysematous bullae (GEB) unfit for surgery and treated with EBV. All patients underwent standard pulmonary function test (PFT) and HRCT scan before and one, three, six, months after EBV. In addition, RVs were measured with plethysmography and Helium dilution and the difference between two methods calculated (Delta-RV). Patients were included into Collapse or No-Collapse Group depending on whether the bulla collapsed after EBV. Mann-Whitney tests and ANOVA test assessed the intergroup differences. ROC curve was generated to identify the optimal Delta-RV cut-off to predict the bulla collapse.

Results:
A complete collapse of bulla was obtained in 21/27 (78%) patients (Collapse Group) while a partial or/no collapse in 6/27 (No-Collapse Group). In Collapse Group the baseline plethysmographic and Helium dilution RVs were similar (192±4.1 vs 188±6.1;p=0.2) while in No-Collapse Group the plethysmographic RV value was significantly higher than that of Helium dilution (185±3.3 versus 145±6.1;p=0.0007). In Collapse group a significant improvement of PFTs were obtained after EBV while no significant benefits were found in No-Collapse group. ROC curve showed that a delta-RV value ≤ 25 predicted the bulla collapse with a sensitivity and specificity of 100% and 83%, respectively (Figure 1).
Conclusion:
In patients with GEB planned for EBV procedure, RVs should be measured with plethysmography and Helium dilution. A delta-RVs value ≥ 25 is predictive of “closed” bulla. Thus, these patients could be not “ideal” candidate for EBV procedure.

Disclosure: No significant relationships.

Keywords: endo-bronchial valve, bronchoscopic lung volume reduction, emphysematous bulla
O-017

ASA SCORE AND PRE-OPERATIVE INTENSIVE CARE UNIT ADMISSION ARE THE ONLY PREDICTORS OF MORTALITY AFTER SURGICAL BIOPSY FOR INTERSTITIAL LUNG DISEASE

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Objectives:
Recently, an aggregate risk score for predicting mortality after surgical biopsy for interstitial lung disease was developed (Fibla, et al. 2012, Interactive Cardiovascular and Thoracic Surgery). This score includes four independent parameters; age ≥67, pre-operative intensive care unit (ICU) admission, immunosuppressive treatment and open surgery.

Methods:
All patients with interstitial lung disease who underwent diagnostic surgical lung biopsy between 2000 and 2014 were included in the study. ROC-curve and multivariate analyses were applied to determine the predictors of mortality. Variables included were age, type of surgery (VATS vs open), immunosuppressive treatment, number of biopsies, American Society of Anesthesiologists (ASA) physical status score, smoking history, pre-op ICU admission, FEV1%, DLCO% and coronary artery disease. A risk score was calculated and classed as low risk or high risk. Statistical significance was set at p>0.05.

Results:
Two hundred and ninety four patients (121 females and 173 males) with an average age of 55.7±14.9 years (range 19 – 85) were included in the study. 161 (54.7%) of the patients were immunocompromised. 39 (13.2%) patients were admitted to the ICU pre-operatively. 30- and 90-day mortality were 6.8% (n=20) and 10.2% (n=30), respectively. ROC-Curve analysis for 30-day mortality revealed ASA score (area under the curve 0.792, p=0.009) and pre-op ICU admission (area under the curve 0.847, p=0.02) as the only predictors for mortality. For the 30-day and 90-day mortality, 255 patients were low risk with three and 12 deaths, respectively. 39 patients were high risk with 17 and 18 deaths, respectively. Open lung biopsy was not an independent predictor of mortality. Age, smoking history, immunocompromised status, number of biopsies, pre-operative lung function and coronary artery disease were not independent predictors.
Conclusion:
In contrast to previously described scores, only pre-operative ICU admission and ASA score were the most important predictors of mortality. The high risk group constituted only a small percentage of our patient population.

Disclosure: No significant relationships.
Keywords: surgical lung biopsy, interstitial lung disease, risk score
O-018

SURGICAL SITE INFECTIONS AFTER LUNG RESECTION: A PROSPECTIVE STUDY OF RISK FACTORS IN 1,091 CONSECUTIVE PATIENTS.

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Objectives:
To assess incidence and risk factors of surgical site infections (SSI) (wound infection, pneumonia, empyema) in a monocentric series of patients undergoing lung resection over 10 years.

Methods:
All patients undergoing lung resection at our institution in 2006-2015 [wedge resection (WR), n=579; lobectomy, n=472 (12% after chemotherapy); pneumonectomy, n=40 (47% after chemotherapy)] were prospectively evaluated. Perioperatively we recorded the following risk factors for SSI: age, gender, diabetes, steroid therapy, induction chemotherapy, blood haemoglobin, lymphocyte count, serum albumin, FEV1% of predicted, length of preoperative hospital stay, malignant/benign disease, resection in 2006-2010/2011-2015, urgent/elective procedure, VATS/open thoracotomy approach, resection type, operative time. SSI diagnosed within 30 days from surgery was prospectively recorded and their association with risk factors was evaluated.

Results:
Of the 1,091 resected patients [median age, 65 (range, 13-91); male, 74%; malignancy, 65%; benign disease, 35%], 124 (11.4%) developed one or more SSI. Overall infection rates after WR, lobectomy and pneumonectomy respectively were 4.8%, 17.4% and 35.0%. In all 1,091 patients, wound infection, pneumonia and empyema rates were 3.2%, 8.3%, 1.9%, respectively. These rates remained stable through the 10-year observation period. Postoperative mortality was 0.64%. Of the 7 deaths, 4 (57%) were causally related with SSI. Multivariate analysis showed several significant risk factors for SSI: male gender, diabetes, preoperative steroid therapy, induction chemotherapy, no antibiotic prophylaxis, resection type (table). By resection type, independent risk factors for SSI were: WR, preoperative steroids (p<0.001) and diabetes (p=0.019); lobectomy, preoperative steroids (p=0.027), induction chemotherapy (p<0.001) and preoperative hospital stay (p=0.028); pneumonectomy, none.
Table: Univariate and multivariate analysis of risk factors for postoperative SSI in 1,091 consecutive lung resections.

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>OR</th>
<th>95% CI</th>
<th>P</th>
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<tbody>
<tr>
<td><strong>Univariate</strong></td>
<td></td>
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<tr>
<td>Age (+1 y)</td>
<td>1.02</td>
<td>1.01-1.04</td>
<td>&lt;0.001</td>
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<tr>
<td>Gender (female vs male)</td>
<td>2.09</td>
<td>1.25-3.47</td>
<td>0.005</td>
</tr>
<tr>
<td>Preop. diabetes (no vs yes)</td>
<td>2.25</td>
<td>1.30-3.88</td>
<td>0.003</td>
</tr>
<tr>
<td>Preop. steroid therapy (no vs yes)</td>
<td>4.18</td>
<td>2.39-7.29</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Induction chemo- and/or radiotherapy (no vs yes)</td>
<td>3.80</td>
<td>2.36-6.10</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Preop. haemoglobin g/dL (≥12 vs &lt;12)</td>
<td>1.19</td>
<td>0.70-2.03</td>
<td>0.529</td>
</tr>
<tr>
<td>Lymphocyte count, cells/μL (≥1500 vs &lt;1500)</td>
<td>1.17</td>
<td>0.78-1.76</td>
<td>0.445</td>
</tr>
<tr>
<td>Serum albumin, g/dL (≥3.5 vs &lt;3.5)</td>
<td>1.53</td>
<td>0.88-2.67</td>
<td>0.133</td>
</tr>
<tr>
<td>FEV 1, % of predicted (+1%)</td>
<td>0.98</td>
<td>0.98-0.99</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>FEV 1, % of predicted (≥70% vs &lt;70%)</td>
<td>1.24</td>
<td>0.74-2.08</td>
<td>0.409</td>
</tr>
<tr>
<td>Preop. hospital stay (+1 day)</td>
<td>1.03</td>
<td>1.00-1.06</td>
<td>0.033</td>
</tr>
<tr>
<td>Preop. hospital stay (&gt;4 vs ≤4 days)</td>
<td>1.92</td>
<td>1.27-2.88</td>
<td>0.002</td>
</tr>
<tr>
<td>Malignant disease (no vs yes)</td>
<td>4.46</td>
<td>2.56-7.78</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Period of resection (2006-2010 vs 2011-2015)</td>
<td>0.94</td>
<td>0.65-1.36</td>
<td>0.737</td>
</tr>
<tr>
<td>Antibiotic prophylaxis (yes vs no)</td>
<td>3.40</td>
<td>0.87-13.32</td>
<td>0.079</td>
</tr>
<tr>
<td>Urgent surgery (no vs yes)</td>
<td>1.12</td>
<td>0.39-3.24</td>
<td>0.837</td>
</tr>
<tr>
<td>Surgical approach (VATS vs thoracotomy)</td>
<td>3.11</td>
<td>2.03-4.79</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Resection type (wedge vs lob. vs pneum.)</td>
<td>3.54</td>
<td>2.54-4.93</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Operative time (≤180 min vs &gt;180 min)</td>
<td>3.47</td>
<td>2.37-5.09</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Multivariate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (+1 y)</td>
<td>1.01</td>
<td>0.99-1.03</td>
<td>0.384</td>
</tr>
<tr>
<td>Gender (female vs male)</td>
<td>1.78</td>
<td>1.03-3.06</td>
<td>0.039</td>
</tr>
<tr>
<td>Preop. diabetes (no vs yes)</td>
<td>1.94</td>
<td>1.08-3.50</td>
<td>0.027</td>
</tr>
<tr>
<td>Preop. steroid therapy (no vs yes)</td>
<td>4.65</td>
<td>2.48-8.70</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Induction chemo- and/or radiotherapy (no vs yes)</td>
<td>2.65</td>
<td>1.55-4.54</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Serum albumin, g/dL (≥3.5 vs &lt;3.5)</td>
<td>1.06</td>
<td>0.57-1.98</td>
<td>0.847</td>
</tr>
<tr>
<td>Preop. hospital stay (&gt;4 vs ≤4 days)</td>
<td>1.46</td>
<td>0.93-2.30</td>
<td>0.098</td>
</tr>
<tr>
<td>Malignant disease (no vs yes)</td>
<td>1.21</td>
<td>0.52-2.82</td>
<td>0.655</td>
</tr>
<tr>
<td>Antibiotic prophylaxis (yes vs no)</td>
<td>5.25</td>
<td>1.13-24.37</td>
<td>0.034</td>
</tr>
<tr>
<td>Surgical approach (VATS vs thoracotomy)</td>
<td>0.84</td>
<td>0.45-1.57</td>
<td>0.576</td>
</tr>
<tr>
<td>Resection type (wedge vs lob. vs pneum.)</td>
<td>2.45</td>
<td>1.44-4.17</td>
<td>0.001</td>
</tr>
<tr>
<td>Operative time (≤180 min vs &gt;180 min)</td>
<td>1.54</td>
<td>0.95-2.51</td>
<td>0.079</td>
</tr>
</tbody>
</table>

OR: Odds ratio; CI: Confidence interval.
Conclusion:
SSI rates after wedge resection, lobectomy and pneumonectomy were stable over a decade. The observed 11.4% frequency of SSI indicates that postoperative infection remains a relevant issue and a predominant cause of mortality in lung resections. Focusing attention on the identified risk factors of SSI, that are perioperatively modifiable, may improve surgical results.

Disclosure: No significant relationships.
Keywords: surgical site infection, postoperative pneumonia, risk factors, postoperative empyema, wound infection, lung resection
HEALTHCARE ASSOCIATED INFECTION AFTER LUNG SURGERY

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Objectives:
Although Healthcare Associated Infections (HAI) have a critical importance in patients undergoing lung surgery we still not have certain data about risk and prognostic factors for postoperative infections. We wanted to assess HAI development in the postoperative course of patients submitted to thoracic surgery procedures with the aim to evaluate the role of different risk factors.

Methods:
All patients undergoing thoracic surgery procedures between January 2008 and October 2015, for noninfectious disease and without signs of acute respiratory infections were included. Patients treated with antibiotics (because of respiratory or extra-respiratory infections) in the week before surgery, as well as those with clinical and radiologic signs of pulmonary infection at the time of hospital admittance were excluded. Lung transplantations were also excluded from this study.

Results:
Three thousand two hundred eighty-nine patients undergoing thoracic surgery were included. Patients characteristics are shown in Table 1. Antibiotic prophylaxis was performed in 80.5% of cases, according to local hospital policy (Cefazolin or Cefuroxime) and in 19.5% with other antibiotics. One-hundred twenty-three (3.7%) patients developed a HAI. The incidences of Hospital Acquired Pneumonia (HAP), Surgical Site Infections (SSIs), Ventilator Associated Pneumonia (VAP) and Exacerbations of Chronic Obstructive Pulmonary Disease (AECOPD) were: 1.9%, 0.24%, 0.36%, 1.18% respectively.

The overall infective mortality was 3.25%. HAI development was statistically associated with smoking status and BMI < 23 kg/m² (P<0.01).
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Data</th>
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<tbody>
<tr>
<td>Total number of patients</td>
<td>3289</td>
</tr>
<tr>
<td>CAUTI</td>
<td>9 (0.27%)</td>
</tr>
<tr>
<td>Total Thoracic HAI</td>
<td>123 (3.73%)</td>
</tr>
<tr>
<td>Age, median (range) (yr)</td>
<td>65 (16-86)</td>
</tr>
<tr>
<td>BMI &lt; 23 kg/m², No (%)</td>
<td>69 (56.09%)</td>
</tr>
<tr>
<td>Male sex, No. (%)</td>
<td>89 (72.35%)</td>
</tr>
<tr>
<td>Smoking history, No. (%)</td>
<td></td>
</tr>
<tr>
<td>Never smoker</td>
<td>28 (22.76%)</td>
</tr>
<tr>
<td>Past-smoker</td>
<td>58 (47.15%)</td>
</tr>
<tr>
<td>Current-smoker</td>
<td>37 (30.08%)</td>
</tr>
<tr>
<td>Neoplastic disease, No. (%)</td>
<td>106 (86.17%)</td>
</tr>
<tr>
<td>Charlson CI, No. (%)</td>
<td></td>
</tr>
<tr>
<td>&lt;=2</td>
<td>66 (53.65%)</td>
</tr>
<tr>
<td>3-5</td>
<td>42 (34.14%)</td>
</tr>
<tr>
<td>&gt;5</td>
<td>15 (12.19%)</td>
</tr>
<tr>
<td>LOS, median (range) (day)</td>
<td>8 (4-39)</td>
</tr>
<tr>
<td>Prophylactic antibiotics</td>
<td></td>
</tr>
<tr>
<td>Local Hospital Policy (Cefazolin or Cefuroxime)</td>
<td>99 (80.48%)</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>16 (13.00%)</td>
</tr>
<tr>
<td>Quinolone</td>
<td>8 (6.50%)</td>
</tr>
<tr>
<td>Surgical procedure, No. (%)</td>
<td></td>
</tr>
<tr>
<td>Wedge resection</td>
<td>16 (13.00%)</td>
</tr>
<tr>
<td>Lobectomy</td>
<td>64 (52.03%)</td>
</tr>
<tr>
<td>Bilobectomy</td>
<td>6 (4.87%)</td>
</tr>
<tr>
<td>Pneumonecstasy</td>
<td>8 (6.50%)</td>
</tr>
<tr>
<td>Others</td>
<td>29 (23.57%)</td>
</tr>
<tr>
<td>ASA physical status, No. (%)</td>
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</tr>
<tr>
<td>1</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>2</td>
<td>24 (19.51%)</td>
</tr>
<tr>
<td>3</td>
<td>99 (80.48%)</td>
</tr>
<tr>
<td>4</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>5</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Anesthesia, No. (%)</td>
<td></td>
</tr>
<tr>
<td>General and combined</td>
<td>105 (85.36%)</td>
</tr>
<tr>
<td>Sedation</td>
<td>18 (14.63%)</td>
</tr>
<tr>
<td>Duration of surgery, h; No (%)</td>
<td></td>
</tr>
<tr>
<td>&lt;2 h</td>
<td>41 (33.33%)</td>
</tr>
<tr>
<td>2-3 h</td>
<td>70 (56.91%)</td>
</tr>
<tr>
<td>&gt;3 h</td>
<td>12 (9.75%)</td>
</tr>
</tbody>
</table>
Conclusion:
It is of vital importance to take control of all preventable preoperative risk factors, following local hospital policy for infection prevention, which reflect local pathogens, and to increase and develop intensive hygiene and infection control programs. With an aggressive antibiotic therapy, we obtained a low HAI and overall mortality incidence.

Disclosure: No significant relationships.
Keywords: healthcare associated infection, hospital-acquired pneumonia, postoperative pneumonia
O-020

LONG TERM SURVIVAL AND SYMPTOMATIC RELIEF IN LOWER LOBE LUNG VOLUME REDUCTION SURGERY

Periklis Perikleous, A. Sharkey, I. Oey, S. Tenconi, S. Rathinam, D. Waller
Thoracic Surgery, Glenfield Hospital, Leicester, United Kingdom

Objectives:
Lung volume reduction surgery has been demonstrated to provide symptomatic relief and improve lung function in patients with end-stage emphysema. The NETT trial specifically noted functional benefits in patients with predominantly upper lobe emphysema and patients with non-upper lobe emphysema and a low baseline exercise capacity. The goal of our study was to investigate whether physiological and health status benefits correlated with lower lobe LVRS by evaluating parameters such as subjective and objective postoperative outcomes, longitudinal spirometry, and overall survival rates.

Methods:
For this retrospective analysis, data were collected from prospectively populated patient databases, operative logbooks, and patients’ medical records. A total of 42 patients with severe, non-upper lobe predominant emphysema underwent lower lobe lung volume reduction surgery in our institution over a 20-year period. The assessments consisted of measurements of Body Mass Index (BMI), Pulmonary Function (PFTs), and health-related quality of life (HRQL) using the Short Form 36-item questionnaires (SF-36), over specific time intervals.

Results:
Lung function was seen to improve three months after the procedure, maintained until the first six months, decline over the second half of the first year and gradually return to pre-op levels after two years [(median FEV1 (%pred) pre-op 26, 3m 32 (p=0.002), 6m 28 (p=0.016), 12m 28 (p=0.4), 24m 27 (p=0.6)] while RV/TLC (%) ratio was seen to follow the same pattern [pre-op 69, 3m 63 (p=0.02), 6m 63 (p<0.001), 12m 64 (p=0.18), 24m 69 (p=0.4)]. Quality of life improvements were mainly noted in physical components. Overall, median survival was calculated at 57.8 months with 4 out of 5 patients having survived for longer than two years (90day mortality 4.6%, 1y 19.0%, 2y 21.4%, 5y 73.8%).
## Correlation of physiological and health status performance over 3, 6, 12 and 24 month intervals

<table>
<thead>
<tr>
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<th>pre-op</th>
<th>3-months</th>
<th>6-months</th>
<th>12-months</th>
<th>24-months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>median</td>
<td>median</td>
<td>p-value</td>
<td>median</td>
<td>p-value</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>23</td>
<td>23.4</td>
<td>0.496</td>
<td>24.1</td>
<td>0.673</td>
</tr>
<tr>
<td>FEV1 (%pred)</td>
<td>26</td>
<td>32</td>
<td>0.002</td>
<td>28</td>
<td>0.016</td>
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<tr>
<td>RV/TLV (%) ratio</td>
<td>69.24</td>
<td>63</td>
<td>0.021</td>
<td>62.5</td>
<td>0.001</td>
</tr>
<tr>
<td>Physical Component</td>
<td></td>
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<td></td>
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<tr>
<td>Physical function</td>
<td>18</td>
<td>32.5</td>
<td>0.001</td>
<td>22.5</td>
<td>0.078</td>
</tr>
<tr>
<td>Role physical</td>
<td>0</td>
<td>25</td>
<td>0.006</td>
<td>0</td>
<td>0.559</td>
</tr>
<tr>
<td>Bodily pain</td>
<td>77.8</td>
<td>55.6</td>
<td>0.01</td>
<td>61.1</td>
<td>0.05</td>
</tr>
<tr>
<td>General Health</td>
<td>25</td>
<td>75</td>
<td>0.001</td>
<td>75</td>
<td>0.01</td>
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<td>Mental component</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental health</td>
<td>84</td>
<td>74</td>
<td>0.223</td>
<td>72</td>
<td>0.097</td>
</tr>
<tr>
<td>Role emotional</td>
<td>100</td>
<td>100</td>
<td>0.542</td>
<td>33.3</td>
<td>0.323</td>
</tr>
<tr>
<td>Social function</td>
<td>38.9</td>
<td>72.2</td>
<td>0.12</td>
<td>55.6</td>
<td>0.313</td>
</tr>
<tr>
<td>Vitality</td>
<td>35</td>
<td>50</td>
<td>0.001</td>
<td>42.5</td>
<td>0.167</td>
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</tbody>
</table>

### Conclusion:
Contrary to widely held misbelief following the NETT trial, we feel justified in offering lower lobe LVRS in patients meeting the same selection criteria as upper lobe LVRS.

### Disclosure:
No significant relationships.

### Keywords:
emphysema, lower lobes, health-related quality of life, pulmonary function, LVRS, lung volume reduction
ASSOCIATION OF CIRCULATING TUMOR CELLS WITH EARLY RELAPSE AND 18F-FDG PET UPTAKE IN RESECTED NON-SMALL CELL LUNG CANCER

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¹Thoracic Surgery, Virgen de las Nieves University Hospital, Granada, Spain, ²Genomic Oncology, Centre for Genomics and Oncological Research (GENyO), Granada, Spain, ³Nuclear Medicine, Virgen de las Nieves University Hospital, Granada, Spain, ⁴Oncology Department, Hospital Clinico San Cecilio, Granada, Spain

Objectives:
More than 20% of lung cancer patients develop recurrence, even after curative resection. It is hypothesized that relapse may arise from dissemination of circulating tumor cells (CTCs). The present study evaluated the influence of CTCs detection on recurrence rate in surgically resected non-small cell lung cancer (NSCLC). Secondly, we investigated the association between CTCs and primary tumor ¹⁸F-fluorodeoxyglucose (FDG) uptake on PET scan.

Methods:
In this single-center prospective study, blood samples for CTCs analysis were obtained from 102 patients with previously untreated, stage I-IIIA NSCLC both before and one month after radical resection. CTCs were isolated using immunomagnetic techniques. CTCs presence was correlated with standardized uptake value (SUVmax) measured on preoperative FDG PET/TC. Recurrence and disease free survival (DFS) analysis was performed.

Results:
CTCs were detected in 39.2% of patients before surgery and in 27.5% one month after surgery. Most patients with CTCs at baseline (34 out of 40) showed a decrease in CTC count after surgery. CTC presence after surgery was significantly correlated with SUVmax on PET scan, pathological stage and with surgical approach. But only SUVmax on PET was an independent predictor of CTC presence after the operation in multivariate analysis (HR=3.71,95% CI 1.32-10.37, p=0.013). 36 patients (35.3%) experienced recurrence during a median follow-up period of 19 months. CTC presence after surgery was significantly associated with early recurrence (p=0.006) and with a shorter DFS, with a one year DFS rate of 52.1% compared to 79.1% for CTC negative group (log rank test p=0.005). In multivariate analysis CTC presence after surgery was associated with a shorter DFS, independently of disease staging.
Conclusion:
Detection of CTCs one month after radical resection might be a useful marker to predict early recurrence in stage I-III NSCLC. SUVmax value of the primary tumor on preoperative PET scan was associated with CTC presence one month after the operation.

Disclosure: No significant relationships.
Keywords: positron emission tomography, cancer treatment, recurrence, non-small cell lung cancer, circulating tumor cells
O-022

NODAL MANAGEMENT AND UPSTAGING OF DISEASE: INITIAL RESULTS FROM THE ITALIAN VATS LOBECTOMY REGISTRY.

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Thoracic Surgery and Lung Transplantation, ISMETT - UPMC, PALERMO, Italy

Objectives:
The authors report on behalf of the Italian VATS Group. An optimal strategy of lymph node retrieval during lung resection for non-small cell lung cancer (NSCLC) and a quantitative definition of complete lymph node dissection (CLD) and systematic sampling (SS) are still not clarified. In this study we evaluated the rates of nodal upstaging after CLD or SS from the cohort of patients of the Italian Registry of VATS lobectomies.

Methods:
Between 1/2014 and 10/2015, 1851 VATS lobectomies were included in the database. One thousand five hundred and eighty one cases with stage I or II NSCLC and a complete pre/post-operative record set were included in the analysis. All patients underwent a complete pre-operative workup with contrast CT-scan, PET and EBUS/EUS. One thousand five hundred and seven patients (95.3%) had a clinical pre-operative N0 disease and 74 (4.7%) had clinical N1 disease. One thousand and seventy one patients (74%) underwent CLD while 376 (26%) had SS.

Results:
In average, an overall higher number of resected nodes (#RN) was recorded in patients receiving CLD vs. SS (14.6 vs 10.7, p=0.0000), both more N1 nodes (6.7 vs. 5.4, p=0.0000) and N2 nodes (7.9 vs. 5.3, p=0.0000). N0 to N1 upstaging occurred in 102 cases (6.4%) while N0 to N2 upstaging in 89 cases (5.5%). On logistic regression, the #RN but not the type of lymph node dissection per se (CLD or SS) had a significant impact on N0 to N2 upstaging (p=0.003, OR=1.03). No correlation was found between the #RN and N0 to N1 upstaging (p=0.09, OR 1.01).

Conclusion:
During VATS lobectomy, CLD allows obtaining a higher #RN compared to SS. A higher #RN was correlated to a higher rate of N2 but not N1 upstaging, confirming a specific beneficial effect of CLD on ruling out unexpected N2 disease.

Disclosure: No significant relationships.
Keywords: VATS lobectomy, nodal upstaging, lymph node dissection, systematic sampling
THE CHANGES IN CIRCULATING TUMOR CELLS COUNTS IN PULMONARY VENOUS BLOOD AFTER SURGICAL MANIPULATION IS A PREDICTIVE MARKER OF POSTOPERATIVE DISTANT METASTASIS IN PRIMARY LUNG CANCER PATIENTS

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Objectives:
Circulating tumor cells (CTCs) are shed from the primary tumor and circulate peripheral blood through pulmonary vein (PV) in primary lung cancer patients. We previously presented a significant increase in CTC count of drainage PV blood (pvCTC-count) after surgical manipulation in patients with primary lung cancer. We assessed the correlation between the changes in pvCTC-count after surgical manipulation (ΔpvCTC) and tumor recurrence.

Methods:
A total of 30 consecutive peripheral-type of primary lung cancer patients who underwent lobectomy or bi-lobectomy through open thoracotomy were included. For each patients, 2.5ml of blood was drawn from lobar PV of the tumor site before and after surgical manipulation for lobectomy. The CTCs were evaluated quantitatively with CellSearch® system.

Results:
Median follow up period was 63.6 months (8-76.6). Tumor recurrence occurred in 11 patients (36.7%). Of these 11 patients, distant metastasis occurred in seven patients (23.3%), and only local recurrence in four patients (13.3%). The median ΔpvCTC was 61 cells/2.5 ml (range, 1-1851). In nine patients (30%), ΔpvCTC was more than 100 cells/2.5 ml. When a cut-off value of 100 cells/2.5 was employed in ΔpvCTC, the time to distant metastasis in high ΔpvCTC group (ΔpvCTC-count > 100cells/2.5 ml) was shorter than that in low ΔpvCTC group (ΔpvCTC-count ≤ 100 cells/2.5 ml) significantly (p<0.0129). In high ΔpvCTC group, all patients were ligated pulmonary artery prior to pulmonary vein. Neither any clinicopathological factor or any surgical procedure including the sequence of vessel interruption were significantly correlated with ΔpvCTC.
Conclusion:
ΔpvCTC is a predictive marker of postoperative distant metastasis in primary lung cancer patients. In case with increasing pvCTC-count more than 100 cells/2.5 ml after surgical manipulation, the time to distant metastasis was significantly shorter than the others.

Disclosure: No significant relationships.
Keywords: surgical manipulation, primary lung cancer, circulating tumor cell, distant metastasis
SURVIVAL ANALYSIS USING PHYSIQUE-ADJUSTED SIZE OF NON-SMALL CELL LUNG CANCER

Naoki Ozeki, T. Okasaka, K. Kawaguchi, T. Fukui, K. Fukumoto, S. Nakamura, S. Hakiri, K. Yokoi
Thoracic Surgery, Nagoya University Graduate School of Medicine, Nagoya, Japan

Objectives:
Regarding survival analysis of solid tumors, the differences of individual physique have not been well considered. We hypothesized, for example, that prognosis of a 150cm 55kg patient with a 2.5cm non-small cell lung cancer (NSCLC) is almost the same as that of a 180cm 66kg patient with a 3cm NSCLC, and investigated whether physique-adjusted size is superior to non-adjusted size in predicting prognosis.

Methods:
Between 2005 and 2012, 843 patients who underwent R0 resection of NSCLC were retrospectively reviewed, and overall survival (OS) was evaluated. Physique-adjusted size was defined as follows: x-adjusted size = tumor size × mean x / x (x = height, weight, body surface area [BSA], or body mass index [BMI]). Age, sex, and histology were adjusted in multivariate analysis.

Results:
The mean height, weight, BSA, and BMI were 160.7 cm, 57.6 kg, 1.60 m², and 22.2 kg/m², respectively. The five-year survival rates of the non-adjusted size group (from ≤2cm to >7cm) ranged from 88% to 59% (separation index, 1.935; p = 2.4×10⁻¹⁰); those of the height-adjusted size group ranged from 90% to 57% (separation index, 2.233; p = 0.8×10⁻¹⁰); those of the weight-adjusted size group ranged from 91% to 53% (separation index, 2.151; p = 1.2×10⁻¹⁰); those of the BSA-adjusted size group ranged from 90% to 58% (separation index, 2.024; p = 89.7×10⁻¹⁰); those of the BMI-adjusted size group ranged from 91% to 52% (separation index, 2.168; p = 0.5×10⁻¹⁰). In the multivariate Cox regression models using size as continuous variables, each physique-adjusted size seemed to be more associated with the OS than the non-adjusted size (hazard ratios, 1.207-1.231 vs. 1.211; p = 0.5-6.9×10⁻⁷ vs. 15.7×10⁻⁷).
<table>
<thead>
<tr>
<th>Size group</th>
<th>Category (cm)</th>
<th>n</th>
<th>5-year survival rate (%)</th>
<th>HR</th>
<th>95% CI</th>
<th>Separation index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-adjusted</td>
<td>≤2</td>
<td>268</td>
<td>88</td>
<td>1</td>
<td></td>
<td>1.935</td>
</tr>
<tr>
<td></td>
<td>2-3</td>
<td>254</td>
<td>80</td>
<td>1.89</td>
<td>1.20-2.98</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-5</td>
<td>233</td>
<td>68</td>
<td>2.99</td>
<td>1.94-4.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5-7</td>
<td>60</td>
<td>61</td>
<td>5.01</td>
<td>2.91-8.61</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;7</td>
<td>28</td>
<td>59</td>
<td>4.66</td>
<td>2.27-9.57</td>
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<tr>
<td>Height-adjusted</td>
<td>≤2</td>
<td>249</td>
<td>90</td>
<td>1</td>
<td></td>
<td>2.233</td>
</tr>
<tr>
<td></td>
<td>2-3</td>
<td>267</td>
<td>79</td>
<td>2.32</td>
<td>1.43-3.78</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-5</td>
<td>230</td>
<td>69</td>
<td>3.47</td>
<td>2.17-5.56</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5-7</td>
<td>68</td>
<td>64</td>
<td>5.45</td>
<td>3.11-9.57</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;7</td>
<td>29</td>
<td>57</td>
<td>5.84</td>
<td>2.85-12.01</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion:**
The highest separation index for the OS was found in the height-adjusted size model. Considering the differences of physique can be helpful in understanding of cancer prognosis.

**Disclosure:** No significant relationships.

**Keywords:** physique, height, prognosis, NSCLC, lung cancer
POOR PREOPERATIVE PATIENT-REPORTED QUALITY OF LIFE IS ASSOCIATED WITH COMPLICATIONS FOLLOWING PULMONARY LOBECTOMY FOR LUNG CANCER

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Objectives:
Patient-reported quality of life (QOL) has been shown to correlate poorly with functional parameters commonly used to assess fitness before lung resection. The objective of this analysis is to assess whether QOL is associated with cardiopulmonary complications following pulmonary lobectomy.

Methods:
Retrospective analysis of 201 consecutive patients submitted to pulmonary lobectomy (168 by VATS) for lung cancer (September 2014-October 2015). QOL was assessed by the EORTC-QLQC30 questionnaire within two weeks before operation, assessing 5 function and 9 symptom scales and a global health status scale. The individual QOL scales were tested for a possible association with cardiopulmonary complications along with objective baseline and surgical parameters by univariable and multivariable analyses.

Results:
Forty three patients (21%) developed cardiopulmonary complications within 30 days from operation, four of them died in-hospital or within 30 days (2%). Univariable analysis showed that reduced Global Health status (GHS) (p=0.02), reduced Physical Functioning (p=0.07) and appetite loss (p=0.06) were significantly associated with postoperative complications. No other QOL scales were associated with outcome. Objective variables significantly associated with negative outcome after univariable analysis were: FEV1 (p=0.02), DLCO (p=0.01), performance score (p=0.02) and previous history of cerebrovascular disease (p=0.05). Stepwise logistic regression analysis showed that the only factor significantly associated with cardiopulmonary complications (p=0.009) was patient-reported GHS, whereas objective parameters (i.e. FEV1, DLCO) were not. The best cutoff value for GHS to discriminate patients with complications was 50 (c-index 0.68). Twenty three patients had a preoperative GHS<50 and 11 (48%) of them developed complications. Among the 178 patients with GHS>50, 33 (18%) developed complications (p=0.001).
Conclusion:
The subjective perception of a poor global health status is associated with postoperative cardiopulmonary morbidity after pulmonary lobectomy. This finding warrants the adoption of a holistic approach during the surgical shared-decision-making process. Patient perceptions and values should be included in the risk stratification process to tailor cancer treatment.

Disclosure: No significant relationships.

Keywords: lung cancer, patient reported outcomes, postoperative complications, quality of life
PROGNOSTIC IMPLICATION OF MICROSCOPIC VESSEL INVASION AND ITS RELATION WITH T-SIZE CATEGORIES OF 8TH UICC CLASSIFICATION IN NON-SMALL CELL LUNG CANCER

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²Department of Thoracic Surgery, The University of Tokyo Graduate School of Medicine, Tokyo, Japan

Objectives:
We evaluated the significance of blood vessel invasion (BVI) and lymphatic vessel invasion (LVI) in a population of surgically managed patients with non-small cell lung cancer (NSCLC), along with an analysis of the effect of the combination of LVI/BVI and tumor size for the T-size categories according to the coming 8th UICC classification of lung cancer.

Methods:
A retrospective analysis of surgically managed 986 patients (pT1-4N0M0) at the University of Tokyo Hospital, Japan between Jan 1979 and Oct 2010 was conducted. LVI and BVI were ascertained using histopathological and immunohistochemical techniques. Survival analysis was performed based on the presence of LVI and/or BVI, and no LVI/BVI. Age, gender, histology, smoking status, and the presence or absence of LVI/BVI were used for multivariate analysis.

Results:
LVI/BVI was observed in 383 of 986 patients (39%), including six out of 121 patients (5%) with T1a, 88 of 321 (27%) with T1b, 106 of 247 (43%) with T1c, 76 of 137 (55%) with T2a, 54 of 77 (70%) with T2b, 40 of 60 (67%) with T3, and 12 of 23 (52%) with T4, respectively. Prevalence of LVI/BVI showed significant differences in different T category (p<0.001, Fig 1). In each T category, survival rates of patients with LVI/BVI were significantly lower than the corresponding LVI/BVI negative patients. The survival rates of T1b (63.6%) and T1c (62.3%) with LVI/BVI patients were equally poor when compared to those of T2-T4 without LVI/BVI patients. In a multivariate survival analysis, LVI/BVI was an indicator of poor survival (p<0.001).
Conclusion:
The presence of LVI and/or BVI in pT1-4N0M0 population appears to be independent poor prognostic factor in surgically managed NSCLC. Those with the presence of LVI and/or BVI may require closer follow-up and a more aggressive treatment strategy after surgery, even if they were in the early T categories.

Disclosure: No significant relationships.

Keywords: BVI, LVI, prognostic, 8th UICC classification, lung cancer
O-027

COMPARISON OF CLINICAL OUTCOMES BETWEEN SUBLOBAR RESECTION AND LOBECTOMIES IN EARLY STAGE LUNG ADENOCARCINOMA: A PROPENSITY SCORE MATCHING ANALYSIS

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Thoracic and Cardiovascular Surgery, Seoul National University Bundang Hospital, Seongnam-Si, Republic of Korea

Objectives:
Adoption of limited resections for the definite treatment of early stage lung cancer still remains controversial. This study aims to investigate the clinical outcomes of sublobar resections and compare with those of lobectomies in early stage lung adenocarcinoma patients.

Methods:
We reviewed medical records of 871 patients who underwent lobectomies or sublobar resections for their stage I lung adenocarcinomas. Patients with sublobar resections were 235 (27.0%) and lobectomies were 636 (73.0%). After propensity score matching, there were 219 patients in each group. Prognostic risk factors for recurrence were analyzed, and survival analysis was performed.

Results:
The mean age of enrolled patients was 61.9 (±10.38, ranging 21 to 91), mean follow-up periods were 50.8 (±27.57, ranging 6.1 to 128.9) months and mean tumor size were 15.2 (±6.49, ranging 3.0 to 45.0) mm. During the follow-up periods, 29 patients had died (6.6%) and postoperative 30-day mortality was 0.0%. Overall recurrence rates were 9.4% (41 patients), and those with sublobar resections were 9.1% (20 patients) and with lobectomies were 9.6% (21 patients). The rates and sites for recurrence between two groups showed no statistical differences (p=0.500, and 0.401 respectively). Overall five-year survival and recurrence-free survival of sublobar resections were 90.6 and 89.5%, respectively. Those of lobectomies were 91.9 and 88.3%, respectively. No significant differences were found in overall five-year survival and recurrence-free survival rates between two groups (p=0.636 and p=0.975 respectively).

Conclusion:
The prognosis of early stage lung adenocarcinomas which underwent sublobar resections are not inferior to that of lobectomies in carefully selected cases. Further investigations including randomized controlled trials should be needed to identify the equivalent oncologic efficacy of sublobar resections.

Disclosure: No significant relationships.
Keywords: lung adenocarcinoma, surgery, survival analysis
O-028

HEALING OF THE BRONCHIAL ANASTOMOSIS AND COMPLICATIONS AFTER SLEEVE LOBECTOMY IN DEPENDENCE ON THE INTERVAL BETWEEN NEOADJUVANT RADIOCHEMOTHERAPY AND SURGERY.

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Lungenklinik, Kliniken der Stadt Koeln, Mehrheim, Cologne, Germany

Objectives:
A pneumonectomy should be avoided after radiochemotherapy by using sleeve lobectomy for radical surgery in stage III lung cancer. The negative influence of radiochemotherapy on wound healing is well known. There is however little data on what should be the optimal interval between radiochemotherapy and surgery. For that reason we investigate the relationship between bronchial healing and interval until surgery after radiochemotherapy.

Methods:
Analysis of 485 patient cases after sleeve lobectomy, who were operated on between 2006 and 2014. Eighty-one received a neoadjuvant radiochemotherapy up to a dose of 66Gy. All patients were assessed bronchoscopically on day seven after surgery and the anastomotic healing was classified using a standardized score. The grading begins at 1-3 (normal finding, focal or circular mucosal necrosis) and ends with necrosis of the bronchial wall or insufficiency (grade 4+5). Furthermore the postoperative complications and the 30-day mortality were analysed.

Results:
The patients were divided into three groups: surgery within six weeks, more than six weeks or without pretreatment.

<table>
<thead>
<tr>
<th>n = 485</th>
<th>&lt;42 days after RTx (n = 41)</th>
<th>≥42 days after RTx (n = 40)</th>
<th>no pretreatment (n=366)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male : Female</td>
<td>28:13</td>
<td>26:14</td>
<td>241:125</td>
</tr>
<tr>
<td>Age</td>
<td>44 – 76</td>
<td>43 – 77</td>
<td>41 - 78</td>
</tr>
<tr>
<td>Bronchoscopy (grade 1-3)</td>
<td>33 *</td>
<td>37 *</td>
<td>343*</td>
</tr>
<tr>
<td>Bronchoscopy (grade 4+5)</td>
<td>8 (19,5%) *</td>
<td>3 (7.5%) *</td>
<td>23 (6,2 %)*</td>
</tr>
<tr>
<td>Complications</td>
<td>28 (34,56)%</td>
<td>13 (16,04)%</td>
<td>124(33,88%)</td>
</tr>
<tr>
<td>30-day mortality</td>
<td>5</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

*p < 0,05
Conclusion:
In contrast to the general recommendation to perform the lung resection four weeks after radiochemotherapy, our data suggest an interval of 6-8 weeks.

Disclosure: No significant relationships.
Keywords: bronchial, anastomosis, sleeve, lobectomy, neoadjuvant, radiochemotherapy
MONDAY, 30 MAY 2016  
13:45 - 15:30  
ESTS CHEST WALL WORKING GROUP SESSION  
F-029  

HIGHER RISK OF SERIOUS PERIOPERATIVE COMPLICATIONS IN DOUBLE NUSS BAR REMOVALS

Zeynep Bilgi¹, N.O. Ermerak², Ç. Çetinkaya¹, T. Laçın¹, M. Yüksel¹  
¹Thoracic Surgery, Marmara University Faculty of Medicine, İstanbul, Turkey,  
²Department of Thoracic Surgery, Kilis State Hospital, Kilis, Turkey

Objectives:  
Nuss procedure requires a bar removal operation two to three years after the initial correction. While bar removal is generally believed to be safe, perioperative complications including major bleeding can occur incidentally. In this study, we are presenting potential risk factors for perioperative complications for Nuss bar removal.

Methods:  
All Nuss bar removal cases done since April 2007 were recorded in a prospective database. Data on amount of blood loss, diagnostic interventions, operative management, postoperative course were gathered.

Results:  
Out of a total 246 (162 single, 80 double, 4 triple bar) cases, 43 patients (17,5%) experienced perioperative complications. 5 patients underwent secondary postoperative interventions, one patient required same session emergency video assisted thoracic surgery (VATS) due to major bleeding. Patients having complications were significantly older from non-complicated patients (20,5 vs 17,1, p<0,001). Double bar removals were significantly more likely to undergo perioperative complications (p=0,01) and complications requiring secondary interventions (p<0,01).

Conclusion:  
Major complications after Nuss bar removal are not exceedingly rare. While double bar removals in our cohort showed increased tendency for relatively major complications, reasons for those are poorly understood. Immediate management of those complications may require multidisciplinary care. Multi central pooling of cases is needed for better risk stratification. Table 1: Patient characteristics and complication breakdown
<table>
<thead>
<tr>
<th>Complication Type</th>
<th>Single Bar Subcutaneous drain: 16 Pneumothorax: 2 Pleural effusion: 1 Chest tube insertion: 1</th>
<th>Double Bars Subcutaneous drain: 13 Pneumothorax: 1 Pleural effusion: 1 Chest tube insertion: 5 Major intraoperative bleeding: 3**</th>
<th>p&lt;0,001***</th>
</tr>
</thead>
</table>

*One patient with triple bars had a subcutaneous drain ** One major intraoperative bleeding patient underwent a chest tube insertion on the floor. *** For undergoing secondary interventions (Transesophageal ECHO, chest tube etc.)

**Disclosure:** No significant relationships.

**Keywords:** Nuss procedure, complications, patient safety, bar removal
OPERATIVE STABILISATION OF CHEST WALL TRAUMA: SINGLE CENTER REPORT OF INITIAL MANAGEMENT AND LONG-TERM OUTCOME

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¹Trauma Surgery, Kantonsspital Graubuenden, Chur, Switzerland, ²Thoracic Surgery, Kantonsspital Graubuenden, Chur, Switzerland

Objectives:
Conservative treatment of even severe thoracic trauma including flail chest was traditionally the standard of care. Recently we reported possible benefits of surgical chest wall stabilization in accordance with other groups. The aim of this study was to critically review our indications and results of internal fixation of rib fractures after blunt thoracic trauma also in the longterm course.

Methods:
We analysed the prospectively collected data of a consecutive series of patients having had internal rib fracture fixation at our institution from 8/2009 until 12/2014 and we retrospectively studied the late outcome by clinical examination or personal interview.

Results:
From 1398 patients with a thoracic trauma treated at our institution during that time period 235 sustained a severe thoracic trauma (AIS ≥3). In 23 of these patients 102 internal rib fixation were performed using the MatrixRIB® system. The mean age of these patients with chest wall stabilization was 49.3 years with a mean ISS of 22.9. Operation time was 115±51 minutes. From 18 local resident patients follow up could be obtained after an average time period of 27.6 (12-68) months. All of these patients were free of pain and had no limitations in their daily routine. Of all implants, five splint tips perforated the rib in the postoperative course but all patients remained clinically asymptomatic. Plate osteosynthesis showed no loss of reduction in the postoperative course. No case of hardware prominence, wound infection or non-union occurred.

Conclusion:
In our carefully selected thoracic trauma patients, locked plate rib Fixation seems to be safe and beneficial not only in the early posttraumatic course but also after months and years patients remain asymptomatic and complete recovery is the rule.

Disclosure: No significant relationships.
Keywords: thoracic trauma, internal rib fixation, flail chest
EVALUATION OF CHEST WALL MORPHOLOGY BY CHEST COMPUTER TOMOGRAPHY AFTER MINIMALLY INVASIVE REPAIR OF PECTUS EXCAVATUM

Department of Thoracic and Cardiovascular Surgery, Seoul National University Hospital, Seoul, Republic of Korea

Objectives:
Minimally invasive repair of pectus excavatum (MIPRE) using Nuss technique has been widely accepted as an effective technique for correction of pectus excavatum (PE). However, assessment of postoperative morphological outcome has been performed subjectively based on external appearance. The aim of this study was to assess effects of MIRPE on chest wall morphology by comparing chest CT indices.

Methods:
A total of 117 patients who underwent chest CT scan before MIRPE and after bar removal were included. To assess severities of PE, we measured 8 CT indices as follow; degree of depression (pectus index [PI], depression index [DI]), degree of asymmetry/unbalance (asymmetry index [AI], eccentricity index [EI], sternal rotation angle [SA]), degree of flatness (angle of Louis [AL] and flatness index [FI]) and degree of correction (correction index [CI]). Changes of CT indices were analyzed and subgroup analysis was performed: Group-1 (n=58, age≤7) and Group-2 (n=59, age>7).

Results:
Median age of the patients was 7.2 year-old (range:2.1-30.1). Male-to-female ratio was 4.5(96/21). Median time interval to bar removal was 25.5 months (range:9.4-43.0). Degrees of chest wall depression and flatness were significantly improved after MIRPE: PI(P<0.001), DI(P<0.001), FI(P<0.001), and LA(P<0.001). However, asymmetry/unbalance indices did not change significantly except SA: AI (P=0.124), EI(P=0.292), and SA(P<0.001). In subgroup analysis (table), prior to MIRPE, Group-1 showed more severe depression and Group-2 showed more severe eccentricity. After MIRPE, both groups showed significant improvement of depression; however, failed to improve asymmetry and unbalance. Failure to improve flatness was also identified in Group-2 although AL was increased significantly. Group-1 had better degree of depression, flatness and asymmetry/unbalance than Group-2 after MIRPE.
Comparison of CT indices between pre- and post- MIRPE by age group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group1-Pre</th>
<th>Group1-Post</th>
<th>P-value</th>
<th>Group2-Pre</th>
<th>Group2-Post</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td></td>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>PI</td>
<td>4.57±1.26</td>
<td>&lt;0.001</td>
<td>4.29±1.47</td>
<td>3.23±0.73</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>DI</td>
<td>2.65±0.64</td>
<td>&lt;0.001</td>
<td>2.44±0.76</td>
<td>1.86±0.33</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Asymmetry/Unbalance</td>
<td>AI</td>
<td>0.95±0.04</td>
<td>0.453</td>
<td>0.94±0.05</td>
<td>0.93±0.05</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>EI</td>
<td>1.16±0.15</td>
<td>0.977</td>
<td>1.43±0.34</td>
<td>1.21±0.28</td>
<td>0.121</td>
</tr>
<tr>
<td></td>
<td>SA</td>
<td>6.28±9.28</td>
<td>0.010</td>
<td>10.07±9.88</td>
<td>6.51±7.02</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Flatness</td>
<td>FI</td>
<td>1.72±0.16</td>
<td>&lt;0.001</td>
<td>1.75±0.15</td>
<td>1.73±0.17</td>
<td>0.156</td>
</tr>
<tr>
<td></td>
<td>AL</td>
<td>166.34±7.56</td>
<td>&lt;0.001</td>
<td>169.56±5.93</td>
<td>171.66±5.98</td>
<td>0.002</td>
</tr>
<tr>
<td>Correction</td>
<td>CI</td>
<td>32.22±11.24</td>
<td>&lt;0.001</td>
<td>28.65±10.40</td>
<td>11.21±9.06</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

**Conclusion:**
Depression of chest wall can be corrected using MIRPE. However, correction of asymmetry and unbalance was not satisfactory regardless of age group. Furthermore, flatness of chest wall was difficult to be corrected in elderly patients. Those findings suggest that severe asymmetric or unbalanced PE may require additional technique to MIRPE to obtain better morphologic outcome.

**Disclosure:** No significant relationships.

**Keywords:** minimally invasive repair, pectus excavatum, computed tomography
F-032

ASSESSMENT OF MORPHOLOGICAL PARTICULARITIES OF BONE CALLOUS FORMATION IN CASE OF USE DIFFERENT RIB FRACTURE STABILIZATION METHODS IN PATIENT WITH CRANIOThorACIC TRAUMA

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Surgery №2, Dnepropetrovsk Medical Academy of Ministry of Health of Ukraine, Dnepropetrovsk, Ukraine

Objectives: To compare morphological particularities of bone callous formation in zone of rib fracture, depending on the way of chest stabilization, for victims with thoracic trauma, combined with brain injury.

Methods: We have analysed results of pathohistological investigation of zone of rib fracture in 13 patients (2010-2014) with combined thoracic and brain trauma, along with 3rd or 4th degree of rib fracture according to Oxford classification, who died in term from 7 till 14 days due to multiple organ failure. Five of these patients (I group) underwent surgical chest stabilizations by means our own extrapleural method of osteosynthesis. For other 8 injured persons (II group) internal stabilization by means artificial lung ventilation was used. Slices from distal as well as proximal part of at least 2 ribs were taken for each of victims; subsequently quantity of specimens was equal to 20 and 32 in I and II group respectively. All of them were dyed by Van Gieson’s stain. Such factors as osteoid tissue organisation in periostium, endostium and medulla, as well as osteoblasts and collagen fibers formation, were taken into account concerning evaluation of rib fracture consolidation degree.

Results: In the I group osteoid tissue had been formed in periosteum in 80.0% of specimen, in endostium in 70.0% and in medulla in 85.0% of slices, whereas in the II group it had been formed just only in 18.8% (p= 0.001), 28.1% (p=0.0031) and 12.5 % (p<0.001) of cases respectively. Osteoblasts were presented more frequently in the I group (60.0%) than in the II (15.6%) one (p=0.0009). Collagen fibers were observed in 45.0% and in 12.5 % of cases in I and II group respectively (p=0.00846)

Conclusion: Surgical stabilization lead to considerably more appropriate morphological results in comparison with internal stabilization by means of artificial lung ventilation

Disclosure: No significant relationships.
Keywords: extrapleural stabilization, craniothoracic trauma, rib fracture
MONDAY, 30 MAY 2016
15:30 - 17:00
SESSION V: YOUNG INVESTIGATOR AWARD
F-033

A RANDOMISED TRIAL OF ANALGESIA IN VATS SURGERY: LOCAL ANAESTHETIC DELIVERY BY WOUND INFILTRATION CATHETER COMPARED WITH TOPICAL TRANS-DERMAL PATCH DELIVERY

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²Thoracic Surgery, St Vincent’s University Hospital, Dublin, Ireland

Objectives:
The optimal post-operative analgesia regime in minimally invasive thoracic surgery is a continuing quest. Local anaesthetic delivery to the wounds aids pain relief, has a favourable side effect profile and is a part of an opioid sparing strategy. However intraoperative delivery is limited by the drug half life. Therefore for extended postoperative pain relief with local anaesthetic agents, additional delivery mechanisms need to be explored. Here we compare a continuous wound infusion catheter delivery with trans-dermal patch application in the first 48 hours after surgery

Methods:
Patients undergoing minimally invasive VATS surgery were recruited. Randomization was with a blind envelope method. The camera port site is recycled as a drain site in all cases. Group A was allocated to the placement of a wound infiltration catheter (bupivacaine) to a subpleural level under direct camera vision, in the intercostal level of the camera / drain entry site. Group B instead had a lidocaine 5% patch placed proximally to the drain site. Patients were managed with a standardized post-operative pain strategy otherwise, and opioids delivered by an intravenous PCA method. Pain scores and opioid usage were collected. Additional opioid usage was also noted and morphine equivalence added to the total.

Results:
Fifty five patients were available for analysis. There were no adverse effects with either agent. Demography across the groups was homogenous. The lidocaine patch was assessed as more expensive on cost analysis. There was no significant difference between the groups in regard to opioid usage or subjected pain scores.
Conclusion:
The two methods under test provided similar pain relief. The trans-dermal patch provides less of an obstacle to patient mobility post-operatively but is a more costly method than a wound catheter. Our recommendation is to use the wound infiltration catheter based on cost effectiveness.

Disclosure: No significant relationships.

Keywords: wound infiltration catheter, thoracic analgesia, topical lidocaine patch
FEASIBILITY OF RAPID DIAGNOSIS BY MALDI - TOF MASS SPECTROMETRY FOR PATIENTS WITH NON-SMALL CELL LUNG CANCER

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Objectives:
A research protocol was established in order to study the feasibility of the rapid diagnosis of non-small cell lung cancer (NSCLC) by MALDI Mass Spectrometry using a simple method of identification applied to specimen from lung and lymph nodes obtained by surgery, mediastinoscopy and ultrasound-guided bronchoscopy (EBUS).

Methods:
Surgical specimen and mediastinoscopy samples were freshly homogenized by the technique of Fast PREP® -24, diluted 1/160°, and analyzed by a spectrometer Microflex LT™ analyzer (Bruker Daltonics™ Germany). EBUS samples were frozen at -80°C for the preservation, then thawed, centrifuged; homogenized by the technique of Fast PREP® -24 and analyzed by the spectrometer. Using a MALDI BioyperTM Software, each spectrum was identified by homology based on the search for similar peaks with Cancer or Not Cancer sample’s spectra from a preexisting database with an associated score ([0-1.6] : unreliable; [1.7-1.9] : possible; [2-3 : reliable]. The surgical and mediastinoscopy samples were identified by a 307 fresh samples database and the EBUS samples by a 290 frozen samples database.

Results:
Between March and August 2015, 95 samples were collected: 63 of surgical specimen, 12 by mediastinoscopy and 20 by EBUS. The median identification score was 2.42 [2.06 to 2.68], 2.23 [1.98 to 2.52], and 2,196 [0 to 2.679] respectively. All of the spectra were identified for fresh solid samples and only 80% for the EBUS samples. Classification by BiotyperTM as Cancer or not Cancer gets a sensitivity of 86.4% and a specificity of 100% for samples from surgical specimen, a sensitivity of 100% and a specificity of 77, 8% for samples by mediastinoscopy and a sensitivity of 50% and a specificity of 100% for samples by EBUS.

Conclusion:
Maldi-Tof Mass spectrometry is a feasible rapid diagnostic tool in real conditions for the rapid diagnosis of NSCLC.

Disclosure: No significant relationships.
Keywords: lung cancer, proteomic, rapid diagnosis
F-035

RIB PRODUCTION WITH NYLON 680 CO-POLYMER BY 3D PRINTING AND IMPLANTATION INTO THE PIGS AFTER CHEST WALL RESECTION

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⁵Faculty of Medicine, Marmara University, Istanbul, Turkey

Objectives:
3D printing gained popularity among all fields of science in recent years. New research about utilization of 3D printing in the medical field in terms of medical devices and implants for the body was published recently. We tried to adapt this technology into thoracic surgery by implanting 3D produced ribs after chest wall resection.

Methods:
We performed CT scan for two swines. We measured the area that we plan to resect on chest wall. We used these data for printing custom-made rib for replacing the resected area. We produced ribs with Nylon 680 Co-Polymer/ FDA approved material (Taulman3D,Saint Peters , MO, USA) by using 3D Printer. (Afinia H480,Chanhassen, MO, USA). We operated swines and resected ribs from each of them. Then, we replaced those resected areas with 3D printed ribs.

Results:
One of the swines passed away due to myocardial infarction during waking up from anesthesia. We followed up the other swine for 45 days. Then, we sacrificed the animal and resected the operated part for histopathological evaluation. Histopathologic evaluation reveals moderate chronic inflammation with a few giant cells containing pigmented foreign bodies.

Conclusion:
Although we need more researches, it is a big step for adapting 3D printing into thoracic surgery. We can use 3D printed implants in surgical interventions. We can practically produce custom-made implants by ourselves at low cost in shorter time.

Disclosure: No significant relationships.
Keywords: chest wall, 3D printing, Nylon 680 Co-Polymer, thoracic surgery
F-036

EGFR MUTATIONS ARE LINKED TO SKIP N2 LYMPH NODE METASTASIS IN RESECTED NON-SMALL CELL LUNG CANCER ADENOCARCINOMAS

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Objectives:
Skip-N2 metastases (e.g. N2 lymph node metastases without N1) impact on survival in surgically resected non-small lung cancer remains an intriguing and rarely investigated topic. Our study aimed to elucidate: 1. Skip-N2 influence on overall survival (OS) and disease free survival (DFS) in resected lung adenocarcinoma patients, 2. Its link with EGFR and KRAS mutations.

Methods:
A retrospective analysis of 279 consecutive lung pN2 adenocarcinoma patients, operated in two institutions between 2003 and 2013, was conducted. OS and DFS were calculated using Kaplan Maier. Crude and multivariate-adjusted comparisons by skip-N2 for OS and DFS was performed using Cox method with shared frailty (accounting for the within-center correlation). Associations between skip-N2 metastasis, clinical-pathological characteristics and EGFR/KRAS mutations were investigated using Chi-square, Fisher’s exact test and Cramer’s V, when appropriate.

Results:
Mean age at time of surgery was 63 years-old (+/- 12, Table1), median follow-up time was 36 months (min 3; max 101). Skip-N2 was observed in 54 patients (19%). EGFR mutations were observed in 38 patients (14%), while KRAS mutations in 86 patients (31%). Patients with skip-N2 metastasis were predominantly non-smokers (P= 0.001), underwent segmentectomy (P= 0.004), and were not submitted to adjuvant therapy (P= 0.022). Multivariate-adjusted model showed a skip N2 protective effect on OS (OR: 0.5, 95% CI: 0.285 – 0.875, P=0.015) but not on DFS (OR: 0.8, 95% CI: 0.428 – 1.454, P=0.45). Moreover, there was a correlation between EGFR mutations and skip-N2 (Cramer’s V: 0.25, P<0.001). Indeed, EGFR mutations were significantly more frequent in skip-N2 tumors (33%) compared to non-skip (10%), P<0.001. No correlation between skip-N2 and KRAS mutations was observed (Cramer’s V: 0.05, P=0.46).
<table>
<thead>
<tr>
<th></th>
<th>Total N2</th>
<th>Skip N2</th>
<th>Not Skip N2</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>279</td>
<td>54</td>
<td>225</td>
<td>81%</td>
</tr>
<tr>
<td>Age (years) (mean, SD)</td>
<td>63</td>
<td>12</td>
<td>62</td>
<td>14</td>
</tr>
<tr>
<td>Gender (male)</td>
<td>168</td>
<td>60%</td>
<td>27</td>
<td>50%</td>
</tr>
<tr>
<td>Smoke (Ever - yes)</td>
<td>205</td>
<td>73%</td>
<td>28</td>
<td>52%</td>
</tr>
<tr>
<td>pT Stage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>T1</strong></td>
<td>73</td>
<td>26%</td>
<td>14</td>
<td>26%</td>
</tr>
<tr>
<td><strong>T2</strong></td>
<td>136</td>
<td>49%</td>
<td>22</td>
<td>41%</td>
</tr>
<tr>
<td><strong>T3</strong></td>
<td>49</td>
<td>18%</td>
<td>14</td>
<td>26%</td>
</tr>
<tr>
<td><strong>T4</strong></td>
<td>21</td>
<td>8%</td>
<td>4</td>
<td>7%</td>
</tr>
<tr>
<td>Vascular Invasion (yes)</td>
<td>148</td>
<td>53%</td>
<td>33</td>
<td>61%</td>
</tr>
<tr>
<td>R status (R1-2)</td>
<td>14</td>
<td>5%</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>Surgery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bilobectomy</td>
<td>13</td>
<td>5%</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Lobectomy</td>
<td>213</td>
<td>76%</td>
<td>38</td>
<td>70%</td>
</tr>
<tr>
<td>Pneumonectomy</td>
<td>31</td>
<td>11%</td>
<td>4</td>
<td>7%</td>
</tr>
<tr>
<td>Wedge/Segmentectomy</td>
<td>22</td>
<td>8%</td>
<td>11</td>
<td>20%</td>
</tr>
<tr>
<td>Preoperative treatment (yes) (n= 267)</td>
<td>132</td>
<td>49%</td>
<td>25</td>
<td>46%</td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>106</td>
<td>40%</td>
<td>15</td>
<td>60%</td>
</tr>
<tr>
<td>Radiotherapy</td>
<td>21</td>
<td>8%</td>
<td>8</td>
<td>32%</td>
</tr>
<tr>
<td>Chemo+Radiotherapy</td>
<td>5</td>
<td>2%</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>Postoperative treatment (yes) (n= 267)</td>
<td>231</td>
<td>87%</td>
<td>38</td>
<td>70%</td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>153</td>
<td>57%</td>
<td>23</td>
<td>61%</td>
</tr>
<tr>
<td>Radiotherapy</td>
<td>14</td>
<td>5%</td>
<td>5</td>
<td>13%</td>
</tr>
<tr>
<td>Chemo+Radiotherapy</td>
<td>64</td>
<td>24%</td>
<td>10</td>
<td>26%</td>
</tr>
<tr>
<td>EGFR (Mutate) (n= 261)</td>
<td>38</td>
<td>14%</td>
<td>16</td>
<td>33%</td>
</tr>
<tr>
<td>exon 19</td>
<td>18</td>
<td>47%</td>
<td>6</td>
<td>38%</td>
</tr>
<tr>
<td>exon 19+20</td>
<td>1</td>
<td>3%</td>
<td>1</td>
<td>6%</td>
</tr>
<tr>
<td>exon 20</td>
<td>3</td>
<td>8%</td>
<td>3</td>
<td>19%</td>
</tr>
<tr>
<td>exon 21</td>
<td>16</td>
<td>42%</td>
<td>6</td>
<td>38%</td>
</tr>
<tr>
<td>Kras (Mutate) (n= 261)</td>
<td>86</td>
<td>31%</td>
<td>18</td>
<td>38%</td>
</tr>
<tr>
<td>G12A</td>
<td>3</td>
<td>3%</td>
<td>2</td>
<td>11%</td>
</tr>
<tr>
<td>G12C</td>
<td>65</td>
<td>76%</td>
<td>13</td>
<td>72%</td>
</tr>
<tr>
<td>G12D</td>
<td>4</td>
<td>5%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>G12S</td>
<td>1</td>
<td>1%</td>
<td>1</td>
<td>6%</td>
</tr>
<tr>
<td>G12V</td>
<td>6</td>
<td>7%</td>
<td>1</td>
<td>6%</td>
</tr>
<tr>
<td>G13C</td>
<td>4</td>
<td>5%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>G13D</td>
<td>3</td>
<td>3%</td>
<td>1</td>
<td>6%</td>
</tr>
</tbody>
</table>
Conclusion:
In our series, lung adenocarcinoma skip-N2 metastases showed a better prognosis. Presence of EGFR mutations could have significance in the specific anatomic pattern of lymphatic metastases in skip-N2 tumors.

Disclosure: No significant relationships.
Keywords: lung adenocarcinoma, lymph node, EGFR, KRAS, Skip N2 metastasis
18-F FDG PET/CT SCAN IN SOLID-TYPE STAGE-I PULMONARY ADENOCARCINOMAS: WHAT CAUSES FALSE-NEGATIVE CASES?

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²Department of Infrastructure Research And Statistics, IRCCS-Arcispedale Santa Maria Nuova, Reggio Emilia, Italy,
³Unit of Nuclear Medicine, IRCCS-Arcispedale Santa Maria Nuova, Reggio Emilia, Italy,
⁴Unit of Pathology, IRCCS-Arcispedale Santa Maria Nuova, Reggio Emilia, Italy,
⁵Unit of Pulmonology, IRCCS-Arcispedale Santa Maria Nuova, Reggio Emilia, Italy

Objectives:
False-negative FDG uptake can be divided into those cases related to technological limitations of PET and others related to inherent properties of neoplasms. We aim to clarify possible factors causing false-negative PET results in solid-type pulmonary adenocarcinomas (PA).

Methods:
From 01/2007 to 12/2014, among 255 Stage-I NSCLCs we retrospectively review PET/CT-records, clinical information, preoperative thin-section CT-images, and pathological features (classified by the IASLC/ATS/ERS subtyping criteria) of 94 consecutive solid-type Stage-I PA undergone surgical resection at Our Institution. Univariate and multivariate logistic analysis were used to identify and weigh the independent predictors of PET-findings: body weight, blood glucose level, tumor-size, and histological classification.

Results:
There were 58 males and 36 females (mean age= 68.7 yrs, range 42-85). Seventeen lesions (18.1%) were judged as PET-negative and 77 lesions (81.9%) as PET-positive. Overall, mean SUVmax was 8.0 (range 0-35) with higher SUVmax-values (p<0.001) in PA>2cm (mean SUVmax=10.6) than PA<2cm (mean SUVmax=4.8). PET false-negative (FN) results were also differently distributed (27.9% in PA <2cm vs 9.8% in PA>2 cm, p=0.023).

When clustering the PA in two histological classes (Class-A [“colloid/mucinous/lepidic”] vs Class-B [“micropapillary/solid/acinar/papillary”]), the radiometabolic patterns were significantly different [mean SUVmax 3.8 in Class-A vs 9.9 in Class-B, p<0.001], as reported in Figure 1. Similarly, a different distribution of PET FN-cases was observed (38.7% FN in Class-A vs 7.9% FN in Class-B, p<0.001). Table 1 shows the results of multivariate logistic analysis. Both the tumor-size (cut-off=2cm) and IASLC/ATS/ERS aggregated clusters were clinically relevant factors for determining whether PET results were negative or positive, but only histology was statistically significant (OR:6.1, 95%CI: 1.85-20.15, p=0.003).
Conclusion:
Among solid-type lung adenocarcinoma, tumor-size and histopathological findings were significantly associated with FDG-uptake. In particular, it warrants attention that lesions ≤2cm and “colloid/mucinous/lepidic” adenocarcinomas have a tendency for negative PET-findings.

Disclosure: No significant relationships.

Keywords: false-negative cases, 18 FDG PET/CT, NSCLC, SUVmax, pulmonary adenocarcinoma, PET
F-038

EXPERT OPINION ON SHARED DECISION MAKING IN EARLY STAGE NON-SMALL CELL LUNG CANCER

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²Pulmonary Disease, Erasmus University Medical Center, Rotterdam, Netherlands,
³Radiation Oncology, Erasmus University Medical Center, Rotterdam, Netherlands

Objectives:
In lung cancer shared decision making (SDM) has not been widely incorporated into routine clinical practice because physicians are often not adequately trained to implement SDM or there is lack of familiarity. This study aims to investigate the attitude of physicians toward patient involvement, and barriers/drivers to apply SDM in NSCLC.

Methods:
A survey was conducted among Dutch cardio-thoracic surgeons/lung surgeons, pulmonologists and radiation oncologists. Clinician opinion regarding SDM was assessed by using 1-5 Likert-scale and open-questions. Between-group differences were compared using the Kruskal-Wallis-test or χ²-test when appropriate.

Results:
Fifty-four percent of respondents agreed that the patient should always be involved in SDM (p-value=0.678) and 21% indicated that they always apply SDM (p-value=0.102). Fifty-one percent found that ideally doctors and patients should make a treatment decision together (p-value=0.005). The respondents indicated that SDM benefits the physician-patient relationship and will give the patient more control over treatment, resulting in better compliance. However, SDM may not always be feasible due to low patient education-level and little patient knowledge concerning NSCLC. Also, some patients are not able to make a weighted decision in an early stage of diagnosis as they are emotionally unstable and overloaded with information. The majority found that more consultation-time is needed to properly apply SDM. Table-1 illustrates perceived barriers/drivers of SDM. Furthermore, 30% of surgeons, 27% of pulmonologists, and 44% of radiation oncologists indicated that doctors are not properly trained to implement SDM (p-value=0.371), whereas the remaining respondents think that they have enough skills to implement SDM.
## Benefits of SDM:

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Total, N (%)</th>
<th>Surgeons, N (%)</th>
<th>Pulmonologists, N (%)</th>
<th>Radiation oncologists, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Patient is motivated</td>
<td>17 (15.5)</td>
<td>7 (15.2)</td>
<td>4 (13.3)</td>
<td>6 (17.6)</td>
</tr>
<tr>
<td>- Well-informed</td>
<td>15 (13.6)</td>
<td>4 (8.7)</td>
<td>5 (16.7)</td>
<td>6 (17.6)</td>
</tr>
<tr>
<td>- Compliance</td>
<td>11 (10)</td>
<td>6 (13.0)</td>
<td>2 (6.7)</td>
<td>3 (8.8)</td>
</tr>
<tr>
<td>- Will benefit the physician-patient relationship</td>
<td>23 (21)</td>
<td>11 (23.9)</td>
<td>7 (23.3)</td>
<td>5 (14.7)</td>
</tr>
<tr>
<td>- Autonomy and control over treatment</td>
<td>24 (21.8)</td>
<td>10 (21.7)</td>
<td>4 (13.3)</td>
<td>10 (29.4)</td>
</tr>
<tr>
<td>- Patient will support the treatment decision</td>
<td>31 (28.2)</td>
<td>13 (28.3)</td>
<td>10 (33.3)</td>
<td>8 (23.5)</td>
</tr>
</tbody>
</table>

## Objections to SDM:

<table>
<thead>
<tr>
<th>Objection</th>
<th>Total, N (%)</th>
<th>Surgeons, N (%)</th>
<th>Pulmonologists, N (%)</th>
<th>Radiation oncologists, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- No objections</td>
<td>26 (23.6)</td>
<td>9 (19.6)</td>
<td>8 (26.7)</td>
<td>9 (26.5)</td>
</tr>
<tr>
<td>- Time consuming</td>
<td>19 (17.3)</td>
<td>8 (17.4)</td>
<td>4 (13.3)</td>
<td>7 (20.6)</td>
</tr>
<tr>
<td>- Low patient education-level</td>
<td>7 (6.4)</td>
<td>4 (8.7)</td>
<td>2 (6.7)</td>
<td>1 (2.9)</td>
</tr>
<tr>
<td>- Not able to make a weighted decision</td>
<td>36 (32.7)</td>
<td>16 (34.8)</td>
<td>11 (36.7)</td>
<td>9 (26.5)</td>
</tr>
<tr>
<td>- More healthcare costs</td>
<td>10 (9)</td>
<td>0</td>
<td>2 (6.7)</td>
<td>8 (23.5)</td>
</tr>
<tr>
<td>- No choice between treatments</td>
<td>5 (4.5)</td>
<td>1 (2.2)</td>
<td>2 (6.7)</td>
<td>2 (5.9)</td>
</tr>
</tbody>
</table>

## Conditions that are less suitable to apply SDM:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Total, N (%)</th>
<th>Surgeons, N (%)</th>
<th>Pulmonologists, N (%)</th>
<th>Radiation oncologists, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- No conditions</td>
<td>9 (8.2)</td>
<td>3 (6.5)</td>
<td>2 (6.7)</td>
<td>4 (11.8)</td>
</tr>
<tr>
<td>- Neuro-cognitive conditions/legally incapable</td>
<td>33 (30)</td>
<td>10 (21.7)</td>
<td>13 (43.3)</td>
<td>10 (29.4)</td>
</tr>
<tr>
<td>- Not able to make a decision</td>
<td>31 (28.2)</td>
<td>14 (30.4)</td>
<td>9 (30)</td>
<td>8 (23.5)</td>
</tr>
<tr>
<td>- No choice between treatments</td>
<td>13 (11.8)</td>
<td>8 (17.4)</td>
<td>2 (6.7)</td>
<td>3 (8.8)</td>
</tr>
<tr>
<td>- Acute situations/time pressure</td>
<td>10 (9.1)</td>
<td>3 (6.5)</td>
<td>2 (6.7)</td>
<td>5 (14.7)</td>
</tr>
</tbody>
</table>

## In what circumstances would you like to apply SDM:

<table>
<thead>
<tr>
<th>Circumstance</th>
<th>Total, N (%)</th>
<th>Surgeons, N (%)</th>
<th>Pulmonologists, N (%)</th>
<th>Radiation oncologists, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Always apply SDM</td>
<td>59 (53.6)</td>
<td>26 (56.5)</td>
<td>21 (70)</td>
<td>12 (35.3)</td>
</tr>
<tr>
<td>- If there is a choice</td>
<td>18 (16.4)</td>
<td>5 (10.9)</td>
<td>4 (13.3)</td>
<td>9 (26.5)</td>
</tr>
<tr>
<td>- If the patient is able to make a choice</td>
<td>13 (11.8)</td>
<td>6 (13)</td>
<td>2 (6.7)</td>
<td>5 (14.7)</td>
</tr>
</tbody>
</table>

## What makes it difficult to apply SDM:

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Total, N (%)</th>
<th>Surgeons, N (%)</th>
<th>Pulmonologists, N (%)</th>
<th>Radiation oncologists, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- No problems</td>
<td>12 (10.9)</td>
<td>7 (15.2)</td>
<td>2 (6.7)</td>
<td>3 (8.8)</td>
</tr>
<tr>
<td>- Time pressure/high work pressure</td>
<td>40 (36.4)</td>
<td>16 (34.8)</td>
<td>14 (46.7)</td>
<td>10 (29.4)</td>
</tr>
<tr>
<td>- Patient do not want to be involved</td>
<td>6 (5.5)</td>
<td>2 (4.3)</td>
<td>2 (6.7)</td>
<td>2 (5.9)</td>
</tr>
<tr>
<td>- Understanding of the information</td>
<td>22 (20)</td>
<td>9 (19.6)</td>
<td>5 (16.7)</td>
<td>8 (23.5)</td>
</tr>
<tr>
<td>- Not able to participate in SDM</td>
<td>14 (12.7)</td>
<td>4 (8.7)</td>
<td>8 (26.7)</td>
<td>2 (5.9)</td>
</tr>
<tr>
<td>- No choice between treatments/MTB meeting</td>
<td>8 (7.3)</td>
<td>4 (8.7)</td>
<td>0</td>
<td>4 (11.8)</td>
</tr>
<tr>
<td>- No decision aids</td>
<td>4 (3.6)</td>
<td>1 (2.2)</td>
<td>0</td>
<td>3 (8.8)</td>
</tr>
</tbody>
</table>

## Are patients burdened by SDM:

<table>
<thead>
<tr>
<th>Burden</th>
<th>Total, N (%)</th>
<th>Surgeons, N (%)</th>
<th>Pulmonologists, N (%)</th>
<th>Radiation oncologists, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- No</td>
<td>57 (51.8)</td>
<td>22 (47.8)</td>
<td>16 (53.3)</td>
<td>19 (55.9)</td>
</tr>
<tr>
<td>- Yes</td>
<td>22 (20)</td>
<td>10 (21.7)</td>
<td>5 (16.7)</td>
<td>7 (20.6)</td>
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<tr>
<td>- Depending on the personality of the patient</td>
<td>9 (8.2)</td>
<td>2 (4.3)</td>
<td>2 (6.7)</td>
<td>5 (14.7)</td>
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</tbody>
</table>
Conclusion:
In this study, lung cancer physicians recognize that there are several areas of improvement for effective SDM in NSCLC, such as increasing patient knowledge, resolving time constraints, and adequate implementation of SDM in the care path. Patient decision-aids may be helpful for physicians and patients to improve patient information and patient participation in SDM.

Disclosure: No significant relationships.
Keywords: clinician opinion, decision aids, lung cancer, shared decision making
STAGING IMPLICATIONS OF INTRAOPERATIVE ULTRASOUND GUIDED MEDIASTINAL LYMPHADENECTOMY IN NON-SMALL CELL LUNG CANCER VATS SURGERY

Duje Orsulic
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Objectives:
Extent of lymph node involvement in NSCLC is a key prognostic factor as it determines the stage of the disease and influences both modality of the treatment and the final outcome. Skip nodal metastases are determined as N2 disease, without evident N1 involvement, and are the theoretical principal for radical lymphadenectomy. The aim of this study is to determine the efficacy of ultrasound guided VATS dissection of mediastinal lymph nodes in patients with NSCLC.

Methods:
We conducted a prospective randomized trial from April 2015 till December 2015. Twenty six patients, enrolled into the study thus far, had undergone surgical staging after radical resection for NSCLC. Patients were divided into two groups according to the methods used for systemic nodal dissection: fifteen patients in whom ultrasound guided VATS mediastinal lymphadenectomy was performed and eleven patients in the standard nodal dissection group. Lymph nodes were mapped by their stations and are harvested for histopathological examination.

Results:
The number and stations of evaluated lymph nodes was significantly higher (p < 0.001) in the US guided VATS lobectomy group. Skip nodal metastases occurred more often in ultrasound mediated VATS nodal dissection. In the same group 10% of patients were upstaged using US guided mediastinal lymphadenectomy and received adjuvant treatment that otherwise would have been omitted.

Conclusion:
Temporary results suggest that VATS lymphadenectomy guided by ultrasound is safe and allows for a more radical mediastinal lymphadenectomy. Furthermore, the interim results suggest that intraoperative US may have important staging implications. As this is still an ongoing study, we believe that further findings will be relevant to clinical practice once this study is finished.

Disclosure: No significant relationships.
Keywords: VATS, lymphadenectomy, ultrasound, NSCLC
RECURRENT PULMONARY METASTASES FROM COLORECTAL CANCER: AN INDICATION TO OPERATE

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Objectives:
Resection of recurrent lung metastases from colorectal cancer is not completely investigated. We analyzed overall survival and prognosticators after metastasectomy.

Methods:
We retrospectively reviewed our database of 238 patients with lung metastases of colorectal cancer, undergoing curative resection with systematic lymph node dissection from 1999-2014. 55 patients had lymph node and 79 patients liver metastases.

Results:
The 5- and 10-year survival rates (5-and 10-years) for the whole collective were 48% and 32%. 101 patients developed recurrent lung metastases. The recurrence had no impact on survival (5-and 10-years without vs. with: 53% and 44% vs. 51% and 26%;p=0.474). The 5-and 10-years from beginning of recurrent metastases were 40% and 25%. 52 of the 101 patients had been operated for recurrent metastases. There was a significant difference in survival between operated and non-operated patients (5-and 10-years: 75% and 47% vs. 24% and 0.3%;p<0.001). Also survival from beginning of recurrent metastases was significant longer (5-and 10 years: 62% and 46% vs. 16% and 0.4%;p<0.001). Recurrence was more often detected in case of multiple lung metastases (p=0.002), bilateral metastases (p=0.012) and atypical resections (p=0.029) at first metastasectomy. Lymph node metastases (p=0.084) and liver metastases (p=0.195) had no influence on recurrence. Prognosticators for survival in univariate analyses for reoperated patients were lower grading of primary tumor (G1/2 vs. G3/4;p=0.007) and stable disease after preoperative chemotherapy at first metastasectomy (p=0.033). Lower grading of primary tumor was the only independent prognosticator (p=0.044).

Conclusion:
Good long-term survival is achievable for patients with resectable recurrent lung metastases. In our database multiple and bilateral lung metastases and atypical resection at first metastasectomy were associated with recurrent disease. Neither lymph node metastases nor liver metastases were significantly associated with recurrence. Lower grading of primary tumor was the only independent prognosticator for survival.

Disclosure: No significant relationships.
Keywords: recurrent lung metastases, colorectal cancer, pulmonary metastases, repeat metastasectomy
F-041

EVALUATING THE SURGICAL APPROACHES TO ANATOMICAL SEGMENTECTOMIES. THE TRANSITION TO VATS IMPROVES HOSPITAL OUTCOMES

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Objectives:
We aim to evaluate the transition process from open to VATS segmentectomies in a Regional Thoracic Surgical Unit

Methods:
In a retrospective study from January 2013 to December 2015 we identified all anatomical segmentectomies performed in our unit. Pre, peri and postoperative data were compared between the three years (2013, 2014 and 2015). Thoracotomy after VATS intraoperative biopsy was considered as a conversion for the purpose of the study. Chi-square and Wilcoxon’s Rank Tests were used.

Results:
A total of 86 consecutive cases [56 female and 30 male, median age of 70.5 (range 43 to 83) years; median FEV1 of 78 (range 41 to 84) % and median TLCO of 59% (range 18 to 122)%] were included. There was a significant change in the surgical approach with time. FIGURE 1.

Sixty one cases underwent VATS (72% via Single-Port) and 28 Open Surgery. Nine cases (15%) were converted to thoracotomy after VATS frozen section, four in the multiport VATS group (22%) and five in the Single-port VATS (11%) p=0.4. There were no postoperative deaths in the VATS group and one in the open group. Operative outcomes were similar over time with no haemorrhagic events, similar R1 resection rates and similar nodal stations explored in all lymph
node positive patients. In node negative cases however, open surgery was associated with more extensive mediastinal exploration. Patients in 2015 had a shorter hospital stay [median of four (range 1-15 days)], versus median of 6 (range 4-27) in previous years (p=0.01). There were no differences in the incidence of complications or readmissions to hospital over time.

**Conclusion:**
The transition over a short period of time from open to single-port VATS segmentectomy has allowed us to significantly reduce postoperative hospital stay without compromise of other operative or postoperative outcomes

**Disclosure:** No significant relationships.

**Keywords:** single-port VATS, surgical outcomes, service evaluation
INTERSTITIAL FLUID PRESSURE: A NOVEL FUNCTIONAL BIOMARKER FOR THE MONITORING OF DRUG UPTAKE IN NORMAL AND TUMOR TISSUES AFTER PHOTODYNAMIC THERAPY

S. Cavin¹, X. Wang¹, M. Gonzalez¹, M. Bensimon², G. Wagnieres², T. Krueger¹, H. Ris¹, Jean Yannis Perentes¹
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²Institute of Chemical Sciences and Engineering, Ecole Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland

Objectives:
Low dose photodynamic therapy (L-PDT) was shown to modulate tumor vasculature, change interstitial fluid pressure (IFP) and enhance the uptake/efficacy of subsequently administered chemotherapy. However, L-PDT drug/light conditions are critical to remain tumor specific as higher fluencies can enhance chemotherapy distribution in normal tissues. Here, we study the changes induced by different PDT conditions on the interstitial fluid pressure (IFP) of tumor/normal tissues and correlate them with drug distribution in two pre-clinical models.

Methods:
Fischer rats bearing pleural sarcoma (n=10) and adenocarcinoma (n=10) underwent intravenous Lipoplatin® administration (5 mg/kg) alone (n=5) or in combination with L-PDT (0.0625 mg/kg Visudyne®, 10J/cm²). Then, tumor-free minipigs (n=5) underwent intravenous Lipoplatin® injection (5 mg/kg) followed by video-assisted intrapleural L-PDT with a higher fluence to increase the chances of normal tissue vascular modulation (0.0625 mg/kg Visudyne®, 30J/cm²). In all animals, IFP was assessed using the wick-in-needle technique before and 60min after L-PDT in tumor and/or normal tissues. These findings were correlated with Lipoplatin® concentrations in tissue assessed by mass spectrometry.

Results:
In the rodent tumor model, L-PDT caused a significant decrease in tumor IFP for both tumor types (sarcoma 4±1mmHg, adenocarcinoma 6±1.5mmHg, p<0.05) 60min after L-PDT while IFP remained unchanged in the surrounding normal tissue. This correlated with enhanced Lipoplatin® tumor/normal tissue concentration ratio in L-PDT treated animals compared to controls (sarcoma 0.8±0.1 vs 0.6±0.1 and adenocarcinoma 1.4±0.4 vs 0.9±0.1, p<0.05). In the porcine model, pleural IFP increased in 2 of 5 animals 60 min after L-PDT (6mmHg and 8mmHg) and correlated with an increased pleural Lipoplatin® uptake at 60min (2000ng/mL and 2200ng/mL) In all other animals, no IFP or Lipoplatin® concentration changes were observed with L-PDT over time.
Conclusion:
IFP changes correlate with drug uptake in tumor and normal tissues treated by L-PDT and could represent a novel functional biomarker of vessel modulation.

Disclosure: No significant relationships.

Keywords: interstitial fluid pressure, pleural malignancy, liposomal chemotherapy, photodynamic therapy, biomarker
EVALUATION OF TUMOUR-INFILTRATING IMMUNE CELLS FOR DEVELOPMENT OF NON-SMALL LUNG CANCER IMMUNOSCORE

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²Clinical Immunology, Pauls Stradins Clinical University Hospital, Riga, Latvia,
³Vascular Surgery, Pauls Stradins Clinical University Hospital, Riga, Latvia

Objectives:
Solid tumours like lung cancer contain in addition to tumour cells, also various types of stromal cells, such as lymphocytes, neutrophils, macrophages, fibroblasts and endothelial cells which contribute to the tumour growth, invasion and metastasis. Immune cells-infiltrating tumors are frequently observed, but not appropriately evaluated. Aim of our study was gathering data to support creation of immunoscore for non-small cell lung cancer (NSCLC).

Methods:
The study recruited 62 patients (mean age 68 ± 11.5) with primary NSCLC ranging from stage IA to IIIA undergoing anatomical pulmonary resection between June 2009 and June 2011. Patients were followed until January 2016. Tumor-infiltrating immune cells including neutrophils, T helper cells (CD4), cytotoxic T lymphocytes (CD8), B cells (CD20) macrophages (CD68) and plasma cells (CD138) were evaluated in resected tumour by immunohistochemistry. Immune cell count and ratio was calculated and compared to TNM denominators, tumour size, NSCLC stage, relapse, including time to relapse and survival.

Results:
There was no correlation between tumour-infiltrating immune cells and TNM descriptors, except T helper cell ratio which correlates with N denominator (r=0.35, p=0.05). Infiltration of tumour by cytotoxic T lymphocytes and increased cytotoxic T lymphocytes to other immune cells ratio correlates with NSCLC stage (r=0.35, p=0.05; r=0.52, p <0.01). Increased T helper cell ratio could be predictor of relapse (r=0.44, p<0.05). High levels of intratumoral neutrophils are associated with a poor prognosis and shorter time to relapse (r=-0.74, p<0.05).

Conclusion:
Immune parameters have now been recognized as directly or indirectly influencing cancer patient survival. Development and incorporation of an immunoscore into the traditional classification and staging of lung cancer could provide an essential prognostic and potentially predictive tool in the pathology report.

Disclosure: No significant relationships.
Keywords: immune cell infiltrate, lung cancer, immunoscore
CHROMOSOME 7 MULTIPLICATION MODIFIES THE EGFR EXPRESSION SURGICAL SPECIMENS IN NON-SMALL CELL LUNG CARCINOMAS: A TISSUE MICROARRAY ANALYSIS

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Objectives:
Epidermal growth factor receptor (EGFR) over activation is observed in significant proportions of non-small cell lung carcinomas (NSCLC). Additionally, EGFR gene amplification is a significant genetic event leading to protein over expression in the majority of those cases. The role of chromosome 7 multiplication or true polysomy is still under investigation regarding its influence in EGFR expression.

Methods:
Using tissue microarray technology, fifty (n = 50) paraffin embedded, histologically confirmed primary NSCLCs were cored and re-embedded into a recipient block. Immunohistochemistry was performed for the determination of EGFR protein levels and chromogenic in situ hybridization (CISH) was also implemented (EGFR gene/CEP 7).

Results:
EGFR over expression (2+/3+) was observed in 23/40 (57.5%) cases correlated to the stage of the tumors (p = 0.001). EGFR gene amplification (low to high) was identified in 11/50 (22%) cases demonstrating a borderline association to its overall protein levels (p = 0.05), whereas chromosome 7 was detected in 8/50 (16%) cases. In three of them (n=3), gene amplification was also detected. Concerning the others (n=5), pure chromosome 7 multiplication alone led to a low or even moderate level of expression (2+,1+).

Conclusion:
EGFR expression levels are associated not only with gene amplification, but also to chromosome multiple signals. Chromosome 7 multiplication or true polysomy -after its clarification based not on FISH/CISH analysis but on comparative genomic hybridization (CGH) or similar molecular methods – is critical for handling those patients via monoclonal antibody targeted therapeutic strategies.

Disclosure: No significant relationships.
Keywords: Tissue microarray analysis, NSCLC, EGFR, chromosome 7
F-045

STUDY ON THE ROLE OF TRANSIENT RECEPTOR POTENTIAL C6 CHANNELS IN ESOPHAGEAL SQUAMOUS CELL CARCINOMA RADIOSENSITIVITY

Yongxing Zhang, H. Fan, Y. Zhang, Q. Wang
Thoracic Surgery, Zhongshan Hospital, Fudan University, Shanghai, China

Objectives:
To study the effect of transient receptor potential C6 (TRPC6) channels on Eca109 cell cycle and to confirm whether TRPC6 channel is candidate radiosensitivity.

Methods:
We chose Eca109 cell line with a strong TRPC6 channels expression. Cell cycle was investigated after TRPC6 channel inhibitor SKF96365 was treated. According to the results of cell cycle, radiation was performed. CCK-8 test was used to test the cell proliferation. We performed the same study in vivo. Total of 40 male nude mice were randomly divided into four groups as follows: control, SKF96365, radio and combined radio-SKF96365. In control group, nude mice were injected saline into the abdominal cavity at day 5-11. In SKF96365 group, 20mg/kg 5μM SKF96365 was injected at day 5-11. In radiation group, the nude mice received radiotherapy 2Gy per day at day 7-11. In combined radio-SKF96365 group, 20mg/kg 5μM SKF96365 was injected at day 5-11 and 2Gy radiotherapy was delivered to the tumor site at day 7-11. General state of health was observed, the tumor size in volume was measured with calipers two times every week, six weeks after seeding, mice were sacrificed by neck-break. The tumor size was measured in volume with caliper and in weigh with scale.

Results:
Treatment with SKF96365 substantially increased the percentage of Eca109 cells in the G2/M phase and reduced that in G0/G1 phase in a time-dependent manner. Most of the cells (85.26%), 24 hours after SKF96365 treatment were arrested in the G2/M phase. CCK-8 test showed that Eca109 ESCC cells received both SKF96365 and radiation showed the worst ability of cell proliferation. The same result was obtained in vivo. Nude mice received combined radio-SKF96365 showed the smallest tumor size and volume.

Conclusion:
TRPC6 plays an important role in development of esophageal cancer, and SKF96365 may increase the sensitivity of radiotherapy. TRPC6 may become a new radiotherapy target in esophageal cancer.

Disclosure: No significant relationships.
Keywords: G2/M phase, radiosensitivity, transient receptor potential C6 (TRPC6), esophageal squamous cell carcinoma
IS DEFINITIVE SURGICAL RESSECTION ACCEPTABLE AS A TREATMENT STRATEGY FOR CLINICAL-STAGE I RADIOLOGICAL PURE-SOLID LUNG CANCER SATISFIED WITH CURRENT “MEDICALLY INOPERABLE” CRITERIA?

Aritoshi Hattori, T. Matsunaga, K. Takamochi, S. Oh, K. Suzuki
General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan

Objectives:
Radiological pure-solid lung cancers are considered to be invasive despite their small tumor size. Pulmonary lobectomy is favorable surgical procedures for them to prevent locoregional recurrence. Among them, however, treatment strategy for the patients defined as “medically inoperable (MI)” status is still controversial.

Methods:
We reviewed 500 surgically resected c-stage I radiological pure-solid lung cancer. Pure-solid tumor was defined as a tumor without GGO component on thin-section CT, i.e., consolidation tumor ratio equal to 1.0. Based on the “MI” status currently used in clinical trials of SBRT for NSCLCs, high-risk group was defined as follow: 1. preoperative FEV1% or DLco%<50%, 2. 50%<FEV1% or DLco%<60% with age>75y, 3. Three or more severe comorbidities. The prognostic value and surgical outcomes were evaluated between the high-risk (n=184) and normal-risk group (n=316).

Results:
The proportion of males, elderly subjects and smokers were higher among the high-risk groups than the normal-risk group (p<0.001). Lobectomy was performed in 148 (80%) among the high-risk group. A multivariate analysis revealed that maximum tumor size and CEA titer were clinically significant prognostic factors (p=0.002, 0.004), while medically high-risk criteria was not associated with poor survival (p=0.454). The 30-day and 90-day mortality rates among the high-risk group were 1.6% and 3.8%, and those among the 427 (85%) patients undergoing lobectomy were 2.0% and 4.0%, respectively. Although overall survival was significantly worse in the high-risk groups (59.4% vs 73.1%, p=0.004), there were no significant differences in cancer-specific survival between the high-risk and normal-risk arm (74.5% vs 79.2%, p=0.569), which was also proven in the patients undergoing lobectomy (72.7% vs 81.5%, p=0.481).
Conclusion:
Current “MI” criteria are not always appropriate prognostic variable. Surgical management including lobectomy for clinical-stage I radiological pure-solid lung cancer defined as the high-risk could be safely performed with acceptable perioperative mortality and equivalent cancer-specific survival.

Disclosure: No significant relationships.

Keywords: lung cancer, medically inoperable status, surgical outcome, lobectomy
SHOULD ADDITIONAL SURGICAL STAGING BE PERFORMED ENSUING A NEGATIVE RESULT BY ENDOBRONCHIAL ULTRASOUND-GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION?

Department of General Thoracic Surgery, Chiba University Graduate School of Medicine, Chiba, Japan

Objectives:
The current guidelines recommend pathological confirmation of mediastinal lymph node metastasis in patients with non-small cell lung cancer (NSCLC) that are suspected to have nodal metastasis by radiology. Both CT and PET negative patients can be waived for tissue confirmation. Minimally invasive needle biopsy techniques such as endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is recommended as the first step for invasive nodal staging. Negative results using minimally invasive procedures will be recommended for additional surgical staging. The aim of this study is debating the necessity of additional surgical staging in patients with clinically N0 (cN0) disease by EBUS-TBNA.

Methods:
A retrospective chart review was performed to assess the prognosis of pathologically N2 (pN2) NSCLC patients who were staged as cN0 disease by radiology or EBUS-TBNA.

Results:
Between April 2008 and April 2015, 812 NSCLC patients with cN0 disease underwent surgery with curative intent. 61 patients (7.5%) were diagnosed with pN2 disease postoperatively. There were 40 males and 21 females with an average age of 66.2. 42 out of 61 patients (69%) were found to be cN0 by both CT and PET results (Group A) and 19 out of 61 patients (31%) were diagnosed as cN0 by EBUS-TBNA even compare to the CT/PET that found them to have N1-2 disease (Group B). Postoperative adjuvant chemotherapy was performed on 21 patients (50%) in Group A and 12 patients (63%) in Group B. The 5-year overall survival and recurrence free survival were 60.8% and 18.7% in Group A and 70.7% and 27.1% in Group B, respectively. There was no clinical outcome difference between two groups.

Conclusion:
Following the improvement of postoperative treatments, the patients achieved relatively good overall survival. No survival difference between radiologically-N0 and EBUS-N0 patients was observed; hence, there is no supporting data to promote additional surgical staging for the negative results by EBUS-TBNA.

Disclosure: T. Nakajima: Takahiro Nakajima received honoraria and lecture fees from Olympus Medical Systems.
T. Fujiwara: Taiki Fujiwara received lecture fees from Olympus Medical Systems.

Keywords: endobronchial ultrasound-guided transbronchial needle aspiration, surgical nodal staging, nodal staging in non-small cell lung cancer
F-048

PROGNOSTIC NUTRITIONAL INDEX PREDICTS POSTOPERATIVE OUTCOME OF COMPLETELY RESECTED NON-SMALL CELL LUNG CANCER

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Objectives:
Immunological parameters and nutritional status have been postulated to influence the outcome of patients with malignant tumors. However, prognostic value of prognostic nutritional index (PNI), a biomarker reflecting immune-nutritional status, remains uncertain in non-small cell lung cancer (NSCLC). This study aimed to investigate the prognostic impact of PNI in patients with completely resected NSCLC.

Methods:
A retrospective review was conducted for 229 patients with NSCLC who underwent complete resection by lobectomy with lymph node dissection between January 2005 and December 2013. PNI was calculated as $10 \times$ serum albumin (g/dl) + $0.005 \times$ total lymphocyte count (/mm$^3$). Univariate and multivariate analysis were performed to assess the prognostic value of relevant clinicopathological variables. Survival was calculated using the Kaplan-Meier method.

Results:
The optimal cutoff level of PNI for predicting recurrence was set to 48.2 by ROC curve analysis. Low PNI was significantly correlated with old age, high serum carcinoembryonic antigen (CEA) level, and large tumor size. The proportion of postoperative complications classified as grade II or more on Clavien-Dindo classification was significantly higher in the low-PNI group ($P < 0.05$). The 5-year overall survival rates were 81.8% and 58.1% in the high-PNI group and the low-PNI group, respectively ($P = 0.01$). The 5-year recurrence-free survival (RFS) rates were 78.1% and 49.7% in the high-PNI group and the low-PNI group, respectively ($P < 0.001$). Univariate analysis showed that gender, smoking, CEA level, pathological stage, and PNI were significant prognostic factors. Multivariate analysis suggested that PNI ($P = 0.003$), CEA level ($P < 0.001$), pathological T category ($P = 0.03$), and pathological N category ($P < 0.001$) were independent prognostic factors of RFS.
Conclusion:
Our results indicate that PNI is an independent predictor of postoperative complications and survival in patients with completely resected NSCLC. PNI is a simple biomarker to support perioperative management of surgical candidates.

Disclosure: No significant relationships.
Keywords: non-small cell lung cancer, surgery, complication, survival, prognostic nutritional index
F-049

PREOPERATIVE PERIPHERAL BLOOD NEUTROPHIL-TO-LYMPHOCYTE RATIO IS AN INDEPENDENT PREDICTOR OF SURVIVAL IN PATIENT WITH THYMIC EPITHELIAL TUMOR UNDERGOING SURGERY.

Department of Thoracic Surgery, The University of Tokyo Graduate School of Medicine, Tokyo, Japan

Objectives:
Previous studies have shown that preoperative neutrophil-to-lymphocyte ratio (NLR) is associated with a poor prognosis in patients with various cancers. The aim of this study was to investigate the prognostic role of preoperative NLR in patients with thymic epithelial tumor.

Methods:
Retrospective review of patients who underwent surgical resection for thymic epithelial tumor. (N=160, 01/1988-12/2013) We excluded patients who had received steroid therapy, recurrence of thymic epithelial tumor, or missing data. Preoperative NLR was measured within three months before surgery. ROC curve analysis was used to identify the optimal value (2.81) for NLR in relation to 10-year disease free survival. The patients were classified into two groups by NLR: low NLR (< 2.81) and high NLR (≧ 2.81). Overall survival and relapse-free survival were estimated using the Kaplan-Meier method.

Results:
One hundred and twenty-five patients were included in this analysis. Twenty-four patients were classified as high-NLR individuals. The overall survival was significantly worse in the patients with a high NLR (p<0.001). The five-year survival for patients of thymic cancer or thymic carcinoid with high NLR was significantly worse than that for patients with low NLR (28.6% vs 67.5%, p=0.021). Among patients for thymoma, there was no significant difference in overall survival between high NLR group and low NLR group (p=0.14). However, relapse-free survival for patients of thymoma with high NLR was worse than that with low NLR (p=0.052). In multivariate analysis, high preoperative NLR (HR 3.386, 95%CI 1.305-8.783; p=0.012), Masaoka stage (HR 3.750, 95%CI 1.421-9.899; p=0.0076) and histology type (HR 6.456, 95%CI 2.451-17.010; p=0.0002) were independently associated with poor survival.
Conclusion:
High preoperative NLR is associated with poor survival in patients who underwent surgery for thymic epithelial tumor. NLR is a useful biomarker for predicting prognosis of patients with thymic epithelial tumor.

Disclosure: No significant relationships.

Keywords: thymic epithelial tumor, thymoma, thymic carcinoid, thymic cancer
TRIPORTAL VERSUS UNIPORTAL VATS FOR MAJOR ANATOMICAL LUNG RESECTIONS: A PROPENSITY SCORE MATCHED ANALYSIS

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Objectives:
VATS for anatomical pulmonary resections is nowadays an established technique in thoracic surgery’s practice, but in the literature there is still much debate around which access is the best for patients.

Methods:
Between January 2013 and December 2015, 280 patients underwent anatomical pulmonary resections and were included in our enhanced-recovery pathway. Two hundred and seven patients underwent 3-port-VATS and 73 uniportal-VATS. Our aim was to compare the surgical outcome between the two groups. Propensity score analysis was performed to reduce selection-bias and potential confounding. Propensity-scores were estimated with multiple logistic-regressions based on potential confounding variables. For development of propensity-score‑matched pairs (1:1 match), greedy 5-to-1 digit matching algorithm was used. Matching based on propensity-scores produced 73 patients in each group for analysis of postoperative outcomes. After propensity-score matching, data of groups were compared with paired Student’s t-test, Pearson’s $\chi^2$ and Fisher’s exact test. To explore a possible development in procedure time and complications as progression along learning curve, they were plotted against procedure number and correlations were calculated using Spearman’s-rho. R (version 3.2.3) was used for statistical analyses.

Results:
Characteristics of propensity score‑matched patients were in Table-1a. There were no differences in anatomical distribution (except middle lobe) of pulmonary resections between two groups (Table-1b). Intraoperative and postoperative outcomes were in Table-1c. Median hospital stay was not significant different (p=0.738). Interpolation line of procedure time showed no significant reduction (Spearman’s-rho=0.372 and 0.05, respectively). There were no statistical significant differences in global postoperative complications; nevertheless, it is notable that, compared to matched 3-port group, no patients in uniportal-group developed atrial fibrillation (p=0.043) or renal impairment (p=0.043).
Conclusion:
VATS anatomical pulmonary resections provide low operative mortality and favourable outcomes without statistically significant differences between accesses. Introduction of uniportal VATS lobectomies into surgical practice can be achieved safely to become an integral part of thoracic surgeon’s armamentarium.

| Table 1a. Demographics of propensity score matched patients underwent VATS major lung resection |
|---------------------------------|------------------|------------------|------------------|
| Age                            | 3 – port VATS (n = 73) | Uniportal VATS (n = 73) | p-value |
| Age                            | 67.86 ± 10.93 | 69.32 ± 11.03 | 0.975 |
| Male/%                         | 47.9            | 45.2            | 0.780 |
| FEV1%                          | 85.95 ± 18.26 | 84.84 ± 20.18 | 0.752 |
| FVC%                           | 101.08 ± 16.98 | 94.12 ± 18.40 | 0.670 |
| DLCO%                          | 73.86 ± 12.70 | 71.18 ± 9.54 | 0.587 |
| Smoking/former                 | 55 (75.3%)      | 54 (74.0%)      | 0.916 |
| COPD                           | 36 (49.3%)      | 53 (72.6%)      | 0.035 |

| Table 1b. Anatomical distribution of pulmonary resections performed in propensity score matched patients |
|---------------------------------|------------------|------------------|------------------|
| RUL                            | 3 – port VATS (n = 73) | Uniportal VATS (n = 73) | p-value |
| RUL                            | 26 (35.6%)        | 30 (41.1%)        | 0.530 |
| RML                            | 6 (8.2%)          | 1 (1.4%)          | 0.028 |
| RLL                            | 9 (12.3%)         | 9 (12.3%)         | N.A. |
| LUL                            | 21 (28.8%)        | 23 (31.5%)        | 0.728 |
| LLL                            | 11 (15.1%)        | 10 (13.7%)        | 0.794 |
| Bilobectomy                    | 0                 | 0                 | N.A. |
| Pneumonectomy                  | 0                 | 0                 | N.A. |

| Table 1c. Intraoperative and postoperative outcomes in propensity score matched patients |
|---------------------------------|------------------|------------------|------------------|
| Conversion                      | 3 – port VATS (n = 73) | Uniportal VATS (n = 73) | p-value |
| Conversion                      | 6 (8.2%)          | 8 (11.0%)         | 0.523 |
| Operation time (minutes)        | 83.67 ± 32.71     | 84.53 ± 34.05     | 0.916 |
| ITU stay                        | 0                 | 1 (1.4%)          | 0.237 |
| Air leaks                       | 4 (5.5%)          | 9 (12.3%)         | 0.107 |
| Hospital length-of-stay (days), median (range) | 4 (1 – 19) | 4 (2 – 15) | 0.738 |
| Mortality                       | 2 (2.7%)          | 1 (1.4%)          | 0.521 |
| Complications                   | 13 (17.8%)        | 14 (19.2%)        | 0.818 |
| · Atrial fibrillation           | 3 (4.1%)          | 0                 | 0.043 |
| · Renal impairment              | 3 (4.1%)          | 0                 | 0.043 |
| Blood transfusions              | 0                 | 0                 | N.A. |

Disclosure: No significant relationships.
Keywords: uniportal VATS thoracic surgery, triportal VATS thoracic surgery, major lung resections
F-051

A PLEA FOR THORACOSCOPIC RESECTION OF INDETERMINATE SOLITARY PULMONARY NODULES IN PATIENTS WITH KNOWN MALIGNANCY

J. Bellier, J.Y. Perentes, P. Rosskopfova, T. Krueger, H. Ris, Michel Gonzalez
Thoracic Surgery, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland

Objectives:
Solitary pulmonary nodules (SPN) of indeterminate etiology are frequently detected in patients with known malignancies and these lesions are increasingly treated by non-surgical techniques (radio-ablation or stereotactic radiotherapy) without histological confirmation. The aim of this study is to determine the nature of thoracoscopically resected SPN in these patients and to establish predictors of malignancy in order to avoid undertreatment (primary lung cancer) and overtreatment (benign lesions).

Methods:
Retrospective analysis of all surgically fit patients with known malignancy undergoing VATS resection of indeterminate SPN between 2001 and 2014.

Results:
One hundred and forty patients underwent VATS resection of SPN. There were 75 men and 65 women (median age 65 years, range 28-82 years) with the following underlying malignancies: colorectal cancer (n=41), melanoma (n=19), lung cancer (n=17), head and neck cancer (n=14), sarcoma (n=13), breast cancer (n=11), uro-genital cancer (n=11) and others (n=14). The resected SPN was malignant in 106 patients (75.7%) and benign in 34 (24.3%). Malignant SPN were related to metastatic diseases in 70 patients (50%) and to primary lung cancer in 36 patients (25.7%). Univariate analysis revealed a significant association with SPN malignancy and age > 60 years (RR: 2.673; CI 95%: 1.167-6.122; p=0.02), disease-free interval >24 months (RR:2.898; CI 95%: 1.31-6.41; p=0.009), SPN size >8mm (RR: 5.401; CI 95%: 2.282-12.782; p<0.0001) upper lobe localization (RR: 2.665, CI 95%: 1.203-5.905; p=0.016) and PET hyper-metabolism (RR: 7.933; CI 95%: 2.213-28.436; p=0.001).

Conclusion:
The majority of SPN in patients with known malignancy were malignant but a substantial number of cases were benign. In addition, only two third of malignant SPN were related to the underlying malignancy whereas one third were new primary lung cancers. These results endorse the need of histological confirmation of SPN in these patients in order to avoid inappropriate diagnostic uncertainty and suboptimal treatments.

Disclosure: No significant relationships.

Keywords: thoracoscopy, solitary pulmonary nodule, lung metastasis
F-052

SUBMUCOSAL TUNNELING ENDOSCOPIC RESECTION AS A NOVEL APPROACH FOR ESOPHAGEAL LEIOMYOMA ORIGINATING FROM THE MUSCULARIS PROPRIA LAYER

Kongjia Luo, Y. Hu, X. Lin, L. Zhang, J. Fu
Department of Thoracic Surgery, Sun Yat-Sen University Cancer Center, Guangzhou, China

Objectives:
Submucosal endoscopic surgery is a brand-new frontier of minimal invasive treatment. The purpose of this study was to analyze the safety and efficacy of submucosal tunneling endoscopic resection (STER) for esophageal leiomyoma originating from the muscularis propria layer.

Methods:
During October 2012 and November 2015, a total of 22 patients with leiomyoma underwent STER in our department. Clinicopathological characteristics, complication and perioperative outcomes were collected and analyzed retrospectively.

Results:
Eighteen patients underwent STER successfully with a mean operation time of 81.3 min and four patients suffered conversion events who received video-assisted thoracoscopic surgery. The reasons of conversion were tumor size, tumor location and major bleeding. The postoperative complications included mediastinal emphysema (5/18), serious pneumothorax (1/18) and avascular necrosis of mucosa (1/18). Although the overall incidence of complications was 27.8% (5/18), only 16.7% cases required intervention for complications. The average of hospital stay after surgery was 7.6 days.

Conclusion:
STER is a safe and novel technique for the minimal invasive treatment of esophageal leiomyoma. A large submucosal tumor (≥4.0cm) located in cervical or upper thoracic esophagus was evaluated particularly before STER.

Disclosure: No significant relationships.
Keywords: submucosal endoscopic, leiomyoma, tunneling, muscularis propria layer
F-053

THE IMPACT OF NUMBER OF PORTS ON SHORT-TERM OUTCOMES FOLLOWING VIDEO ASSISTED THORACIC SURGERY FOR ANATOMICAL LUNG RESECTION: A MULTI-CENTER STUDY

Alan Sihoe¹, H.K. Kim², J.M. Lee³, W. Fang⁴

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²Department of Thoracic and Cardiovascular Surgery, Korea University Guro Hospital, Seoul, Republic of Korea
³Department of Surgery, National Taiwan University Hospital, Taipei, Taiwan,
⁴Department of Thoracic Surgery, Shanghai Chest Hospital, Shanghai, China

Objectives:
Despite the recent trend for Video Assisted Thoracic Surgery (VATS) being performed with fewer ports, evidence that the number of ports has any influence on postoperative morbidity is hitherto lacking.

Methods:
Prospectively collected data for 458 consecutive adult patients receiving VATS lobectomy or segmentectomy for lung malignancy at university teaching hospitals in four countries were retrospectively analyzed. The experience represented a period of transition between traditional multiportal VATS and uniportal VATS at all centers, and hence the number of ports was varied (range: 1-4).

Results:
The key findings are summarized in the Table. Amongst patients receiving a lobectomy, although patients with one or two ports had more comorbidities and suspected advanced disease preoperatively, rates of postoperative morbidity were not increased compared to patients with three or four ports. Lymph node dissection and rate of postoperative upstaging were non-inferior amongst patients with one or two ports. Although use of fewer ports resulted in higher intraoperative blood loss, the absolute difference in volume was small and postoperative drainage was actually less. The proportion of patients with more than mild pain postoperatively was also lower amongst patients with fewer ports. This difference in pain was even more marked amongst patients receiving segmentectomy. Chest drain durations and lengths of stay appear unaffected by the number of ports. Differences between the use of one or two ports could not be demonstrated.
### Conclusion:
The use of fewer (one-two) ports for VATS anatomical lung resections does reduce early postoperative pain, but does not substantively reduce recovery times or morbidity. It does not compromise patient safety or radicality of resection.

### Disclosure:
No significant relationships.

### Keywords:
lung cancer, outcomes, uniportal, VATS

<table>
<thead>
<tr>
<th>Lobectomy (n=303)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>1 vs 2-4</th>
<th>p value</th>
<th>1-2 vs 3-4</th>
<th>1 vs 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (years)</td>
<td>65.0 ± 9.0</td>
<td>65.2 ± 6.8</td>
<td>63.1 ± 10.1</td>
<td>61.2 ± 10.5</td>
<td>0.04</td>
<td>0.19</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>72 (65.3%)</td>
<td>5 (38%)</td>
<td>84 (50.0%)</td>
<td>4 (33.3%)</td>
<td>&lt;0.01</td>
<td>0.02</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>% Predicted Forced Expiratory Volume in 1 sec, mean</td>
<td>88.9 ± 19.4</td>
<td>90.8 ± 13.7</td>
<td>89.6 ± 18.6</td>
<td>87.7 ± 12.0</td>
<td>0.79</td>
<td>0.89</td>
<td>0.79</td>
<td></td>
</tr>
<tr>
<td>Respiratory co-morbidity</td>
<td>26 (26.6%)</td>
<td>2 (15.4%)</td>
<td>6 (4.0%)</td>
<td>0 (0.0%)</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular co-morbidity</td>
<td>50 (51.0%)</td>
<td>1 (7.1%)</td>
<td>47 (31.3%)</td>
<td>4 (26.6%)</td>
<td>&lt;0.01</td>
<td>0.02</td>
<td>&lt;0.01</td>
<td></td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>30 (26.6%)</td>
<td>0 (0.0%)</td>
<td>18 (12.0%)</td>
<td>2 (12.6%)</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td></td>
</tr>
<tr>
<td>Pre-op: Stage 1 Primary Lung Cancer</td>
<td>58 (72.3%)</td>
<td>8 (7.7%)</td>
<td>80 (51.5%)</td>
<td>10 (83.3%)</td>
<td>0.06</td>
<td>0.06</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Operation time, mean (mins)</td>
<td>170.3 ± 71.3</td>
<td>171.9 ± 109.1</td>
<td>176.1 ± 95.6</td>
<td>100 ± 23.1</td>
<td>0.89</td>
<td>0.81</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>Blood loss, mean (ml)</td>
<td>250.5 ± 297.9</td>
<td>298.3 ± 272.2</td>
<td>183.5 ± 203.5</td>
<td>100 ± 122.2</td>
<td>&lt;0.02</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td></td>
</tr>
<tr>
<td>Conversion to full mini-chestotomy</td>
<td>2 (2.0%)</td>
<td>1 (6.3%)</td>
<td>13 (8.7%)</td>
<td>0 (0.0%)</td>
<td>0.04</td>
<td>0.06</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>3 or more mediastinal nodal stations dissected</td>
<td>88 (89.7%)</td>
<td>13 (100.0%)</td>
<td>138 (86.5%)</td>
<td>12 (90.9%)</td>
<td>0.14</td>
<td>0.30</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>Patients upstaged postoperatively</td>
<td>12 (21.1%)</td>
<td>1 (11.1%)</td>
<td>2 (2.4%)</td>
<td>0 (0.0%)</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td></td>
</tr>
<tr>
<td>Chest drain duration, mean (days)</td>
<td>4.2 ± 2.3</td>
<td>4.9 ± 2.7</td>
<td>3.9 ± 2.4</td>
<td>2.8 ± 1.1</td>
<td>0.26</td>
<td>0.25</td>
<td>0.39</td>
<td></td>
</tr>
<tr>
<td>Total drainage at time of drain removal, mean (ml)</td>
<td>356.6 ± 185.6</td>
<td>560.2 ± 532.2</td>
<td>542.1 ± 233.3</td>
<td>513.7 ± 223.8</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td></td>
</tr>
<tr>
<td>Length of stay, mean (days)</td>
<td>7.8 ± 3.4</td>
<td>6.9 ± 3.4</td>
<td>7.2 ± 2.6</td>
<td>4.3 ± 1.2</td>
<td>0.24</td>
<td>0.35</td>
<td>0.44</td>
<td></td>
</tr>
<tr>
<td>Mortality</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>Mortality, all</td>
<td>19 (17.8%)</td>
<td>2 (15.4%)</td>
<td>21 (12.5%)</td>
<td>1 (8.3%)</td>
<td>0.25</td>
<td>0.23</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>Mortality, prolonged air leak &gt;5 days</td>
<td>8 (7.3%)</td>
<td>2 (15.4%)</td>
<td>12 (7.1%)</td>
<td>1 (8.3%)</td>
<td>0.87</td>
<td>0.77</td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td>Pain &gt;3 on postop day 1 (visual analog scale 0-10)</td>
<td>29 (36.5%)</td>
<td>2 (20.0%)</td>
<td>51 (42.9%)</td>
<td>5 (41.7%)</td>
<td>0.10</td>
<td>0.04</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Pain &gt;3 on postop day 2 (visual analog scale 0-10)</td>
<td>23 (28.0%)</td>
<td>2 (20.0%)</td>
<td>46 (39.6%)</td>
<td>7 (58.3%)</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lobectomy (n=155)</th>
<th>56</th>
<th>2</th>
<th>89</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (years)</td>
<td>59.2 ± 11.8</td>
<td>55.5 ± 7.8</td>
<td>61.0 ± 12.0</td>
<td>61.1 ± 8.8</td>
</tr>
<tr>
<td>Male</td>
<td>20 (38.7%)</td>
<td>1 (50.0%)</td>
<td>38 (42.7%)</td>
<td>3 (37.5%)</td>
</tr>
<tr>
<td>Operation time, mean (mins)</td>
<td>131.3 ± 62.6</td>
<td>124.5 ± 13.4</td>
<td>120.6 ± 74.0</td>
<td>97.2 ± 13.9</td>
</tr>
<tr>
<td>Blood loss, mean (ml)</td>
<td>19.5 ± 53.3</td>
<td>n/a</td>
<td>66.7 ± 75.2</td>
<td>93.9 ± 17.7</td>
</tr>
<tr>
<td>Length of stay, mean (days)</td>
<td>6.6 ± 2.7</td>
<td>4.5 ± 3.5</td>
<td>7.2 ± 5.5</td>
<td>4.5 ± 1.6</td>
</tr>
<tr>
<td>Mortality</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Mortality, all</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>3 (4.0%)</td>
<td>1 (22.2%)</td>
</tr>
<tr>
<td>Pain &gt;3 on postop day 1 (visual analog scale 0-10)</td>
<td>5 (12.5%)</td>
<td>0 (0.0%)</td>
<td>11 (13.7%)</td>
<td>4 (50.0%)</td>
</tr>
<tr>
<td>Pain &gt;3 on postop day 2 (visual analog scale 0-10)</td>
<td>4 (10.4%)</td>
<td>0 (0.0%)</td>
<td>8 (9.9%)</td>
<td>5 (62.5%)</td>
</tr>
<tr>
<td>Pain &gt;3 on postop day 3 (visual analog scale 0-10)</td>
<td>3 (8.1%)</td>
<td>0 (0.0%)</td>
<td>10 (17.0%)</td>
<td>6 (75.0%)</td>
</tr>
</tbody>
</table>

*Note: due to a few missing data, ‘100%’ may equal less than total number of patients in each subgroup or some of the above cells.*
V-054

SINGLE-PORT VATS PLEURECTOMY BY HYDROSTATIC PLEURAL DISSECTION FOR PLEURODESIS

C.A.A. Araujo¹, G.S.L. Carvalho¹, L.D.P. Pinheiro², M.G. Costa³, L.V. Melo³, Marcos Alexandre Balieiro⁴, C.A. Amorim³, J.L.C.M. Dantas¹, A.A. Oliveira⁵, T.B.F. Diniz⁶

¹Departamento de Medicina Integrada, Universidade Federal do Rio Grande do Norte, Natal, Brazil,
²Departamento de Cirurgia, Universidade do Estado do Rio Grande do Norte, Mossoró, Brazil,
³Departamento de Cirurgia Cardiotorálica, Hospital Memorial São José, Recife, Brazil,
⁴Departamento de Cirurgia Torácica, Hospital Federal dos Servidores do Estado, Rio de Janeiro, Brazil,
⁵Departamento de Cirurgia, Universidade Federal de Goiás, Goiânia, Brazil,
⁶Departamento de Cirurgia, Universidade Potiguar, Natal, Brazil

Objectives:
Pleurodesis plays an important role in treating spontaneous pneumothorax and recurrent pleural effusions. Conventional pleurectomy and talc pleurodesis achieve good results. Nevertheless, the former may be technically challenging and associated with bleeding, and the latter may result in respiratory distress. Considering the above, this paper aims to demonstrate a technique that facilitates pleurectomy by subpleural epinephrine/saline solution infusion.

Video description:
The procedure was performed in 18 patients: 12 men and six women aged 16 to 68 years. Indications for surgery included: recurrent malignant pleural effusion, primary recurrent pneumothorax or secondary pneumothorax complicated by COPD. The technique consisted of a singleport pleuroscopy to guide the percutaneous punctures and subpleural positioning of the needles, followed by infusion of diluted epinephrine in normothermic 0.9% saline in each intercostal space, separating the parietal pleura from the endothoracic fascia, creating a space which facilitates pleurectomy. The whole process was monitored by video, assuring space creation and safety. Cardiovascular parameters were monitored during and after the infusion. Pleurectomy was performed by VATS, through a singleport, using blunt instruments (Foster clamp and aspirator), followed by hemostasis review of all the dissected area. It is noteworthy that the removal of the parietal pleura is performed under direct video vision of the space between it and the endothoracic fascia, allowing local hemostasis when required. Finally a chest tube is placed under thoracoscopy. All patients had a good outcome without significant bleeding on
chest tube drainage. Daily radiographic control was obtained until removal of the drain, usually on the second postoperative day, following lung expansion and a debt below 150ml in the past 12 hours. No patient experienced significant cardiovascular changes during solution infusion.

**Conclusions:**
The authors conclude that the infusion facilitates pleurectomy and minimizes intraoperative and postoperative bleeding, allowing a safer and technically easier approach for pleurectomy and pleurodesis.

**Disclosure:** No significant relationships.

**Keywords:** Pleurodesis, epinephrine solution, hydrostatic dissections, pleurectomy technique
V-055

THORACOSCOPIC RESECTION OF POSTERIOR MEDIASTINUM MÜLLERIAN CYST

Guillermo Puchulo1, A. Cataldo1, M. Rodriguez Zubieta2, J. Braga Menendez1, J. Ansede1, D. Chimondeguy1

1Cirugía Torácica, Hospital Universitario Austral, Derqui, Argentina,
2Anatomía Patológica, Hospital Universitario Austral, Derqui, Argentina

Objectives:
Primary congenital mediastinal cysts have a broad range of etiologies. They can be bronchogenic, thymic, neuroenteric, or esophageal in origin. Müllerian cysts of the posterior mediastinum are rare, and the first report was published in 2005 by Hattori. Up to date there are approximately 20 cases reported. We present a video thoracoscopic resection of a müllerian cyst of the posterior mediastinum.

Video description:
We present a female patient of 40 years old with a ciliated cyst with müllerian differentiation. The patient was asymptomatic. The cyst was found in a routine medical checkup. The mass was studied with TAC and RMI and it suggested being purely cystic measuring 27mm. It was placed paravertebral behind the aortic arch at T4-T5 level. The whole cyst was resected by video thoracoscopic surgery with three incisions.

Conclusions:
Hattori’s cyst accounts for about 5.5% of mediastinal non-neoplastic cysts. They are usually found in female between 35 and 60 years. They may be misdiagnosed as bronchogenic cysts due to their ciliated epithelium, but the expression of estrogenic and progesterone receptors proofs its müllerian differentiation. Actually the patient is in fourth month postoperative with no sign of recurrence. Müllerian cyst is rare but we suggest to be considered in posterior mediastinum cysts found in women between 35 and 60 years. The behavior of these lesions appears to be benign and there are no reports of recurrence. To our knowledge, this is the first report of müllerian cyst of posterior mediastinum in Argentina.

Disclosure: No significant relationships.
Keywords: VATS, mediastinum, müllerian, cyst
OUTCOMES OF ANATOMIC LUNG RESECTIONS IN BRAZIL: RESULTS OF A NATIONAL DATABASE FROM THE BRAZILIAN SOCIETY OF THORACIC SURGERY

Ricardo Terra¹, G. Fortunato², S. Camargo³, M.T. Tsukazan⁴, L. Lauricella¹, H. Oliveira⁵, D. Pinto Filho⁶

¹Thoracic Surgery, University of Sao Paulo Medical School, Sao Paulo, Brazil,
²Thoracic Surgery, Santa Casa de Misericordia da Bahia - Hospital Santa Isabel, Salvador, Brazil,
³Pavilhão Pereira Fiho, Santa Casa de Porto Alegre, Porto Alegre, Brazil,
⁴Thoracic Surgery, Hospital São Lucas - Pontificia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brazil,
⁵Thoracic Surgery, Hospital de Base do Distrito Federal, Brasilia, Brazil,
⁶Thoracic Surgery, Universidade de Caxias do Sul, Caxias do Sul, Brazil

Objectives:
Analyze morbidity and mortality of anatomic lung resections in Brazil.

Methods:
The Brazilian Society of Thoracic Surgery (BSTS) has partnered with ESTS and since August/2015 uses a customized version of the ESTS platform as its national database (BSTS Database) and, in December 2015, 1367 patients were already registered. In the current analysis, we included patients who underwent anatomic lung resections; wedge resections and unspecified cases were excluded. The main outcome was postoperative mortality (in-hospital) and the secondary outcome was complication rate and profile.

Results:
Out of the 1367 cases registered, 902 were anatomic lung resections. Patient’s mean age was 59.6 years (+-15.2) and 52.5% were women. The baseline diagnosis (n=597) was lung cancer in 450 (75.3%), bronchiectasis or lung malformations in 70 (11.7%), tuberculosis-associated lung destruction in 57 (9.5%), and metastasis in 14 (2.4%). ASA score (n=793) was 1 in 16.1%, 2 in 49.8 %, 3 in 28.7%, and 4 in 5.4 %. The resections performed were lobectomy in 681 cases (75.5%, 45% of which were VATS), pneumonectomy in 71 (7.9%, 13% VATS), bilobectomy 39 (4.3%, 13% VATS), and segmentectomy 111 (12.3%, 66% VATS). Morbidity rate was 36.7% and it varied according to the procedure performed, complication profile was also different between lobectomy and pneumonectomy (Table1). Overall mortality rate was 2.6% (22/843) and it varied significantly according to the procedure performed, lobectomy 11/641 (1.7%), pneumonectomy 6/62 (8.8%), bilobectomy 2/36 (5.5%), and segmentectomy 3/104 (2.8%). Most relevant complications in patients with fatal outcome were pneumonia (11), myocardial infarct (3), bleeding requiring reoperation (1), and impossibility to wean from mechanical ventilation (1).
Conclusion:
Mortality and major morbidity rates of anatomic lung resections in Brazil are similar to other international series. Nevertheless, the high incidence of infectious complications as pneumonia and empyema is an issue to be studied and dealt with.

Disclosure: R. Terra: Scientific consultant/Advisory board: Johnson &Johnson and Medtronic

Keywords: database, outcomes, lung resection, lobectomy, pneumonectomy
**MONDAY, 30 MAY 2016**

**17:30 - 19:00**

**SESSION VI: INNOVATIVE/EXPERIMENTAL**

**F-057**

**MODIFIED GENE EXPRESSIONS OF ALVEOLAR-CAPILLAR MEMBRANE, EXTRACELLULAR MATRIX AND MEMBRANE PROTEINS AFTER INDUCTION CHEMOTHERAPY FOR NON SMALL CELL LUNG CANCER**

Lucio Cagini¹, L. Marinucci², V. Ludovini³, M. Andolfi¹, R. Potenza¹, S. Balloni², J. Vannucci¹, A. Siggillino¹, F.R. Tofanetti³, G. Bellezza⁴, M. Bodo², F. Puma¹

¹Surgical Science, University of Perugia, Thoracic Surgery Unit, Perugia, Italy;
²Experimental Medicine, University of Perugia, Section of Bioscience and Medical Embryology, Perugia, Italy;
³Medical Oncology Department, Medical Oncology Unit, Perugia, Italy;
⁴Department of Experimental Medicine, University Of Perugia, Section of Anatomic Pathology and Histology, Perugia, Italy

**Objectives:**

It has been hypothesised that preoperative chemotherapy may play a role in postoperative respiratory complications due to subclinical parenchymal damage. We investigated the gene expressions of lung tissue components after neoadjuvant chemotherapy of alveolar-capillar membrane (ACM), extracellular matrix (ECM) and membrane proteins.

**Methods:**

The study group included 14 patients submitted to pulmonary resection for lung cancer after at least three cycles of platinum-based chemotherapy, while the control group included 14 naïve-treatment patients. Total RNA was extracted from frozen tissue obtained by healthy lung specimens using EZ1 RNA Universal Tissue kit and automatically purified by BioRobot EZ1 instrument. 500 ng of total RNA was reverse transcribed to cDNA and used to evaluate the gene expression of type I and III collagen, elastin, syndecan, MMP13, AQP5 and integrins in real-time PCR. The primer sequences of each gene were obtained from Invitrogen. Results were expressed as the mean ± S.D. of three independent experiments, each performed in triplicate. Analysis of variance (ANOVA) followed by Sheffe F-test were performed.

**Results:**

Among the ACM and ECM genes, type I and III collagens, as well as syndecan were significantly up-regulated (+614%, +317% and +248%, respectively) while elastin and MMP13 were down-regulated in the study group vs. control group. Furthermore, chemotherapy significantly increased AQP expressions (AQP1:+51% and AQP5:+35%) and reduced integrins (a2:-79%, av:-85% and b1:-63%). Differences vs. mRNA levels in each respective control: F-test significant at 99%; only elastin F-test significant at 95%.
Conclusion:
The gene expressions of ACM, ECM and membrane proteins were found to be significantly modified after chemotherapy suggesting that it may trigger parenchymal damage. Moreover, we observed a significant up-regulation of genes predicting both interstitial lung edema and lung fibrosis along with a down regulation of genes involved in elastic plasticity. This study was supported by AIRC.

Disclosure: No significant relationships.
Keywords: lung resection, neoadjuvant chemotherapy, lung fibrosis
NEW APPROACHES IN THE MALIGNANT MESOTHELIOMA STUDY: CHICK EMBRYO CHorioALLANTOIC MEMBRANE MODEL AND NANOPIRTELES THERAPY

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Objectives:
The aim of this study was to evaluate the behavior of the human malignant mesothelioma transplanted xenografts on the chicken embryos chorioallantoic membranes. Also we tested the antiproliferative and antimetastatic effects of the magnetic targeted Fe3O4/salicylic acid nanoparticles in the tumor areas.

Methods:
Xenografts of tumor tissue intraoperative harvested from a patient with pleural malignant mesothelioma were implanted on the six day old chicken embryos chorioallantoic membranes, and placed in an incubator for five days in order to develop. Half of the chicken embryos were injected intravenously with 0.25 ml aqueous dispersion of Fe3O4/salicylic acid nanoparticles, and exposed to the action of a static magnetic field by placing a magnet on the chorioallantoic membranes to drive targeted nanoparticles in the xenografts areas. Xenografts and surrounding chorioallantoic membrane were harvested four days after the nanoparticles administration, and processed by histological and immunohistochemical methods (H&E, Calretinin, HBME-1, and Cytokeratin stainings).

Results:
The transplanted mesothelioma cells had highly metastatic features, and showed a specific pattern of metastasis. They migrated on the chorioallantoic membrane surface only in the direction of the vessels that contain oxygenated blood (chorioallantoic membrane veins). The metastatic mesothelioma cells grown and finally formed tumor masses on the chorioallantoic membrane with a similar layout of the subjacent venous network. The mesothelioma metastatic cells kept the same immunohistochemical features as the xenografts cells (Calretinin+, HBME-1+, and Cytokeratin+). Mesoscopic and immunohistochemical analysis of the nanoparticles injected embryos revealed a regression until to disappearance of the metastatic tumor masses exposed to the magnetic field action.
Conclusion:
This work confirmed the chick chorioallantoic membrane versatility as a model to study malignant mesothelioma. Magnetic targeted Fe3O4/salicylic acid nanoparticles inhibited the proliferation and metastasis of the malignant mesothelioma cells on the chick embryo chorioallantoic membrane.

Disclosure: No significant relationships.

Keywords: Mesothelioma, chick chorioallantoic membrane, magnetic nanoparticles, salicylic acid, tumor xenograft, nanomedicine
POWERED STAPLER DEVICE REDUCES THE INCIDENCE OF PROLONGED AIR LEAK AND DURATION OF CHEST TUBE DRAINAGE AFTER LUNG VOLUME REDUCTION SURGERY: A PROSPECTIVE RANDOMIZED BLINDED STUDY

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Objectives:
Prolonged air leak is reported in up to 50% of patients after lung volume reduction surgery (LVRS). The effect of a powered stapler on the volume and duration of air leak and on the time to chest-drain removal after LVRS was investigated in a randomized, blinded prospective clinical trial.

Methods:
Nineteen patients, aged 64 years (range 35-77) underwent bilateral LVRS by video-assisted thoracic surgery (VATS). The powered group, Echelon FLEX™ Powered ENDOPATH® Stapler (Johnson & Johnson, U.S.A) was compared to the control group, non-powered ECHELON FLEX™ ENDOPATH® Stapler (Johnson & Johnson, U.S.A) within each patient. The left or right side allocation was randomly assigned to the control or the powered group in the operating room. Sealed envelopes were used for the allocation. Air leak was measured using the thoracic drainage Medela-Topaz™ system. The measurement was performed by a co-investigator blinded to the experiment. Results are presented as mean ± SD.

Results:
The mean volume of air leak for the first 48 hours postoperative was significantly lower in the powered group (366.8±570.3) than in the control group (734.7±797.4; p<0.01). Duration of air leak was significantly lower in the powered group (3.8±3.3 days) than in the control group (7.6±6.1; p<0.012), independent of the length of the resection and the operating time. The mean duration of the chest tube drainage was significantly lower in the powered group (5.3±3.1 days) than in the control group (8.5±5.4; p<0.011). The postoperative complications were also lower in the powered group 5/19 (26.3%) vs. the control group 10/19 (52.6%). There was no mortality.

Conclusion:
Echelon FLEX™ Powered ENDOPATH® Stapler for lung volume reduction surgery significantly reduces prolonged air leak, duration of chest tube drainage and postoperative complications.

Disclosure: No significant relationships.
Keywords: prolonged air leak, surgical technique, lung volume reduction surgery
F-060

ENDOBRONCHIAL ULTRASONOGRAPHY WITH GUIDE SHEATH VERSUS CT GUIDED PERCUTANEOUS BIOPSIES FOR PERIPHERAL LUNG LESIONS: A PROSPECTIVE STUDY WITH PROPENSITY SCORE MATCHING ANALYSIS

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Objectives:
It is still controversial which is a better choice for diagnosing peripheral pulmonary nodules without large sample sized prospective randomised trial. The aim of this study is to determine diagnostic accuracy, complications and patient tolerability of EBUS-GS and CT-guided percutaneous biopsy for peripheral lung lesions.

Methods:
This was a prospective cohort study. Patients were divided into EBUS-GS group and CT guided biopsy group according to patient intent to treatment. The inclusion criteria included: CT proven peripheral pulmonary nodules with no clear pathological diagnosis, patients without contraindication of EBUS-GS or CT guided biopsy. Primary endpoints were adverse events and diagnostic accuracy of each procedure. Propensity score matching was used to eliminate the intergroup bias.

Results:
From June 2014 to August 2015, 180 patients were included in the study, with 50 patients in EBUS-GS group and 130 in CT guided biopsy group. After matching, 50 patients in each group were included for analysis. There were no significant differences between the two groups in terms of gender, age, tumor size, pulmonary complications or ECOG performance status. Diagnostic sensitivity was 86% (43/50) for CT biopsy cases and 78% (39/50) for EBUS-GS cases (p > 0.1). Thirty six cases and 44 cases were diagnosed as malignant finally in CT group and EBUS-GS group separately. The sensitivity for malignancy was 91.7% (33/36) for CT-guided biopsy and 75.0% (33/44) for EBUS-GS (p<0.01). The overall morbidity rate was 14% (7/50) for CT-guided biopsy group, including 4 cases with pneumothorax, and three cases with severe chest pain. While there was neither pneumothorax.

Conclusion:
The overall diagnostic sensitivity of EBUS-GS was comparable to CT-guided biopsy, but the sensitivity for malignancy was lower in EBUS-GS group. EBUS-GS had better tolerability and fewer complications, especially for patients with COPD or pulmonary interstitial fibrosis.

Disclosure: No significant relationships.
Keywords: endobronchial ultrasonography with guide sheath, CT guided biopsy, propensity score matching
INTERSTITIAL FLUID PRESSURE OF THYMIC EPITHELIAL TUMOR

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Objectives:
Interstitial fluid pressure (IFP) was reported to be one of prognostic factors for head and neck cancer and hepatocellular carcinoma (HCC). The aim of this study is to evaluate clinical effectiveness of measuring IFP of thymic epithelial tumor.

Methods:
After institutional review board approval, from March 2010 to January 2015 we conducted to measure IFP of 44 cases of thymic epithelial tumors, 11 male and 33 female with mean age of 64 year-old (40-87). The histological types of 44 thymic epithelial tumors according to WHO classification are as follows: A (3), AB (12), B1 (8), B2 (14), B3 (2), sclerosing thymoma (1), and thoracic carcinoma (4), respectively. The distributions of Masaoka stages of 44 thymic epithelial tumors are as follows: stage I (11), stage II (24), stage III (5), stage IVa (2), and stage IVb (2), respectively. IFP was measured was measured using a micro catheter pressure transducer (SPR-1000, Millar) in a manner similar to that described by an earlier report.

Results:
Mean IFP was 11.3 ± 6.0mmHg (1.5-28.6). Mean IFPs of the tumors according to WHO classification were as follows: A = 9, AB = 9, B1 =14, B2 = 13, B3 =8, thymic carcinoma = 12 mmHg. Mean IFPs of the tumors according to the stage were as follows: I = 9, II = 11, III =14, IVa = 16, IVb = 16 mmHg., IFP was correlated with the stage (p = 0.03), SUVmax (r = 0.71), lung invasion (p = 0.006), and dissemination (p = 0.008). In univariate analysis, the stage, WHO classification, lung invasion, dissemination were selected for prognostic factors for thymic epithelial tumors after surgery (disease free survival, p < 0.05). Lower IFP showed tendency towards better survival (p = 0.07).

Conclusion:
IFP of thyromic epithelial tumor correlated with Masaoka stage.

Disclosure: No significant relationships.
Keywords: interstitial fluid pressure, thymoma, thymic carcinoma, thymic epithelial tumor
LESSONS TISSUE ENGINEERING TRACHEA: SEEN A LIGHT AT THE END OF THE TUNNEL?

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Objectives:
Resection of more than 50% of the length of the trachea is considered hazardous in terms of insolvency and death. The open question is the possibility of not only the complete replacement of the trachea, and a types scaffold used? Synthetic or cadaveric, seeded patient’s own cells?

Methods:
Between 2011-2015, KKB №1 based study was carried out (www.clinicaltrials.gov) on the use of synthetic scaffolds seeded own stem cells with full replacement of the trachea in previously fully treated patients with lesions of more than 50% of the length of the trachea. We studied the safety, biocompatibility, stability of the graft, the patient’s quality of life. Been performed six transplants of which two retransplantation in four patients with non-malignant stenosis of the trachea three of whom (75%) sublaryngeal stenosis. All operations via sternotomy access to the performance of circular resection five (sublaryngeal anastomoses). Two types of synthetic scaffolds

Results:
Observation periods of seven to 27 months, intraoperative complications were observed. After surgery, the most significant complication is the retention of sputum and chronic infection, the development of granulation tissue. Two months after transplantation, the leading problem is the absence of revascularization in the middle of the scaffold, although in the first month after transplantation of islet development of the epithelium were detected on the scaffold. Three patients died of four in terms of seven, 21, 27 months after transplantation for various reasons.

Conclusion:
Present technology needs to be improved, although at the moment we can guarantee up to two years life expectancy for patients with severe or end-life disease as salvage treatment. Probably promising is the use of biological scaffold.

Disclosure: No significant relationships.
Keywords: stem cells, artificial tracheal scaffold, tracheal transplantation
PULSOMETRY IN PROGNOSIS OF BRONCHO-PLEURAL FISTULA AFTER PNEUMONECTOMY.

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Objectives:
The aim of the study is to evaluate the pulse blood flow in a bronchial stump after pneumonectomy and its influence on the probability of the broncho-pleural fistula (BPF) formation.

Methods:
Original photometric device (pulsograph) enable to fix the pulse blood flow in various areas of bronchial stump was used. The detection of pulsations of bronchial stump submucosal vessels using fibrobronchoscope was carried out. Procedure was performed during the early postoperative period. The areas of a bronchial stump were lit with a light source via the bronchoscope. Through the fiber-optical conductor the reflected light modulated by a pulse blood flow of the targeted area came to the photoconverter. The pulse blood flow was measured in three points of a bronchial stump suture line – medial, middle and lateral. Data were displayed in the form of fluctuations on the paper tape carrier. The level of a pulse blood flow was quantitatively estimated as a curve amplitude in millimeters (mm). The pulse blood flow was estimated by a curve amplitude height.

Results:
The BPF was diagnosed at 10 of 96 patients (10,4%). Eight (80,0%) of ten patients with an amplitude of a pulse blood flow in a middle point of a stump equal or smaller than 3 mm developed BPF and were included in a high risk group. Sensitivity of this method was 83,3%, specificity – 98,8% and accuracy - 97,8%.

Conclusion:
Endoscopic monitoring of the pulse blood flow in the bronchial stump after pneumonectomy is a reliable method of prediction of the BPF with the probability of 77,2%.

Disclosure: No significant relationships.
Keywords: fistula, pneumonectomy, pulsometry, bronchoscopy
THE USE OF A SMARTPHONE APPLICATION FOR FAST LUNG CANCER RISK ASSESSMENT

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Objectives:
The early detection of NSCLC cases is still the key point of the surgical treatment of lung cancer. Finding the symptomless patients require the system of risk assessment, risk group selection and a controlled screening. The modern communication path of the mobile devices are enabling us a complete new communication and selection method which can effectively simplify the risk group identification and the suggestion of screening by the Screening Centers. The aim of our study was to determine the effectivity of a lung cancer risk assessment mobile application (LungScreen) in a localised setting.

Methods:
In 2015 we started to apply a lung cancer risk assessment application (LungScreen) for Android and iOS mobile platforms for selecting high risk population in Baranya County, Hungary. The program was advertised on social media and local newspaper targeting the population of 700,000 citizens. The participation was voluntary. Based on GPS coordinates the high risk participant were navigated to the nearest Screening Center for further investigation (LDCT following Pulmonological verification). We analysed the records of the application in one year test period aided by an informative campaign locally.

Results:
In one year test period 12780 participants downloaded and completed the risk assessment test (Male/Female 58%/42%, Age range 9-92 years, mean age 38.2 year). 2750 participants were active smokers, high risk criteria was calculated in 789 cases, in which further screening investigation were suggested. 158 LDCT screening were performed, with 32 positive findings which required further investigations. In nine cases Tumor Board decided to indicate surgery (seven cases NSCLC, two cases benign lesion). All the procedures were performed with VATS.

Conclusion:
Lung cancer risk assessment via mobile devices allows free, fast and efficient way to select, manage and localize high risk population for NSCLC in a localised setting. It can aid to initiate screening trials as it simplifies the recruitment dramatically.

Disclosure: No significant relationships.
Keywords: lung screen test, lung, cancer, screening
BRONCHOSCOPIC ASSESSMENT OF BRONCHIAL ANASTOMOSIS BY VISUALIZING LOCAL CIRCULATION STATUS

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Objectives:
Healing of airway anastomosis is largely affected by local conditions. The index of hemoglobin (IHB) mode is a color enhancement technique that clarifies local circulation of the involved endoscopic field. This study was performed to investigate the relationship between bronchoscopic assessment of tracheobronchial anastomosis using the IHB and occurrence of anastomosis-related complications.

Methods:
The IHB was calculated by logarithmic transformation for each pixel of the electronic endoscopic images and expressed by colors of red, green, and blue. The distribution of each color area was automatically calculated by the summation of pixels. The relationship between the circulatory status and IHB findings in bronchoscopy was confirmed using isosorbide mononitrate-injected swine. Forty consecutive patients who underwent tracheobronchial plasty were divided into training and validation cohorts, and anastomosis-related complications and IHB findings were analyzed.

Results:
The correlation between circulation and the IHB was implicated in the swine experiment. Among 25 cases of the training cohort, six cases experienced complications, and lower red values and higher blue values in the IHB were significant observed in the cases (p < 0.05). A receiver operating characteristic curve for the IHB red and blue distributions revealed the thresholds to differentiate cases with complications as 89.2 and 109.0, respectively. An analysis of the validation cohort revealed that the IHB blue on POD 7 was a potentially reliable predictor of complications, with 60.0% sensitivity and 90.0% specificity.

Conclusion:
IHB mode was useful to assess the condition of the anastomosis after tracheobronchial plasty. The IHB mode is simple and may be helpful in the diagnosis of mucosal ischemic damage of bronchial anastomosis after bronchoplasty.

Disclosure: No significant relationships.
Keywords: index of hemoglobin, bronchoscopy, bronchoplasty, lung cancer, complication
THORACOSCOPIC LATERAL AND POSTERIOR BASAL (S9+10) SEGMENTECTOMY USING “INTERSEGMENTAL TUNNELING”

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Objectives:
Appropriate lateral and posterior basal (S9+10) segmentectomy requires exposure and recognition of common basal pulmonary vein branches located deep in lung parenchyma. Therefore, we applied the “intersegmental tunneling method” in patients undergoing S9+10 segmentectomy to accurately detect the pulmonary vein branches feeding the affected S9+10 segment.

Video description:
Five patients underwent thoracoscopic S9+10 segmentectomy using “intersegmental tunneling” between April 2014 and December 2015. A preoperative three-dimensional computed tomography scan was taken to identify branches of the pulmonary vessels in all patients. The S9+10 segmental pulmonary artery was divided at the fissure. The pulmonary ligament was incised up to the lower pulmonary vein, and the superior segmental pulmonary vein (V6) was exposed. The dissection of the fissure proceeded along the outer sidewall of the S9+10 segmental bronchus (B9+10) toward the back, and V6 was detected. “Intersegmental tunneling” was performed caudal to V6, and the B9+10 was transected. Then, the segmental plane between the superior segment (S6) and S9+10 was divided by electrocautery or staples. The branches of the pulmonary vein feeding the affected S9+10 segment were recognized easily and divided. Finally, the segmental plane between the medial and anterior basal segment (S7+8) and S9+10 was divided. One patient had an involved left side and four had an involved right side. Mean operation time was 218 ± 15 min. Mean total blood loss was 16 ± 23 ml, and mean postoperative drainage duration was 2.2 ± 0.4 days.

Conclusions:
The branches of the pulmonary vein feeding the affected S9+10 segment were recognized accurately using “intersegmental tunneling”, allowing for an appropriate S9+10 segmentectomy.

Disclosure: No significant relationships.
Keywords: thoracoscopy, S9+10 segmentectomy, intersegmental tunneling
BRONCHOSTOMY FOR OPERATIVE MANAGEMENT IN A CARINAL PNEUMONECTOMY: A NOVEL TECHNIQUE OF CROSS-FIELD INTUBATION

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Objectives:
A carinal pneumonectomy is a challenging procedure. Appropriate surgical approach and respiratory management should be selected carefully for each case especially in left side lesions.

Video description:
A 52 year-old female complained about persistent cough for three months. A tumor involving the left main bronchus was revealed in CT. Her respiratory condition acutely deteriorated before fine examination. Emergent bronchoscopy revealed that the tumor occluded the left main bronchus and invaded to the trachea, then two expandable metallic stents were inserted in tandem. Pathologic diagnosis was adenoid cystic carcinoma, and carinal pneumonectomy was performed one month later. The patient was intubated using a single lumen tube and a clam-shell thoracotomy was selected in consideration of dissection of the tumor and pericardium. Through an anterior pericardiotomy, the lower trachea, carina, bilateral main bronchus, and right pulmonary artery was exposed. Left pulmonary vessels were encircled. After insertion of endotracheal blocker in the left main bronchus, a bronchostomy was made at the proximal portion of the left lower bronchus. The 5.5mm ID spiral endotracheal tube (Phycon, Tokyo, Japan) was inserted, and fixed with a purse string suture, and cross-field ventilation was established. The trachea was transected at the three rings above the carina, the right main bronchus was transected at the orifice, and the two stumps were sutured to seal the left ventilation system. The trachea and right main bronchus was anastomosed with 4-0 PDS. After division of severe adhesion to the pericardium, a left pneumonectomy was completed by transection of the previously dissected vessels. Operation period was six hours two minutes, and estimated blood loss was 940g.

Conclusions:
Cross-field ventilation via a bronchostomy could maintain a stable anesthetic condition, and help us to performing a tracheo-bronchial anastomosis smoothly because of ventilator system was set in the affected side.

Disclosure: No significant relationships.
Keywords: carinal pneumonectomy, sleeve pneumonectomy, tracheal tumor, adenoid cystic carcinoma, cross-field ventilation
LEFT SLEEVE PNEUMONECTOMY THROUGH LEFT LATERAL THORACOTOMY

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Objectives:
Tumors involving the carina continue to be a challenge due to the surgical complexity of airway reconstruction. Left sleeve pneumonectomy, in particular, is a complex and aggressive procedure for the treatment of these tumors, providing lesion-free margins for most patients, which represents an important prognostic factor. Median sternotomy and clamshell incision are the approaches most frequently used for left sleeve pneumonectomy allowing for good exposure of the carina.

Video description:
We present the case of a 54 year old male diagnosed with left squamous NSCLC, involving the carina and left main bronchus. Fiber-optic bronchoscopy showed infiltration of the carina and main left bronchus down to the emergence of the upper bronchus. CT scan showed only the presence of infracentimetric lymph nodes. A decision was taken to perform radical left sleeve pneumonectomy through lateral thoracotomy. After dividing pulmonary vessels, the trachea and main bronchi were dissected and freed from surrounding mediastinal tissue in order to facilitate anastomosis. Tracheobronchial division was performed and the endotracheal tube was replaced with high frequency jet ventilation catheter. End-to-end anastomosis of right main bronchus and distal trachea was performed with continuous suture. The anastomosis was verified for air tightness with saline solution and protected with pericardial fat pad. Postoperative recovery was uneventful and the patient was discharged 10 days later.

Conclusions:
Although left sleeve pneumonectomy through lateral thoracotomy is considered to be nearly impossible, mainly due to the presence of the aortic arch, it is still feasible if the distal trachea and right main bronchus have been extensively dissected from the surrounding mediastinal tissue, thus gaining enough length for anastomosis and avoiding tension sutures. Using left lateral thoracotomy we were able to avoid a one-step surgery performed through sternotomy or a two-step procedure consisting in left thoracotomy for pneumonectomy and carinal resection and anastomosis through standard right thoracotomy.

Disclosure: No significant relationships.
Keywords: left sleeve pneumonectomy, carinal resection, airway reconstruction, tumors involving the carina
NOVEL TECHNIQUE OF INDOCYANINE GREEN-NAVIGATED THORACOSCOPIC SEGMENTECTOMY

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Objectives:
Segmentectomy for peripheral small-sized lung nodules such as ground-glass opacities (GGOs) and metastatic pulmonary tumors is useful in obtaining pathological diagnosis and radical cure. However, thoracoscopic segmentectomy (TS-S), because of the need to identify variances in pulmonary vessels preoperatively and the intersegmental line during operation, is a technically more complicated operative procedure than lobectomy. We report the novel technique of indocyanine green fluorescence (ICGF)-navigated thoracoscopic right segment (S) 9+10 segmentectomy for primary lung cancer.

Video description:
Preoperatively, we evaluated the target segmental pulmonary artery and created a virtual intersegmental plane using simulation software (Volume Analyzer Synapse Vincent; Fujifilm Medical Systems, Tokyo, Japan). During operation, inferior pulmonary vein and pulmonary artery were exposed and we made a tunnel between S6 and basal segment. And then first ICGF was done after clamping A6. After intravenous systemic injection of ICG (0.25 mg/kg), ICGF of the non-target segments (basal segments) was observed using infrared thoracoscopy (KARL STORZ Endoskope Japan K.K., Tokyo, Japan). We marked the border between S6 and basal segments with electrocautery and divided the lung parenchyma along this border using staples. So, we could easily expose and divide A9+10 and B9+10. Then, second ICGF was done and we marked the border between S9+10 and S7+8. After dividing V9+10, we divided lung parenchyma using stapler alone this marking. ICG-navigated thoracoscopic S9+10 segmentectomy was completely done.

Conclusions:
ICGF-navigation is a simple and effective technique for TS-S.

Disclosure: No significant relationships.

Keywords: thoracoscopic surgery, segmentectomy, indocyanine green fluorescence
V-070

ROBOTIC RESECTION OF A LARGE THYMOMA WITH PERICARDIAL RESECTION

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Objectives:
There remains a general consensus that large thymoma should be resected using the open approach in order to stick to the general principles of oncological resection. After having used the robot for resection of a significant number of small and moderately sized thymomas we started using the robot for resection of large thymomas which were over 8 cm in size. With this video we want to demonstrate the feasibility and safety of robotic resection of large thymoma with invasion of the pericardium.

Video description:
The video demonstrates a three port robotic assisted radical thymectomy for a large thymoma of over 10 cm in the greatest dimension along with resection of involved pericardium with strict adherence to all oncological principles.

Conclusions:
Robotic resection of large thymoma with pericardial involvement is safe and feasible. However the enthusiasm of doing the procedure through robotic approach should be backed up by experience and a mindset of low threshold for conversion in event of inability to achieve all oncological aims.

Disclosure: No significant relationships.

Keywords: robotic thymectomy, radical thymectomy, robotic thoracic surgery, thymoma
COMBINED MINIMAL INVASIVE TRANSDIAPHRAGMATIC RESECTION OF PERIPHERAL COLORECTAL LUNG METASTASES IN PATIENTS UNDERGOING LAPAROSCOPIC LIVER RESECTION

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Objectives:
The management of patients with simultaneously diagnosed colorectal liver and lung metastases (SLLM) remains controversial. However, a recent study based on an analysis of the Liver-MetSurvey demonstrated that patients with SLLM suitable for resection of all metastases have similar survival when compared to patients who undergo removal of isolated liver metastases. Simultaneous transdiaphragmatic resection of peripheral lung lesions and liver resection by laparotomy has been described previously. To our knowledge no previous reports have been published on a similar minimal invasive approach.

Video description:
Since April 2015 we started performing combined minimal invasive transdiaphragmatic resections of peripheral colorectal lung metastases in patients undergoing laparoscopic liver resections.

General anesthesia is induced with placement of a double-lumen endotracheal tube to achieve single lung ventilation. Once laparoscopic liver resection is completed, the lung containing the metastatic lesion(s) is fully deflated, and the hemidiaphragm is carefully divided using a 10cm incision around the central tendon in order not to damage the phrenic nerve. Lung metastases are localized using intra-operative ultrasound. In patients with very small lung lesions (<1cm), the lesions are coiled preoperatively by an interventional radiologist in order to facilitate localization peroperatively using fluoroscopy. Larger lesions (>1cm) can be localised by intra-operative ultrasound. Lung resection is performed using endoscopic stapling devices. A thoracic tube is placed, and the diaphragm is closed with a running non-absorbable suture. The aim of this video is to demonstrate our initial experience with this minimal invasive approach.

Conclusions:
Combined resection of liver and lung metastasis by complete minimal invasive and transdiaphragmatic approach is a feasible and safe procedure.

Disclosure: No significant relationships.
Keywords: liver and lung metastasis, resection, transdiaphragmatic, minimal invasive, combined
A CASE OF LIPOSARCOMA UNDERGONE RESECTION OF PHARYNGES, LARYNXES, CERVICAL ESOPHAGUS AND MEDIASTINAL TUMOR WITH FREE JEJUNAL GRAFT AND ANTERIOR MEDIASTINAL TRACHEOSTOMY WITH PEDICLED OMENTAL FLAP.

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Objectives:
We have experienced a case that was completely resected in collaboration with other department to neck-mediastinal liposarcoma recurrence. Therefore, we report including surgical video.

Video description:
Seventy year old, male, four years ago, mediastinal tumor resection and neck tumor resection were divided into two times for neck-mediastinal liposarcoma. However, it showed progression of the tracheal stenosis at the post-operative recurrence, we decided enforce a radical operation again. Tumor was localized to the carina continuous with the mediastinum through the vertebral body front from the nasopharynx. The collaboration with thoracic surgery, otolaryngology, gastrointestinal surgery and plastic surgery, Resection of pharynges, larynxes, cervical esophagus and mediastinal tumor with free jejunal graft and anterior mediastinal tracheostomy with pedicled omental flap were performed. It underwent pharynx, larynx removed in the first range in otolaryngology operation of both sides in the carotid vein inside. In a state in which the tumor has been continuous in the mediastinum, it underwent cervical esophagus removal and mediastinum dissection at thoracic surgery. It was excised tumor disconnect the trachea at the level of under the second cartilage wheel. After the trachea dissection was performed the operative field intubation using 8Fr spiral tube. To perform the collection of free jejunum in gastrointestinal surgery, and underwent vascular anastomosis in plastic surgery, and rebuilt the free jejunum and nasopharyngeal and thoracic esophagus. In addition it was taken enterostomy and pedicled omental flap. After trimming the trachea, the omentum was filled around, underwent anterior mediastinal tracheostomy. Surgery time was 16 hours, bleeding was 16000cc. The postoperative course is good, it is currently undergoing observation.

Conclusions:
We performed a successful resection of massive liposarcoma arising from mediastinum. Surgical resection for massive liposarcoma is effective to release the pressure symptom.

Disclosure: No significant relationships.
Keywords: liposarcoma, surgery, mediastinal tracheostomy
THE EFFECT OF COLCHICINE ADMINISTRATION ON POST-OPERATIVE PLEURAL EFFUSION FOLLOWING THORACIC SURGERY: A RANDOMIZED, DOUBLE BLIND, PLACEBO-CONTROLLED, FEASIBILITY PILOT STUDY

A. Bessissow¹, John Agzarian², S. Srinathan³, L. Schneider², P. Devereaux¹, J. Neary⁴, W. Dechert⁵, L. Gandy⁶, C. Finley⁷, W.C. Hanna⁷, C. Schieman⁷, Y. Shargall⁷

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²Surgery, McMaster University, Hamilton, Canada,
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Objectives:
Colchicine was previously found to be effective in preventing postoperative pericardial effusion following cardiac surgery with potent anti-inflammatory effects. This study seeks to assess its effect on the volume of post-operative pleural drainage, duration of chest tube in-situ and length of stay following lung resection.

Methods:
Between April 2014 and April 2015, 100 patients undergoing lung resection at two tertiary care centers were randomized to either colchicine (n=49) or placebo (n=51) treatment arms (Figure 1), as part of a feasibility, pilot double-blind study assessing colchicine for prevention of perioperative atrial fibrillation. Patients received either colchicine 0.6 mg or placebo orally twice daily for 10 days, with the first dose given four hours prior to surgery. Pleural drainage volumes were recorded in eight-hour intervals until chest tube removal as per a standardized, pre-defined protocol.
Results:
The two groups were comparable on baseline characteristics with regard to cancer stage, co-morbidities, surgical approach and extent of resection (51% open procedures; 86% anatomic resections), but not for sex, coronary artery disease and hypertension. Analysis of total drainage volumes demonstrated a statistically significant difference in favour of the colchicine group (583.8 vs. 763.3 ml, p=0.039), with findings that remained consistent across the time intervals collected. The volume of pleural drainage at 1-hour post-op was significantly less in the colchicine group (92.9 vs. 156.6 ml, p=0.008), and remained lower at the 40-hour interval (550.9 vs. 741.3 ml, p=0.039). There were no differences in time to chest tube removal (6.8 vs. 5.9 days, p=0.585), hospital length of stay (7.4 vs. 6.9 days, p=0.641), or with regards to major bleeding, infection or adverse events.

Conclusion:
Perioperative administration of oral colchicine is potentially effective in diminishing the amount of pleural drainage post-lung resection. A full-scale, prospective placebo-control randomized trial is needed to assess the clinical significance of perioperative colchicine administration.
Disclosure: A. Bessissow: Colchicine, prepared by Bay Area Research Laboratory
J. Agzarian: Colchicine, prepared by Bay Area Research Laboratory
S. Srinathan: Colchicine, prepared by Bay Area Research Laboratory
L. Schneider: Colchicine, prepared by Bay Area Research Laboratory
P. Devereaux: Research grants: Canadian Institute of Health Research Open Operating Grant; Physicians Services Incorporated Foundation Research Grant
P. Devereaux: Colchicine: Produced by Bay Area Research Laboratory
J. Neary: Research grants: Physicians Services Incorporated Foundation Research Grant
J. Neary: Colchicine: Produced by Bay Area Research Laboratory
W. Dechert: Colchicine, prepared by Bay Area Research Laboratory
L. Gandy: Colchicine, prepared by Bay Area Research Laboratory
C. Finley: Colchicine, prepared by Bay Area Research Laboratory
W.C. Hanna: Colchicine, prepared by Bay Area Research Laboratory
C. Schieman: Colchicine, prepared by Bay Area Research Laboratory
Y. Shargall: Colchicine, prepared by Bay Area Research Laboratory

Keywords: pleural drainage, colchicine, RCT, placebo, lung resection
PROPENSITY SCORE MATCHING ANALYSIS OF SEGMENTECTOMY COMPARED WITH LOBECTOMY FOR CLINICAL STAGE I LUNG CANCER

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General and Cardiothoracic Surgery, Graduate School of Medicine, Gifu University, Gifu, Japan

Objectives:
We had reported feasibility of segmental resection in non-small-cell lung cancer with ground-glass opacity. (H. Iwata et al. Eur J Cardiothorac Surg. 2014:46(3):375-9). In this study, segmentectomy was compared with lobectomy for clinical stage I lung cancer using propensity score matching analysis.

Methods:
Segmentectomy and lobectomy were performed in 81 and 438 patients, respectively. Propensity scores were calculated using logistic regression analysis, and matched within score ±0.01 for age, sex, size of tumor, FDG-PET SUV value, CEA, consolidation/tumor diameter ratio of CT image (C/T ratio), clinical stage, pathological stage and histology.

Results:
In the non-matched analysis, the results for segmentectomy and lobectomy, respectively, were as follows: tumor size, 18±8 and 24±11 mm (p=0.003); FDG-PET SUV, 3.4±5.6 and 6.2±5.6 (p<0.001); C/T ratio, 46.4±40.2 and 62.8±42.6 % (p=0.024); clinical stage (IA/IB), 71/10 and 313/125 (p=0.002); blood loss, 81±171 and 131±206 mL (p=0.034); pathological stage (IA/IB/IIB/IIIA&IIB), 66/12/2/1 and 221/124/51/42 (p<0.001); mean duration of drainage, 3.1±2.6 and 4.1±4.6 days (p=0.015); five-year overall survival, 88.4% and 75.4% (log-rank p=0.068) ; and disease free survival, 84.0% and 68.9% (log-rank p=0.031). In 81 matched cases, the results for segmentectomy and lobectomy, respectively, were as follows: mean operative time, 266±90 and 271±96 min (p=0.706); blood loss, 81±171 and 92±94 mL (p=0.623); mean duration of drainage, 3.1±2.6 and 4.2±5.6 days (p=0.122); postoperative complications, 26 (32.1%) and 31 (38.3.8%; p=0.411); respiratory complications, 18 (22.2%) and 18 (22.2%; p=1.000); five-year overall survival, 88.3% and 88.1% (log-rank p=0.989) ; and disease free survival, 84.0% and 87.0% (log-rank p=0.689).

Conclusion:
On propensity score matching, segmentectomy showed similar outcomes compared to lobectomy for clinical stage I lung cancer with less than 20mm, less than 50% C/T ratio, and low FDG-PET SUV of the tumor.

Disclosure: No significant relationships.
Keywords: propensity score matching, lung cancer, segmentectomy, lobectomy
F-075

COMPARATIVE REVIEW OF SUBLOBAR RESECTION BETWEEN BEFORE AND AFTER VIRTUAL ASSISTED LUNG MAPPING INTRODUCTION IN A SINGLE INSTITUTE

Department of Thoracic Surgery, The University of Tokyo Graduate School of Medicine, Tokyo, Japan

Objectives:
Virtual assisted lung mapping (VAL-MAP) is as a novel preoperative bronchoscopic multi-spot dye-marking technique utilizing 3D virtual imaging. The aim of this study is to evaluate the efficacy of VAL-MAP in successful lung resection compared with histological controls.

Methods:
VAL-MAP was selected for lesions expected to be difficult to identify intraoperatively and/or for those requiring careful determination of resection margins during thoracoscopic sublobar lung resection (wedge resection or segmentectomy). As a historical control, we analyzed all sublobar resections conducted in 2013 without any preoperative markings (i.e., tumours identified visually or by palpation). We also collected the data of conventional CT-guided marking conducted after 2002. Thoracoscopic sublobar resections for suspected malignant lesions ≤20 mm in diameter were evaluated except for biopsy cases including biopsy followed by lobectomy. “Successful resection” was defined as tumor resection with greater margins than the diameter at the first resection. The ratio of successful resection was compared using Fisher’s exact tests.
Results:
From January 2014 to December 2015, 27 patients underwent VAL-MAP. Among them, 34 lesions of 20 patients were evaluated for this study. Successful resection was achieved in 33 lesions (97.1%). A historical control without markings showed successful resection in 38/56 lesions (67.7%), which was significantly lower than the VAL-MAP group (P=0.0010). In the CT-guided marking group, detailed data on surgical margin was missing in multiple cases; however, successful resection was not achieved at least in nine cases. Thus, the successful resection ratio was estimated to be at most 60/69 lesion (87.0%), suggesting a trend toward better successful resection by VAL-MAP (P=0.16). The only complication associated with VAL-MAP was a case of minor pneumothorax with no need of treatment.

Conclusion:
This retrospective analysis suggested the clinical usefulness of VAL-MAP for sublobar resection to obtain sufficient resection margins.

Disclosure: No significant relationships.
Keywords: CT-guided marking, wedge resection, segmentectomy, VAL-MAP, virtual assisted lung mapping
LYMPHATIC INVASION IS MORE SIGNIFICANT PROGNOSTIC FACTOR THAN PLEURAL INVASION IN NON-SMALL CELL LUNG CANCER OF 3CM OR LESS

Youngkyu Moon, S.W. Sung
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Objectives:
According to TNM staging system, tumor size and visceral pleural invasion are considered prognostic factors in stage I non-small cell lung cancer. Especially, visceral pleural invasion is an upstaging factor from T1 to T2 in tumor of 3cm or less. However, lymphatic invasion has not been adopted to TNM staging system. The purpose of this study was to identify more significant prognostic factor between visceral pleural invasion and lymphatic invasion.

Methods:
We conducted a retrospective review of 353 consecutive patients who received curative anatomical resection for stage I non-small cell lung cancer of 3cm or less at single institution between 2003 and 2013. The patients were divided into three groups according to presence of pleural invasion and lymphatic invasion: Group A, no invasion, Group B, pleural invasion only, and Group C, lymphatic invasion only. We compared clinicopathologic characteristics and survival among three groups. We also evaluated risk factors for recurrence with multivariate analysis.

Results:
The number of Group A was 243 patients, Group B was 27 patients and Group C was 47 patients. All patients of Group B were stage IB, on the other hand, Group A and C were stage IA. Five-year recurrence free survival was 86.2%, 71.5%, and 72.0%, respectively. There was a significant difference in recurrence free survival between Group A and Group C (p=0.001). Group A and B were not statistically different (p=0.547). In multivariate analysis to determine risk factors for recurrence using Cox proportional hazard model, lymphatic invasion, histologic differentiation and adenocarcinoma were related to recurrence (HR=2.9, p=0.002, HR = 3.1, p=0.017, HR 3.3, p=0.022). Pleural invasion was not significant risk factor for recurrence (p=0.312)
Conclusion:
Lymphatic invasion is a more significant prognostic factor than pleural invasion in non-small cell lung cancer of 3 cm or smaller.

Disclosure: No significant relationships.
Keywords: Lung cancer, pleural invasion, lymphatic invasion
PERI-OPERATIVE BEVACIZUMAB IMPROVES SURVIVAL IN LUNG METASTASECTOMY OF COLORECTAL CANCER HARBORING KRAS EXON 2 CODON 12 MUTATIONS

Stéphane Renaud¹, P. Falcoz¹, M. Schaeffer², B. Romain³, A. Olland¹, J. Reeb¹, A. Voegeli⁴, M. Legrain⁵, C. Brigand³, S. Rohr³, G. Dominique⁵, G. Massard¹

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Objectives:
The place of peri-operative chemotherapy (POC) and targeted therapies (TT) in lung metastasectomy of colorectal cancer (CRC) is still subject of a debate. We aimed to evaluate whether POC and TT were associated with different outcomes according to mutational status.

Methods:
We reviewed data from 223 patients who underwent pulmonary metastasectomy for CRC from 1998 to 2015, and for whom KRAS and BRAF mutational status was known. Comparisons between groups were performed using Chi-square, medians, Fisher’s or Student’s t-tests where appropriate. The prognostic influence of variables on overall survival (OS) and disease free survival (DFS) was assessed using the log-rank test and Cox proportional hazards model. Variables were considered significant for P values < 0.05. All variables with P values < 0.2 were tested in multivariate analysis.

Results:
A total of 167 patients (74.8%) underwent POC. KRAS mutations (mKRAS) were observed in 122 patients (54.7%), whereas BRAF (mBRAF) in 26 (11.6%). On the whole cohort, POC did not significantly influence both PFS (p=0.21) and OS (p=0.26). In mKRAS, peri-operative bevacizumab was associated with significant improvement of both PFS (70 vs 24 months, p<0.0001) and OS (101 vs 53 months, p=0.001). These data were confirmed in multivariate analysis for PFS and OS (HR : 0.65 (95% CI : 0.45 – 0.82, p=0.001) ; HR (0.79 (95% CI : 0.66 – 0.95), p=0.03, respectively). However, this benefit was only significant in case of KRAS exon 2 codon 12 mutations (median OS : 101 vs 55 months, p<0.0001, median PFS : 76 vs 44 months, p<0.0001). Finally, mBRAF were not associated with significant different outcomes.
**Conclusion:**
POC seems not to significantly impact outcomes after lung metastasectomy of CRC. However, peri-operative bevacizumab seems to be beneficial in exon 2 codon 12 mKRAS patients undergoing lung metastasectomy of CRC.

**Disclosure:** No significant relationships.

**Keywords:** lung metastasectomy, colorectal cancer, KRAS, BRAF, chemotherapy, targeted therapies
TUESDAY, 31 MAY 2016
08:30 - 10:00
SESSION VIII: MIXED THORACIC I
F-078

DESIGN OF AN EFFICIENT FOLLOW-UP SCHEME THROUGH THE ANALYSIS OF FACTORS INFLUENCING SHORT- AND LONG- TERM SURVIVAL OF PATIENTS UNDERGOING LUNG RESECTION FOR LUNG CANCER.

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¹Thoracic Surgery, Clinic Universitary Hospital, Valladolid, Spain, ²Biostatistics, Clinic Universitary Hospital, Valladolid, Spain

Objectives:
To design through the analysis of factors influencing short- and long- term survival on patients undergoing lung resection for lung cancer, a follow-up scheme with the capacity to efficiently determine their functional and oncological prognosis.

Methods:
Ambispective study. Retrospective analysis based on prospectively collected data on 638 consecutive patients undergoing lung resection for lung cancer before 2000. Follow-up months: from 0 to 372 months. Groups: A and B, survival < vs >10 years. Patients of Group B were classified into B1 and B2 subgroups alive or deceased at the end the study. Analysis of risk factors (demographics, comorbidity, surgical procedure stage, tumoral relapse) in group A patients and also morbidity influencing survival after 10 years. Statistical analysis: Univariate, Chi-square and student t test. Survival, Kaplan Meier, log Rank. Multivariate, logistic regression. The individual probability of adverse events was calculated and the performance of the models (C-index) was calculated in ROC curves.

Results:
Probability of survival in years (years) after lung resection: 2 years: 45%. 5 years: 33%. 10 years: 28%. 15 years: 20%. 20 years: 15%. Analysis of risk factors with influence in survival and ROC curves are presented in figure 1. A: Comparisons on patient groups A and B. B: performance (ROC curve) of models A and B. C: Comparisons on patient groups B1 and B2. D. Performance (ROC curve) of models B1 and B2.
Conclusion:
Accordingly, our approach focuses on periodic follow-ups at six, 12, 18 and 24 months after surgery during the first two years, and annually between the second and fourth years. The follow-ups would then be annual or every two years during years six to 10, depending on findings of proven risk factors (ROC: 0.852). Patients surviving longer than 10 years would receive follow-up every three years, or annually with verification of proven risk factors (ROC: 0.746).

Disclosure: No significant relationships.

Keywords: morbidity, lung cancer, lung surgery, mortality, follow up
CLINICAL SIGNIFICANCE OF MAXIMUM STANDARDIZED UPTAKE VALUE ON POSITRON EMISSION TOMOGRAPHY IN SUBCENTIMETER NON-SMALL CELL LUNG CANCER

Aritoshi Hattori, T. Matsunaga, K. Takamochi, S. Oh, K. Suzuki
General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan

Objectives:
Clinical significance of F-18-fluorodeoxyglucose (FDG) on positron emission tomography (PET) in subcentimeter non-small cell lung cancer (NSCLC) is currently not well known. Hence, we evaluated the clinicopathological features and prognosis of subcentimeter NSCLC showing uptake of FDG-PET.

Methods:
Between 2008 and 2014, 189 patients preoperatively investigated FDG-PET for c-N0 subcentimeter NSCLC. Consolidation tumor ratio (CTR) on thin-section CT was evaluated for all, and tumors were classified into 3 group, i.e., pure-GGO (CTR=0, n=49), part-solid (0<CTR<1.0, n=81), and pure-solid (CTR=1.0, n=59). Pathological invasiveness (PI) was defined as having at least one factor among lymphatic, vascular and pleural invasion. Survivals were calculated by Kaplan-Meier estimation methods using log-rank test.

Results:
PI was found in 28 (15%) of subcentimeter NSCLC. Based on the maximum standardized uptake value (SUVmax) on FDG-PET, a receiver operating characteristics curve elucidated the predictive cutoff value of PI as SUVmax=2.0. Based on the results, high-SUVmax group (SUVmax>2.0, n=42) showed significantly larger tumor size (9.5mm vs 8.4mm, p=0.0009), more radiological pure-solid appearance (90% vs 14%, p<0.0001) and postoperative nodal involvement (12% vs 0%, p<0.0001) than those of low-SUVmax group (SUVmax≤2.0, n=158). According to the CTR, high-SUVmax was observed in 0% of pure-GGO, 5% of part-solid and 64% of pure-solid tumor (p<0.0001). Lung cancer specific overall survival (LCS-OS) and recurrence free survival (LCS-RFS) showed significant differences between the high-SUVmax and low-SUVmax arm (LCS-OS: 90.6% vs 100%, p=0.0196; LCS-RFS: 83.8% vs 99.1%, p=0.0009), and all of the recurrent cases showed radiological pure-solid appearance. Thus, among 38 pure-solid subcentimeter NSCLC with high-SUVmax, the three-year locoregional RFS of segmentectomy or lobectomy arm was significantly better than that of wedge resection arm despite subcentimeter disease (82.8% vs 40.0%, p=0.0325).

Conclusion:
SUVmax on FDG-PET reflected tumor invasiveness and had a great impact on the prognosis of subcentimeter NSCLC provided a tumor showed pure-solid appearance on thin-section CT scan.

Disclosure: No significant relationships.
Keywords: Lung cancer, subcentimeter, FDG-PET, SUVmax, prognosis
OCTOGENARIANS UNDERGOING EMERGENCY GENERAL THORACIC SURGERY FOR BENIGN CONDITIONS - DOES ADVANCED AGE AFFECT THE OUTCOME?

M. Schweigert¹, N. Solymosi², Katja Hujer¹, A. Dubecz³, H. Witzigmann¹, H.J. Stein³
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²Faculty of Science, Szent István University, Budapest, Hungary,
³General and Thoracic Surgery, Klinikum Nuremberg, Nuremberg, Germany

Objectives:
In the contemporary Western World thoracic surgeons are confronted by the challenging task to provide emergency thoracic procedures for a rising population of very elderly patients.

Methods:
All patients who underwent emergency thoracic surgery for non-malignant, non-cardiac and non-oesophageal disorders at two German tertiary referral hospital between 2006 and 06/2013 were included in a retrospective analysis. Patients ≥ 80 years were identified.

Results:
There were 418 patients (347 < 80 years; 71 ≥ 80 years). Main reasons for emergency thoracic surgery were pleural empyema, chest trauma, iatrogenic and spontaneous hemothorax. Mean ASA grade was 2.78, median ICU stay 7.0 days (IQR 17.75), median length of stay 22.0 days (IQR 22.0). Overall 368 patients underwent minimally invasive surgery. Mortality was 8% (33/418). The occurrence of sepsis (OR: 16.05; 95% CI: 6.47-45.53; p<0.001), respiratory failure (OR: 23.24; 95% CI: 8.93-71.85; p<0.001) and acute renal failure (OR: 9.45; 95% CI: 4.02-22.12; p<0.001) were associated with significantly higher mortality. Charlson-index-of-comorbidity-score ≥ 3 and ASA grade ≥ 3 were significantly more frequent in the very elderly (p<0.001). In comparing the two age groups we found no statistically significant differences in the occurrence of sepsis (12/71 vs. 86/347, p=0.17), respiratory failure (11/71 vs. 78/347, p=0.21), acute renal failure (7/71 vs. 39/347, p=0.84) and in the frequency of ICU admission (37/71 vs. 169/347, p=0.61). Moreover, the very elderly had neither a higher tracheotomy rate nor a longer median ICU stay. We found no significant difference in postoperative mortality between the age groups (4/71 vs. 29/347; OR: 0.66; 95% CI: 0.16-1.96; p=0.63).

Conclusion:
In geriatric patients requiring emergency general thoracic surgery advanced age is not associated with an increased risk for fatal outcome. Sepsis and sepsis-related multi organ failure are the predominant reasons for postoperative death. Improved outcome seems achievable by timely surgical intervention before the onset of pulmonary sepsis.

Disclosure: No significant relationships.
Keywords: hemothorax, emergency, geriatric patients, pleural empyema, pulmonary sepsis
PREVIOUS LUNG VOLUME REDUCTION SURGERY DOES NOT NEGATIVELY AFFECT SURVIVAL AFTER LUNG TRANSPLANTATION

Department of Surgery, University Hospital Zurich, Division of Thoracic Surgery, Zurich, Switzerland

Objectives:
Lung volume reduction surgery (LVRS) and lung transplantation (LTx) are the treatment of choice in selected patients with end stage emphysema. The effect of previous LVRS on survival after LTx has been questioned. In the present study, we aim to evaluate the impact of previous LVRS on post-transplant outcomes in patients with emphysema.

Methods:
We reviewed our prospectively recorded database in patients with emphysema undergoing LTx between 1993 and 2014. Preoperative workup and postoperative outcomes were compared between the two groups according to previous LVRS status. Kaplan-Meier test was used for survival analysis and compared with log-rank test.

Results:
One hundred and seventeen patients (66 male; mean age: 56±7 years) underwent LTx during the study period, 52 of which had previous LVRS (LVRS+LTx). Patient characteristics, preoperative workup and early postoperative outcomes were comparable between the 2 groups. Median time from LVRS to LTx was 39±31 months. Overall in hospital mortality was 10%, which did not differ significantly between the 2 groups (p=0.8). The median survival for the LTx only and LVRS+LTx groups was 86 (95% Confidence interval [CI]: 56 to 116) and 107 (95% CI: 77 to 137) months, respectively (p=0.6). Starting at the time of LVRS, the cumulative survival benefit of LVRS+LTx (median: 143; 95% CI: 110 to 177 months) was markedly better than LTx alone (p<0.001).

Conclusion:
Previous LVRS does not negatively affect outcomes following LTx in patients with end stage emphysema. Considering limited number of donor organs available, LVRS option should be kept in mind for the postponement of LTx in selected cases.

Disclosure: No significant relationships.
Keywords: lung transplantation, lung volume reduction surgery, survival, emphysema
F-082

PROGNOSTIC SIGNIFICANCE OF EXTRANODAL EXTENSION AND SIZE OF METASTATIC LYMPH NODE IN PATIENTS WITH PULMONARY ADENO-CARCINOMA

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Center for Lung Cancer, National Cancer Center, Goyang, Gyeonggi, Republic of Korea

Objectives:
This study was designed to assess the prognostic significance of extranodal extension (EN) and the size of the metastatic lymph node (MLN) in patients with node positive pulmonary adenocarcinoma.

Methods:
Lymph nodes were sectioned, stained with hematoxylin and eosin, and the diameter of the largest MLN was measured. The cut-off level was defined using a maximal chi-square method for survival data. The following potential prognostic factors for overall survival were investigated: age, sex, operation type, T stage, N stage, tumor size, visceral pleural invasion, adjuvant chemotherapy, presence of EN and the size of MLN (≤ 7.0 mm vs > 7.0 mm).

Results:
There were 202 male patients and 173 female patients with a mean age of 59.8 ± 10.5 years. Increasing MLN size was associated with large tumor size (p = 0.015), advanced N stage (P < 0.001), and presence of EN (p < 0.001). On multivariate analysis, tumor size (P < 0.001), adjuvant chemotherapy (P < 0.001), EN (P = 0.034) and the MLN size (P < 0.001) were independent prognostic factors for survival, and N stage was not significant. Patients were divided into three subgroups: Group A, MLN ≤ 7.0 mm/EN (-); Group B, either MLN ≤ 7.0 mm/EN (+) or MLN > 7mm/EN (-); Group C, MLN > 7mm/EN (+). Among N1 patients, five year overall survival rates were 73.1%, 66.9%, and 46.0% in Group A, B and C, respectively (P = 0.004). Among N2 patients, five year overall survival rates were 71.2%, 52.9%, and 34.5% in Group A, B and C, respectively (P < 0.001).
Table 1: Prognostic Factors for Overall Survival in Node Positive Pulmonary Adenocarcinoma

<table>
<thead>
<tr>
<th>Variables</th>
<th>Univariate Analysis</th>
<th>Multivariate analysis</th>
<th>Multivariate analysis</th>
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<tbody>
<tr>
<td></td>
<td>P</td>
<td>HR (95% CI)</td>
<td>P</td>
</tr>
<tr>
<td>Age, years</td>
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<td></td>
<td></td>
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<tr>
<td>Sex (female)</td>
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<td>Op type (lobectomy)</td>
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<tr>
<td>Visceral pleural invasion (yes)</td>
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<tr>
<td>Tumor size, cm</td>
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<td>1.135 (1.050-1.228)</td>
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<tr>
<td>T stage (T1)</td>
<td>0.076</td>
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<tr>
<td>T2</td>
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<td>T3</td>
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<tr>
<td>N status (N1)</td>
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<tr>
<td>N2</td>
<td>&lt;0.001</td>
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<tr>
<td>Extranalodal extension (yes)</td>
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<td>1.741 (1.238-2.447)</td>
<td>0.001</td>
</tr>
<tr>
<td>Metastatic LN size (&gt; 7.0 mm)</td>
<td>&lt;0.001</td>
<td>0.582 (0.430-0.787)</td>
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</tr>
<tr>
<td>Adjuvant chemotherapy (yes)</td>
<td>&lt;0.001</td>
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</tbody>
</table>
Conclusion:
The presence of extranodal extension and size of metastatic lymph node could be important prognostic factors coupled with the TNM staging system, in patients with node-positive pulmonary adenocarcinoma.

Disclosure: No significant relationships.
Keywords: prognosis, lung cancer, staging
POSTOPERATIVE INFECTIOUS COMPLICATIONS INCREASE PERIOPERATIVE AND LONG TERM MORTALITY AFTER CURATIVE RESECTIONS DUE TO LUNG CANCER

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Objectives:
The aim of the study was to characterize infectious complications after major pulmonary resections performed due to lung cancer. The influence of infectious complications on short- and long-term survival was evaluated.

Methods:
Between January 2007 and August 2015 1528 patients were operated due to lung cancer in the Thoracic Surgery Department. Retrospective analysis of data gathered in prospective database – National Register of Lung Cancer was performed.

Results:
Infectious complications occurred in 177 patients (11.5%). One hundred twenty patients had atelectasis requiring repeated bronchial aspirations, 45 patients had pneumonia and 12 patients had pneumonia leading to ARDS. Certain specific bacteria obtained from bronchial lavage were identified in 66 patients. Eighty five percent of identified bacteria were Gram negative (Escherichia coli 19%, Haemophilus influenzae 16%, Enterobacter cloacae 15%) susceptible to ciprofloxacin in 86%, cefepime in 69% and cefuroxime in 65%. Patients with infectious complications did not differ concerning pTNM in comparison to patients without complications (stage pI in 47% vs 52% p=0.20), had similar Charlson Comorbidity Index (CCI) (4 vs. 4 p=0.18) but had poorer result of 6-minute walk test (6MWT) (526 meters vs 550 meters p=0.03) and poorer FEV1% (75% vs 87% p<0.01). In multivariate analysis postoperative infectious complications (HR 1.78 95%CI1.15-2.75), CCI higher than 6 (HR 1.80 95%CI1.14-2.85) and 6MWT shorter than 525 meters (HR 0.69 95%CI0.49-0.96) were independent factors negatively influencing survival. In log-rank Cox test patients with infectious complications had poorer five year survival (53% vs 70% p<0.01). The 30-day mortality was higher in group of patients with infectious complications (5.6% vs. 1.0% OR 5.71 95%CI 2.31-13.94), as well as 90-day mortality (10.1% vs. 2.6% OR 4.25 95%CI 2.25-7.97).
Conclusion:
Gram-negative bacteria susceptible to ciprofloxacin are the most common pathogens responsible for postoperative infections after major pulmonary resections. Postoperative infectious complications significantly influence 30-, 90-day mortality and long term survival.

Disclosure: No significant relationships.
Keywords: complications, surgery, lung cancer, pneumonia, infection
PREOPERATIVE PROGNOSTIC NUTRITIONAL INDEX TO PREDICT PROGNOSIS OF LUNG CANCER PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A RETROSPECTIVE ANALYSIS OF JAPANESE SMOKERS

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Objectives:
Correlations between preoperative nutritional status and cancer prognosis are well-established. However, associations between the preoperative prognostic nutritional index (PNI) and survival after resection among patients with lung cancer (LC) and chronic obstructive pulmonary disease (COPD) remain unclear.

Methods:
From January 2006 to May 2015, a total of 998 LC patients underwent surgical resection at the Shinshu University Hospital. Of these, 213 former or current smokers with COPD (forced expiratory volume in 1s < 70%) were included for analysis. The PNI using the most recent serum data before surgery was calculated as $10 \times$ serum albumin (g/dL) + 0.005 $\times$ total lymphocyte count (cells/mL). The PNI cut-off value was set at 50. Patients with a PNI < 50 patients were assigned to group A (malnutrition group) and those with a PNI $\geq$ 50 were assigned to group B (normal group). Retrospective analysis was performed to identify factors associated with survival.

Results:
Overall survival (OS) and disease-free survival (DFS) in group A (PNI < 50) were significantly poorer than in group B (PNI $\geq$ 50) ($p = 0.034$ and 0.048, respectively). The five-year-survival rates for groups A and B were 58.7% and 82.2%, respectively. Considering only stage IA disease, survival was significantly poorer in group A than in group B (OS, $p = 0.004$; DFS, $p = 0.022$). PNI was identified as an independent prognostic factor of survival by the Cox hazard model.

Conclusion:
There were significant correlations between PNI and survival of patients having LC with COPD, particularly those with stage IA disease. Assessment of PNI before surgery was beneficial and easy to predict prognosis.

Disclosure: No significant relationships.

Keywords: prognostic nutritional index, lung cancer, chronic obstructive pulmonary disease
F-085

RESECTABLE OLIGOMETASTATIC NSCLC: DOES SURGERY HAVE A REAL ADVANTAGE?

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Objectives:
Surgical resection of isolated distant metastases in NSCLC patients is not widely accepted and chemotherapy is usually administered. The study was aimed to evaluate the long-term results and prognosis after surgical resection of oligometastases in NSCLC patients.

Methods:
One hundred and thirty nine patients with isolated distant metastases of NSCLC were operated on in our clinic from 1998 to 2011. Solitary brain metastasis was diagnosed in 82, pleural metastases – in 21, contralateral lung – in 17, adrenal metastases – in 11, others – in 8 patients. Synchronous metastases were detected in 61 (43,9%), metachronous – in 78 (56,1%) patients. The primary lung cancer was completely resected in all cases. Surgery included pneumonectomy – in 17, lobectomy – in 112 and sublobar resection – in 10 patients. Median follow up was 62 month.

Results:
Postoperative complications were registered in 10 (7,2%) patients, mortality – 2,2%. Median survival after pulmonary resection and removal of brain metastasis was 23,8 months, resection of the contralateral lung – 12,0 months, lung resection with pleurectomy – 11,0 months and adrenalectomy – 9,0 months. One, three and five year survival after removal of brain, lung, pleural and adrenal metastases was 52,0%, 29,0%, 25,6%; 47,0%, 23,5%, 11,7%; 38,0%, 4,0%, 0%; 28,0%, 0% and 0% respectively. Uni- and multivariate analysis proved that N+ status of lung cancer and synchronous detection of oligometastases were independent unfavourable prognostic factors. In the most representative group of patients with solitary brain metastasis five-year survival in N0 subgroup was 34,8%, while in N1 patients – 7,5% and in N2 – 0% with median survival 19.8, 16.2 and 8.0 months respectively.

Conclusion:
Surgical resection of primary NSCLC and its oligometastases, especially in brain and contralateral lung improves overall survival in patients without intrathoracic lymph node metastases (N0). Accurate N-staging should be carried out in patients with synchronously diagnosed primary and metastatic tumor.

Disclosure: No significant relationships.
Keywords: lung cancer, oligometastatic disease, surgery
LUNG TRANSPLANTATION FOR CYSTIC FIBROSIS: A SINGLE-CENTER 24-YEAR EXPERIENCE

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Objectives:
Lung transplantation (LTx) is an established procedure for cystic fibrosis (CF) patients with end-stage lung disease. We analyzed our single-center experience focusing on long-term graft and patient survival.

Methods:
Between 1991-2014, 818 LTx were performed. Recipient and donor demographics, comorbidities, surgical type, ischemic and operative times, patient and graft survival, pulmonary functional outcome, and chronic lung allograft dysfunction (CLAD) were reviewed. Data are presented as mean ± SD. Mean follow-up was 6.9y ± 4.5.

Results:
One hundred and three (13%) CF recipients were identified. M/F ratio was 49/54 and 51/52 and mean age was 27y ± 9 and 36y ± 13 for recipients and donors, respectively. HBD/NHBD ratio was 96/7. Waiting list time was 221d ± 222. Pretransplant comorbidities in CF patients were exocrine pancreas insufficiency (88%), chronic sinusitis and nasal polyposis (75%), diabetes mellitus (44%), pulmonary hypertension (31%), CF-liver disease (26%) and osteoporosis (18%). Majority (101) underwent bilateral LTx while two patients had single LTx after previous pneumonectomy. Three patients (3%) underwent combined liver-lung Tx. Ischemia was 273min ± 61 and 425min ± 77 for first and second lung, respectively. Operative time was 416min ± 79. One-, three-, five-, and ten-year patient survival was 96%, 88%, 85%, and 80%, whereas graft survival non-censored for death was 94%, 87%, 81%, and 68%, respectively. Patient survival for other LTx indications was 87%, 76%, 69% and 49%, respectively (p<0.0001). Pretransplant forced expiratory volume in 1s (24% ± 7 pred) improved after LTx to 82% ± 24% and 72% ± 31% at five and 10 years, respectively. CLAD was diagnosed in 24% of CF recipients. Fourteen patients underwent re-LTx for CLAD (13) or PGD (1).
**Conclusion:**
LTx is a valuable treatment option for selected patients with end-stage CF, resulting in excellent long-term functional improvement and survival compared to other diseases when combined with re-LTx when indicated.

**Disclosure:** No significant relationships.

**Keywords:** lung transplantation, cystic fibrosis, graft survival, patient survival
VIDEO ASSISTED THORACOSCOPIC LOBECTOMY IS THE PREFERRED APPROACH FOLLOWING INDUCTION CHEMOTHERAPY

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Objectives:
Induction therapy is considered a relative contraindication to video assisted thoracoscopic surgical (VATS) approach. We report our experience with VATS lobectomy following induction chemotherapy for patients with non-small cell lung cancer (NSCLC) compared to open approach, to determine safety and oncologic outcome.

Methods:
A retrospective review of a prospective database (2001-2014) to identify patients undergoing lobectomy for NSCLC following induction therapy. Propensity score matching (age, gender, clinical stage), was performed (1:2) to obtain a balanced cohort of patients undergoing VATS, and thoracotomy (THOR). Survival analysis was done using Kaplan-Meier. COX-regression (MVA) was performed to determine independent predictors of disease free survival (DFS).

Results:
One hundred and fourteen patients were propensity matched (VATS, n=40, THOR, n=74). No differences observed in the clinicopathological factors (Table), or type of induction therapy (conventional vs. targeted) between VATS and THOR groups. Similarly, no differences were found in the number of lymph nodes resected (12 vs. 15, P=0.94), number of stations sampled (4 for each, P=0.68), or R0 resection (95% vs. 96%, P=0.81), between VATS and THOR. 5 VATS cases (12.5%) were converted to open approach. VATS was associated with less blood loss (EBL), [100 vs. 150ml, P=0.002], a shorter chest tube (ct) drainage [2 vs. 3days, P=<0.001], and a shorter length of stay (LOS) [4 vs. 6 days, P=<.001]. Also, there was a trend towards a shorter operative time [129 vs. 150 min, P=0.09], and fewer postoperative complications [6 (15%) vs. 23 (31%), P=0.06] with the VATS approach. There was no difference in DFS, between VATS and THOR (5 yr, 73% vs. 48%, P=0.09). Independent predictors of DFS on MVA were; pathologic N1/N2 (HR: 5.41, P=0.002), and poorly differentiated tumors(HR: 2.66, P=0.03). No difference in DFS was detected between the two surgical approaches in the MVA (VATS; HR: 0.44, P=0.05).
<table>
<thead>
<tr>
<th></th>
<th>VATS (n=40)</th>
<th>Thoracotomy (n=74)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>68 (59-76)</td>
<td>67 (61-72)</td>
<td>0.998</td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>29 (72%)</td>
<td>51 (70%)</td>
<td>0.690</td>
</tr>
<tr>
<td>Comorbidity index (Charlson)</td>
<td>1 (0-3)</td>
<td>1 (0-2)</td>
<td>0.705</td>
</tr>
<tr>
<td>FEV1 (%)</td>
<td>89 (76-100)</td>
<td>87 (75-95)</td>
<td>0.269</td>
</tr>
<tr>
<td>PET SUV max</td>
<td>6 (3-11)</td>
<td>8 (3-12)</td>
<td>0.456</td>
</tr>
<tr>
<td>Histology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adenocarcinoma</td>
<td>31 (77.5%)</td>
<td>56 (75.7%)</td>
<td>0.976</td>
</tr>
<tr>
<td>Squamous Cell Carcinoma</td>
<td>6 (15%)</td>
<td>12 (16.2%)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>3 (7.5%)</td>
<td>6 (8.1%)</td>
<td></td>
</tr>
<tr>
<td>pT size (cm)</td>
<td>2.5 (1.5-3.5)</td>
<td>2.7 (1.4-3.5)</td>
<td>0.741</td>
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<tr>
<td>pT</td>
<td></td>
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<tr>
<td>pT1</td>
<td>22 (55%)</td>
<td>28 (37.8%)</td>
<td></td>
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<tr>
<td>pT2</td>
<td>15 (37.5%)</td>
<td>36 (48.6%)</td>
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<tr>
<td>pT3</td>
<td>3 (7.5%)</td>
<td>10 (13.5%)</td>
<td></td>
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<tr>
<td>pN</td>
<td></td>
<td></td>
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<tr>
<td>N0</td>
<td>24 (60%)</td>
<td>40 (54%)</td>
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</tr>
<tr>
<td>N1</td>
<td>3 (7.5%)</td>
<td>13 (17.6%)</td>
<td>0.335</td>
</tr>
<tr>
<td>N2</td>
<td>13 (32.5%)</td>
<td>21 (28.4%)</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion:**
VATS lobectomy is a feasible, safe, and oncologically sound approach, following induction therapy for NSCLC. When compared to THOR, VATS is associated with more favourable perioperative outcome, in a propensity matched group of patients. VATS should be the approach of choice following induction therapy, given the associated benefits and equivalent survival.

**Disclosure:** No significant relationships.

**Keywords:** NSCLC, post-induction, VATS, lobectomy
**LOCALIZATION OF PERIPHERAL PULMONARY LESIONS TO AID SURGICAL RESECTION: A NOVEL APPROACH OF ELECTROMAGNETIC NAVIGATION BRONCHOSCOPIC DYE MARKING**

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**Objectives:**  
Video-assisted thoracoscopic sublobar resection of ultra-small, non-visible, and non-palpable pulmonary lesions is a realistic challenge. The purpose of this study was to explore an alternative and efficient method for localization of pulmonary lesions using the electromagnetic navigation bronchoscope (ENB).

**Methods:**  
During May 2015 and December 2015, a cohort of 13 patients underwent VATS sublobar resection of peripheral lesions in our hospital. Preoperative ENB was utilized to guide a catheter to be within/adjacent to the target lesion with injection of fibrin glue mixed with methylene blue (FGMB).

**Results:**  
All patients underwent ENB with pleural dye marking immediately followed by surgery without any complications. The median size of the nodules was 14.4mm (range:7-20). Pleural staining by dye was visible in all cases under thoracoscopy and even 10 lesions were tactile satisfactorily. All lesions were fully excised and pathologic examination confirmed accuracy of dye staining.

**Conclusion:**  
FGMB injection with ENB guiding can provide a more effective approach to localize ultra-small and non-palpable pulmonary lesions. With the visible staining and tactile sensation, this method may allow more rapid identification intraoperatively.

**Disclosure:** No significant relationships.  
**Keywords:** electromagnetic navigation bronchoscopy, pulmonary neoplasm, fibrin glue, methylene blue, dye marking
OUTCOMES OF SEGMENTECTOMY AND WEDGE RESECTION FOR PULMONARY COLORECTAL CANCER METASTASES


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Objectives:
While wedge resection is the most common surgical procedure performed for patients with pulmonary colorectal cancer metastases, segmentectomy has not been evaluated for this indica-
tion. The aim of this study was to compare the recurrence and survival rates of wedge resection and segmentectomy in patients with pulmonary colorectal cancer metastases.

**Methods:**
This study was a retrospective and subset analysis of Japan’s nationwide database project involving resected pulmonary colorectal cancer metastases. Between January 2004 and December 2008, a total of 898 patients underwent resection of pulmonary colorectal cancer metastases. After selecting patients who did not receive pre-operative chemotherapy for pulmonary metastases, 553 patients who underwent segmentectomies or wedge resections were studied. Post-operative complications, recurrence patterns, recurrence-free survival, and overall survival were determined for each procedure.

**Results:**
Ninety eight and 455 patients underwent segmentectomies and wedge resections, respectively. The size of the resected tumor was significantly larger in segmentectomies (p < 0.001). Post-operative complications developed in 14.3% and 5.3% of patients who underwent segmentectomies and wedge resections, respectively (p = 0.001). The five year recurrence-free survival was 48.8% in patients with segmentectomy and 36.0% in patients with wedge resections (hazard ratio [HR] 0.63, 95% confidence interval [CI] 0.45-0.85, p = 0.004). The five year overall survival was 80.1% in patients of segmentectomies and 68.5% in patients of wedge resections (HR 0.56, 95% CI 0.33-0.90, p = 0.014). Multivariate analysis revealed that surgical procedure was a significant factor for recurrence (HR 0.63, 95% CI 0.44-0.87, p = 0.005), and segmentectomy showed a substantially better survival than wedge resection (HR 0.65 95%, CI 0.38-1.05, p = 0.080)

**Conclusion:**
Although wedge resection is a widely accepted surgical procedure for pulmonary metastases from colorectal cancer, segmentectomy can be a good option for better outcomes.

**Disclosure:** No significant relationships.

**Keywords:** metastasectomy, wedge resection, segmentectomy
THE VALIDITY OF THE UPDATED LYMPH NODE STAGING GUIDELINE OF EUROPEAN SOCIETY OF THORACIC SURGEONS IN NON-SMALL CELL LUNG CANCER PATIENTS

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Objectives:
The European Society of Thoracic Surgeons (ESTS) has proposed a revised preoperative lymph-node staging guidelines for potentially resectable non-small- cell lung cancer (NSCLC) patients. We aimed to assess the validity and resulting survival of these guidelines.

Methods:
A total of 571 patients who underwent CT-integrated positron emission tomography (PET-CT) between January 2004 and November 2013 were included in the study. The preoperative mediastinal stage was confirmed by mediastinoscopy or video-assisted mediastinoscopy in all but patients with peripheral cT1N0 patients with tumor of non-adenocarcinoma. A resection via thoracotomy or videothoracoscopy was done for mediastinoscopy-negative patients. N2 patients underwent chemoradiotherapy before planned surgery. The mediastinal staging results were adapted to the staging guidelines (direct thoracotomy for T1—2 N0 tumour according to PET-CT and invasive staging for others) and the validity of the guidelines was tested. The mean follow-up time was 34 months.

Results:
In this series, mediastinal lymph-node metastasis were unveiled in 170 patients (29.8%). A total of 397 patients underwent resectional surgery. If the guidelines had not been applied, resectional surgery would have been done in 451 patients. Mediastinoscopy would have been performed in 501 patients and N2 or N3 disease would have been found in 137 (25.0%). Thus, the sensitivity, specificity, and positive and negative predictive values of the guidelines were calculated as 81%, 100%, 100% and 92%, respectively. When we analyzed the rates in patients who underwent videomediastinoscopy as suggested by guidelines, the sensitivity, specificity, and positive and negative predictive values of the guidelines were calculated as 95.0%, 100%, 100% and 94.1%, respectively. The five year survival of all patients was 65.5%, the mean survival time was 97.1 months (95%CI: 89-104 months).

Conclusion:
The preoperative lymph node staging guideline for the patients with NSCLC by the ESTS seems to be effective and it may provide better survival following resectional surgery.

Disclosure: No significant relationships.

Keywords: lung cancer, mediastinal staging, ESTS guideline, survival, validation
O-091

PULMONARY METASTASES: SIGNIFICANT GROWTH DIFFERENCES DEPENDING ON THE PRIMARY TUMOR. HISTOLOGIC ANALYSIS OF 454 LESIONS

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Objectives:
Adequate resection margins in pulmonary metastasectomy are not yet well defined. We think that histological subtype, size of the lesion and local growth characteristics must be taken into consideration during metastasectomy to prevent local recurrence. This study was conducted to examine and classify growth patterns at the transition zone between metastasis and normal lung tissue.

Methods:
Pulmonary metastases were prospectively collected and hematoxylin–eosin stains were systematically evaluated and classified by their pattern of lung tissue infiltration. The classification scheme included: metastasis surface appearance, presence of fibrous pseudocapsule, pleural infiltration, lymphangitic spread, hemangitic spread, interstitial growth, microsatellite nodules, and aerogenous spread of floating cancer-cell clusters (ASFC). Logistic regression was used to model the association between subgroups from different primaries.

Results:
During the observation period from 2009 to 2014, 412 lung specimens containing 454 pulmonary metastases were resected in 183 patients. We found that 58\% of all lesions had microscopic signs of aggressive local dissemination and 42\% were smooth at their transition to normal lung tissue. The metastases showed histology-specific patterns of growth: sarcoma metastases were identified with frequent pleural infiltration (31.2\%); colorectal metastases typically had interstitial spread (66\%) and aerogenous spread of floating cancer-cell clusters (39\%); melanoma grew along blood vessels and were associated (28\%) with lymph vessel involvement. Aggressive patterns of growth had an increasing probability of around 3\% for each additional millimeter of metastasis diameter. A smooth metastasis surface was registered similar in all different histologies (40\%) with the exception of CRC metastases with 24\%.

Conclusion:
Based on these preliminary findings we recommend wide lateral margins for sarcoma metastases, a spherical safety margin for colorectal and other epithelial metastases, and anatomical resections for larger melanoma metastases whenever possible and reasonable. Safety margins should generally increase with the size of the metastasis. These findings should be confirmed in a prospective outcome study.

Disclosure: No significant relationships.

Keywords: microscopy, pulmonary metastases, growth pattern
A MODIFIED PREDICTION MODEL FOR ACUTE PULMONARY EMBOLISM AFTER THORACIC SURGERY FOR LUNG CANCER

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Objectives:
Acute pulmonary embolism (PE) may complicate thoracic surgery and is a major contributor to postoperative mortality. We sought to evaluate incidence and risk factors of PE in persons underwent lung resection because of lung malignancy and to create a validated clinical model.

Methods:
A cohort of 12244 consecutive patients from January 2012 to July 2015 who underwent resections for lung cancer was retrospectively studied. Univariate and multivariate analysis were used to assess which factors were associated with acute PE in the early postoperative period. Then a clinical model for the prediction of PE was formed and tested.

Results:
The total incidence of PE was 0.5% (61 of 12244 patients). Median age was 66.4 years (range, 42-85 years). In fifty-three patients (86.9%) a total of sixty-one PE appeared within the first postoperative week, and 6 of 61 patients died, for the mortality rate of 9.8%. Multivariate analysis revealed that age ≥66 (odds ratio [OR] 1.087, 95% confidence interval [CI]1.054-1.120, p<0.001, point score 1), body-mass index (BMI) ≥25 (OR 1.137, 95% CI 1.033-1.252, p<0.001, point score 1), more than one comorbidity (OR 1.258, 95% CI 1.087-1.483, p<0.001, point score 1) and advanced stage (OR 2.151, 95% CI 1.283-3.607, p<0.001, point score 2) were independent risk factors for PE. We defined three overall risk categories for PE: the patients were divided into low-risk group (score: 0-1), moderate-risk group (score=2) and high-risk group (score≥3).

Conclusion:
Using this model, based on readily available clinical characteristics, we could prospectively identify high-risk patients (score, ≥3) as those who could then be targeted for prophylaxis to the successful minimization or eradication of acute PE after lung resections. Acute PE can be predicted with moderate accuracy based on our modified model.

Disclosure: No significant relationships.
Keywords: Lung cancer, acute pulmonary embolism, thoracic surgery
O-093

STAGE I NON-SMALL CELL LUNG CANCER. LONG-TERM RESULTS OF LOBECTOMY VERSUS SUBLOBAR RESECTION FROM THE POLISH LUNG CANCER NATIONAL REGISTRY

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Objectives:
Lobectomy with lymphadenectomy is still the treatment of choice in early-stage lung cancer. Since increasing number of stage I non-small cell lung cancer (NSCLC) are detected, segmentectomy or wedge resection has become alternative treatment option considered for this patients. We compare long term results of sublobar resection with lobectomy based on data from the Polish Lung Cancer National Registry (PLCNR).

Methods:
In Poland, 16 446 patients with lung cancer were treated surgically between 2007 and 2011. Based on the Polish National Register of Lung Cancer database, we identified 6905 operated patients in stage I NSCLC who underwent lobectomy (5911 pts), segmentectomy (233 pts) or wedge resection (761 pts). Analysis was limited to patients with complete data with final diagnosis of adenocarcinoma or squamous cell carcinoma. 231 patients from each group were compared using propensity score matched analysis depending on the type of resection, age, gender, grading and pathology.

Results:
There was no difference in 30-days (1.56%) and 90-days (2.43%) mortality in all groups. Five-year survival in all patients was 76.62% and was similar in lobectomy group (79.11%) and in segmentectomy group (78.31%), with inferior five-year survival in wedge resection group (58.05%). An effect on five-year survival depending on tumor size (<2 cm and > 2 cm) was similar in segmentectomy and lobectomy group but inferior in wedge resection group. Propensity score matched analysis showed similar five-year survival rate in lobectomy (78.14%) and segmentectomy group (79.19%) but inferior in wedge resection group (54.04%).

Conclusion:
Segmentectomy and lobectomy show similar long term results in stage I NSCLC patients included to Polish Lung Cancer Registry. Wedge resection should be avoided in radical surgical treatment of stage I NSCLC

Disclosure: No significant relationships.
Keywords: sublobar resection, PSMA, stage I NSCLC, Polish National Register of Lung Cancer
IMPORTANCE OF THOROUGH DISTINCTION BASED ON THE PRESENCE OF GROUND GLASS OPACITY COMPONENT IN CLINICAL-STAGE IA RADIOLOGICAL INVASIVE NON-SMALL CELL LUNG CANCER

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Objectives:
Radiological invasive NSCLC is defined as a tumor with consolidation tumor ration (CTR) more than 0.5 based on the prospective study in Japan. However, prognostic significance of the presence of GGO in this cohort is not well clarified. Hence, we evaluated clinicopathological features and prognosis of c-stage IA radiological invasive NSCLC on the basis of GGO component.

Methods:
Between 2008 and 2013, we reviewed 497 surgically resected c-stage IA radiological invasive NSCLC. According to the presence of GGO component, they are classified into 2 group, i.e., part-solid (0.5≤CTR<1.0, n=177) and pure-solid (CTR=1.0, n=320). Furthermore, part-solid tumor was subdivided as GGO-frequent (0.5≤CTR<0.75, n=115) and solid-frequent (0.75≤CTR<1.0, n=62).

Results:
Pure-solid NSCLC showed oncologically significant differences compared with part-solid NSCLC regarding CEA (6.4 ng/dl vs 3.1 ng/dl, p<0.0001), SUVmax (6.1 vs 2.2, p<0.0001), pathological nodal involvement (23.4% vs 4.5%, p<0.0001), lymphovascular invasion (46% vs 17%, p<0.0001). Multivariate analysis revealed that CEA and pure-solid appearance were independently significant clinical predictor of the survival (p=0.001, 0.030). The five year overall survival (OS) and recurrence-free survival (RFS) revealed significant differences between pure-solid and part-solid NSCLC (five year OS, 82.7% vs. 95.3%, p<0.0001; five-year RFS: 71.5% vs. 91.0%, p<0.0001). In contrast, among the patients with part-solid NSCLC, oncological characteristics between GGO-frequent and solid-frequent types are clinicopathologically similar. The five-year OS and RFS are both equivalent between GGO-frequent and solid-frequent arms (five year OS, 95.3% vs. 96.8%, p=0.703; five year RFS: 89.6% vs. 95.2%, p=0.281). Furthermore, maximum tumor size (p=0.371), solid component size (p=0.402) and CTR (p=0.661) were not associated with poor OS in radiological part-solid NSCLC.

Conclusion:
Only a small amount of GGO component could have a great impact on the favorable prognosis among c-stage IA radiological invasive NSCLC. Therefore, a thorough distinction between part-solid and pure-solid findings on thin-section CT scan is extremely important when evaluating oncological outcomes of radiologically solid lung cancers.
**Invasive NSCLC**

- Part-solid tumor
- Pure-solid tumor

5-year Overall survival
- Part-solid [green] = 95.3%
- Pure-solid [blue] = 82.7%

\[ P < 0.0001 \]

**Part-solid NSCLC**

- Solid-frequent (0.75 ≤ CTR < 1.0)
- GGO-frequent (0.5 ≤ CTR < 0.75)

5-year Overall survival
- Solid-frequent [green] = 96.8%
- GGO-frequent [blue] = 95.3%

\[ p = 0.7030 \]

**Overall survival in patients with c-stage IA radiological invasive NSCLC**

**Disclosure:** No significant relationships.

**Keywords:** part-solid tumor, pure-solid tumor, prognosis, non-small cell lung cancer, invasive tumor, ground glass opacity
Objectives:
Surgery for lung abscess is a challenging task. Timing and indications for surgery are not well established. Identification of predictors of outcome could help to clarify the role of surgery.

Methods:
In a retrospective study patients who underwent major thoracic surgery for infectious lung abscess were identified at six centers in Germany, Spain, the United Kingdom and the United States. Study period was 2000-2015.

Results:
There were 84 patients (male 64; median age 59 years, IQR 18). Pulmonary sepsis (43), pleural empyema (41), persistent air leakage (24), acute renal failure (12) and respiratory failure with mechanical ventilation (24) were already preoperatively present. Chronic alcoholism (34), alcoholic liver cirrhosis (8) and drug addiction (5) were common. The mean Charlson index of comorbidity was 3.1 (median 2.0, IQR 3). Procedures were segmentectomy (18), lobectomy (53) and pneumonectomy (13). The 30-day-mortality following surgery was 13/84. There were no significant differences in age, Charlson-index-of-comorbidity and Charlson-combined-age-and-condition-related-score between lobectomy and pneumonectomy patients. Segmentectomy patients were significantly younger (p=0.03). Preoperative sepsis (OR: 15.08, 95%CI: 2.03-675.72, p<0.01), preoperative persistent air leak (OR: 13.02, 95%CI: 2.87-83.31, p<0.01), respiratory failure (OR: 5.36, 95%CI: 1.34-24.00, p<0.01), acute renal failure (OR: 5.54, 95%CI: 1.12-26.73, p=0.02) and Charlson-index-of-comorbidity ≥ 3 (OR: 7.60, 95%CI: 1.49-75.54, p<0.01) are associated with higher mortality whereas age > 70 years (p=0.46) and the extent of pulmonary resection (segmentectomy, lobectomy, pneumonectomy) have no
significant influence on mortality. Patients with fatal outcome have significantly higher both Charlson-index-of-comorbidity (p<0.01) and Charlson combined age and condition related score (p<0.01).

**Conclusion:**
Delayed referral for surgery is common. Significant predictors for fatal outcome are pulmonary sepsis, septic multi organ failure (respiratory failure, acute renal failure) and preexisting comorbidity (Charlson-index-of-comorbidity ≥ 3). The extent of surgical resection shows no significant influence. Further improvement seems achievable by earlier surgical intervention before the onset of pulmonary sepsis.

**Disclosure:** No significant relationships.

**Keywords:** lung abscess, pleural empyema, pulmonary sepsis, septic multi organ failure, comorbidity, emergency thoracic surgery
SURGERY FOR PREDOMINANT LESION IN NON-LOCALIZED BRONCHIECTASIS

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Objectives:
It is well established that localized bronchiectasis is the indication for surgical resection. But there is little information about resection for non-localized bronchiectasis. The purpose of this study was to present our surgical experience for non-localized bronchiectasis and compare surgical outcome between non-localized bronchiectasis and localized bronchiectasis.

Methods:
We reviewed the medical records of consecutive patients who underwent lobectomy for non-localized and localized bronchiectasis between 2005 and 2008. Propensity score matching (1:1) was applied to balance known confounders between the two groups. Finally, 37 patients with non-localized bronchiectasis and 37 patients with localized bronchiectasis were selected and compared.

Results:
There was no significant difference in median operative time and blood loss between the two groups. The postoperative mortality was zero in both groups and postoperative morbidity was 21.6% and 24.3% in non-localized and localized group, respectively (p=0.782). After resection, the frequency of acute infection (5.3±2.1 vs. 1.8±2.3, p<0.01) and hemoptysis (4.9±2.8 vs. 1.1±0.7, p<0.01) declined dramatically in non-localized group and the amount of sputum also decreased (37±3 ml vs. 10±4 ml, p<0.01). Satisfaction with the surgical outcome in non-localized group was comparable to that in localized group (p=0.430).

Conclusion:
Surgery can be safely performed in patients with non-localized bronchiectasis and a better satisfactory outcome can be achieved after resection of predominant lesion in the lung.

Disclosure: No significant relationships.
Keywords: bronchiectasis, surgery, non-localized
F-097

PNEUMONECTOMY IN TUBERCULOSIS-DESTROYED LUNG: CLASSIC VERSUS “TWO-STEP” APPROACH

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Objectives:
In the era of anti-TB drugs, surgery for tuberculosis is not mandatory. Still, there are 2-3% of TB patients, especially regarding the MDR-TB, XDR-TB and complicated TB cases which require pulmonary resections as surgical treatment. Pneumonectomy in tuberculosis-destroyed lung is of major concern, because of its associated morbidity and mortality, and can be performed in a single surgical time or secondary to closing the bronchus first, via the transcervical approach, the subject of our study.

Methods:
Over a period of 6 years, between January 2010 and December 2015, pneumonectomy was performed for 24 patients with documented history of TB. Preoperatively, radiological evidence showed unilateral destroyed lung with no perfusion. Eight female patients (66.6%) and 10 male patients (66.6%) underwent pneumonectomy in a single surgical time. Two female patients (33.4%) and four male patients (33.4%) underwent the transcervical approach for initial bronchial closure, followed by pneumonectomy in a second surgical time.

Results:
Among the 24 patients, 18 had left lung destruction and six had right lung destruction. Among the patients who underwent pneumonectomy in a single surgical time, five patients (27.7%) developed main bronchus postpneumonectomy fistula. Regarding the six cases who underwent the transcervical approach for initial bronchial closure, when waiting more than two months, division of the pulmonary vessels in pneumonectomy was particularly difficult. A maximum 21-day gap until the second surgical time was allowed in a case with infected post-tuberculosis destroyed lung, because of complications associated with lung abscess.

Conclusions:
The “two-step” approach especially addresses patients with tuberculosis-destroyed lung who associate bronchopleural fistula or pulmonary abscess, where the gap between the two surgical times must be minimum. Despite the limited number of cases, “two-step” pneumonectomy showed clear advantages over one step pneumonectomy regarding patient follow-up, with zero cases of main bronchus postpneumonectomy fistula.

Disclosure: No significant relationships.

Keywords: “two-step” approach, bronchus first, pneumonectomy, surgical time, tuberculosis-destroyed lung
F-098

SHORT-TERM AND LONG-TERM OUTCOMES OF INTRATHORACIC VACUUM THERAPY OF THORACIC EMPYEMA IN DEBILITATED PATIENTS

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Objectives:
This retrospective study analyzed the effectiveness of intrathoracic negative pressure therapy for debilitated patients with empyema and compared the short-term and long-term outcomes of three different intrapleural vacuum-assisted closure (VAC) techniques.

Methods:
We investigated 43 consecutive (pre)septic patients with poor general condition (Karnofsky index ≤50%) and multimorbidity (≥3 organ diseases) or immunosuppression, who had been treated for primary, postoperative, or recurrent pleural empyema with VAC in combination with open window thoracostomy (OWT-VAC), in minimally invasive technique (Mini-VAC) and with instillation (Mini-VAC-Instill).

Results:
The overall duration of intrathoracic vacuum therapy was 14 days (five–48 days). Vacuum duration in the Mini-VAC and Mini-VAC-Instill groups (12.4±5.7 and 10.4±5.4 days) was significantly shorter (p = 0.001) than in the open window thoracostomy (OWT)-VAC group (20.3±9.4 days). No major complication was related to intrathoracic VAC therapy. The chest wall closure rates were significantly higher in the Mini-VAC and Mini-VAC-Instill groups than in the OWT-VAC group (p = 0.034 and p = 0.026). Overall, the mean postoperative length of stay in hospital (LOS) was 21 days (median 18, 6–51 days). LOS was significantly shorter (p = 0.027) in the Mini-VAC-Instill group (15.1±4.8) than in the other two groups (23.8±12.3 and 22.7±1.5). Overall, the 30-day and 60-day mortality rates were 4.7% (2/43) and 9.3% (4/43), and none of the deaths was related to infection.

Conclusion:
For debilitated patients with pleural empyema, immediate minimally invasive intrathoracic vacuum therapy is a safe and viable alternative to OWT. Mini-VAC-Instill may provide the fastest clearance rate and healing of empyema.

Disclosure: No significant relationships.

Keywords: outcomes, negative pressure wound therapy, vacuum-assisted closure, thoracic empyema, minimally invasive
USE OF IDRIVE POWERED STAPLING SYSTEM FOR MINIMALLY INVASIVE LUNG VOLUME REDUCTION SURGERY: RESULTS OF A RANDOMIZED TRIAL

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Objectives:
Lung volume reduction surgery (LVRS) represents an important treatment option for patients with advanced lung emphysema. During minimally invasive surgery, endoscopic staplers are used to perform the pulmonary resection. Recently, a new generation of electronically powered stapling systems was developed. In the present study, the iDrive powered stapling system (Covidien, Germany) was first tested during minimally invasive LVRS.

Methods:
Institutional ethics committee vote was obtained prior to performing the study. N = 40 consecutive patients with advanced emphysema were included. All patients underwent bilateral, minimally invasive LVRS. Patients were randomized for iDrive use for the right-sided (n = 20) or left-sided resection (n = 20). A conventional endoscopic stapler (EndoGIA, Covidien, Germany) was used for contralateral resection. Duration of surgery, air leakage after extubation and on POD 1 quantified by a digital drainage system (Medela, Thopaz, Germany) as well length of drainage therapy was documented for each side.

Results:
The application of the new system was unproblematic. Mean duration of surgery was 52 min in the iDrive-side compared with 54 min in the EndoGIA-side (p = 0.5). After extubation, a mean air leakage of 230 ml/min in the iDrive-side was observed. This did not differ significantly from the EndoGIA-side (321 ml/min, p=0.6). On POD1, so significant differences regarding air leakage were observed between the iDrive and EndoGIA side (308 vs. 255 ml/min, p = 0.7). Moreover, length of drainage therapy did not show significant differences between both sides (7 days iDrive vs. 8 days EndGIA, p = 0.6).

Conclusion:
The iDrive powered stapling system offers one-handed, push-button operation, which eliminates the manual firing force and possibly enables more precise resection. In the current study, the novel system lead to comparable results with the conventional hand staplers without any disadvantages in patients undergoing bilateral, minimally invasive LVRS.

Disclosure: No significant relationships.
Keywords: pulmonary resection, iDrive, LVRS
CONSEQUENCES OF INTERATRIAL SHUNTING THROUGH A PATENT FORAMEN OVALE FOLLOWING PULMONARY RESECTION: A PROSPECTIVE STUDY.

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Objectives:
Following thoracic surgery, interatrial shunting (IS) through a previously asymptomatic patent foramen ovale (PFO) has been reported as an infrequent, serious, complication. Its presentation is myriad, occurring either days or months after surgery. As the incidence of PFO in the general population has been reported to be as high as 27%, this study sought to postoperatively investigate the role of PFO in adverse events, as well as the role of major pulmonary resections in the patency of foramen ovale.

Methods:
Prospective, observational cohort study (in a tertiary care hospital), including 63 consecutive patients scheduled for major pulmonary resection. Patients were assessed by transcranial doppler (TCD) with bubble test at baseline, time of discharge and six months after surgery. To confirm PFO, patients with positive TCD also underwent contrast transthoracic echocardiography with agitated saline injection.

Results:
Median age was 65 years (range 36-86), 47 (75%) males. Overall, eight patients underwent pneumonectomy, five bilobectomy and 49 lobectomy; 30 (48%) underwent right side procedure and 32 (52%) left. There was one perioperative death, and postoperative morbidities were: 16 atrial fibrillations, 3 pulmonary complications, one stroke and one ARDS. At baseline, PFO was positive in 14 (22%) and negative in 49 (78%); of the latter, five were positive at discharge (p=0.06). Detection of PFO at baseline was significantly associated with a risk of postoperative complications (OR=5.5; 95% CI=1.3–24.3; P=0.014).

Conclusion:
Preoperative asymptomatic IS resulted being independently associated with postoperative adverse events. Moreover, our results suggest that major pulmonary resections might play an
underlying role in triggering the patency of foramen ovale. These findings need to be confirmed in larger prospective studies, in order to better identify the specific characteristics of PFO in thoracic surgery.

**Disclosure:** No significant relationships.

**Keywords:** interatrial shunting, postoperative adverse events, major pulmonary resection, patent foramen ovale
DIGITAL DEVICES IN THORACIC SURGERY: ARE THEY REALLY USEFUL IN CLINICAL PRACTICE TO PREDICT AIR LEAK? RESULTS FROM A PROSPECTIVE RANDOMIZED CLINICAL TRIAL

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Objectives:
Digital devices could help clinical practice measuring the air leak, but their role is still debated. Aim of this study is to test advantages using these devices.

Methods:
From June 2012 to May 2015 we enrolled 95 patients underwent lobectomy or wedge resection in a prospective randomized trial at our division of thoracic surgery. The patients were divided in group D (50 patients) and group E (45 patients): air-leak was evaluated by digital device in group D and by water seal in group E. In group D chest drain was removed when the air leak was absent or <0.5 liters/hour for 12 consecutive hours. In group E chest drain was removed when clinical signs of air leak were absent.

Results:
Male/female ratio was 50/45, mean age was 63.63±12.95 years. Cumulative mean postoperative hospitalization was 6.00±3.33 days (range 2-31), mean chest tube stay was 5.17±3.54 days, persistent air-leak (>5 days) occurred in 9 (9.9%). Postoperative hospital stay in group D was 5.81±2.56 days and in group E was 6.20±4.12 days (p=0.8), mean chest tube stay was 5.08±3.01 days in group D and 5.27±4.07 days in group E (p=0.8); clamping test was needed in 1 patient in group D and in 7 in group E (p=0.02). Interestingly, air-leak in first post-operative day was a predictive factor of persistent air-leak (AUC on the ROC curve of 69.7%, sensibility: 77.8%).
In detail, in D group an air-leak value > 0.2 l/h with spikes over 0.5l/h in III p.o was predictive of a persistent air-leak; chest tube duration was 7.73±5.20 in patients with spikes and 4.32±1.33 days in patients without spikes, p: 0.001; AUC: 83%, sensitivity:80%.

Conclusion:
Digital devices reduced clamping tests and mistakes in chest drain removal timing. They are also useful to assess and predict persistent air leak, helping clinical practice and chest tube management.

Disclosure: No significant relationships.
Keywords: pulmonary lobectomy, air-leak, chest drain, digital devices
THREE-DIMENSIONAL VIRTUAL BRONCHOSCOPY USING AN IPAD TO GUIDE IN REAL TIME TRADITIONAL TRANS-BRONCHIAL NEEDLE ASPIRATION BIOPSY

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Objectives:
Three-dimensional (3D) imaging is reported to assist several surgical procedures, thus we assumed virtual endoscopy and curved-Multi Planar Reconstructions (c-MPR) to be able to guide in real time “blind”-traditional TBNA and increase its diagnostic accuracy.

Methods:
One Hundred and thirty six consecutive patients with mediastinal adenopathy accessible to TBNA were prospectively enrolled and randomly allocated to Experimental or Traditional Group depending on whether TBNA was performed with or without prospective 3D guidance. EBUS and/or surgical biopsy were performed if TBNA results were inadequate. All patients underwent chest MDCT scans (1mm thickness) which were reconstructed in Open Osirix software to obtain both a c-MPR of trachea and of bronchi and a virtual endoscopy. C-MPR was used to predict a precise sampling location by measuring the distance of the node planned to biopsy from the carina. The static images were edited in dynamic endoscopic navigation by Open iMovie software and were transferred to iPad to guide in real time TBNA (Figure 1). Sensitivity, specificity, PPV, and NPV were calculated in a standard manner for each group and McNemar test assessed the intergroup difference

Results:
Traditional and Experimental group counted 69/136 (51%) and 67/136 (49%) patients, respectively. No significant intergroup difference were found regarding demographic data, lymph node size (17±2.9 versus 16±3.4 mm;p=0.6), stations sampled and operative time (14±2 versus 13±4 minutes). Sensitivity, specificity, NPV and PPV of Traditional Group were 68% (43/63); 100% (6/6); 23% (6/26) and 100% (43/43); and of Experimental Group were 86% (53/61); 100% (6/6); 57% (8/14) and 100% (53/53). The sensitivity was higher in Experimental than in Traditional group (86% versus 68%;p=0.003).
Conclusion:
Our 3D virtual bronchoscopy is cost-effective, easily reproducible, and improves the diagnostic accuracy of traditional TBNA. Surgeons using iPAD can follow simultaneously virtual and normal bronchoscopy step-by-step which helps to identify in real time the right sampling location of lymph node.

Disclosure: No significant relationships.
Keywords: virtual bronchoscopy, mediastinal adenopathy, trans-bronchial needle aspiration biopsy
MODERN RISK MODELING FOR ANATOMICAL LUNG RESECTION: ONLY PATIENT’S AGE PREDICTS THE RISK OF PULMONARY COMPLICATIONS

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Objectives:
In the last ten years, two different flow charts have been proposed for decision making in functional evaluation prior to lung resection. Both are based on patients’ age, ppoFEV1, ppoDLCO, exercise capacity and type of surgery (pneumonectomy) for predicting hospital death in anatomical lung resection. We hypothesize that with currently available techniques and advanced perioperative care, those variables lost predictive power. The objective of this investigation is modelling the risk of postoperative cardio-pulmonary complications (CPC) –one of the causes more related to patients’ death- in a homogeneous population according to case selection criteria, surgical approach, and perioperative care.

Methods:
This is retrospective analysis on records of all patients undergoing anatomical lung resection from January 2010 to September 2015 in our Institution. All patients received similar care, preoperative functional evaluation. We constructed a predictive model for CPCs including the most frequently quoted independent variables: age, ppoFEV1, ppoDLCO, approach type and pneumonectomy. A subset of 400 patients was randomly selected and the model constructed on that population using logistic regression analysis with bootstrap resampling. Then, the model was tested on the remnant cases and its performance estimated by ROC analysis.

Results:
Seven hundred and fifty eight cases were included (84 segmentectomy, 604 lobectomy, 34 bilobectomy and 36 pneumonectomy cases). 444 patients were approached by muscle sparing and 314 by anterior mini-thoracotomy. Overall 30-day mortality was 1.1% (8 cases); by lung resection type: segmentectomy 1.2 (1 case), lobectomy 0.9% (6 cases), bilobectomy 2.9% (1 case) and pneumonectomy 0%. The overall rate of CPCs was 10.8% (82 cases). Only patient’s age was correlated with the outcome (odds ratio: 1.07, 95%CI: 1.03-1.11). On ROC analysis the C-index was 0.66 (95%CI=0.58-0.74).

Conclusion:
With currently available advanced patient care and surgical approach techniques, known risk prediction models are not applicable since only patient’s age has moderate predictive value for CPCs.

Disclosure: No significant relationships.
Keywords: risk modeling, anatomical pulmonary resections, cardiopulmonary complications
F-104

FUNCTIONAL EVALUATION BEFORE LUNG RESECTION. SEARCHING FOR A LOW TECHNOLOGY TEST IN A SAFER ENVIRONMENT FOR THE PATIENT

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Objectives:
Stair climbing is considered the first step for functional evaluation of functionally impaired patients requiring lung resection. That test is not performed routinely due to structural problems or safety reasons. We hypothesize that comparable exercise can be obtained on an ergometric bicycle in a safer environment. In this study we correlate the amount of exercise performed by stair climbing and ergometric bicycle on a series of non-small cell lung cancer (NSCLC) cases prospectively evaluated.

Methods:
Thirty four NSCLC patients scheduled for anatomical lung resection completed stair climbing and the ramp test up to extenuation on ergonomic bicycle. Test were performed the same day separated by two hours resting. The amount of exercise on the stair climbing test (in watts) was calculated according to patient weight, reached height on stairs and time spent. Bicycle test was performed on a Lode Corival ergometer with automatic calculation of total workload in an ad-hoc room fully equipped with monitoring and resuscitation equipment. Bland and Altman plot was calculated for agreement between tests. Lineal regression model was constructed considering watts on stairs as dependent variable and watts on bicycle and patient age as covariates.

Results:
All patients completed both tests without any adverse events. Exercise was greater at stairs test (mean 227w vs 64w at bicycle). Workload was more dependent on age at the stairs test (Pearson coefficient -0.72 on stairs; -0.52 on ergometric bicycle). Bland and Altman plot showed agreement between tests. The logistic model, was highly predictive when the workload at bicycle was corrected by patient’s age ($R^2=0.80$, Fig1).
Conclusion:
Ramp test on ergonomic bicycle could replace the accepted stair climbing test as it showed a good correlation when workload is corrected by patients’ age and it adds safer conditions for evaluation. Its reliability for risk prediction needs to be further evaluated.

Disclosure: No significant relationships.
Keywords: postoperative complications, ergonomic bicycle, stair climbing test, surgical risk, preoperative evaluation, lung resection
THE VATS LOBECTOMY PROCEDURE DOESN’T OFFER ANY FUNCTIONAL RECOVERY ADVANTAGE IN COMPARISON TO THE OPEN APPROACH THREE MONTHS AFTER THE OPERATION. A CASE MATCHED ANALYSIS.

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Objectives:
The objective of the present study was to compare the functional loss (FEV1, DLCO and VO2max reduction) after VATS vs OPEN lobectomies.

Methods:
Prospective observational study on 195 patients submitted to pulmonary lobectomy at our institution from January 2010 to November 2014 and able to complete a functional evaluation follow up program (PFT with DLCO measurement and CPET) three months after the operation. Since we used the VATS technique (biportal/uniportal) as the first choice approach for performing lobectomies from January 2012, we divided the patients into two groups: OPEN-group (112 patients) and VATS-group (83 patients). The OPEN approach access was intended as a muscle sparing and nerve sparing lateral thoracotomy - Several baseline factors (age, gender, body mass index, FEV1/FVC index, pack-years, Charlson’s comorbidity index, ECOG score, morphology, pTstatus, pN status, presence of coronary artery disease, hypertension, arrhythmia and vascular artery disease) were used to construct a propensity score, applied to match the VATS-group patients with their OPEN-group counterparts. These two matched groups were compared in terms of reduction of FEV1, DLCO and VO2max (Mann-Whitney-test).

Results:
Propensity score yielded 83 well-matched pairs of OPEN and VATS patients. In both groups, three months postoperatively, we found a reduction of postoperative FEV1, DLCO and VO2max values in comparison to the preoperative ones (OPEN-patients: FEV1 -10%, DLCO -11.9%, VO2max -5.5%; VATS-patients: FEV1 -7.2%, DLCO -10.6%, VO2max -6.9%). The reductions in FEV1, DLCO and VO2max were similar in the matched OPEN-patients and VATS-patients, with a Cohen effect size<0.2 for all the comparisons (Figure 1) indicating negligible differences.

Conclusion:
In a three months perspective: - both OPEN-patients and VATS-patients experienced a reduction of their preoperative functional parameters. - VATS lobectomy doesn’t offer any advantage in terms of FEV1, DLCO and exercise capacity recovery in comparison to the muscle-sparing thoracotomy approach.
**Disclosure:** No significant relationships.

**Keywords:** lobectomy, pulmonary function, cardiopulmonary exercise test, VATS
ENTRAPMENT OF FOREIGN BODIES DURING THORACIC SURGERY

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Objectives:
During general thoracic procedures, devices are often placed in the airway and esophagus creating an opportunity for their entrapment during anatomic pulmonary resection or foregut surgery. This is detrimental to patient safety and should be a “never event.” Little data is available on the prevalence of these adverse events, the factors associated with their occurrence, and their prevention. We surveyed a population of general thoracic surgeons to obtain information about such events.

Methods:
An electronic survey was distributed to 215 members of the General Thoracic Surgical Club. The survey included questions pertaining to demographics, practice, procedural volume, and specific experiences with entrapment of foreign bodies. It was sent three times in the summer of 2014.

Results:
There were 104 complete responses (48%, 104/215). The majority of respondents work in academic teaching hospitals (78%, 82/104), an urban environment (66%, 69/104), and are male (90%, 94/107). Over 73% (76/104) perform over 50 anatomic pulmonary resections a year with 65% being performed minimally invasively. Thirty two % (33/104) reported entrapment of a foreign body during pulmonary resection and in 69% (22/32), it occurred during an open procedure. Regarding entrapment in foregut surgery, 88% (92/104) of respondents perform foregut procedures. Thirty seven % (34/92) reported entrapment during foregut surgery and in 70.5% (24/34) it occurred during open procedures. Factors contributing to the occurrence included errors in communication among others. (Table 1.)
Conclusion:
Entrapment of foreign bodies during general thoracic procedures occurs. Despite tactile feedback, the majority of entrapments reported occurred during open procedures. Multiple factors contribute to the occurrence of such events, especially errors in communication. Routine specific communication with anesthesia prior to stapling/suturing the airway or esophagus should be mandatory and could prevent future events.

Disclosure: No significant relationships.
Keywords: foregut and pulmonary surgery, retained surgical item, anastomosis, complication, survey
F-107

HIGH EXPRESSION OF HOMEBOX C6 IS CORRELATED WITH CHEMO- THERAPY SENSITIVITY IN ESOPHAGEAL SQUAMOUS CELL CARCINOMA PATIENTS

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Objectives:
High expression of HOXC6 predicts poor prognosis of esophageal squamous cell carcinoma (ESCC) patients and promotes ESCC cell proliferation. Moreover, the expression of HOXC6 was upregulated in chemosensitive ESCC cell lines. We examined the expression of HOXC6 through cytology and immunohistochemistry (IHC) and explored the relationships between HOXC6 expression and chemosensitivity in ESCC.

Methods:
ESCC patients who underwent neoadjuvant chemotherapy followed by surgery by a single-surgeon team from 2000 to 2012 were enrolled. Pretreatment biopsy specimens and postoperative resection samples were collected. IHC was conducted to examine HOXC6 expression, and the relationship between HOXC6 expression and tumor regression grade (TRG) was analyzed. In cell strain exhibiting stable knockdown of HOXC6, CCK8 assays were used to evaluate the chemosensitivity of cells to different concentrations of cis-platinum and paclitaxel.

Results:
Totally 51 pretreatment biopsy specimens were assessed, patients with high expression of HOXC6 in pretreatment biopsy specimens had better TRGs and less tumor cell residue compared with patients having low expression of HOXC6. 170 surgical samples were evaluated, HOXC6 was expressed at low level in patients with better TRG and at high level in patients with less tumor regression. Moreover, downregulation of HOXC6 decreased the sensitivity of ESCC cell lines to cis-platinum and paclitaxel, resulting in increased IC50.
Conclusion:
High expression of HOXC6 before treatment was correlated with chemosensitivity in ESCC tissues. However, further prospective studies are needed to confirm the finding.

Disclosure: No significant relationships.
Keywords: esophageal neoplasm, prognosis, chemotherapy
CASE OF SUCCESSFUL STAGE SURGICAL MANAGEMENT OF THE PATIENT WITH INITIALLY MULTIPLE TYPICAL CARCINOID TUMOR OF TRACHEA AND LARYNX COMPLICATED BY SEVERE MALIGNANT STENOSIS.

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Objectives:
To show results of successful management of the patient with initially multiple carcinoid tumor of trachea and larynx using stage reconstructive operations.

Video description:
Male 32 years old with stridor at rest. Chest CT had revealed two tumors in trachea and larynx. The trachea gleam was opened and tumor by sizes 2x1.5x2.5 cm on right sidewall of cervical department of trachea with transition to right half of a cricoid cartilage, the lower surface of a thyroid cartilage was found. The right recurrent nerve entered in zone of resection. The second tumor size of 1x0.9 cm settled down at distance of 2.5 cm below on the left sidewall of cervicothoracic part of trachea. Total length of tumor was estimated as 5.5 cm taking into account both new growths. Involvement of larynx and the need of resection of recurrent nerve did impossible segmental resection of trachea. Extensive fenestrated resection of trachea and partial resection of larynx was performed. Practically all right sidewall of cervical part of trachea was resected, as well as right half of cricoid cartilage and lower surface of thyroid cartilage, right recurrence nerve. T-tube was entered into trachea. The postoperative period was followed by right-side paresis of larynx, aspiration at meal and drinking, a purulent tracheobronchitis. Histologic research of tumor revealed a picture of initially multiple typical carcinoid tumor. In eight months post op recurrence of a tumor did not revealed. Elimination of extensive defect of trachea and larynx was performed by using of rib cartilage with satisfactory functional and clinical result. In two years post op recurrence of tumor was not revealed. Breath is free. Quality of life is good.

Conclusions:
Using of stage reconstructive plastic operations allows to cure patients with extended tumor defeat of trachea and larynx with subsequent restoration of passability of airways.

Disclosure: No significant relationships.
Keywords: airway stenosis, tracheal tumor, airway surgery, segmental resection of trachea, stage tracheal operation, multiple carcinoid of airway
CASE OF SUCCESSFUL MULTIDISCIPLINARY TREATMENT OF A PATIENT WITH ADVANCED THYROID CANCER INVASIVE TO THE TRACHEA COMPLICATED BY A MALIGNANT TRACHEAL STENOSIS.

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Objectives:
To show process and results of multidisciplinary management of patient with thyroid cancer complicated by malignant tracheal stenosis

Video description:
Male 56 years old with stridor and dysphonia. Study revealed papillary thyroid cancer with germination in trachea. Fast progressing of tumor led to malignant tracheal stenosis and emergence of stridor. Besides metasasis in manubrium of sterni and single metastasis in lungs were revealed. Performance of segmental resection in this case wasn’t possible. Total thyroidectomy with tumor executed, but gleam of trachea wasn’t opened before full termination of mediastinum stage. The partial sternotomy performed. The metallosteosynthesis of sternum and thoracomyoplasty with using of left large pectoral muscle was made. Then extensive resection of anterior and left side walls of cervical and cervicothoracic part of trachea, partial resection of a cricoid cartilage, resection of left recurrence nerve involved in tumoral process were performed. Operation was finished by laryngotracheostomy. Smooth postoperative period. Then patient received combined management including two courses of radioiodine therapy with satisfactory shipping and positive clinical effect. At control inspection in six months of data for local recurrence of a tumor and existence of the distal metastasises it is not received. In seven months and 10 months after the first operation patient had undergone reconstructive plastic surgeries as a result of which the left sidewall of a trachea is created and defect of a forward wall of a trachea is eliminated. Now the patient finished the combined treatment. Breath is free. A voice not ringing, but satisfactory. Recurrence of a tumor at the time of paper creation absent.

Conclusions:
Multidisciplinary management using stage reconstructive operation approved and helps to cure patients with advanced neck tumors with trachea involvement.

Disclosure: No significant relationships.

Keywords: reconstructive surgery of trachea, neck tumor, airway surgery, malignant stenosis
V-110

LAPAROSCOPIC REPAIR OF A DIAPHRAGMATIC HERNIA AFTER TRANSTHORACIC ESOPHAGECTOMY

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Objectives:
Esophageal resection is a complex operation often associated with morbidity. Post-esophagectomy diaphragmatic hernia is a recognized but severely under-reported and potentially hazardous event. In published series the frequency ranges between 0.7% and 4%.

Video description:
We present two cases of complete transhiatal herniation of small bowel an transverse colon in left thoracic cavity after open Ivor Lewis Esophagectomy. In the video we demonstrate the pathology the repositioning of the bowel and the closure of the hiatal defect by direct suturing and mesh repair.

Conclusions:
Hiatal hernia after esophagectomy is rare. Surgical correction of these conditions can alleviate symptoms in these patients. The development of a redundant conduit may be associated with a functional outflow obstruction. These hernias have an increased risk of incarceration or strangulation and should be repaired. Diaphragmatic herniation after esophagectomy mostly occurs into the left chest. Repair can be accomplished with low mortality; however, there is morbidity. Surgeons should be aware of this rare complication in patients presenting with symptoms of intestinal obstruction, malnutrition or respiratory complaints after esophagectomy.

Disclosure: No significant relationships.
Keywords: post esophagectomy, hiatal hernia, dysphagia
SLEEVE LEFT LOWER LOBE AND LINGULAR SEGMENTAL RESECTION AFTER INDUCTION CHEMORADIOThERAPY

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Objectives:
Bronchoplastic procedure is one of the established techniques for complete resection of lung cancer, even after induction chemoradiation. But some techniques are rarely adopted.

Video description:
Present illness: 65-year-old women. Current smoker, Brinkman index was 1350. Tumor was located in left lower lobe, tumor size was 45 mm. Histological diagnosis was adenocarcinoma, clinical stage T2aN2(#7)M0 stage IIIA. Induction chemoradiotherapy with 2 course of CDDP+VNR, concurrent 45Gy radiotherapy was given. Treatment effect was stable disease, but CT and FDG-PET revealed disappearance of #7 lymph-nodes but still #11 was positive. No distant metastasis was found. If no regional lymph node metastasis around upper division bronchus was confirmed, upper division would be preserved by bronchoplastic procedure. Operation: Posterolateral incision was made. No.11 lymph node directly invaded to lingular bronchus and pulmonary artery. Frozen diagnosis of the lymph node around upper division bronchus was no tumor. Thus following the individualization of hilar structure, left main bronchus and upper division bronchus were cut and confirmed to be free of tumor cells. Pulmonary artery after A1+2, inferior pulmonary vein and lingular vein were ligated and divided. Difference in proximal and distal caliber was so large that membranous portion of main bronchus was made. 4-0 PDS was used for anastomosis. Intercostal muscle flat was placed between pulmonary artery and anastomosis. Sealing test revealed no air leakage and upper division was well expanded. Operative time was 206 minutes and blood loss was 50 g.

Conclusions:
Pathological examination confirmed complete resection. Postoperative course was uneventful.

Disclosure: No significant relationships.
Keywords: sleeve resection, induction chemoradiotherapy, lung cancer
TOTAL SUPERIOR VENA CAVA RESECTION COMBINED WITH TRACHEAL RESECTION FOR PRIMARY LUNG CANCER

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Objectives:
Surgery for T4 lung cancer remains challenging. Here, we present a surgical case of primary lung cancer invading the mediastinum with combined resection and reconstruction of entire superior vena cava (SVC) and trachea.

Video description:
A 44-year old man was referred with the diagnosis of clinical stage IIIA (T4N0M0) lung adenocarcinoma originating from right upper lobe with invading the entire portion of superior vena cava (SVC) and its branches including right brachiocephalic vein (RBCV), right subclavial vein (RSCA) and internal jugular vein (RIJV). Though combined approach of median sternotomy with trans-manubrial (TMA) approach, en bloc resection of right upper lobe and involved mediastinal structures including SVC and its branches (RBCV, RSCA, RIJV, azygous vein) was achieved; SVC and its branches were reconstructed with ePTEF conduits. Three rings of trachea were also resected and reconstructed, because of tracheal invasion was identified intraoperatively.

Conclusions:
Complete resection for “double T4” lung cancer was achieved with combined resection of SVC and trachea.

Disclosure: No significant relationships.
Keywords: lung cancer, SVC invasion, SVC reconstruction, T4 lung cancer
THORACOSCOPIC SLEEVE LOBECTOMY UNDER COMPLETE MONITOR VIEW BY CONTINUOUS SUTURE ANASTOMOSIS

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Objectives:
Thoracoscopic bronchoplasty has some challenges. First, the control of stitching needles to the optimal point with appropriate angle is difficult because of restricted movement of needle holder under monitor view. Second, the anastomotic ligation behind the bronchus of the deep part could not get clear view for interrupted sutures. We present the operation of right upper sleeve lobectomy for squamous cell carcinoma of the lung with continuous suture under thoracoscopic surgery.

Video description:
With the left lateral decubitus position, 4-cm incision for working port in the 4th intercostal space on anterior axillary line, 2-cm additional port for thoracoscopy in 7th intercostal space on middle axillary line, and 2-cm additional ports of 7th on scapular line were made. After the right upper lobe was resected, the right main bronchus and the truncus intermedius were anastomosed with two threads of continuous suture using 3-0 Vicryl®. After two knots were performed on the mediastinal side of cartilaginous portion and the membranous portion, continuous suture of cartilaginous portion was performed to the lateral end. Subsequently continuous suture of the membranous portion were finished, and the ligation of the two threads at the lateral end completed the anastomosis. The postoperative course was uneventful, and bronchoscopy 2 months after the operation showed good bronchial patency.

Conclusions:
Continuous sutures of our technique require only three ligations with good monitor view and the movement of needle holder is the repeat of the same rotation. Using this procedure by continuous suture, thoracoscopic sleeve lobectomy would be possible to perform without difficulty.

Disclosure: No significant relationships.
Keywords: bronchoplasty, lung cancer, VATS
FACTORS PROLONGING LENGTH OF STAY IN ENHANCED RECOVERY AFTER SURGERY FOR OPEN LUNG RESECTION SURGERY

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Objectives:
Enhanced Recovery After Surgery (ERAS) has shortened length of stay and fast-tracked patients through their hospital stay. Despite VATS being the mainstay of ERAS, some patients are not suitable for minimally invasive surgery, hence the need for an ERAS pathway for thoracotomies. We however noted that some patients deviate from the ERAS protocol. We look at the obstacles to achieving ERAS goals at our unit.

Methods:
Data was prospectively collected from (May 2015-November 2015) for all open lung resections (n=85). The predetermined length of stay (LOS) for this cohort was set at 7 days. Patients safely discharged home within this period were deemed to be ERAS compliant (EC) and those who didn’t were ERAS deviation (ED). All patients were discharged once physiotherapy milestones, pain control and clinical objectives were met.

Results:
The median LOS was seven days. 53% (n=45) of patients were ERAS Compliant with 47% (n=40) in the ERAS deviation group. There was a significant difference in the proportion of M:F patients with more Females being in the EC group (p=0.003). There were also more patients with renal impairment in the ED group (p=0.045) Other pre-operative comparisons (height, FEV1, ThoracoScore, history of cardiac disease, liver disease, COPD or asthma, depression, smoking status, PVD, side of surgery, type of surgery, primary analgesia (Epidural vs Paravertebral) were not significant.

Post-operative factors that were significant include air leak (1 vs 13; p=0.00002), Social factors (poor mobility, home circumstance etc.) ( p=0.007) and respiratory complications ((1 vs 8); p=0.01)There were no differences in rates of atrial fibrillation, infection and pain control. Other reasons for delayed discharge, urinary retention, constipation) were too small in numbers to individual analyse.
Conclusion: ERAS should be applied where possible to all patients as it has reduced the LOS despite the post-operative complications, which appear to be the main factors for ERAS deviation.

Disclosure: No significant relationships.

Keywords: complications, delayed discharge, enhanced recovery after surgery (ERAS), NSCLC, lung cancer resection
CHANGES OF PULMONARY FUNCTION OVER THREE YEARS AFTER MAJOR PULMONARY RESSECTION:

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Objectives:
We aimed to measure the serial changes in pulmonary function over 36 months after major lung resection whether pulmonary function would continue to improve based on our previous one year follow-up results.

Methods:
Between 2006 and 2012, a total of 345 patients who underwent thoracic surgery followed up pulmonary function at postoperative one month, six months, one year, and then yearly. Among them, 132 patients who had performed lobectomy or greater with more than 36-months' follow-ups, we analyzed the serial changes of forced vital capacity, forced expiratory volume per 1 seconds, diffusion capacity of carbon monoxide by existence of chronic obstructive pulmonary disease, adjuvant chemotherapy, and minimally invasive thoracoscopic surgery.

Results:
The preoperative FEV1% (97.3%) was reduced to mean 75.9 % at postoperative one month (predicted 73.5% at lung perfusion scan), and increased to 81.3% by six months (P<0.001), 80.8% at one year (P=0.923), 78.9% at two years (P=0.427), and 73.6% (P=0.836) at three years. The DLCO% (preoperative 88.2%, predicted 65.5%) was also significantly increased to 78.9% by six months (P<0.001), 81.3% at 1 year (P=0.081), 86% at two years (P=0.524), and 85.8% at three years. There were no significant changes in FEV1% and DLCO% at more than one year follow-up. In addition, there was no significant differences of recovery pattern of FEV1% and DLCO% by thoracic location to operate. The actual level of DLCO% in patients who underwent adjuvant therapy was significantly decreased by one year (P=0.052). The VATS lobectomy group showed better improvement of FEV1% and DLCO% compared to those of thoracotomy (P=0.001). The changes of FEV1% and DLCO% was not significant at more than two years.
Conclusion:
Pulmonary function after lobectomy has continued improvement over three year after thoracic surgery but it showed minor impact on pulmonary function compared to those of 1-year.

Disclosure: No significant relationships.
Keywords: VATS, pulmonary function, thoracotomy, lobectomy
INCIDENCE OF MAJOR CARDIAC COMPLICATIONS AND MORTALITY IN PATIENTS WITH AND WITHOUT CORONARY ARTERY DISEASE AFTER VATS LOBECTOMY.

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Objectives:
To assess whether the incidence of postoperative major cardiac events (MACE) and mortality is higher in patients with history of coronary artery disease (CAD) than in those without CAD following VATS lobectomy.

Methods:
This is a multicenter retrospective analysis performed on prospectively collected data of 1,699 patients submitted to an intention-to-treat VATS lobectomy (January 2012-March 2015). Eighty-eight patients converted to open surgery were included. CAD definition: previous acute myocardial infarct (AMI), angina, percutaneous coronary intervention (PCI) or coronary artery bypass graft (CABG). MACE definition: postoperative acute myocardial ischemia, cardiac arrest or any cardiac death. A propensity score analysis was performed. Patients with and without CAD were matched for several baseline and surgical characteristics. Outcomes of the two matched groups were compared.

Results:
Two hundred and eighteen patients had a history of CAD (13%): 106 previous AMI, 55 angina, 32 CABG and 81 PCI. MACE and mortality rates of the entire population were 0.4% (7 cases) and 1.7% (29 cases). The propensity score yielded two well-balanced groups of 218 pairs, with and without CAD. Rates of MACE (CAD: two patients-0.9% vs. no-CAD: 1, p=0.5), total cardiopulmonary complications (CAD:61 patients-28% vs. no-CAD: 55 patients-23%, p=0.5) and postoperative stay (CAD: 7.3 days vs. no-CAD: 6.9 days, p=0.6) were alike between the groups. The incidence of atrial fibrillation (CAD: 31 patients-14% vs. no-CAD: 16 patients-7.3%, p=0.02), in-hospital or 30-days mortality (CAD: 11 patients-5% vs. no-CAD: 2 patients-0.9%, p=0.02) and dead among patients with postoperative complications (CAD: 18% vs. no-CAD: 3.6%, p=0.01) were higher in the CAD group. Sixteen VATS lobectomies of CAD patients were converted to open surgery and their mortality rate was higher than in those who were not converted (13% vs. 4.5%, p=0.2).
Conclusion:
VATS lobectomy patients with CAD history incur in minimal MACE risk, which is analogous to non-CAD patients. Nevertheless, they need careful cardiopulmonary function evaluation since their postoperative risk of mortality is five-fold higher compared to non-CAD patients.

Disclosure: H.J. Hansen: Speakers bureau of Covidien, Bard and Medela
A. Brunelli: Speaker honoraria from: Medela Healthcare Bard

Keywords: coronary artery disease (CAD), complications, video assisted thoracoscopic surgery (VATS) lobectomy, lung cancer
AN UNUSUAL COMPLICATION AFTER REPEATED PROCEDURES OF THORACIC ENDOVASCULAR AORTIC ANEURYSM REPAIR

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Objectives:
Herewith we want to present the rare complication of aortopulmonary fistula after repeated procedures of thoracic endovascular aortic aneurysm repair (TEVAR) and graft infection.

Case description:
Initially the 69 year old patient was operated in 2007 for a progressive large thoracic and abdominal aortic aneurysm by thoracic endovascular aortic repair (TEVAR) and in 2010 it was followed by a relining of the endovascular prosthesis, which was repeated twice in July 2015. In the postoperative course the patient developed hemoptysis and signs of an infection. The CT scan showed no signs of leakage of the aortic aneurysm. The patient developed a septic shock and respiratory problems necessitating intubation. A clinical suspicion of a fistula between the aortic aneurysm and the lung led to further CT angiogram work-up which showed newly developed entrapped air in the aortic aneurysm and a fistula to lung parenchyma. In the primary operation a resection of the aortopulmonary fistula and a volume reduction of the infected aneurysm followed by a pericardial patch were carried out (Figure 1). Additionally a VAC-therapy was established. A second look and a renewal of the VAC therapy took place three days later. Seven days after the initial operation a partial resection of the destroyed lower left lung under veno-venous extracorporeal membrane oxygenation (vvECMO) was performed. The patient could be discharged on POD 22.

Conclusions:
The development of a fistula is of low incidence and usually diagnosed postmortem. There are few cases reported to be treated surgically. In the present case the interdisciplinary work led to good decisions and outcome. Figure 1
Disclosure: No significant relationships.
Keywords: TEVAR, graft infection, aortopulmonary fistula
O-118

INTRATHORACIC GIANT DESMOID TUMOUR: DECISION-MAKING INTRAOPERATIVE STRATEGY TO AVOID CATASTROPHIC INTRAOPERATIVE COMPLICATIONS

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Objectives:
Here we present a failed surgical challenge for a life-threatening giant intrathoracic desmoid tumour. Decision making steps during the perioperative period and their consequences were addressed.

Case description:

Eighteen year old male presented with severe dyspnoea, orthopnoea, stridor and signs of SVC obstruction. He was oxygen-bound at rest with severe exercise limitation, and was found to have a huge intrathoracic mass occupying the entire right pleural cavity with marked displacement of the heart, great vessels and the trachea (Figure 1). Preceding histology of open biopsy was reported as malignant soft tissue sarcoma with unknown origin. Two previous removal
attempts within the last year via right postero-lateral thoracotomy had been unsuccessful. A consensus was achieved, after a multi-disciplinary meeting, that there was no alternative treatment better than a surgical challenge to relieve his life-threatening symptoms. The patient was prepared for A-V ECMO support and a wide clam-shell incision was utilised for better access to the great vessels and protection of the heart from further compression during dissection. Although the tumour appeared encapsulated, separation from the chest wall was difficult due to dense adhesions from previous thoracotomies resulting in continuous troublesome bleeding and hemodynamic instability, necessitating ECMO support and he was heparinized. After tumour excision, the mediastinum returned back to nearly midline position and the right lung expanded fairly well to fill almost all pleural space. However, intractable hemodynamic instability did not allow successful weaning from ECMO, thus, prohibiting us to achieve a satisfactory haemostasis. Unfortunately, he developed severe hypovolemic low cardiac output syndrome and coagulopathy and died of uncontrollable bleeding despite massive blood transfusion. Final histology revealed a desmoid tumour.

Conclusions:
Late diagnosed giant intra-thoracic tumours can be life-threatening due to severe compression to vital organs. ECMO support facilitates dissection manoeuvres considerably during operation, however; its undesired consequences relating to anticoagulation should be handled cautiously.

Disclosure: No significant relationships.
Keywords: desmoid tumour, surgery, ECMO support, SVC syndrome, mortality
O-119

ARE PATIENTS WITH KARTAGENER’S SYNDROME WITH SITUS VISCERUM INVERSUS AT AN UNACCEPTABLY HIGH TECHNICAL RISK TO BE CONSIDERED FOR LUNG TRANSPLANT?

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Objectives:
The estimated donor to recipient TLC ratio was 1.01. The transplant was approached through a bilateral anterolateral thoracotomy in the 4th intercostal space. A whole left graft implanted first in the left chest. Mimicking a right anatomy, the left main recipient bronchus was shorter and smaller than the left main bronchus of the donor, requiring an end-to-end anastomosis with partial telescoping. The donor pulmonary artery was cut longer than usual and angled at 30 degrees in order to keep a proper hilar alignment and to avoid kinking of the artery. The size of the right chest cavity was significantly reduced compared to the left side and required the use of a lobar (middle and lower lobe) graft. A post-implantation lobectomy was avoided in order to prevent unnecessary bronchial sutures. The whole donor atrial cuff was used for the anastomosis by stapling the upper vein. Part of the bronchus intermedius was preserved and used as a cuff for the anastomosis with the larger recipient bronchus. The recipient pulmonary artery had a complete left-like anatomy and was divided distally to the second mediastinal branch in order to reach the pulmonary artery of the graft. The postoperative course was uneventful and no vascular or bronchial complications were recorded. The patient is alive and well at a four year follow-up.

Conclusions:
A limited number of case reports of lung transplantation have described the technical issues related to the difficult anatomy of the chest in patients with KS.

Disclosure: No significant relationships.

Keywords: lung transplantation, situs viscerum inversus, Kartagener’s syndrome
A LATE COMPLICATION AFTER THERAPY FOR HODGKIN’S DISEASE AND POSSIBLE TREATMENT OPTIONS

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Objectives:
Acquired esophagobronchial fistula after chemotherapy for Hodgkin’s disease, complicated by stenosis of the left main bronchus, and the relaxation of the left diaphragm dome - a rare pathology and is a difficult challenge for the thoracic surgeon. In this article describes an option of treatment.

Case description:
A 40 year old patient, female complained of dysphagia (passes only liquid food), cough during eating, weight loss, cough with purulent sputum, shortness of breath with minimal exertion. In 2006, the patient was treated on the Hodgkin’s lymphoma with intrathoracic lymph nodes involvement at initial presentation. In 2008, was diagnosed esophagobronchial fistula and esophageal stent has been used for it correction, but the cough during ingestion of fluids remained. X-ray and CT examination of the thorax showed a shift of the stent in the esophagus, a total relaxation of the left diaphragm dome, chronic inflammatory changes in the left lung. From esophagoscopy on the front wall of the esophagus on the upper edge stent detected fistula diameter of 1 cm. Bronchoscopy - on the lateral wall of the left main bronchus found fistula diameter of 0.9 cm. 03/21/2014 the patient received laparotomy, plastic left dome of the diaphragm and gastrostomy. Esophageal stent was removed. 01/04/2014 the patient was discharged. 06/24/2014 of the second stage is made: right posterolateral thoracotomy, disconnection esophagobronchial fistula, closure of esophageal defect, circular resection of the left main bronchus, and wedge resection of the carina (area stenosis and fistula), anastomosis between the remaining part of the left main bronchus and trachea bifurcation. The postoperative period was without complications. 07/02/2014 was fulfilled esophagography - satisfactory function of the esophagus. Bronchoscopy - left main bronchus with good clearance. Histological study by mediastinal lymph nodes only sclerotic changes found.

Conclusions:
Benign fistula, even in patient with a oncological history, must requires surgical removal.

Disclosure: No significant relationships.
Keywords: esophagobronchial fistula, relaxation of the left diaphragm dome, Hodgkin’s disease
LYMPH NODAL METASTASES IN THYMIC MALIGNANCIES: A CHINESE ALLIANCE FOR RESEARCH OF THYMOMAS RETROSPECTIVE DATABASE ANALYSIS

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Objectives:
Lymphatic involvement is believed to be relatively rare in thymic epithelial tumors (TETs). The incidence and prognostic significance of nodal metastases is still unclear. This study was to define the incidence and prognostic relevance of nodal metastases in patients with TETs, using a retrospective database by the Chinese Alliance for Research of Thymomas (ChART).

Methods:
Patients who underwent surgical resection upfront without preoperative therapy were enrolled for the study. The ITMIG proposal of a new staging system for TETs was used to define the pathological stage. Incidence of nodal metastases and its impact on survival were examined.
Results:
A total of 1671 patients were enrolled in this study. Nodal metastasis was identified in 38 patients (2.27%). In 1617 patients without pretreatment, no nodal involvement was found in type A, AB, or B1 thymomas. Incidence of nodal metastases in thymoma (B2/B3), thymic carcinoma was 1.3% and 7.9%, respectively. Nodal metastasis was most common in patients with thymic neuroendocrine tumors (16.7%). Meantimes, incidence of nodal metastases, according to TNM stage, were 0.2% in T1, 6.9% in T2, 8.5% in T3, and 7.4% in T4. Gender, T stage, M stage, WHO histological types, and resection state were correlated with nodal metastases (p <0.05). Multivariate analysis revealed that patients with higher grade histology (p<0.001) and tumors in higher T stage (p<0.001) had significantly greater risk of developing nodal metastases. Five-year overall survival of patients without nodal metastases was higher than patients with nodal metastasis (70.3% vs. 25.7%, p<0.001).

Conclusion:
Incidence of nodal metastases in thymic malignancies was rare. However, nodal metastases seemed to be relatively common in patients with higher T stage or higher grade histology, especially in patients with thymic neuroendocrine tumors. More studies are needed to properly clarify the incidence and impact of nodal metastases in patients with thymic tumors.

Disclosure: No significant relationships.
Keywords: lymph node metastases, thymic epithelial tumors, TNM classification
INCIDENTALLY DETECTED ANTERIOR MEDIASTINAL TUMOR BY CHEST COMPUTED TOMOGRAPHY SCREENING: A COMPARATIVE STUDY WITH SYMPTOMATIC ANTERIOR MEDIASTINAL TUMOR.

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Objectives:
Anterior mediastinal tumors (AMT) can be incidentally detected by computed tomography (CT) during lung cancer screening with 1 to 3% of chance. The aim of this study was to evaluate clinical characteristics and treatment outcomes of the patients with incidentally detected AMT compared to symptomatic AMT.

Methods:
Incidentally detected AMTs were evaluated by multidisciplinary surgical team. Solid tumors except a manifestation of systemic disease or metastatic disease were surgically resected. Cystic tumors were resected if the size exceed 3cm. In small cystic tumors surgical treatment was determined after multidisciplinary discussion. From January 2006 to June 2015, 500 patients with AMT were operated on in our institute. There were 231 patients (46%) in incidentally detected asymptomatic AMT (Group A) and 269 patients (54%) in symptomatic AMT (group S). Clinical features and treatment outcomes were compared between two groups.

Results:
Proportion of thymic epithelial tumor (TET) in preoperative diagnosis based on CT imaging was not different between two groups (p=0.17); however proportion of TET was higher in group S in pathologic diagnosis (47.2% vs 52.5%, p=0.03). Because 46 patients (29.7%) with suspected TET in group A was confirmed as thymic cyst. Although there was no difference in tumor size between two groups (4.8±3.4 vs 5.1±3.6, p=0.4), proportion of early Masaoka-Koga stage was higher in group A (61.7% vs 44.9%, p=0.01). Minimally invasive surgery was performed more frequently in Group A (43.3% vs 32.0%, p=0.01). Group A showed lower postoperative complications (9% vs 16.0%, p=0.03) and shorter length of hospital stay (4.6±4.5 vs 7.0±8.9, p<0.01). In TET, five-year overall survival and freedom from recurrence were higher in the group A (100% vs 92.6%, p=0.047, 89.0% vs 80.1%, p=0.08, respectively).
Conclusion:
Detection of AMT during chest CT screening resulted in detection of early stage of tumors, higher chance of minimally invasive surgery, and subsequent improved early outcomes. Furthermore improvement of long-term survival in TET can be expected. CT screening has another role in the improvement of treatment outcomes of AMT.

Disclosure: No significant relationships.

Keywords: anterior mediastinal mass, chest CT screening, thymic epithelial tumor
F-123

PREOPERATIVE STENTING IN ESOPHAGEAL CANCER DOES NOT HAVE AN EFFECT FOR SURVIVAL, DISEASE PROGRESSION OR COMPLICATIONS: A PROPENSITY-MATCHED CASE-CONTROL STUDY

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Objectives:
To determine the effect of preoperative self-expanding covered metallic stent (SEMS) on survival (OS), progression free survival (PFS), operative time and complication rates in esophageal cancer (EC).

Methods:
All esophagectomy patients with EC (N=234) between 2006 and 2013, who had primary tumor cT2 or higher (N=174) were included (135 adenocarcinoma and 38 squamous cell carcinoma). Preoperative SEMS group (N=30; adenocarcinoma 23 and squamous cell 7), was propensity-matched 1:1 to a control group without preoperative SEMS. Median follow-up was 33 months (range: 0-115 months). Kaplan-Meier survival analysis was used for OS and PFS, student’s t-test for operative time and chi-squared test for complication rates.

Results:
Neoadjuvant chemotherapy was given to 56.7% and chemoradiation to 33.3% of patients. Minimally invasive esophagectomy (MIE) was completed in 51.6% and hybrid-MIE in 6.7%. Median survival in the SEMS group and control group was 32.5 months (0-111 months) vs. 29.5 months (5-108 months) and median PFS was 23.5 months (0-111 months) vs. 28.5 (2-108 months), (p=0.540 and p=0.932). Overall survival of SEMS and control group is presented in the Kaplan-Meier plot (p=0.540). Mean operative times between the groups were 436 min vs. 401 min (p=0.156). There were no differences in intra-operative (23.3% vs. 10%. p=0.233), early (50.0% vs. 43.3%, p=0.796) or late complications (53.3% vs. 30.0%, p=0.115). Conversions from MIE occurred in SEMS group 13.3% vs. control group 3.3%. 
Conclusion:
SEMS application has no negative effect on OS, PFS, complications or operative time. There was a trend towards increased incidence of intraoperative leakage, but our study groups were too small to determine any statistical differences. The result is contrary to that of recent multicentre database results, but these results reflect the results of specialised unit. Therefore, we conclude that preoperative SEMS insertion is a feasible and safe strategy when done in experienced centers as a bridge to surgery.

Disclosure: No significant relationships.
Keywords: survival, self-expanding covered metallic stent, esophageal carcinoma
IMPACT OF THE NUMBER OF LYMPH NODES RETRIEVED ON OUTCOME IN PATIENTS WITH ESOPHAGEAL SQUAMOUS CELL CARCINOMA

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Objectives:
Although evaluation of at least 12 lymph nodes (LNs) is recommended as the minimum number of nodes required for accurate staging of esophageal squamous cell carcinoma (ESCC) patients, there is disagreement on what constitutes an adequate identification of such LNs. The current study assesses the trend in lymph node evaluation over time in a single surgeon team, and aims to evaluate the optimal number of LNs for adequate staging of ESCC.

Methods:
Between January 2000 and December 2012, a consecutive series of 651 ESCC patients who had undergone radical esophagectomy with reconstruction was reviewed. Univariate and multivariate analyses were performed to identify prognostic factors. The revised nodal categories are based on the number of metastatic LN stations. The optimal number of LNs for each stage was determined using the restricted cubic splines accordingly.

Results:
The median lymph node retrieved was 16 between 2000 to 2008 rising to 19 between 2009 to 2012 (p < 0.001). However, the number of retrieved LNs was not independent prognostic factor in either period subgroup (HR per 10 additionally resected nodes, 0.78; 95%CI 0.61 - 1.00; and 0.91; 0.71 - 1.15, respectively). The total number of retrieved LNs was significantly associated with survival for patients in the surgery-alone subgroup (HR per 10 additionally resected nodes, 0.75; 95%CI 0.60 - 0.93), but not in the multimodality subgroup (HR 1.02; 95%CI 0.79 - 1.32). The optimal number of LNs for the pathological stage N1, N2 and N3 subgroup was 15, 20 and 22 respectively.

Conclusion:
The number of retrieved LNs had a prognostic impact on survival in patients after surgery alone, but its therapeutic value is still controversial. After neoadjuvant therapy, the number of retrieved LNs was not associated with survival. The proposed number range should be between 15 and 22.

Disclosure: No significant relationships.
Keywords: lymph node metastasis, esophagectomy, esophageal neoplasm
PROGNOSTIC VALUE OF PREOPERATIVE TOTAL PSOAS MUSCLE AREA ON LONG-TERM OUTCOME IN SURGICALLY TREATED ESOPHAGEAL CANCER PATIENTS

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Objectives:
The decrease of psoas muscle area (PMA) has been reported as risk factor for survival in several malignancies, there has been few studies regarding the prognostic effects in esophageal cancer. We investigated the prognostic roles of PMA and its physiologic uptake in patients with esophageal cancer who underwent surgical treatment.

Methods:
We retrospectively reviewed 131 patients with esophageal cancer who underwent surgical resection and complete lymph node dissection from 2004 to 2013. The PMA and standardized uptake value (SUV) mean were measure at L3 spine level.

Results:
The patients included 125 (95.4%) males (mean age, 63.38 ± 8.47 years) of whom 38 (29.0%) were pathological stage I, 41 (31.3%) were stage II, and 52 (39.7%) were stage III. The median follow-up period was 32.52 months. The mean BMI, PMA and SUV mean of psoas muscle were 59.50 ± 10.14, 14.42 ± 4.30 and 1.51 ± 0.27, respectively. The operative mortalities occurred in 7 (5.3%) patients. The BMI and PMA were lower in patients with operative mortalities than in patients without operative mortalities. A multivariate analysis revealed that PMA was a risk factor for overall survival (OS) (hazard ratio [HR], 0.930; p = 0.004) whereas BMI was not a risk factor for OS. The 3-year OS rates were 37.1% in low-PMA (<15.8) patients and 64.9% in high-PMA (≥15.8) patients (p = 0.002). Akaike’s Information Criterion decreased when the PMA was included in the multivariate model compared to the multivariate model without PMA.

Conclusion:
PMA was a significant prognostic factor for OS in patients with surgically treated esophageal cancer patients.

Disclosure: No significant relationships.
Keywords: psoas muscle area, sarcopenia, survival, esophageal cancer
IS THYMOMECTOMY ENOUGH FOR EARLY STAGE NON-MYASTHENIC THYMOMA PATIENTS?

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Objectives:
Thymic complete resection is thought to be the standard treatment for all thymic tumors. But the ideal resection for non-myasthenic early stage thymic tumors is not yet well understood. Therefore, we conducted a retrospective study to investigate the management of this unique scenario.

Methods:
We retrospectively analyzed a total number of 118 early stage thymoma patients whom underwent a thymectomy and thymomectomy with curative intent from January 2003 to December 2013 at our institution. Patients with myasthenia, thymic carcinomas, tumors with undetermined histology, and more advanced stage thymoma patients were excluded from this study. We compared disease free survival (DFS) according to the extent of thymic resection, Masaoka staging and the tumor size.

Results:
One hundred and eighteen patients were staged as early thymoma. Complete resection was achieved in 100% in this group. Thymectomy was performed in 43 (35.6%) patients and thymomectomy was performed 75 (64.4%) patients. Type AB and B2 were the most common subtypes in thymectomy group, type AB was the most common in thymomectomy group. 74 patients were staged as stage I, among them, 57 (76%) had thymomectomy, and 17 (39.5%) had thymectomy. 44 patients were staged as stage II, 18 (24%) underwent thymomectomy, and 26 (60.5%) had thymectomy. 49 (65.3%) patients with tumor size ≤3cm, underwent thymomectomy, and 9 (20.9%) underwent thymectomy. 26 (34.7%) patients with tumor size >3cm underwent thymomectomy, 34 (79.1%) underwent thymectomy. Comparing DFS, we observed better survival in patients with tumor size ≤3cm (P=0.023). In thymomectomy group, recurrence was observed 2 patients, and in thymectomy group, 3 had reoccurrence. Comparing DFS between two groups, there was no significant statistical difference in recurrence (p =0.250).

Conclusion:
No difference in the rate of recurrence was observed in early stage non-myasthenic patients following extent of thymic resection and Masaoka-Koga staging. But early stage thymoma patients with tumor size >3cm, thymectomy is considered to be a better option.

Disclosure: No significant relationships.
Keywords: thymoma, thymectomy, thymomectomy
PATIENT SELF-ADMINISTRATION OF ENTERAL NUTRITION FEEDING VIA JEJUNOSTOMIC TUBE IS BENEFICIAL FOR THE POSTOPERATIVE RECOVERY AFTER MINIMALLY INVASIVE ESOPHAGECTOMY: A COMPARATIVE STUDY

Department of Thoracic Surgery, Zhongshan Hospital, Fudan University, Shanghai, China

Objectives:
Patients who underwent esophagectomy usually have deteriorated nutritional status in the perioperative period. And, the nutritional status after discharge often become worse, owing to the abnormal diet caused by inadaptation to the reconstructed digestive tract, which is disadvantageous for the recovery. Therefore, we hypothesized that patient self-administration of enteral nutrition via tube feeding through jejunostomy might give enough supplementation. This study was to exam the effect of this strategy on patients’ postoperative recovery after minimally invasive esophagectomy (MIE).

Methods:
A total of 110 consecutive esophageal cancer patients between March 2014 and June 2015 were included. They underwent MIE by one surgical team. The initial 55 patients implemented conventional care, who were placed nasointestinal tube (Group N) and received enteral nutrition feeding. The nasointestinal tube was removed when discharge. Laparoscopic feeding jejunostomy was performed in the later 55 patients (Group J), and enteral nutrition feeding was given perioperatively. After discharge, the feeding was self-administered by patients till three months after surgery.

Results:
The two groups were comparable on patients’ demographics and surgical features. No significant difference was found between perioperative morbidity, mortality, hospital stay. Postoperatively, compared with Group N, the patients in Group J had faster weight recovery (67.3% vs 38.2%, p=0.002), less need of intravenous infusion in hospital (12.7% vs 54.5%, p=0.000), less 90-day morbidity (10.9% vs 25.5%, p=0.048) and lower incidence of readmission to hospital (3.8% vs 9.1%, p=0.508). Besides, incomplete intestinal obstruction occurred in two patients in Group J, who were cured after non-surgical treatment. Moreover, for the patients who required to receive adjuvant chemotherapy, the status of tolerance to chemotherapy was much better in Group J than Group N (89.3%[25/28] vs 61.5%[16/26], p=0.017).

Conclusion:
Our study suggests that patient self-administration of enteral nutrition feeding via jejunostomic tube is feasible and beneficial for the postoperative recovery after MIE.

Disclosure: No significant relationships.
Keywords: enteral nutrition feeding, jejunostomy, minimally invasive esophagectomy
F-128

RISK FACTORS OF MYASTHENIC CRISIS AFTER TOTAL THYMECTOMY FOR PATIENTS WITH THYMOMA AND MYASTHENIA GRAVIS

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Objectives:
Total thymectomy should be performed on patients of thymoma with myasthenia gravis (MG). This study aims to investigate the risk factors of postoperative myasthenic crisis (POMC) in these patients.

Methods:
The clinical records of 127 patients (68 male, 59 female; median age, 50 years) of thymoma with MG who underwent total thymectomy at our institution from 2005 to 2014 were retrospectively reviewed. The following factors were analysed in relation to POMC: gender, age, duration of symptoms, bulbar symptoms, smoking history, history of myasthenic crisis, comorbidities, pereoperative pyridostigmine and prednisolone therapy, spirometric and blood gas parameters, Osserman-stage, operation approach, major complications, WHO histologic classification, Masaoka staging, use of immunoglobulins or plasmapheresis.

Results:
Thirteen patients (10.2%) experienced POMC and required intubation. All the patients were weaned after 3-58 days (median 9 days) and were discharged. Univariate analysis revealed a correlation with Osserman-stage IIB~IV (OR=4.928, 95% CI = 1.286-18.882, P=0.012), with bulbar symptoms (OR=3.828, 95% CI = 1.112-13.176, P=0.040), FEV1< 75% ppo FEV1 (OR=4.856, 95% CI = 1.380-17.081, P=0.020) and more frequent POMC occurred in type B2~B3 than in type A~B1 thymomas (OR=8.118, 95% CI = 1.020-64.590, P=0.030). Multivariate logistic regression analysis showed WHO histologic classification (OR=10.041, 95% CI = 1.228~82.090, P=0.031), Osserman-stage (OR=5.953, 95% CI = 1.506~23.538, P=0.011) independently predicted POMC.

Conclusion:
Osserman stage (IIb~IV), type B2~B3 thymoma are independent predictors of POMC in thymoma patients with myasthenia gravis who underwent total thymectomy. Special perioperative care should be taken to these patients.

Disclosure: No significant relationships.
Keywords: thymoma, myasthenic crisis, myasthenia gravis, Osserman-stage
ENDOSCOPIC NASO-FISTULA DRAINAGE: A SAFE AND EFFECTIVE METHOD FOR THE MANAGEMENT OF INTRATHORACIC ANASTOMOTIC FISTULA AFTER ESOPHAGECTOMY

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Objectives:
Intrathoracic anastomotic fistula (IAF) remains a major complication of esophagectomy. Main non-surgical options for management include chest drainage and endoscope interventions. This study is aimed to present our experience of endoscopic naso-fistula drainage (ENFD) for the patients with IAF.

Methods:
From June 2011 to October 2015, 67 patients who developed IAF after esophagectomy managed by non-surgical approaches were analyzed retrospectively. IAF was confirmed according to clinical presentations combined with the finds of CT scan, radiography and endoscope. 38 patients were treated by conventional chest drainage (CD group) and 29 patients underwent ENFD with or without chest drainage (ENFD group), while other treatments including enteral nutrition and antibiotics had no difference between the two groups. In ENFD group, a 12Fr naso-fistula tube was placed through the fistula to the bottom of the vomica under ultra-slim electronic gastroscope. Then, the naso-fistula tube was connected to a gastrointestinal decompression device for drainage and was also used for irrigation. When the vomica diminished and the drainage was also clean, the naso-fistula tube could be pulled back gradually. Finally, healing of the fistula was confirmed endoscopically. Clinical records of the two groups were analyzed.

Results:
In ENFD group, Naso-fistula tubes were successfully placed under endoscope in all 29 patients without procedure-related complications. In CD group, the mortality is 7.9% (3 patients) and five patients (13.2%) developed to systemic inflammatory response syndrome (SIRS) due to insufficient drainage. While in ENFD group, there was only one patient (3.4%) developed to SIRS and no death was observed, but the difference was not statistically significant. As compared with the CD group, the ENFD group had a shorter healing course (44.2±18.3 vs 60.5±27.7 days, p<0.01) and duration of fever (9.5±8.6 vs 4.3±2.2 days, p<0.01).

Conclusion:
According to our initial experience, ENFD can be used for the management of IAF after esophagectomy safely and effectively.

Disclosure: No significant relationships.
Keywords: esophagectomy, drainage, fistula
EX VIVO ADMINISTRATION OF TRIMETAZIDINE IMPROVES POST-TRANSPLANT LUNG FUNCTION IN A PIG MODEL

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Objectives:
Ex vivo lung perfusion (EVLP) is an established method to reassess marginal donor lungs. It is also a platform to deliver therapeutics outside the body. Previously, we have shown the beneficial effects of trimetazidine (TMZ) on ischemia reperfusion injury in a rat model. This study evaluated the effect of ex vivo delivered TMZ in a pig lung transplant model.

Methods:
Pig lungs were retrieved and stored 24h at 4°C followed by 4-h EVLP according to the Toronto protocol on randomly allocated two groups (n=5, each): control (CON) and treatment (TMZ). TMZ (5mg/kg) was added in the prime solution prior to EVLP. Left lungs were then transplanted and recipients were observed for 4h. Lung function and mechanics were recorded hourly throughout reperfusion. At the end of 4-h reperfusion, the right pulmonary artery was occluded for five minutes to assess isolated allograft function. Bronchoalveolar lavage (BAL) and tissue samples were harvested for biochemical assessments.

Results:
TMZ group showed a significantly better oxygenation throughout the 4-h reperfusion period (p=0.04) and after isolation of the allograft (p=0.04). During EVLP, TMZ group showed a trend toward higher oxygenation (p=0.06). Dynamic compliance and pulmonary vascular resistance were comparable between the two groups during EVLP. Tissue thiobarbituric acid level, myeloperoxidase activity and total protein concentration in BAL were significantly lower in the TMZ group at the end of EVLP. Detailed EVLP and transplantation findings are shown in Table 1.
Table 1

<table>
<thead>
<tr>
<th></th>
<th>CON Group (5)</th>
<th>TMZ Group (5)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Donor parameters</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Weight (kg)</td>
<td>31.4±2.6</td>
<td>30.8±1.3</td>
<td>0.6</td>
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<tr>
<td>Baseline (\text{PaO}_2) (kPa)</td>
<td>64.7±27.7</td>
<td>66.3±6.6</td>
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<tr>
<td><strong>Recipient parameters</strong></td>
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<tr>
<td>Weight (kg)</td>
<td>33.8±2.6</td>
<td>33.4±1.8</td>
<td>0.8</td>
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<tr>
<td>Baseline (\text{PaO}_2) (kPa)</td>
<td>65.9±8.9</td>
<td>65.2±6.1</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>EVLPI</strong></td>
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<tr>
<td>TBARS (nmol/mg)</td>
<td>1.1±0.3</td>
<td>0.7±0.2</td>
<td>0.04</td>
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<tr>
<td>MPO (mU/mg)</td>
<td>0.6±0.1</td>
<td>0.3±0.2</td>
<td>0.02</td>
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<tr>
<td>BAL protein assay (µg/ml)</td>
<td>10822±6846</td>
<td>3843±4609</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>Transplantation</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(\text{PaO}_2)* (kPa)</td>
<td>34.7±24</td>
<td>72.5±4.5</td>
<td>0.04</td>
</tr>
<tr>
<td>TBARS (nmol/mg)</td>
<td>0.5±0.2</td>
<td>0.5±0.2</td>
<td>0.9</td>
</tr>
<tr>
<td>MPO (mU/mg)</td>
<td>0.3±0.1</td>
<td>0.2±0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>BAL protein assay (µg/ml)</td>
<td>4030±2498</td>
<td>2075±977</td>
<td>0.2</td>
</tr>
</tbody>
</table>

EVLP: Ex Vivo Lung Perfusion, TBARS: Thiobarbituric Acid Reactive Substances, MPO: Myeloperoxidase activity, BAL: Broncho alveolar lavage, *: 5 minutes after occlusion of the right pulmonary artery, kPa: kilo Pascal. All values presented as mean±SD

Conclusion:

Ex vivo administration of TMZ improved pulmonary gas exchange after reperfusion. Protective effect of TMZ was attributed to inhibition of lipid peroxidation and neutrophil infiltration during EVLP. Further studies are warranted to elucidate mechanisms of the beneficial effect of TMZ in this setting.

Disclosure: No significant relationships.

Keywords: lung transplantation, ex vivo lung perfusion, Trimetazidine
CONGENITAL TRACHEO-ESOPHAGEAL FISTULA IN ADULTS

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Objectives:
Congenital tracheoesophageal fistula (TEF) is typically diagnosed in infancy but may also present later in life. This study reviews our experience with the clinical presentation, diagnosis, and management of congenital tracheoesophageal fistulas (TEF) in adult patients. There are no literature reports of late recurrence of TEF (repaired in childhood and recurring in adulthood) and only 14 reported cases of initial adult presentation of TEF. This series provides the first description of late recurrence of congenital TEF following repair in infancy or childhood.

Methods:
We performed a computer-based search of the adult thoracic surgery departmental operative database at our institution from 2002 to 2014. Patients with iatrogenic TEF or malignant TEF were excluded.

Results:
Seven patients are included in our series. Five patients (71%) had recurrent congenital TEF and two (29%) had initial diagnosis of congenital TEF. All presented with severe coughing symptoms, and most (86%) had a history of recurrent aspiration pneumonia. Repair technique was dictated by the location of the TEF and the specific tracheoesophageal pathology. Four patients underwent repair via cervical approach with or without a tracheal resection. Three patients had significant segmental dysmotility of the esophagus and underwent repair via right thoracotomy with partial esophagectomy and cervical reconstruction. Patients were followed for at least one year. All seven patients experienced full resolution of symptoms. One patient required post-operative placement of a retrievable tracheal stent for tracheomalacia. There were no mortalities.

Conclusion:
Adult presentation of congenital TEF is a rare but recognizable clinical entity. Recurrent TEF in adulthood is a possible late complication of TEF repair performed in childhood that has not previously been described. Adult patients experiencing symptoms of cough and recurrent aspiration pneumonia should be evaluated for congenital TEF. Surgical repair of congenital TEF in the adult is feasible and effective with acceptable morbidity.

Disclosure: No significant relationships.
Keywords: congenital TEF, recurrent TEF, aspiration pneumonia, esophagectomy, tracheoesophageal fistula, tracheal resection
F-132

SURGICAL OUTCOMES OF ADDITIONAL PROCEDURES FOR INTERLOBAR PULMONARY ARTERY IN LIVING-DONOR LOBECTOMY

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Objectives:
Donor lobectomies are to be performed carefully both for donors and recipients in living-donor lobar lung transplantation (LDLLT). In some cases, additional surgical procedures are required for interlobar pulmonary artery. Herein we retrospectively reviewed surgical outcomes of additional procedures for pulmonary artery in donor lobectomy.

Methods:
Between 2008 and 2015, 116 living-donor lobectomies were performed in 64 consecutive LDLLTs (52 bilateral, 12 single). Surgical outcomes of additional procedures for pulmonary artery in donor lobectomy were retrospectively reviewed.

Results:

In 116 living-donor lobectomies, there were 71 right lower lobectomies, 45 left lower lobectomies, and two middle lobectomies. In 61 donors (52.6%), small branches of the pulmonary artery were inevitably sacrificed for anatomical reasons. Pulmonary arterioplasties for preserving branches were undertaken in 12 donors (10.3%). All of them were performed in left lower lobectomies for preserving lingular branches since the lingular branch arose far distal to the superior segmental branch of the left lower lobe. Of these 12 donors, pulmonary arterioplasty with autopericardial patch was performed in nine donors and pulmonary arterioplasty with end-to-end anastomosis was performed in three donors. All the surgical procedures were performed without complications. Furthermore, in terms of the ratio of pulmonary function test result at three month after lobectomies to the preoperative value (including forced vital capacity, forced expiratory volume in one second and diffusing capacity of carbon monoxide) and complication
rate, there were no significant differences between donors with and without pulmonary arterio-
plasties, and donors with and without sacrifices of small branches. All living donors returned to
their previous lifestyles without restriction.

**Conclusion:**
Although additional surgical procedures were frequently required in donor lobectomies, living-
donor lobectomies were performed with satisfactory outcomes.

**Disclosure:** No significant relationships.

**Keywords:** living-donor lobectomy, surgical outcome, additional procedures, pulmonary
artery
PARENCHYMA SPARING NON-STANDARD BRONCHIAL RECONSTRUCTIONS: RETROSPECTIVE ANALYSIS OF 774 PATIENTS WITH BRONCHOPLASTIC PROCEDURES.

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Objectives:
To present multiple choices of bronchial tree resection and reconstruction

Methods:
We summarize 40 years’ experience of surgical treatment of 774 patients with mean age 50 years (range, 11 months - 79 years) with bronchial diseases and injuries. 755 patients (75.5%) were operated for tumors. In other 24.5 %, 6 different diseases were the indications for bronchial sleeve resections. Type of surgical intervention was planned on the basis of preop CT scans and bronchoscopy. However, the final decision was made during surgical procedure requiring clear margins on frozen section. Depending on the lesion extension more than 40 types of bronchial surgical procedures were used. The main goal was to restore the continuity of bronchial tree with a wide anastomotic lumen regardless of the resection size. In 280 patients (36.2 %) isolated bronchial resections were performed. 22.8% (64 patients) out of them had non-standard multibronchial (≥3 bronchi) anastomosis after isolated bronchial resection. 494 patients (63.8%) underwent surgical bronchopulmonary resections with plasty due to tumor extension and/or irreversible changes in parenchyma. Segmental resection was performed in 6.7% (33 patients), lobectomy – in 76.5% (378 patients) and combined resection – in 16.8% (83 patients) In 74.1%, the bronchopulmonary sleeve resection was completed by formation of standard bronchial anastomosis. Non-standard variants of reconstructions were used in 78 (15.7%) patients. 10.2 % of patients with associated aero-digestive problems had reconstruction of the esophageal and bronchial defects

Results:
Seven hundred and fifty nine (98.1 %) patients had good outcome with 3,5% morbidity. Mortality rate made up 1,9% (15 patients). Bleeding (five), acute respiratory failure (four), pulmonary embolism (three) and other (three) were the main causes of deaths
Conclusion:
Besides standard well-known methods of resection and reconstruction of the bronchial tree, non-standard ones allowed to spare the functioning lung parenchyma in 142 (18.3%) out of 774 patients with acceptable morbidity and mortality

Disclosure: No significant relationships.

Keywords: bronchial resection, lung sparing resection, multibronchial anastomosis, bronchial trauma, bronchoplastic
F-134

PREDICTABILITY OF OUTCOME AFTER LARYNGO-TRACHEAL RESECTION AND RECONSTRUCTION

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Objectives:
Tracheal resection and reconstruction is considered a standard procedure in dedicated hospitals. However, in subglottic pathology the outcome is less predictable due to the complex local anatomy compared to the mid- and distal trachea. Our aim is to compare the outcome of laryngopharyngeal resection to segmental tracheal resection.

Methods:
Data of all patients who underwent (laryngo-)tracheal surgery for acquired subglottic or tracheal pathology, were included in a retrospective cohort study in our center between January 2000 and December 2015. Outcome measures were minor- (mild granulation, superficial wound infection, hematoma) and major complications (re-stenosis, any need for re-intervention, accidental recurrent nerve palsy, voice alterations without recurrent nerve palsy, anastomotic dehiscence/air leak). IBM SPSS statistics 22, Chi-square- and fisher’s exact test were used to compare both groups.

Results:
One hundred and fourteen patients (63 male), with a mean age of 50.3 years, 58 patients (50.9%) underwent a laryngopharyngeal- and 56 (49.1%) an isolated segmental tracheal resection. Indication for surgery was benign pathology in 88 patients (77.2%) and malignancy in 26 patients (22.8%). Major complications occurred more frequently in patients in the laryngopharyngeal resection group (29.3% versus 8.9% P=0.006) [Table 1]: the re-stenosis rate was 8.8% in laryngopharyngeal resection group versus 5.4% in segmental tracheal resection group (P=0.368). Any need for re-interventions was twice as high in the laryngopharyngeal resection group, although not considered significant (P=0.247). However, vocal alterations count for almost half of the patients with a major complication in the laryngopharyngeal resection group, but are not seen in the segmental tracheal resection group. There were no significant differences in minor complications. In-hospital mortality was 0.7% (one patient).
<table>
<thead>
<tr>
<th></th>
<th>Laryngo-tracheal resection N=58 patients N (%)</th>
<th>Segmental tracheal resection N=56 patients N (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor complications *</td>
<td>15 (25.9)</td>
<td>20 (35.7)</td>
<td>0.254</td>
</tr>
<tr>
<td>Mild granulation</td>
<td>14 (24.1)</td>
<td>17 (30.4)</td>
<td>0.456</td>
</tr>
<tr>
<td>Superficial wound infection</td>
<td>1 (1.7)</td>
<td>2 (3.6)</td>
<td>0.487</td>
</tr>
<tr>
<td>Hematoma</td>
<td>1 (1.7)</td>
<td>2 (3.6)</td>
<td>0.487</td>
</tr>
<tr>
<td>Major complications*</td>
<td>17 (29.3)</td>
<td>5 (8.9)</td>
<td>0.006</td>
</tr>
<tr>
<td>Any need for re-intervention</td>
<td>8 (13.8)</td>
<td>4 (7.1)</td>
<td>0.247</td>
</tr>
<tr>
<td>Re-stenosis</td>
<td>5 (8.8)</td>
<td>3 (5.4)</td>
<td>0.368</td>
</tr>
<tr>
<td>Accidental recurrent palsy</td>
<td>3 (5.1)</td>
<td>0</td>
<td>0.255</td>
</tr>
<tr>
<td>Vocal alterations</td>
<td>8 (13.8)</td>
<td>0</td>
<td>0.003</td>
</tr>
<tr>
<td>Air leak</td>
<td>0</td>
<td>1 (1.8)</td>
<td>0.491</td>
</tr>
</tbody>
</table>

Table 1: Minor and major complications after laryngo-tracheal resection versus segmental tracheal resection. *Number of patients who had one or more complications.

**Conclusion:**

Laryngo-tracheal resection and reconstruction tends to have a higher rate of re-stenosis and need for re-intervention compared to segmental tracheal resection. Yet, vocal alterations without recurrent nerve palsy is exclusively seen in laryngo-tracheal resection.

**Disclosure:** No significant relationships.

**Keywords:** outcome, tracheal surgery, laryngo-tracheal resection, voice alterations
PHARMACOLOGICAL INHIBITION OF POLY (ADP-RIBOSE) POLYMERASE DURING EXPERIMENTAL EX-VIVO LUNG PERFUSION REDUCES ISCHEMIA-REPERFUSION INJURY AND IMPROVES FUNCTION OF TRANSPLANTED LUNG GRAFTS

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Objectives:
Ischemia-reperfusion injury (IRI) is a key mechanism of graft damage during lung transplantation, which could be targeted by therapies applied during ex-vivo lung perfusion (EVLP). Production of oxidants and activation of the enzyme poly(ADP-ribose)polymerase (PARP) are key processes involved in IRI. Previously, the pharmacological inhibition of PARP during EVLP was shown to alleviate reperfusion injury and improve graft function ex-vivo. Here, we hypothesized that inhibition of PARP with 3-aminobenzamide (3AB) during EVLP improves lung graft function and reduces IRI in a rodent lung transplantation model.

Methods:
Male Sprague-Dawley rats (n=12) underwent left single lung transplantation. Donor lungs were procured from male Sprague-Dawley rats (3 groups, n=4 each): lungs of group 1 were flushed with cold Perfadex following cardiac arrest and stored for 4 hrs at 4°C before transplantation, donor lungs of group 2 and 3 underwent 1hr warm ischemia following cardiac arrest, cold Perfadex flush, and were stored for 1 hr at 4°C, followed by 3 hrs of normothermic EVLP either with Steen solution (group 2) or with Steen solution supplemented with 3AB (group 3). Graft function after transplantation was assessed during 2 hrs with independent ventilation of the graft and the native lung, including assessment of dynamic compliance of the graft. At 2 hours bronchoalveolar lavage (BAL) was performed to measure lactate dehydrogenase (LDH), total protein, and cytokine levels.

Results:
Three AB-treated grafts showed significantly increased dynamic compliance up to two hours after transplantation compared to all other lungs. 3AB-treated grafts revealed reduced IRI with significantly lower protein, LDH, CINC-1, TNF-α and IL-6 levels in BAL as compared to lungs undergoing warm ischemia but no PARP inhibition.
Conclusion: Pharmacological intervention during EVLP inhibiting PARP protects damaged lung lungs from ischemia-reperfusion injury after transplantation and improves post-transplant graft function in this experimental setting.

Disclosure: No significant relationships.

Keywords: experimental ex-vivo lung perfusion, ischemia-reperfusion injury, experimental lung transplantation, inhibition poly (adp-ribose) polymerase
O-136

ROLE OF SURGERY IN MALIGNANT PLEURAL MESOTHELIOMA IN A FINNISH COHORT OF 1011 PATIENTS BETWEEN 2000-2012

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Objectives:
Identify the role of surgery in management of malignant pleural mesothelioma (MPM) in a national cohort between 2000 and 2012. No previous studies exists that evaluates the role of surgery for MPM in national cohort.

Methods:
All mesothelioma patients diagnosed in Finland were identified from Finnish Cancer Registry. Survival data was gathered collectively from National registry in May 2015. Clinical supplemental information about diagnosis and treatment was submitted to Finnish Cancer Registry and derived data was manually checked for validity. Analysis was done using students’ t-test and chi-square test.

Results:
One thousand and eleven MPM were diagnosed. Histological subtype was known in 46.5% cases, of which 65.3% were epithelioid/non-sarcomatoid. Surgical procedure was verified in 236 patients (23.3% of all patients). From them 109 (46.2%) were palliative (pleurectomy, pleurodesis or in-dwelling catheter), 43 (18.2%) had extrapleural pneumonectomy (EPP) or radical total pleurectomy including pericardial and diaphragmatic resection (PD), mostly in connection with intrathoracic heated chemotherapy, 42 (17.8%) diagnostic and 42 (17.8%) unspecified surgery. Kaplan-Meier plot shows an advantage over EPP (p=0.001) of other forms of surgery. Median survival after EPP was 19.0 months (95%CI 13.9-24.1) and after non-radical surgery 13.0 months (95%CI 10.6-15.4). Patients without any surgical procedure median survival was 9.0 months (95%CI 8.1-9.9). Trimodality treatment did not significantly differ from EPP/PD alone. EPP/PD patients were younger than non-radical surgery (median age 61.0 vs 66 years, p=0.001). Only two centers performed EPP/PD, of these units our department performed 95% of the reported EPP/PD cases.
Conclusion:
EPP/PD shows significant survival advantage in national level accomplishing a survival plateau after 36 months (Fig 1). There is also bias because surgery is mostly offered for younger patients in better condition. In addition EPP is offered exclusively to patients with prognostically better non-sarcomatoid histology.

Disclosure: No significant relationships.
Keywords: malignant pleural mesothelioma, cohort-study, surgery
**PREOPERATIVE PREDICTORS OF CONVERSION IN THORACOSCOPIC SURGERY FOR PLEURAL EMPYEMA**

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**Objectives:**
Nonetheless thoracoscopic surgery for pleural empyema is effective and widely used, it is still unclear for what patient and when it could be the best method of choice. The identification of preoperative factors that might facilitate surgeons to select appropriate successful operation could be of great interest in clinical practice.

**Methods:**
There were 71 patients prospectively included in the study during the period from January 2011 to June 2014 in whom thoracoscopic surgery for stage II/III nonspecific pleural empyema was attempted to perform. In some patients thoracoscopy failed and required conversion to open thoracotomy. Different preoperative factors (anamnesis, clinical, radiologic, laboratory features) that might predict conversion were analyzed. Early postoperative period was also evaluated.

**Results:**
Conversion to open thoracotomy was required in 18 (25.4%) patients. Obliterated pleural space (in 12 patients) and failure to achieve total lung reexpansion (in six patients) were the main reasons for conversion. Multivariate logistic regression analysis showed that each additional day of illness (odds ratio 1.1 (95% confidence interval 1.0-1.2), p=0.004) and frank pus on thoracocentesis (odds ratio 4.4 (95% confidence interval 1.2-15.3), p=0.021) were the only true preoperative independent predictors of conversion. According receiver operating characteristic analysis, time of illness had high predictive value for conversion (area under the receiver operating characteristic curve – 0.8 (95% confidence interval 0.7-0.9), p<0.001). The cut-off value for time of illness was 16 days (sensitivity 94.4%, specificity 54.7%). Postoperatively thoracoscopic and conversion groups did not differ significantly according to complication rate, postoperative hospital stay and chest tube duration time. Conversion group had significantly higher postoperative Intensive Care Unit stay (0.9±0.5 vs 0.6±0.7 days, p=0.045).

**Conclusion:**
Longer time of illness and frank pus on thoracocentesis can be used to predict probability of conversion. Some preoperative factors can be helpful selecting the patient for appropriate operation.

**Disclosure:** No significant relationships.

**Keywords:** empyema, thoracoscopic surgery, conversion to open surgery
DOES PRESENCE OF PLEURAL ADHESIONS ALTER THE OUTCOME OF PATIENTS UNDERGOING MAJOR LUNG RESECTION?

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Objectives:
Adhesions affect fluid recycling through mesothelia. In many cases they may alter the surgical plan in the fear of adverse events. This study investigates the outcome of major lung resection in patients, with pleural adhesions upon entrance into the pleural cavity.

Methods:
A retrospective analysis of prospectively collected data of 144 patients subjected to a major lung resection over a period of nine months (August 2014 – March 2015) was performed. Data investigated included; demographics, comorbidities, surgical data, drainage characteristics (air leak, drainage at 1st and 2nd postoperative day (POD)), the overall and pleural (empyema, prolonged air leak or drainage) morbidity, 30-day and overall mortality. Patients were grouped depending on the presence of adhesions while entering the chest.

Results:
The mean age was 69.3 years (57% females) while 91.7% underwent a lobectomy (79.2% VATS). Adhesions were encountered in 49 patients (34%). Patients with adhesions had longer operative time (169.3 vs 138.2 minutes, p=0.002), higher postoperative drainage (1st POD: 474.5 vs 324.6 ml, p<0.001, 2nd POD: 346 vs 209.7 ml, p<0.001), longer duration of air leak (3.53 vs 1.25 days, p=0.026), total drain stay (4.43 vs 3.03 days, p=0.041) and higher pleural morbidity (p=0.016). Chest tube removal within the first 2 POD was associated with higher morbidity (p=0.023); when adhesions involved the lower chest (55.1%), the drainage was higher (700 vs 272 ml, p=0.008) at the 2nd POD and had increased pleural morbidity (p=0.004). Conversion rate and mortality between the two groups was similar.

Conclusion:
Patients with pleural adhesions encountered during entrance into the chest, undergoing major lung resection, have a more adverse outcome when compared to patients without adhesions. Early drain removal in these patients should be carefully considered, especially if the adhesions involve the lower parts of the pleural cavity.

Disclosure: No significant relationships.
Keywords: resection, outcome, adhesions, lung
THORACOGRAPHIC FIBRIN GLUE SEALING: A NOVEL INTERVENTIONAL TREATMENT FOR PNEUMOTHORAX WITH INTRACTABLE PERSISTENT AIR LEAKAGE

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Objectives:
We developed an innovative interventional treatment which could selectively stop air leakage for pneumothorax with intractable persistent air leakage or inoperable condition. That was named Thoracographic Fibrin Glue Sealing Method (TGF).

Methods:
TGF was applied to 190 cases with intractable persistent air leak pneumothorax. The patients were between 18 and 92 years old. The patients were 99 cases of COPD, 21 cases of interstitial pneumonia, 29 cases with remarkable adhesion, 40 cases of postoperative intractable air leakage, and one case of cerebral infarction at brain stem. TGF is performed in X-ray room. First, the air leak point is identified by thoracography (pleurography) with a contrast medium. Secondly the double lumen catheter is inserted through a chest tube and guided to air leak point. Fibrin Glue A and B, each diluted with contrast media, are dropped in alternation slowly just at the air leak point up to confirm clearly that the air leakage has perfectly stopped.

Results:
One hundred and thirty one in 190 cases were sealed soon after dropping the fibrin glue. Thirty eight cases were sealed in less than 24 hours and eight cases in less than 72 hours. Thirteen cases were not sealed although air leakage was decreasing. It is known that pleurodesis makes respiratory function often worse and that it is often ineffective on intractable pneumothorax. It is because pleurodesis is usually performed in patients’ bedside. It is impossible to confirm if the chemicals have reached the air leak point. TGF is an interventional treatment which is aiming at an air leak.

Conclusion:
TGF is an innovative method which can effectively seal the air leak point in the patients with prolonged intractable pneumothorax.

Disclosure: No significant relationships.
Keywords: air leak, interventional treatment, intractable pneumothorax, fibrin glue, thoracography, TGF
O-140

EFFECT OF DIAPHRAGM PACING ON QUALITY OF LIFE AND RESPIRATION IN PATIENTS WITH AMYOTROPHIC LATERAL SCLEROSIS: PRELIMINARY STUDY

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Objectives:
Respiratory insufficiency in amyotrophic lateral sclerosis (ALS) patients is managed initially by noninvasive measures. Need for other measures have evolved as respiratory related deaths predominate. We aim to detect the efficacy and safety of diaphragm pacing in managing respiratory insufficiency of selected ALS patients with stimulatable diaphragms.

Methods:
Prospectively collected data of seven patients (four female, three male, median age 57, 7) with ALS who underwent diaphragmatic pacing between April and October 2014 were reviewed. Two were on BIPAP, one had a tracheostomy. Preoperative selection criteria for pacing included positive evidence of stimulatable diaphragms tested through diaphragm EMG, ultrasound and one of the four evidence of chronic hypoventilation: FVC<50%, maximal inspiratory pressure<60cmH2O, pCO2>45 mmHg or saturation <88% for five minutes during sleep. Patients underwent 4-port laparoscopic placement of the electrodes. The duration for pacing of each patient was set according to the need.

Results:
Six patients had an uneventful course. One had a pneumothorax requiring chest tube placement. The patient who was under 20 hours of BIPAP did not benefit from pacing. She had a cardiac arrest at postoperative third month. Six patients stated that they have a better sleep cycle. The patient who had tracheostomy was off ventilator at the end of the third month. In four patients, the decrease in diaphragm thickness fraction correlated with increase in symptoms. None of the patients had a pneumonia attack during the follow-up. Five patients who underwent pacing retained their respiration parameters at the end of first year. One patient received tracheostomy at postoperative eighth month for progressive disease.

Conclusion:
With the better understanding of the respiration dynamics in patients who underwent pacing, timing of the implantation will be precise. Diaphragm thickness fraction measurement is a reliable tool to assess disease progression. This preliminary study showed that pacing may
treat respiration insufficiency in select patients by increasing the thickness of the diaphragms. As the disease progression is heterogeneous and the cohort size is small, it is assertive to state that system may prolong survival by delaying ventilator dependence.

**Disclosure:** No significant relationships.

**Keywords:** diaphragm, pacing, amyotrophic lateral sclerosis, laparoscopy, ultrasound
O-141

USEFULNESS OF FLEXIBLE SILICONE DRAINAGE VERSUS CONVENTIONAL PLASTIC DRAINAGE IN THORACIC SURGERY

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Objectives:
Pleural drainages are used in general thoracic surgery to evacuate air and liquids after surgery. It also works as a witness to detect early postoperative complications. Nowadays rigid drainages are more commonly used but they have some disadvantages like postoperative pain that causes respiratory complications due to less physiotherapy exercises after surgery. Flexible silicone drainages seem to be better tolerate by patients. The aim of this study is to compare flexible versus rigid drainage after lung resection surgery.

Methods:
A randomized clinical trial was performed to compare flexible versus rigid drains after lung resection surgery. Two homogeneous groups of 50 patients were enrolled: Group A (Rigid plastic drainage 24 Fr MedovationsÒ), Group B (round silicone fluted drain 24 Fr Biovac™). Variables studied: age, gender, pre and postoperative diagnosis, kind of resection and approach, intraoperative incidents, air leaks, subcutaneous emphysema, pleural liquid evacuated, postoperative complications, days with drainage, length of stay (LOS). Statistical analysis: Chi square for qualitative data and t-student test for quantitative variables (SSPS 22.0).

Results:
Both groups were comparable and no significant differences were found in age (p=0.55), gender (p=0.79), malignant diagnosis (p=0.61), kind of resection (p=0.21), videothoracoscopic or conventional approach (p=0.82) and intraoperative complications (p=0.61). Results of variables related to chest tube are shown in Table 1, and although LOS seems to be shorter in group B and there were more subcutaneous emphysema in group B, no statistically significant differences were found in any variable. Table 1. Dependent variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group A</th>
<th>Group B</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air leak</td>
<td>No</td>
<td>Yes</td>
<td>38 12</td>
</tr>
<tr>
<td>Total fluid</td>
<td>Mean IQR</td>
<td></td>
<td>902.5 655.3</td>
</tr>
<tr>
<td>Postoperative complications</td>
<td>No</td>
<td>Yes</td>
<td>42 8</td>
</tr>
<tr>
<td>Subcutaneous emphysema</td>
<td>No</td>
<td>Yes</td>
<td>48 2</td>
</tr>
<tr>
<td>Days with drainage</td>
<td>Mean IQR</td>
<td></td>
<td>3.8 2.5</td>
</tr>
<tr>
<td>Length of stay</td>
<td>Mean IQR</td>
<td></td>
<td>4.2 3.5</td>
</tr>
</tbody>
</table>
Conclusion:
According to the data of our study, there are no differences in the efficacy of rigid drainages against flexible silicone drains after lung resection surgery. Considering that the patients better tolerate this kind of drainage, flexible silicon drains can be a good choice after lung surgery.

Disclosure: No significant relationships.
Keywords: pleural drainage, flexible silicone drainage, thoracic surgery, postoperative
O-142

COMPARISON OF VIDEO ASSISTED THORACOSCOPIC SURGERY AND OPEN THORACOTOMY FOR DECORTICATION OF CHRONIC EMPYEMAS: A RANDOMISED CONTROL TRIAL.

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**Objectives:**
Decortication by posterolateral thoracotomy has been the gold standard in management of chronic empyemas. Thoracoscopic surgery has been proven to be equally effective as thoracotomy in management of stage II and early stage III empyema by various studies, but its role in patients with chronic empyemas presenting with gross pleural thickening and rib crowding is not well defined. We present a prospective randomised control trial done to evaluate the efficacy of thoracoscopic decortication in comparison with open decortication in patients having empyema of six months or more duration.

**Methods:**
Thirty patients with chronic empyema of history six months or more were included from July to September 2015. There were 21 males and nine females with mean age of 26 years and mean duration of symptoms of 15 months. Thirteen patients underwent thoracoscopic decortication and 17 underwent thoracotomy. Single chest tube was inserted and a digital suction drain was used in all the patients postoperatively. Intraoperative and postoperative analgesia for both groups was similar. Various parameters in two groups were analysed.

**Results:**
Mean operative time for thoracoscopy was 175 minutes and for thoracotomy was 111 minutes (p>0.001). Mean postoperative pain score in thoracoscopy and thoracotomy was 5.85 and 6.12 respectively (p=0.63). Mean duration of chesttube removal for thoracoscopy and thoracotomy was 4.6 and 4.5 days respectively (p=0.73). 3 cases of thoracotomy had superficial wound infection while none in case of thoracoscopy (p=0.09). Mean hospital stay for thoracoscopic and thoracotomy groups was 9.92 and 10.05 days respectively (p=0.70). There was no recurrence after one month follow up in either group.

**Conclusion:**
Benefit of thoracoscopic decortication over open decortication seem to be less in chronic empyemas when the duration of symptoms are more than 6 months. A larger study may be necessary for conclusive evidence

**Disclosure:** No significant relationships.

**Keywords:** chronic empyema, decortication, thoracoscopic, thoracotomy
SHOULD NEONATES WITH SEVERE CONGENITAL DIAPHRAGMATIC HERNIA BE GIVEN THE OPTION OF ECMO? DO OR DO NOT, THERE IS NO TRY. OR IS THERE?

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Objectives:
Neonates with severe congenital diaphragmatic hernia requiring extracorporeal membrane oxygenation (ECMO) have a high rate of mortality. There is controversy regarding optimal time of surgical intervention. We present our data over a 24 year period.

Methods:
We analysed data from our ELSO registry forms between 1991 and 2015 in order to determine the factors affecting survival outcome of repair of congenital diaphragmatic hernia with ECMO as a bridge to surgery and/or recovery.

Results:
Ninety eight neonates with congenital diaphragmatic hernia requiring ECMO were identified. In hospital mortality was 32%. The overall mortality (47.9%) in our study was seen up to 7 months, after this point there was no mortality. There was no difference in survival in patients repaired using pre, intra or post-operative ECMO (P:0.65). Requiring haemofiltration at any point was significantly associated with reduced survival (HR 2.4 (95%CI 1.3-4.3) P:0.03) as was the presence of neurological complications (HR 3.8 (95%CI 1.7-8.7) P:0.006). Age, APGAR score, mode of delivery, side, associated cardiac co-morbidities, pH, Pc02, p02, oxygen saturations, bicarbonate, mode of ECMO, NO2 and bleeding were not associated with any survival difference.
Conclusion:
We believe that all neonates with severe diaphragmatic hernia should be given the option of ECMO if clinically indicated. Provided they survive the initial post operative period, these patients go on to have a sustained survival benefit.

Disclosure: No significant relationships.
Keywords: ECMO, diaphragmatic Hernia, congenital, neonatal
SUPRAVENTRICULAR TACHYARRHYTHMIA AFTER MAJOR THORACIC SURGERY AND CARDIOPULMONARY EXERCISE TEST. THE PREDICTIVE POWER OF MINUTE VENTILATION-TO-Carbon Dioxide Output (Ve/VCO2).

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¹General Thoracic Surgery, Vittorio Emanuele Policlinico Hospital, Catania, Italy,
²Department of Pulmonary Medicine, Vittorio Emanuele Policlinico Hospital, Catania, Italy

Objectives:
Perioperative atrial tachyarrhythmias (POAT) are the commonest arrhythmia after major lung resections. To date the relationship between POAT and cardiopulmonary exercise test (CPET) parameters were never tested after major thoracic surgery. Aim of the study was to assess the association between CPET data and postoperative complications with particular focus on POAT and atrial fibrillation (AF).

Methods:
Seventy four consecutive patients, underwent pulmonary lobectomy from January 2013 to June 2015, were assessed by pre-operative spirometry, arterial blood gas analysis, diffusing capacity of the lungs for carbon monoxide, CPET on cycle ergometer, ECG and echocardiogram. Cardiologic and respiratory complications were recorded and matched with functional parameters and to identify any potential risk factors.

Results:
Cardiopulmonary morbidity, POAT, AF and respiratory failure incidences were 23 (31.1%), 22 (29.7%), 6 (8.1%) and 4 (5.4%) respectively. The followed associations were found: steeper Ve/VCO2 slope (p=0.005), lower FEV1/FVC (p=0.006) and FEV1 lower than 80% of predicted (FEV1<80%) (p=0.03) with POAT. Regression analysis indicated Ve/VCO2 (p=0.008; HR=1.18 [CI95%:1.04-1.34]), FEV1/FVC (p=0.02; HR=0.06 [CI95%:1.01-1.11]) and FEV1<80% (p=0.03; HR=3.30 [CI95%:1.08-10.06]) as risk factors for POAT and among these, the only independent risks factor is Ve/VCO2 (p=0.013; HR=1.20 [CI95%:1.03-1.38]). AF was associated with elderly age (p=0.002), higher systolic pulmonary artery pressure (PAPs) (p=0.002) and lower Ejection-Fraction% (p=0.011). Regression analysis suggested that PAPs (p=0.03; HR=1.44 [CI95%:1.01-2.05]) and elderly age (p=0.024; HR=1.18 [CI95%:1.02-1.37]) can predict the risk of atrial fibrillation.
Conclusion:
Our data suggest that VE/VCO2 is an objective good predictor of POAT and AF is strongly correlate to age and PAPs. These data should be considered to identify patients at risk for POAT and AF and should be helpful to guide preoperative prophylactic therapy.

Disclosure: No significant relationships.

Keywords: lung resection, postoperative complications, atrial fibrillation, perioperative atrial tachyarrhythmias, cardiopulmonary exercise test, minute ventilation-to-carbon dioxide output (VE/VCO2)
THE INFLUENCE OF PHYSICIAN AND PATIENT GENDER ON PREOPERATIVE RISK ASSESSMENT FOR LUNG CANCER RESECTION: A RANDOMIZED TRIAL

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²Department of Medicine, The University of Chicago, Chicago, United States of America

Objectives:
Women do not receive appropriate surgical therapy for lung cancer as often as men. Patient gender may influence treatment recommendations; less is known about the effect of physician gender on recommendations.

Methods:
Gender neutral clinical vignettes representing low (two), average (two) and high (two) risk lung resection candidates were paired with concordant videos of male and female standardized patients (SPs). Cardiothoracic trainees and practicing thoracic surgeons read a vignette, provided an initial estimate of the percent risk of major complications after lung resection, viewed a video (randomized to male or female SP matched for race, age, BMI, gait speed, and strength), and provided a final estimate of risk.

Results:
One hundred and seven surgeons participated; 90 were men and 17 were women. Initial estimated risks were calibrated to actual vignette risk: 10.4% ± 10.6 for low-risk vignettes, 17.6% ± 15.0 for average-risk vignettes, and 21.1% ± 16.4 for high-risk vignettes (p<0.001 by ANOVA). After viewing SP videos, final risk estimates were: 9.5% ± 10.3, 20.8% ± 17.1, and 30.8% ± 20.7, respectively, for low-risk, average-risk, and high-risk vignettes (p<0.001 by ANOVA). On average, male surgeons increased their risk estimates in response to viewing videos more than did female surgeons (mean change: 4.5 ± 9.5 vs. 1.7 ± 7.2, p=0.001). This was particularly true for average-risk and high-risk vignettes (Figure). This effect was greater for male surgeons viewing female SP videos (male surgeons’ risk estimate increase 4.2 ± 9.8 vs 1.0 ± 6.2 for female surgeons; p < 0.004) than when male surgeons viewed male SP videos (4.7 ± 9.2 vs 2.3 ± 8.0; p = 0.057).
Conclusion:
Differences in estimating the risk of complications for lung resection candidates are related to physician and patient gender. This may influence recommendations for surgery. Understanding such biases may help reduce inequities in treatment recommendations.

Disclosure: No significant relationships.

Keywords: lung cancer, lung resection, risk assessment, gender bias
ANALYSIS OF PATIENTS DISCHARGED FROM THE HOSPITAL WITH A CHEST TUBE IN PLACE AFTER THORACIC SURGERY

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Objectives:
Prolonged air leak can be a persistent problem after pulmonary resection. One strategy to manage this problem is to discharge the patient with a chest tube and a one-way valve attached as an alternative to continued hospitalization. The objective of this study was to evaluate the rate of empyema and readmission following dismissal from the hospital with a chest tube in place.

Methods:
A retrospective review of our institutional database from January 2004 to December 2013 identified 236 patients discharged with an indwelling chest tube and one-way valve attached. Empyema was defined by leukocytosis or fever and undrained pleural effusion on chest x-ray or chest CT. Readmission was defined as readmission to the hospital for any reason. Standard univariate analyses were performed to identify risk factors for empyema or readmission.

Results:
Median age was 67 years (range 18-91) with the majority of patients being male (54.7%). Median number of days with chest tube was 18 (range 6-90 days). Empyema occurred in 39 patients (16.5%) and readmission in 60 patients (25.4%). We stratified these patients based on severity due to treatments employed: 44% (17/39) antibiotics alone, 31% (12/39) further drainage, 13% (5/39) fibrinolytic therapy, and 13% (5/39) operative decortication. Predictors of empyema included male sex, coronary artery disease, and peripheral vascular disease. Dividing the cohort into two five-year periods, one-way valve use after pulmonary resection increased from 3.4% (101/2,990) to 4.5% (135/2,968) (p=0.03), mirroring an increase in video-assisted approaches (34.1% (1,021/2,990) versus 48% (1,426/2,968).

Conclusion:
Patients with prolonged air leaks who are dismissed home with a chest tube and a one way valve are at significant risk for further complications and need for additional interventions. Improved metrics to predict prolonged air leaks and therefore guide appropriate use of adjuncts to decrease air leaks may help alleviate this issue.
Table 1: Representative Operations and Rates of Empyema

<table>
<thead>
<tr>
<th>Operation</th>
<th>Number of operation, n (%)</th>
<th>Empyema, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>236</td>
<td>39 (16.5%)</td>
</tr>
<tr>
<td><strong>Wedge Resection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Open</td>
<td>69 (29%)</td>
<td>15 (22%)</td>
</tr>
<tr>
<td>• VATS</td>
<td>36 (15%)</td>
<td>8 (22%)</td>
</tr>
<tr>
<td>• VATS</td>
<td>33 (14%)</td>
<td>7 (21%)</td>
</tr>
<tr>
<td><strong>Lobectomy</strong></td>
<td>90 (38%)</td>
<td>14 (15.5%)</td>
</tr>
<tr>
<td>• Open</td>
<td>55 (23.3%)</td>
<td>9 (16%)</td>
</tr>
<tr>
<td>• VATS</td>
<td>29 (12.2%)</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>• Bilobectomy</td>
<td>4 (1.7%)</td>
<td>2 (50%)</td>
</tr>
<tr>
<td>• Sleeve Lobectomy</td>
<td>2 (0.8%)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Segmentectomy</strong></td>
<td>12 (5%)</td>
<td>3 (25%)</td>
</tr>
<tr>
<td><strong>Lung Volume Reduction</strong></td>
<td>7 (3%)</td>
<td>3 (43%)</td>
</tr>
<tr>
<td>• Open</td>
<td>3 (1.3%)</td>
<td>2 (67%)</td>
</tr>
<tr>
<td>• VATS</td>
<td>4 (1.7%)</td>
<td>1 (25%)</td>
</tr>
<tr>
<td><strong>VATS Apical Blebectomy, Pleurodesis</strong></td>
<td>17 (7%)</td>
<td>2 (12%)</td>
</tr>
<tr>
<td><strong>Thoracotomy Bullectomy</strong></td>
<td>2 (0.8%)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Exploratory thoracotomy, pneumolysis</strong></td>
<td>4 (1.7%)</td>
<td>1 (25%)</td>
</tr>
<tr>
<td><strong>VATS pleurodesis</strong></td>
<td>3 (1.3%)</td>
<td>1 (33%)</td>
</tr>
<tr>
<td><strong>Pleurectomy Decortication</strong></td>
<td>4 (1.7%)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Lung Transplant</strong></td>
<td>1 (.04%)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Chest Tube Placement</strong></td>
<td>27 (11%)</td>
<td>0</td>
</tr>
</tbody>
</table>

*(VATS = Video-assisted thoracoscopic surgery)*

**Disclosure:** No significant relationships.

**Keywords:** pleural infection, complications, pulmonary resection, prolonged air leak
THE IMPORTANCE OF LYMPH NODE DISSECTION ACCOMPANYING WEDGE RESECTION FOR CLINICAL STAGE IA LUNG CANCER

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Objectives:
For patients undergoing lobectomy for non-small cell lung cancer (NSCLC), studies suggest a survival benefit associated with increased lymph nodes sampled. It is unclear whether this is true for stage I patients treated by wedge resection. Whether or not lymphadenectomy impacts survival also has important implications when deciding between surgery and radiotherapy. We sought to evaluate the association of lymph node removal with outcomes in NSCLC patients undergoing wedge resection.

Methods:
From a prospectively maintained database (2000-2014), we evaluated patients undergoing wedge resection for peripheral, cIA NSCLC. Patients were divided into those with and without nodal assessment. Demographic, clinical, and pathological data were compared. Disease free survival (DFS) was analyzed using Kaplan-Meier and differences compared using log-rank test.

Results:
Among 3600 patients undergoing surgery, we performed 196 wedge resections (5.4%). 138 patients (70%) had lymph nodes assessed (median=4 nodes), while 58 patients (30%) had no nodes evaluated. The groups were well matched for demographic variables, comorbidity index, FEV1, and tumor characteristics. There was no difference between groups in OR time, estimated blood loss, chest tube duration, postoperative complications, or length of stay. Median pT size was 1.5cm in both (p=0.732). There were no differences between groups regarding margin or pathologic characteristics. Among patients with nodes sampled, 6 (4.3%) had positive nodes. Locoregional recurrence was over 2-fold higher (p=0.062) in patients without lymph nodes sampled (n=8, 14%) versus those with sampling (n=8, 6%). DFS at 5 years (median f/u = 30 months) favored patients who had nodal sampling versus those who did not (65% vs. 40%, p=0.058).
<table>
<thead>
<tr>
<th>Outcome</th>
<th>No lymph nodes assessed (n=58)</th>
<th>Lymph nodes assessed (n=138)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR Time (min)</td>
<td>94 (59-118)</td>
<td>95 (67-125)</td>
<td>0.356</td>
</tr>
<tr>
<td>Chest tube duration (days)</td>
<td>2 (1-3)</td>
<td>2 (2-3)</td>
<td>0.735</td>
</tr>
<tr>
<td>Length of stay (days)</td>
<td>4 (3-6)</td>
<td>4 (3-5)</td>
<td>0.978</td>
</tr>
<tr>
<td>Postoperative complications</td>
<td>13 (22%)</td>
<td>34 (25%)</td>
<td>0.739</td>
</tr>
<tr>
<td>pT size (cm)</td>
<td>1.5 (1.0-2.0)</td>
<td>1.5 (1.0-1.9)</td>
<td>0.732</td>
</tr>
<tr>
<td>pN+</td>
<td>N/A</td>
<td>6 (4.3%)</td>
<td>N/A</td>
</tr>
<tr>
<td>Locoregional recurrence</td>
<td>8 (14%)</td>
<td>8 (5.8%)</td>
<td>0.062</td>
</tr>
<tr>
<td>DFS (5 year)</td>
<td>40%</td>
<td>65%</td>
<td>0.058</td>
</tr>
</tbody>
</table>

**Conclusion:**
When performed with wedge resection for cIA NSCLC, lymph node sampling adds no morbidity and doesn’t increase length of stay. Positive nodes are identified in 4.3% of patients thought eligible for wedge resection. Lymph node removal appears to decrease locoregional recurrence and to be associated with a survival benefit.

**Disclosure:** No significant relationships.

**Keywords:** lymph nodes, limited resection, lymphadenectomy, lung cancer
REDUCED MORBIDITY FOR OCTOGENARIANS AFTER VATS LUNG RESECTION COMPARED TO AN OPEN APPROACH

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Objectives:
Due to prolonged life expectancy, more patients aged 80 years or older will undergo anatomic lung resection for lung cancer. This study was performed to evaluate perioperative morbidity and mortality in these patients and differences due to the surgical technique (thoracotomy vs. video-assisted thoracoscopic surgery – VATS).

Methods:
A retrospective analysis of patients aged 80 years or older who underwent anatomical lung resection between 2001 and 2015 was performed.

Results:
Forty seven patients were found in the database. Resection was performed by VATS technique in 27 patients and an open technique in 20 patients. Median age was 81 years and did not differ between the VATS and thoracotomy group. UICC staging was stage I in 29 patients, stage II in 13 patients and stage III in four patients; one patient had metastatic disease requiring lobectomy. Forty patients had one or more comorbidities (COPD, coronary artery disease with intervention, diabetes mellitus or renal insufficiency) with no differences between the VATS and thoracotomy group. Types of resection were lobectomy in 38 patients, segmentectomy in three, bilobectomy in five and pneumonectomy in one patient. Chest drain duration was 6.5 days in median in the thoracotomy group and 5 days in the VATS group (p=0.07). 12 patients had post-operative complications, with significantly less complications in the VATS group (11.1% vs. 45%, p=0.0161). Median length of hospital stay for all patients was 12 days, with a significant shorter stay in the VATS group (10 vs 13 days, p=0.008). There was no in-hospital mortality.

Conclusion:
Lung resection can safely be performed in selected octogenarians with acceptable morbidity and low mortality rates. The use of a VATS technique can significantly reduce the rate of peri-operative complications and length of hospital stay.

Disclosure: No significant relationships.
Keywords: morbidity, octogenarians, VATS lobectomy, open lobectomy
LONG-TERM OUTCOME OF OPEN VERSUS LAPAROSCOPIC IVOR LEWIS ESOPHAGECTOMY: A PROPENSITY MATCH SCORE STUDY

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¹Thoracic Surgery, Aix-Marseille University, Marseille, France, ²Department of Thoracic Surgery, Lung Transplantation & Diseases of The Esophagus, Service de Chirurgie Thoracique - HN - APHM, Chirurgie Thoracique - Marseille, Marseille, France, ³Biostatistics, Service de Chirurgie Thoracique - HN - APHM, Chirurgie Thoracique - Marseille, Marseille, France

Objectives:
Laparoscopic Ivor Lewis (IL) esophagectomy has been suggested to reduce postoperative morbidity and mortality. However, long-term outcomes of this hybrid minimally invasive procedure have been poorly reported.

Methods:
All the patients who had an IL esophagectomy for cancer were extracted from a prospective database. Patients were matched one-to-one according to the surgical approach (laparoscopy versus laparotomy) and on the basis of a propensity score including 8 variables: age, gender, FEV1, neoadjuvant treatment, salvage surgery, histology, location and p stage. The first endpoint was the assessment of the five year survival and disease-free survival (DFS) rates. The secondary end-points were: 1) the quality of the surgery (R0 resection rate, number resected lymph nodes (LN)); 2) the patterns of recurrence.

Results:
Over a 12-year period, 379 esophagectomies were performed among whom 272 were done using IL technique. 140 patients were matched in two homogeneous groups: laparotomy (n=70) and laparoscopy (n=70). The median follow-up for those alive and without recurrence at study end was 32 months (range, 1–104). The five year overall and DFS survival rates were 65% and 48% in laparotomy group and 73% and 51% in the laparoscopy group (p=0,891; p=0,912). R0 resection rates were respectively 93% versus 97% (p=0,441). The number and distribution of resected LN are presented in Table 1. At the time of review, 32 patients (23%) had developed a recurrence, and 33 patients (24%) had died. According to the surgical approach, the patterns of recurrence were similar in both groups.
Conclusion:
Laparoscopic approach to IL esophagectomy does not compromise the long-term oncologic outcome compared to open one. The quality of surgery seems similar in both techniques excepted for the number of resected LN at the level of the celiac trunk. Further randomized controlled trials are necessary to confirm these results.

Disclosure: No significant relationships.
Keywords: esophagus, outcome, esophageal cancer, esophagectomy, laparoscopy
F-150

PROSPECTIVE STUDY OF NEAR-INFRARED THORACOSCOPY FOR INTER-SEGMENTAL PLANE IDENTIFICATION DURING VIDEO-ASSISTED THORACOSCOPIC SEGMENTECTOMY

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⁴Department of General Surgery, Clinique de Valère, Sion, Switzerland

Objectives:
Segmentectomy by video-assisted thoracoscopic surgery (VATS) allows anatomical resection for diagnosis and treatment of small lung nodules, but identification of the intersegmental planes remains difficult. The purpose of this study is to assess the usefulness of Near-Infrared Thoracoscopy (NIT) for this identification.

Methods:
From November 2014 to October 2015, 22 consecutive VATS segmentectomies were performed with NIT at our institution. Segmental localisation and anatomical vascular supply were identified on preoperative computed tomography, before VATS with systemic Indocyanine Green (ICG) injection after arterial ligation.

Results:
Segmentectomies were all feasible by VATS, and intersegmental plane identification by NIT was good in all 22 cases. NIT was particularly helpful for the identification of the limits of atypical segments. NIT also provided an additional support in case of difficulty with anatomical vascular segmentation: for assessment of the distribution of an artery before its section, for assessment of vascular supply of the remaining lung, and for the distinction between segmental and intersegmental veins thus enhancing the quality and security of the resection. Three patients were intentionally converted to lobectomy for oncological reasons, by thoracotomy in one case. Postoperative course was uneventful for 18 patients, and complicated with two prolonged air leaks (10 and 15 days) and pneumonia for one patient, one gastroparesis and one colonic subileus. Drain was removed before 3rd post-operative day except for the two mentioned patients; the mean hospital stay was 5.4 days (+/- 4.5). All four benign lesions and 18 primary lung cancers were completely removed, including 14 stages IA, 2 IIA and 2 IIIA.
Conclusion:
NIT provides a technical support for the identification of the intersegmental during VATS, and facilitates vascular identification. It contributes to the quality of segmentectomy for diagnostic and therapeutic excisions of small nodules which are often not visible and not palpable during VATS.

Disclosure: No significant relationships.
Keywords: segmentectomy, VATS, intersegmental plane, near-infrared thoracoscopy
F-151

LONG-TERM OUTCOME OF VIDEO-ASSISTED THORACOSCOPIC SURGERY VERSUS THORACOTOMY FOR PATHOLOGICAL N1 STAGE NON-SMALL CELL LUNG CANCER

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Objectives:
Application of video-assisted thoracoscopic surgery (VATS) was noted in several studies on early stage non-small cell lung cancer. However, it has not been evaluated in advanced stage non-small cell lung cancer. We compared the oncologic outcomes between VATS and open thoracotomy retrospectively, by using propensity score matching.

Methods:
We evaluated 276 consecutive patients who underwent lung resection surgery for pathologic N1 stage non-small cell lung cancer between January 2000 and December 2011 via a retrospective chart review. We used a propensity score matching analysis for comparing VATS and thoracotomy except clinical T3 and T4 stage patients (based on age, sex, smoking, forced expiratory volume in 1 second [FEV1], diffusing capacity of the lungs for carbon monoxide [DLco], and clinical T stage).

Results:
We performed open thoracotomy in 218 patients and VATS in 58 patients. Patient’s demographics were similar between VATS and thoracotomy. However, VATS patients had smaller tumor size than open group. (p=0.012). The difference in the five-year survival rate and the five-year disease-free survival rate for the pathological stage were not statistically significant between the VATS and thoracotomy. The propensity matching group is in 156 patients (46 VATS and 110 thoracotomy). Median operative time and median total number of lymph nodes retrieved was similar between two groups. The propensity matching group is in 156 patients (46 VATS and 110 thoracotomy). Median operative time and median total number of lymph nodes retrieved were similar. However, the hospital stay duration and the chest tube indwelling time were significantly shorter in the VATS group compared to in the open group (Table. 1).

Conclusion:
VATS for patients with pathological N1 stage non-small cell lung cancer appears to have long-term outcomes of survival and recurrence similar to those with thoracotomy. Therefore, VATS is a feasible approach for patients with pathological N1 stage non-small cell lung cancer.

Disclosure: No significant relationships.
Keywords: non-small cell lung cancer, video-assisted thoracoscopic surgery, open thoracotomy, propensity score matching
Objectives:
Retrospective study of 249 consecutive cases of VATS lobectomy using different approach (4-, 3-, 2-port), with evaluation of operative time, conversion rate, complications, lymph node dissection, post-operative hospital stay, and length of pleural drainage.

Methods:
From May 2012 to December 2015 249 lung resections have been performed using VATS technique. In the first 44 patients the approach was 4-port, then 3-port in 56, and finally 2-port in 149. Average age 69.5 years (44-89), 170 males, 79 females. Lung cancer patients had cStage I-II in 242, IIIA (single cN2 station) in six, one patient with cStage IV. All the patients received PET/CT, spirometry with DLCO and walking test.

Results:
Lung resections were: 237 lobectomies, three bilobectomies, seven anatomical segmental resections, two pneumonectomies. Main histology was adenocarcinoma (n. 156). The annual distribution of operations is shown in fig. 1:
The conversion rate was 25% in 2012, 14% in 2013, 13% in 2014 and 2015. The average surgical time was 141 minutes (4-port: 134 min.; 3-port: 147; 2-port: 142). The average number of removed lymph nodes was 14 (6-26). Complications: atrial fibrillation four, haemothorax three, prolonged air leak eight, mucous impaction three, acute pancreatitis one, ictus cerebri one. Average post-operative stay: 4-port approach 5.5 days, 3-port 4.4, 2-port 4.2. Average length of drainage: 4-port 5.5 days, 3-port 4.4, 2-port 4.2. The comparison between cStage and pStage showed an upstaging in 14.4% of the patients.

**Conclusion:**
At our opinion, there is no difference between 4-, 3-, and 2-port approach in VATS lobectomy: all the main variables (operative time, conversion rate, post-operative hospital stay) show any statistical difference. In the on-going time of our experience, we chose the 2-port approach because it allows a correct anatomical vision especially because of the parallel running of the camera and stapler, when inserting the stapler through the camera port.

**Disclosure:** No significant relationships.

**Keywords:** lung resection, VATS lobectomy, 4-,3-,2-port access
COMPARISON OF CLINICAL OUTCOMES OF MINIMALLY INVASIVE ESOPHAGECTOMY WITH CONVENTIONAL OPEN ESOPHAGECTOMY FOR ESOPHAGEAL CANCER: A PROPENSITY SCORE-MATCHED ANALYSIS

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Objectives:
Minimally invasive esophagectomy (MIE) theoretically offers advantages compared with open esophagectomy (OE). The aim of this study was to compare early and mid-term outcomes between MIE and OE in patients with esophageal cancer.

Methods:
From November 2011 to July 2015, MIE was performed for a group of 53 patients, which was compared with a group of 184 cases of OE. A propensity analysis that incorporated perioperative variables, such as age, sex, preoperative pulmonary function, Charlson comorbidity index, tumor location, histologic grade of the tumor, pathologic stage and operative procedure (Ivor Lewis or McKeown) was performed, and postoperative outcomes were compared.

Results:
Matching based on propensity scores produced 42 patients in each group for the analysis of postoperative outcomes. There were only two operative mortalities in OE group, and all of these patients died of postoperative pneumonia. The overall incidence of postoperative complications was 38.1% (16 of 42) and 57.1% (24 of 42) in MIE group and in the OE group, respectively (P = 0.088). Compared with OE group, MIE was associated with a lower incidence of pulmonary complications (9.5 vs 38.1%; P = 0.005). The two year overall survival and disease-free survival was not different between the two groups (74.4% and 69.5% in the MIE group, and 69.5% and 69.8% in the OE group, P = 0.865, and P = 0.513, respectively).
Table 1: Patients’ characteristics and postoperative outcomes in the MIE and OE groups after propensity score-matching.

<table>
<thead>
<tr>
<th>Variables</th>
<th>MIE (N=42)</th>
<th>OE (N=42)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>63.3±7.7</td>
<td>64.3±7.2</td>
<td>0.557</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>40</td>
<td>39</td>
<td>0.665</td>
</tr>
<tr>
<td>BMI</td>
<td>22.1±2.7</td>
<td>21.9±2.9</td>
<td>0.773</td>
</tr>
<tr>
<td>FEV1(%)</td>
<td>104.4±18.5</td>
<td>103.2±13.9</td>
<td>0.714</td>
</tr>
<tr>
<td>Charlson Comorbidity Index 2 3 4</td>
<td>26 (61.9%) 13 (31.0%) 3 (7.1%)</td>
<td>21 (50.0%) 20 (47.6%) 1 (2.4%)</td>
<td>0.513</td>
</tr>
<tr>
<td>Tumor location Middle Lower</td>
<td>30 (71.4%) 12 (28.6%)</td>
<td>31 (73.8%) 11 (26.2%)</td>
<td>0.796</td>
</tr>
<tr>
<td>Tumor type Squamous cell carcinoma</td>
<td>39 (92.9%) 2 (4.8%) 1 (2.4%)</td>
<td>39 (92.9%) 0 3 (7.1%)</td>
<td>0.516</td>
</tr>
<tr>
<td>Histologic grade well differentiated</td>
<td>11 (26.2%) 26 (61.9%) 5 (11.9%)</td>
<td>12 (28.6%) 28 (66.7%) 2 (4.8%)</td>
<td>0.414</td>
</tr>
<tr>
<td>pT stage 1 2 3</td>
<td>28 (66.7%) 3 (7.1%) 11 (26.2%)</td>
<td>29 (69.0%) 2 (4.8%) 11 (26.2%)</td>
<td>0.914</td>
</tr>
<tr>
<td>p N stage 0 1 2</td>
<td>25 (59.5%) 12 (28.6%) 5 (11.9%)</td>
<td>25 (59.5%) 13 (31.0%) 4 (9.5%)</td>
<td>0.870</td>
</tr>
<tr>
<td>OP type Ivor Lewis operation McKeown operation</td>
<td>35 (83.3%) 7 (16.7%)</td>
<td>35 (83.3%) 7 (16.7%)</td>
<td>1.000</td>
</tr>
<tr>
<td>3 Field LN dissection</td>
<td>4 (9.4%)</td>
<td>7 (16.7%)</td>
<td>0.366</td>
</tr>
<tr>
<td>Operative mortality</td>
<td>0</td>
<td>2 (4.8%)</td>
<td>0.157</td>
</tr>
<tr>
<td>Overall complications</td>
<td>16 (38.1%)</td>
<td>24 (57.1%)</td>
<td>0.088</td>
</tr>
<tr>
<td>Anastomotic leak, conduit problems, or aero-digestive fistula</td>
<td>2 (4.8%)</td>
<td>4 (9.5%)</td>
<td>0.414</td>
</tr>
<tr>
<td>Pulmonary complications</td>
<td>4 (9.5%)</td>
<td>16 (38.1%)</td>
<td>0.005</td>
</tr>
<tr>
<td>Recurrent laryngeal nerve injury</td>
<td>8 (19.0%)</td>
<td>7 (16.7%)</td>
<td>0.782</td>
</tr>
<tr>
<td>Chylothorax</td>
<td>1 (2.4%)</td>
<td>2 (4.8%)</td>
<td>0.564</td>
</tr>
<tr>
<td>Postop bleeding</td>
<td>2 (4.8%)</td>
<td>1 (2.4%)</td>
<td>0.564</td>
</tr>
<tr>
<td>OP time, min</td>
<td>330 (235-595)</td>
<td>298 (155-455)</td>
<td>0.015</td>
</tr>
<tr>
<td>Estimated blood loss, mL</td>
<td>200 (100-1400)</td>
<td>300 (70-1350)</td>
<td>0.291</td>
</tr>
<tr>
<td>Total harvested LNs (n)</td>
<td>31 (7-71)</td>
<td>33(7-81)</td>
<td>0.198</td>
</tr>
<tr>
<td>Length of ICU stay, days</td>
<td>1(1-5)</td>
<td>1(1-159)</td>
<td>0.143</td>
</tr>
<tr>
<td>Length of postoperative hospital stay, days</td>
<td>15 (11-108)</td>
<td>15 (11-159)</td>
<td>0.519</td>
</tr>
</tbody>
</table>
Conclusion:
In selective patients, MIE could achieve superior short-term surgical results and equal oncological outcomes compared with OE.

Disclosure: No significant relationships.

Keywords: minimally invasive esophagectomy, postoperative outcomes, esophageal cancer
F-154

A NOVEL STRATEGY TO INITIATE A PERORAL ENDOSCOPIC MYOTOMY PROGRAM

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Objectives:
The standard of care for achalasia remains laparoscopic modified Heller myotomy with partial fundoplication. Peroral endoscopic myotomy (POEM) has been introduced as an alternative to surgery, but safety and long-term efficacy are not yet established. We report our experience developing a POEM program using a novel approach.

Methods:
We developed a hybrid approach to POEM with a POEM followed immediately by laparoscopic evaluation, extension of the myotomy if necessary, and partial fundoplication. We reviewed the program from April 2012 until May 2015. Starting in 2014, we began offering either a POEM or hybrid POEM. Patient data were gathered from our institutional database. Preoperative and postoperative Eckardt scores were compared.

Results:
A total of 27 patients with achalasia have undergone POEM or POEM plus laparoscopic evaluation with partial fundoplication, and 191 patients have undergone laparoscopic modified Heller myotomy over a three year period. Patient characteristics, perioperative, and postoperative data are recorded in Table 1. 37% (10/27) of patients had a previous endoscopic intervention prior to POEM. Median preoperative Eckardt score was six (range 4-11). The mean follow-up was 136 days (range 41-330) with a median postoperative Eckardt score of zero (range 0-6) at six weeks. During our initial ten patients, six required laparoscopic extension of the myotomy; five subsequent patients did not require additional myotomy. Three patients who underwent POEM without laparoscopy had continued dysphagia postoperatively. One patient had an attempted POEM which was aborted secondary to bleeding and a laparoscopic modified Heller myotomy with partial fundoplication was performed.

Conclusion:
The excellent results of a laparoscopic modified Heller myotomy with partial fundoplication are challenging to duplicate in the initial adoption of a POEM approach. We present a program developed to steepen the learning curve, enhance patient safety, and ensure adequate patient follow-up while implementing this new and complex procedure.
### Table 1: Characteristics of patients undergoing POEM procedures

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Patients</td>
<td>27</td>
</tr>
<tr>
<td>- Hybrid POEM</td>
<td>16</td>
</tr>
<tr>
<td>- POEM</td>
<td>10</td>
</tr>
<tr>
<td>- Attempted POEM</td>
<td>1</td>
</tr>
<tr>
<td>Age, mean (range), y</td>
<td>53.5 (14-81)</td>
</tr>
<tr>
<td>Male, no (%)</td>
<td>14 (52%)</td>
</tr>
<tr>
<td>Symptoms, no. (%)</td>
<td></td>
</tr>
<tr>
<td>- Dysphagia</td>
<td>26 (96%)</td>
</tr>
<tr>
<td>- Regurgitation</td>
<td>18 (67%)</td>
</tr>
<tr>
<td>- Chest pain</td>
<td>9 (33%)</td>
</tr>
<tr>
<td>Prior interventions, no. (%)</td>
<td></td>
</tr>
<tr>
<td>- Total</td>
<td>10 (37%)</td>
</tr>
<tr>
<td>- Dilatation</td>
<td>4 (15%)</td>
</tr>
<tr>
<td>- BoTox</td>
<td>7 (26%)</td>
</tr>
<tr>
<td>Myotomy Length, mean (range), cm</td>
<td>11 (6-18)</td>
</tr>
<tr>
<td>Length of Stay, median (range), d</td>
<td>2 (1-13)</td>
</tr>
<tr>
<td>Preop Eckardt Score, median (range)</td>
<td>6 (4-11)</td>
</tr>
<tr>
<td>Postop Eckardt Score, median (range)</td>
<td>0 (0-6)</td>
</tr>
<tr>
<td>Intraoperative Complications, no. (%)</td>
<td>13 (48%)</td>
</tr>
<tr>
<td>- Tension Pneumothorax</td>
<td>2 (7%)</td>
</tr>
<tr>
<td>- Decompression of Pneumoperitoneum</td>
<td>6 (22%)</td>
</tr>
<tr>
<td>- Mucosal Perforation</td>
<td>4 (15%)</td>
</tr>
<tr>
<td>- Bleeding</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>Postoperative Outcomes, no. (%)</td>
<td></td>
</tr>
<tr>
<td>- Reflux requiring medication</td>
<td>8 (30%)</td>
</tr>
<tr>
<td>- Erosive Esophagitis</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>- Inadequate Myotomy</td>
<td>4 (15%)</td>
</tr>
</tbody>
</table>

**Disclosure:** No significant relationships.

**Keywords:** esophagus - benign disease, esophageal surgery, esophageal motility disorders, endoscopy/endoscopic procedures
F-155

LONG TERM OUTCOME OF 3-PORT THORACOSCOPIC LOBECTOMY AND THE IMPORTANCE OF MEDIASTINAL LYMPHADENECTOMY FOR NON-SMALL CELL LUNG CANCER

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 Objectives:
From the annual report of the Japanese Association for Thoracic Surgery, 65% primary lung cancers were resected by thoracoscopically in 2012. The approaches and procedures vary between institutions. We examined safety and long term outcome of 3-port thoracoscopic lobectomy with mediastinal lymphadenectomy for non-small cell lung cancer (NSCLC).

 Methods:
From 2005 to 2010, 1007 patients received surgery for primary lung cancer at Toranomon Hospital. Six hundred thirty for patients underwent 3-port thoracoscopic lobectomy. In these patients 512 patients of lobectomy +ND2a were able to be followed for 5 years or longer after surgery and were evaluated safety, Overall Survival(OS) and Disease Free Survival(DFS).

 Results:
Patient’s clinical stages were cIA; 389, cIB; 87, cIIA; 14, cIIIB; 11, cIIIA 11. In those lobe specific lymphadenectomy(ND2a-1) was performed in 483 cases, systematic lymph node dissection(ND2a-2) was done in 29 cases. There were two open conversion(0.3%). The mean operation time was 217 minutes, and the mean blood loss was 123 mL. The mean postoperative stay was six days. There was no re-thoracotomy for hemostasis and perioperative deaths. Postoperative complications occurred in 73 patients (14%). Major complications included prolonged air leak (9.1%), mild arrhythmia (2.2%) and bacterial pneumonia (1.6%). The most common histopathologic type was adenocarcinoma (84%). Pathological stages were pIA; 322, pIB; 88, pIIA; 37, pIIIB; 18, pIIIA; 47. Pathologic LN node upstaging was noted in 61 patients (11%). Five-year OS was 96.2% in pIA, 85.2% in pIB, 72.9% in pIIA, 78.2% in pIIIB and 55.5% in pIIIA. Five-year DFS was 93.4% in pIA, 77.2% in pIB, 56.7% in pIIA, 56.5% in pIIIB and 42.5% in pIIIA. Recurrence occurred in 70 cases (20 locoregional, 36 distant and both 14).
**Conclusion:**
Our findings suggest that performing thoracoscopic lobectomy with mediastinal lymphadenectomy for primary lung cancer was safe and long term outcome was superior or equal to conventional approaches. Because of a higher percentage of lymph node upstaging compared lymph node downstaging, mediastinal lymphadenectomy was important in the pathological staging.

**Disclosure:** No significant relationships.

**Keywords:** non-small-cell lung cancer, mediastinal lymphadenectomy, three-port thoracoscopic lobectomy

<table>
<thead>
<tr>
<th></th>
<th>5-year OS</th>
<th>5-year DFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>pIA</td>
<td>96.2% <em>(86.8%)</em></td>
<td>93.4%</td>
</tr>
<tr>
<td>pIB</td>
<td>85.2% <em>(73.9%)</em></td>
<td>77.2%</td>
</tr>
<tr>
<td>pIIA</td>
<td>72.9% <em>(61.8%)</em></td>
<td>56.7%</td>
</tr>
<tr>
<td>pIIIB</td>
<td>78.2% <em>(49.8%)</em></td>
<td>56.5%</td>
</tr>
<tr>
<td>pIIIA</td>
<td>55.5% <em>(40.9%)</em></td>
<td>42.5%</td>
</tr>
</tbody>
</table>

*5-year OS (%)*: the data of the Japanese Joint Committee for Lung Cancer Registration in 2004.
LOCALIZATION OF SMALL LUNG LESIONS USING A RADIOFREQUENCY IDENTIFICATION MARKING SYSTEM.

Yojiro Yutaka¹, T. Sato², K. Matsushita³, Y. Muranishi⁴, Y. Sakaguchi¹, T. Komatsu¹, M. Hamaji¹, F. Kojima⁵, K. Hijiya⁴, H. Motoyama⁴, J. Zhang⁴, T. Menju⁴, A. Aoyama⁴, T.F. Chen-Yoshikawa⁴, M. Sonobe⁴, T. Nakamura¹, H. Date⁴
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²Clinical Research Center for Medical Equipment Development, Kyoto University Graduate School of Medicine, Kyoto, Japan,
³Research and Development Department, Hogy Medical Co., Ltd., Tokyo, Japan,
⁴Thoracic Surgery, Kyoto University Graduate School of Medicine, Kyoto, Japan,
⁵Thoracic Surgery, St Luke’s International Hospital, Tokyo, Japan

Objectives:
Accurate localization of the exact position of small lung lesions represents a significant challenge in thoracoscopic surgery. We have developed a novel marking system comprising a 13.56-MHz radiofrequency identification (RFID) tags (3.2 ‘ 1.6 ‘ 0.9 mm) and a signal-processing device aiming at clinical applications. Here, we report results from preclinical studies conducted in a canine model.

Methods:
① Evaluation of functional placement: Three types of tags (Group A, tag alone (n=18); Group B, tag + resin anchor (n=15); and Group C, tag + NiTi coil anchor (n=15)) were placed in the subpleural area and subsegmental bronchi (2.0-4.3 mm). The number of tags which remained at the implanted sites were examined until day 14 on chest X-ray. ② Assessment with partial resection: Tags were placed at a mean depth of 13.2 mm (range, 9-15.7 mm) from the pleura and at a mean bronchus diameter of 1.34 mm (range, 0.9-1.9 mm) (n=7), and were excised with VATS partial lung resection.

Results:
① Peripheral airway placement: Compared to Groups A and B, Group C demonstrated satisfactory functional placement (remaining rate at day 14: Group A, 11.1%; Group B, 26.7%; Group C, 86.7%; p<0.0011). No losses were observed in Group C until day 6 after tag placement. Subsegmental placement: The remaining rate in Group C was 73.3%, and placement was possible in bronchi with diameters up to 3 mm. ② The mean time required for tag detection was 11.1 s (range, 8-15 s), mean distance between the tag and resection margin was 9.29 mm (range, 6-13 mm), and tag recovery rate was 100%.
Conclusion:
This system proved useful in localization of small lung lesions. A tag with NiTi coil anchor was shown to be effective in keeping the tag position, which may enable accurate navigational surgery. Further validation is currently underway in a canine segmentectomy model.

Disclosure: Y. Yutaka: Y. Yutaka has a financial relationship with HOGY MEDICAL CO., LTD. who developed the RFID system used in this study. HOGY MEDICAL CO., LTD. provided the RFID system and financial support by means of an institutional research.
T. Sato: T. Sato has a financial relationship with HOGY MEDICAL CO., LTD. who developed the RFID system used in this study. HOGY MEDICAL CO., LTD. provided the RFID system and financial support by means of an institutional research.
H. Date: H. Date has a financial relationship with HOGY MEDICAL CO., LTD. who developed the RFID system used in this study. HOGY MEDICAL CO., LTD. provided the RFID system and financial support by means of an institutional research.

Keywords: preoperative marking, small lesions, VATS, navigational surgery, RFID
SIMULTANEOUS SURGERY IN SEVERE PATIENT WITH BLEEDING PULMONARY TYPICAL CARCINOID TUMOR AND CORONARY ARTERY DISEASE: LOWER LOBECTOMY WITH SLEEVE RESECTION OF MAIN BRONCHUS AND OFF PUMP CABG.

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Thoracic Surgery, National Research Centre of Surgery, Moscow, Russian Federation

Objectives:
To show result of simultaneous operation in severe patient with several comorbid pathology

Video description:
Male 78 years old with complaints of recurrent hemoptysis and dyspnea in physical activity. Chest CT had revealed tumor of left lower bronchus with transition to membrane part of left main bronchus. Bronchoscopy had confirmed bleeding tumor of left lower bronchus passing to membrane part of left main bronchus. Histologic research of tumor revealed picture of typical carcinoid tumor. The spirometry testified III stage of COPD with FEV1 - 47%. Coronary angiography revealed 70% stenosis of anterior descending artery. Treadmill test had revealed decreasing ST segment in all chest assignments. Performing of isolated thoracic operation was interfaced to high risk of development of myocardial infarction in perioperative period. Performance by first stage of operation on heart with delay of operation on lung threatened with progressing of tumor. We chose tactics of simultaneous surgery. Discussing volume of lung resection, considered heavy COPD therefore we had decided to perform sleeve lower lobectomy. Off pump revascularization of anterior descending artery and the lower lobectomy with closing of defect of the left main bronchus with patch of anterior wall of inferior bronchus with mediastinal lymph node sampling was performed. The postoperative period proceeded smoothly. In two weeks after operation bronchoscopy had revealed full healing of defect of left main bronchus. In six months after operation recurrence and progressing of tumor were not revealed. Respiratory dysfunction are not present. Research of cardiovascular system didn’t reveal violations of a coronary blood-groove. Patient estimated quality of life after operation as good.

Conclusions:
Application of cardiac technologies and approaches of bronchoplastic surgery helps to expand significantly limits of functional operability and to performs expanded resections of lungs even in very heavy patients with the satisfactory short-term and long-term results.

Disclosure: No significant relationships.
Keywords: pulmonary carcinoid, coronary heart disease, CABG, lung tumor, simultaneous operation, sleeve bronchoplastic lobectomy
RIGHT SLEEVE MIDDLE AND LOWER LOBECTOMY FOR LUNG CANCER, SO-CALLED EXTENDED TYPE D SLEEVE, SCARIFYING THE BRANCH TO THE SPARED S2 OF THE UPPER LOBE.

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General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan

Objectives:
Theoretically blood supply to the distal bronchus after sleeve resection depends on pulmonary artery. We present a case of extended type D sleeve scarifying the pulmonary artery to the spared segment for discussing the feasibility of the procedure.

Video description:
A 54 year-old woman was referred to our department, presenting with cough. Computed tomography showed the abnormal shadow which was 6 cm in size, located in segment six of the right lower lobe. The lymph nodes with #4R, 4L, 11s and 12u were swelling, but high FDG uptake by positron emission tomography was recognized only #4R lymph node. Pathological diagnosis was non-small cell lung cancer by bronchoscope and clinical stage was T2bN2M0 stageIIIA. Primary surgery was performed, because she had rejected induction therapy. We performed right middle and lower sleeve lobectomy with bronchial plasty. Because 11s lymph node had extranodal infiltration to bronchus of superior lobe and intermedius and inferior truncus pulmonary artery, we resected right middle and lower lobectomy with 2nd carina and inferior truncus pulmonary artery accompanied by ascending A2 and performed bronchial plasty. Operative time was 202 minutes and blood loss was 230cc. The postoperative complication had a persistent alveolar air leakage, but it was improved by pleurodesis and endobronchial watanabe spigot. She was discharged at 58 postoperative day.

Conclusions:
The scarifying the branch to the spared S2 of the upper lobe when bronchial sleeve lobectomy was performed was not a risk factor of an anastomosis fistula to effect a very poor blood flow.

Disclosure: No significant relationships.

Keywords: sleeve lobectomy, extended type D sleeve, lung cancer
OMENTOPLASTY AND THORACIC PACKING TO TREAT A RIGHT POST-PNEUMONECTOMY BRONCHOPLEURAL FISTULA

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Objectives:
Bronchopleural fistula represents a major complication especially after pneumonectomy for lung cancer. We present a video showing an easy method to treat this dramatic complication.

Video description:
Patient initially underwent inferior bilobectomy for lung cancer. In the fifth postoperative day, the patient developed a bronchial stump fistula. At reoperation, ischemic signs of the bronchial stump forced to perform completion pneumonectomy to solve the situation, and a mediastinal fat pad was used to protect the right main bronchus stump. Thirteen days later, a new large fistula developed on the right main bronchus stump. The patient was again reoperated on using an omentum flap to cover the bronchial stump and the mediastinum without trying to suture the bronchial stump. The omentum flap was just laid on the right mediastinal site to cover widely the bronchial stump, and was kept in place by applying a few stitches to the diaphragm and to the pericardium, and also several compresses inside the postpneumonectomy thoracic cavity to pack the omentum against the mediastinum. A chest tube was connected to suction to avoid accumulation of infected pleural effusion. Compresses were changed every 2-3 days for three times. The omentum flap got intensely attached to the mediastinum and the right main bronchial fistula completely healed. Patient was discharged 14 days after omentoplasty, and no signs of fistula relapse appeared in the follow-up.

Conclusions:
Omentoplasty plus thoracic packing and a chest tube connected to suction followed by a few compresses and dressings changing is effective an easy to treat postpneumonectomy large bronchopleural fistula.

Disclosure: No significant relationships.
Keywords: omentoplasty, thoracic packing, bronchopleural fistula, pneumonectomy
ONE-STAGE BILATERAL SINGLE-PORT VATS SUBLOBAR RESECTIONS WITH PREOPERATIVE DUAL LOCALIZATIONS

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Objectives:
It has generally been accepted that sublobar resections, specifically segmentectomy and wedge resection, should be considered for patients in whom lobectomy is contraindicated because of insufficient lung reserve and comorbidity.

Video description:
In this video, we performed one-stage bilateral single incisional thoracoscopic sublobar resection; wedge resection for RUL lesion, segmentectomy for LUL lesion, with preoperative dual localization with hookwire and lipiodol. A 75-year old male with bilateral lung lesions, 1.7 cm sized mixed GGO lesion at RUL and 1.2 cm sized solid lesion at LUL, was referred to our center for curative resection. Preoperative dual localization with hook-wire and lipiodol could help the correct location of the lesions. With a 2-cm single incision, thoracoscopic wedge resection and segmentectomy could be performed safely. A pathology result was adenocarcinoma in situ with no lymph node metastasis

Conclusions:
A single-incision VATS segmentectomy could be a feasible option for early lung cancer and could be performed safely and without difficulty, even through a 2 cm incision, by using an appropriate preoperative localization.

Disclosure: No significant relationships.
Keywords: sublobar resection, localization, segmentectomy, uniportal VATS
VATS UPPER LOBE TRISEGMENTECTOMY IN PATIENT WITH NON-SMALL CELL LUNG CANCER AND PULMONARY FIBROSIS

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¹General and Oncologic Surgery Unit, Santo Stefano Hospital, Prato, Italy,
²Anesthesiology Unit, Santo Stefano Hospital, Prato, Italy,
³Nuclear Medicine Unit, Santo Stefano Hospital, Prato, Italy

Objectives:
Pulmonary fibrosis is a frequent condition. The lungs progressively became thick, stiff and scarred. Patients with non-small cell lung cancer (NSCLC) and pulmonary fibrosis represent a therapeutical problem because sometimes are unfit for surgery or high risk to worse their respiratory function. The goal in operable patients is to perform lung sparing surgery like anatomical segmentectomy instead lobectomy.

Video description:
Operative steps: 1 Anterior approach by utility incision in the 5th space, mid axillary, and two camera ports in the 7-8 space 2 Finding lesion in upper lobe and planning operation 3 Lymphadenectomy station 5-6 4 Isolated upper lobe vein and stapling of V1+V2 and V3 5 Isolated and stapling of apical artery A1 6 Isolated and stapling trisegmental bronchus 7 Lymphadenectomy station 10 8 Isolated and stapling A2, A3, A4 9 Endobag specimen placement 10 28 Fr chest tube placement 11 Lung re-expansion

Conclusions:
In patients with low pulmonary function may be carried out videothoracoscopic segmentectomy obtaining oncologic resection and respiratory function sparing.

Disclosure: No significant relationships.
Keywords: VATS, trisegmentectomy, NSCLC, pulmonary fibrosis
SUBCARINAL LYMPH NODE DISSECTION FOR LEFT SIDE LUNG CANCER UNDER DIFFICULT CONDITIONS

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¹Chect Surgery, Kinki Central Hospital, Hyogo, Japan,
²Surgery, Toyonaka Municipal Hospital, Osaka, Japan

Objectives:
Subcarinal lymph node dissection for left side lung cancer is often difficult due to anatomic limitation or the disturbance of bronchial tube inserted to left main bronchus. We will present a video of subcarinal lymph node dissection for lung cancer in left lower lobe using a energy device (LigaSure™ blunt tip, COVIDIEN) and a suction tube (KodamaDissection™, Sumitomo Bakelite Company Limited) under previously described difficult conditions.

Video description:
We performed VATS lobectomy and mediastinal lymph node dissection with two access windows both 3cm lengths and one camera port completely under thoracoscopic view. Operator : 5th intercostal access window at middle axillary line Assistant : 7th intercostal access window at subscapular area Camera : KARL STORZ 30 degree rigid scope through 7th intercostal port at posterior axillary line In this operation, the subcarinal view was extremely bad because of bronchial tube inserted to left main bronchus and overhang of Aorta. We usually dissect the subcarinal lymph nodes pulling up resecting left lobe to improve the view. However, in this case, the left lobe that had a little bleeding, was resected before dissection. We have dissected almost all lymph nodes around subcarinal area against narrow operative view using a LigaSure™ blunt tip and a KodamaDissection™. LigaSure™ contributes the operation with multi functions like grasp, dissection, cauterization, and cutting. KodamaDissection™ improves the operative view with its soft silicon tip and a little curved pipe.

Conclusions:
LigaSure™ blunt tip and KodamaDissection™ contributed the successful lymph node dissection around subcarinal area under difficult conditions.

Disclosure: No significant relationships.
Keywords: subcarinal, lymph node dissection, lung cancer
ANATOMICAL VATS RESECTION AFTER INDUCTION THERAPY

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Visceral, Transplant And Thoracic Surgery, Innsbruck Medical University, Innsbruck, Austria,

Objectives:
With increasing experience indications for VATS resections are extended. In our center, we are performing anatomical VATS resections after induction therapy. Goal of this study is to retrospectively analyze the perioperative outcome after anatomical VATS resection following induction chemotherapy. Data of this population are compared with our primary VATS operated patients.

Methods:
This is a retrospective study using a prospective database. The study was approved by our local ethical committee of the Medical University of Innsbruck.

Results:
From 2009 to 2014, 356 patients underwent anatomical VATS resection for lung cancer. 41 patients (11.5%) received induction therapy because of advanced cancer. Patients with induction therapy were significantly younger (59.1 vs. 63.5, p=0.0233). No differences were found in gender, functional lung testing and body mass index. Operative time (198.1 vs. 166.7 min, p=0.0009) and conversion rate (20.6 vs. 4.3%, p=0.004) were significantly higher after induction therapy. Number of dissected lymph nodes, duration of drainage and length of hospital stay were comparable. No difference was found in postoperative morbidity (9/41 vs. 87/315, p=0.5749) and mortality (0/41 vs. 6/315, p=1.0).

Conclusion:
In our series, induction therapy did not influence postoperative morbidity or mortality after anatomical VATS resection. More complex dissection because of advanced cancer possibly explains longer operative time. Patients have to be informed of higher conversion rates after induction therapy.

Disclosure: No significant relationships.
Keywords: VATS, anatomical resection, induction therapy
FACTORS ASSOCIATED WITH LONG TERM FREEDOM FROM RECURRENT AFTER INDUCTION CHEMOTHERAPY AND EXTRAPLEURAL PNEUMONECTOMY IN MESOTHELIOMA PATIENTS

Isabelle Opitz, M. Friess, M. Meerang, M. Kirschner, K. Berard, B.K.Y. Bitanihirwe, W. Weder
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Objectives:
Treatment outcomes following multimodality treatment of mesothelioma are variable. There are patients with exceptionally long freedom from recurrence (FFR) following multimodality treatment consisting of induction chemotherapy followed by extrapleural pneumonectomy (EPP). We aimed to determine clinical and biological prognostic factors associated with long term freedom of recurrence (3 years).

Methods:
Between September 1999 and July 2009 93 patients with malignant pleural mesothelioma (MPM) were treated with induction chemotherapy and extrapleural pneumonectomy. They were stratified into 2 groups: freedom from recurrence (FFR) less than 36 months (n=81) and FFR of 36 months and longer (n=12). Proliferation index (Ki-67 and Survivin) in the surgical specimen as well as clinical factors were analyzed using Mann-Whitney U test for continuous variables and Fisher’s exact test for categorical variables.

Results:
Age at surgery was significantly higher in patients with long term FFR (median age 66 years vs. 60 years; p=0.001) and there were significantly more women in the long term FFR group (33% vs. 6%, p=0.02). IMIG stage was lower in the long term FFR group, with none of the long FFR patients being IMIG stage IV. Ki-67 and Survivin staining index (p=0.02 and 0.001, respectively) were significantly lower in the tumor tissue of patients with long term FFR (Figure 1).

Conclusion:
Our analyses demonstrated that older age, female gender, low IMIG stage and low tumor proliferation index are associated with long FFR after multimodality treatment. This study shows that biological differences exist between patients with long and short FFR, which could be the underlying reason for these differences in FFR and warrant further investigation.
Figure 1: Differences in FFR after surgery depending on Survivin and Ki67-proliferation index (Mann-Whitney U test)

Disclosure: No significant relationships.
Keywords: tumor recurrence, multimodality therapy, mesothelioma
SURGERY IN LOCALLY ADVANCED T4N2M0 NON-SMALL CELL LUNG CANCER INVADING MEDIASTINAL STRUCTURES.

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²Thoracic Surgery, 9th City Hospital, Minsk, Belarus

Objectives:
We investigate the role of surgery in locally advanced T4N2M0 non-small cell lung cancer invading mediastinal structures.

Methods:
From January 1996 to December 2015 239 patients (235 males, four females) with locally advanced NSCLC were operated on. Median age was 56, ranging from 21 to 80 years. Disease was staged as pT4N0M0 in 31 cases, pT4N1M0 - 74, pT4N2M0 - 134. pT4 was established due to invasion of trachea in 30 cases, intrapericardial parts of pulmonary vessels - 114, vena cava superior- 39, subclavian artery - 7, atrium – 53, aorta – 39, esophagus – 37. Two or more mediastinal structures were invaded in 70 cases. One or two mediastinal lymph node stations were involved in 107 N2 patients, 3-6 – in 27. Pneumonectomy was performed in 232 patients (including 48 sleeve and 46 carinal), lobectomy or bilobectomy in 7 patients. Thirty-five patients were treated with preoperative chemo- or radiotherapy and 67 – postoperative. Kaplan-Meier survival method was used to calculate the overall survival (OS). A P value less than 0.05 was evaluated as statistically significant.

Results:
The postoperative morbidity and mortality rate were 33.2 % and 13.8 %, respectively. The five-year OS for all (pT4N0-2M0) patients was 20.0 %. Patients with pT4N0-1M0 had higher survival rate (26.2%), compared with pT4N2M0 (15.0%) patients (p=0.045). For pT4N2M0 patients with one or two positive lymph node stations five-year OS was 19.2%, and 0% for patients with 3 or more involved lymph node stations (p=0.014).

Conclusion:
Surgery is strongly indicated for patients with locally advanced T4N0-1M0 NSCLC invading mediastinal structures. It also should be considered for the subgroup of T4N2M0 patients with involvement of not more than two mediastinal lymph node stations.

Disclosure: No significant relationships.

Keywords: T4, surgery, locally advanced lung cancer
NEW HORIZON OF SURGICAL TREATMENTS IN PATIENTS WITH PULMONARY METASTASES: COMBINATION WITH RADIOFREQUENCY ABLATION

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²Department of Radiology, Mie University School of Medicine, Tsu, Mie, Japan,
³Surgery, Anjo Kosei Hospital, Anjo-cho, Aichi, Japan,
⁴Department of Radiology, Hyogo College of Medicine, Nishinomiya-shi, Hyogo, Japan

Objectives:
Although pulmonary resection has been a standard treatment for selected patients with a limited number of lung metastases, Radiofrequency ablation (RFA) is a promising alternative which is less invasive and repeatable. The aim of this study is to evaluate clinical results of combined surgery with RFA in patients with pulmonary metastases.

Methods:
Clinical data and overall survival (OS) were retrospectively compared in patients with metastatic lung tumor treated by surgical resection alone or combined with RFA in Mie University Hospital between January 2008 and December 2013.

Results:
Seventy one patients were treated by pulmonary resection alone, and 39 were treated by combination with surgery and RFA (20: Surgery followed by RFA, 19: RFA followed by surgery). Gender, age, tumor pathology and DFI were comparative between two groups, although surgical procedure adopted in the first operation was different (Lobectomy is more frequent in the combined treatment group.). There was no mortality and severe morbidity. Five-year OS was 53.5% in surgery alone and 80.5% in combined treatment combined with RFA (p = 0.035; 0.045 after matching). In combined treatment group, there was no significant difference in five-year OS between salvage RFA (Surgery followed by RFA) and salvage operation (RFA followed by surgery).
**Conclusion:**
Pulmonary resection and RFA are complementary each other in the local treatment for pulmonary metastatic lesions. Combination therapy with surgery and RFA may be feasible and promising. Salvage RFA (patients initially treated by surgery, and thereafter followed by RFA) and salvage operation (patients initially treated by RFA, and thereafter followed by pulmonary resection) could improve clinical outcomes in the highly selective patients with pulmonary metastases.

**Disclosure:** No significant relationships.

**Keywords:** pulmonary metastases, radiofrequency ablation, surgical resection
NOTCH SIGNALING IS INVOLVED IN THE DEVELOPMENT OF ESOPHAGEAL MUCOSAL INJURY CAUSED BY GASTROESOPHAGEAL REFLUX: THE FIRST REPORT FROM HUMAN MODEL

Yong Yuan, L. Chen
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Objectives:
Gastroesophageal reflux is a common complication for patients after esophagectomy and gastric interposition, which could serve as an ideal human reflux model to study the molecular pathogenesis of esophageal mucosal damage by gastroesophageal reflux. This study was conducted to investigate the role of Notch signaling in reflux injury of esophageal mucosa.

Methods:
Forty eight patients who underwent Ivor-Lewis esophagectomy with gastric interposition between 2011 and 2012 were prospectively included. Follow-ups were scheduled at 6 months, 18 months and 36 months postoperatively, including reflux symptoms assessment, endoscopic evaluation of esophageal mucosal damage (MUSE classification) and biopsies were taken for detection of histological mucosal damage, Notch1 and its downstream target gene Hes1 expressions (Q-PCR for mRNA and IHC for protein).

Results:
Forty five of 48 included patients completed three follow-ups. Both endoscopically visualized and histologically evidenced damage were more often in samples with longer postoperative period (p<0.05). The mRNA Expression of Notch1 and Hes1 were decreased in a time-dependent manner after operation (p=0.026). Notch1 mRNA expressions were significant lower in MUSE positive patients than that of MUSE negative patients (p=0.018). Similarly, Notch1 mRNA expressions were lower in patients with pathological evidence of mucosal damage than in patients with normal biopsies (p=0.043). The rates of positive IHC stainings for Notch1 and Hes1 were decreased in a time-dependent manner as well. Samples with metaplasia exhibited much more weaker IHC staining of Notch1 compared with biopsies without any evidence of reflux damage (p=0.022). there was also a trend toward seeing weaker Hes1 IHC staining in esophageal mucosa subjecting long-term postoperative reflux (p=0.061).

Conclusion:
This is the first report studying Notch signaling in human model of gastroesophageal reflux disease over a long period of time. Our findings suggest suppression of Notch signaling is involved in the development of mucosa damage after gastroesophageal reflux.

Disclosure: No significant relationships.

Keywords: gastroesophageal reflux, esophagectomy, notch signaling
MONDAY, 30 MAY 2016
17:00 - 19:00
MODERATED POSTERS
P-168

NEXT-GENERATION SEQUENCING OF CIRCULATING TUMOR DNA FOR EARLY DETECTION OF NON-SMALL CELL LUNG CANCER

Yang Yang, W. Yin, K. Fei, J. Gening
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Objectives:
The presence of tumor DNA in the circulation (ctDNA) of patients with non-small cell lung cancer (NSCLC) is recognized, but practical tools for its detection were hitherto unavailable. In this study, we investigate the use of next generation sequencing of ctDNA as a tool for early detection of NSCLC.

Methods:
We established a 168-gene panel capturing the frequently mutated regions among NSCLC patients. The panel included the mutated genes identified by tumor database (The Cancer Genome Atlas) and our previous analysis of whole genome exon sequencing of NSCLC patients. Ultra-deep sequencing on DNA extracted from plasma and matching tumor tissues in early stage NSCLC patients was performed using this panel.

Results:
This study recruited 28 plasma samples in which 23 had matched cancer tissues. We successfully enriched cell free DNA (cfDNA) from all peripheral blood samples. The concentration and length of cfDNA was 0.5-1.45ng/µl and 167-180 bp respectively. We employed two strategies to identify the ctDNA of these samples. Firstly, ctDNA was identified by whether had the identical nucleotide variation with their matching tumor tissues. The sensitivity of ctDNA approach was 35% (7/20) and the specificity was 100% (3/3) in this way. Next, we used the mahalanobis distance analysis to identify the malignancy status assuming there was no matched tumor tissue. We successfully diagnosed 12 malignant NSCLC patients. The sensitivity was 42.86% (12/28) through ctDNA analysis only. The correlation analysis between ctDNA concentration and patients’ phenotype suggested patients’ gender, the CEA concentration and tumor volume were positive correlated with ctDNA level.

Conclusion:
The results shown in this study suggested ctDNA approach might be a potential noninvasive method for early detection of NSCLC.

Disclosure: No significant relationships.
Keywords: non-small cell lung cancer, ultra-deep sequencing, circulating tumor DNA
P-169

PATTERNS OF RECURRENCE AFTER R0 VATS LOBECTOMY FOR NON-SMALL CELL LUNG CANCER

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Objectives:
To evaluate and report the frequency and patterns of recurrence after curative VATS lobectomy for NSCLC.

Methods:
All patients who underwent R0 VATS lobectomy and lymph node dissection for NSCLC were identified from a prospective database. Patient characteristics and details of recurrences status were abstracted. Univariate analysis and multivariable logistic regression analysis were used to identify variables associated with the development and pattern of recurrent disease.

Results:
There were 1073 NSCLC patients who underwent VATS lobectomy between September 2006 and December 2013. After excluding patients with non-R0 resection, lung cancer in situ, stage IIIb & IV disease and who were lost to follow-up, 957 cases were analyzed. There were 508 males and 449 females with a median age of 62.5 years (range 29 to 86). Most cases were pathologic stage I (70.3%; 673/957), and adenocarcinoma was the most common pathologic type (80.9%; 774/957). The median follow-up time interval was 32 months (12 to 99 months). 3-year DFS for stages I, II, and III was 89.0%, 55.8%, and 41.3%, respectively. Five-year OS for stages I, II, and III was 87.9%, 66.0%, and 54.1%, respectively. Recurrence was identified in 168 patients (17.6%), classified as distant (78; 46.4%), local (65; 38.7%), or combined (25; 14.9%). The most common local recurrence sites were ipsilateral lung (53.8%) and mediastinal lymph nodes (36.6%). The most common distant recurrence sites were contralateral lung (25.4%), bone (25.4%), and brain (17.5%). Multivariable analysis found that age, N stage, T stage, and histologic grade were independent covariates associated with recurrence after operation. And the multivariable analysis results were similar for local and distant recurrence.
### Univariable and multivariable analysis of Recurrence

<table>
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<tr>
<th>Variables</th>
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**Conclusion:**

Recurrence of NSCLC after R0 VATS lobectomy is more common in distant sites. Age, N stage, T stage, and differentiation grade are independently associated with recurrence after VATS lobectomy.

**Disclosure:** No significant relationships.

**Keywords:** patterns of recurrence, VATS lobectomy, non-small cell lung cancer
P-170

ADJUVANT CHEMOTHERAPY BASED ON BIOMARKER EXAMINATION MAY IMPROVE SURVIVAL IN COMPLETELY RESECTED NON-SMALL CELL LUNG CANCER PATIENTS

General Thoracic Surgery, Kagawa University Hospital, Miki-cho, Japan

Objectives:
Adjuvant platinum-based chemotherapy is recommended for patients with completely resected stage I NSCLC patients with blood vessel and/or lymphatic invasion, stage II (N1) and III (N2) NSCLC patients. However, the optimal chemotherapy menu for individual patients is difficult to predict. The present study examined the relationship between biomarkers for the status of chemotherapy and the effect of adjuvant chemotherapy.

Methods:
Between January 2006 and December 2014, 66 patients with p-stage I (with vessel and/or lymphatic invasion), II (N1), or IIIA (N2) who underwent R0 operation received platinum doublet adjuvant chemotherapy (2-4 cycles). Excision repair cross-complementing 1 (E) for platinum, class III β tubulin (T) for DOC and thymidylate synthase (TS) for PEM and S-1 were evaluated by immunohistochemistry. A matched chemotherapy menu means that platinum+DOC is administered in patients with E(-) and T(-), platinum+PEM in adenocarcinoma patients with E(-) and TS(-), and platinum+S-1 in squamous cell carcinoma patients with E(-) and TS(-).

Results:
Male/female, 46/20; Ad/Sq/others, 49/15/2; and p-stage I/II/III, 12/24/30. The five-year survival rate was 77.5% for all 66 patients, and 85.7%, 71.8%, and 78.8% for p-stage I, II, and III, respectively. Patients with E(-) and either T(-) or TS(-) and who received a matched chemotherapy menu (n=13; stage I/II/III, 0/6/7; platinum+DOC/platinum+PEM, 8/5) showed significantly better survival than unmatched biomarker status patients (n=53; stage I/II/III, 12/18/23) (five-year survival: 100% and 71.0%, respectively; p=0.0011). One biomarker status did not affect the survival of patients after adjuvant chemotherapy.

Conclusion:
Regardless of p-stage, patients who received an adjuvant chemotherapy menu matched by biomarker status showed significantly better survival. Considering the equivalent effectiveness of new-generation cytotoxic agents for advanced NSCLC, a prospective study in which order-made adjuvant chemotherapy is administered according to biomarker status for individual patients should be undertaken.

Disclosure: No significant relationships.

Keywords: adjuvant chemotherapy, biomarker, lung cancer
P-171

PREDICTION MODEL FOR DIFFERENTIAL DIAGNOSIS OF GROUND-GLASS NODULE LESS THAN OR EQUAL TO 3CM

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²Pathology, Zhongshan Hospital, Fudan University, Shanghai, China,
³Thoracic Surgery, Zhongshan Hospital, Fudan University, Shanghai, China

Objectives:
To investigate the biological features of ground-glass nodule (GGN), and to find out when to perform surgery. To set up a prediction model for the diagnosis of GGN which may help the management of GGN.

Methods:
A total of 233 cases (236 GGNs) were included in the study. The patients received sublobectomy/lobectomy and systemic lymph node dissection/sampling. The nodules were ≤3cm. The CT images were viewed with a window level of -600 HU and a window width of 2000 HU. The sizes of nodule and the solid component were measured. The follow-up duration, change of nodule, and pathology were documented.

Results:
Among the 236 GGNs, 226 GGNs were resected after a period of follow-up. Of the 226 GGNs, 42 GGNs became increased in either nodule size or solid component size. Of the 42 changed GGNs, 47.6% were invasive adenocarcinoma, which was not significantly different from that of the 180 unchanged GGNs (46.2%, p=0.867). No lymph node metastasis occurred. No recurrence or death occurred after operation. The solid component percentage of nodules, which were confirmed to be AAH, AIS, or MIA, was all ≤ 50%. Logistic regression analysis showed that GGN size (HR=1.343, 95%CI=1.172-1.539, P<0.001) and solid component percentage (HR=1.068, 95%CI=1.026-1.111, P=0.001) were significantly related with the diagnosis of invasive adenocarcinoma. A formula was calculated for predicting invasive adenocarcinoma: 0.178×size (mm) + 0.039 × solid percentage (%) -2.927. If the result is larger than 0, the GGN is likely to be invasive adenocarcinoma. The sensitivity of the model was 71.2%, the specificity was 83.2%.

Conclusion:
The pathological results and prognosis of GGNs which changed during follow-up were not different from those of GGNs which did not change during follow-up. Surgery can be deferred until the change of either size or solid component size. The prediction formula may assist the decision making.

Disclosure: No significant relationships.
Keywords: diagnosis, treatment, ground-glass nodule
P-172

CLINICAL PREDICTORS FOR GROWING GROUND GLASS NODULES IN THE LUNG

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General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan

Objectives:
Management of ground glass nodules (GGN) remains controversial. We investigated the indication of surgical intervention for GGN by way of searching predictors of growing GGNs.

Methods:
One thousand, one hundred and thirty five patients underwent surgical resection for primary lung cancers between February 2009 and May 2013 in our institute. Among them there were 70 patients having GGN which was followed up for more than two years. GGN was defined as pulmonary nodules with consolidation tumor ratio < 0.5. Growing GGN was defined as an increase in size more than 2 mm or appearance of consolidation component on thin section CT. We investigated predictors of growing GGNs using following clinical factors; gender, age, a history of lung cancer, tumor size, CEA, the presence of consolidation component and the shape of tumor (round or not), and investigated the predictors for GGGN in uni- and multivariate analysis.

Results:
Growing GGN were observed in 32.9% (23/70). The median of follow-up time was 47.7 months (24-73.4). In univariate analysis, predictors for GGGN were age (HR: 1.117, CI: 1.041-1.198, p-value: 0.002), the tumor size (HR: 1.274, CI: 1.087-1.494, p-value: 0.003), the presence of consolidation component (HR: 9.844, CI: 1.849-52.395, p-value: 0.007) and the shape of tumor (HR: 4.480, CI: 1.266-15.849, p-value: 0.020). In multivariate analysis, predictors for it were age (HR: 1.091, CI: 1.008-1.181, p-value: 0.031) and tumor size (HR: 1.188, CI: 1.004-1.405, p-value: 0.044). 10mm less than of 21 GGN in patients less than 65 years old did not grow within two years.

Conclusion:
In this study, we could follow small GGN (less than 10mm) in young patients and the follow-up interval could be at least two years. Growing GGN was found more frequently in elderly patients compared with younger, and this might explain small GGN would have chance to be driven to grow in size in some time during lifetime.

Disclosure: No significant relationships.
Keywords: lung cancer, surgical intervention, follow-up, ground glass nodule
P-173

IMPACT OF PERIOPERATIVE GABAPENTIN ADMINISTRATION ON POST-OPERATIVE OPIOID REQUIREMENTS AND CHRONIC PAIN IN PATIENTS UNDERGOING ANATOMICAL LUNG RESECTIONS FOR NON-SMALL CELL LUNG CANCER

Styliani Maria Kolokotroni¹, J. Barron², L. Toufektzian¹, S. Marshall², L. Veres¹, T. Routledge¹, A. Bille¹

¹Thoracic Surgery, Guy’s Hospital, London, United Kingdom, ²Anaesthesia, Guy’s Hospital, London, United Kingdom

Objectives:
Postoperative and chronic pain have a major impact on patient recovery after anatomical lung resections for non-small cell lung cancer (NSCLC). This study aimed to evaluate the impact of perioperative gabapentin in reducing postoperative opioid requirements and pain at two weeks.

Methods:
Between August and December 2015, 62 consecutive patients undergoing video-assisted (VATS) or open anatomical lung resections for NSCLC were prospectively included and divided into two groups: (1) Gabapentin plus standard analgesia (G+SA) (morphine/fentanyl PCA, morphine/dihydrocodeine, paracetamol and ibuprofen); 600mg of gabapentin immediately preoperatively and for one week postoperatively (300mg three times daily); (2) standard analgesia (SA) only. A validated pain score, the Brief Pain Inventory (BPI) created by Dr. Cleeland, was used to assess pain in the immediate postoperative period and at two weeks after surgery.

Results:
Sixty two consecutive patients with a median age of 71 years were included: 27 patients in G+SA group (VATS n= 15, open n=12); 35 patients in SA group (VATS n=25, open n=10). No significant differences in demographics were observed between the 2 groups. One patient stopped gabapentin due to excessive sedation. Duration of PCA use and pain scores at 8h, 24h and 48h postoperatively were not significantly different between the two groups. Patients undergoing VATS resection required less PCA morphine in the G+SA group than those in the SA group (21 vs. 37 mg respectively; p=0.04), and had their PCA removed earlier (1.2 vs. 1.5 days respectively; p=0.03). Patients undergoing VATS in the G+SAP group had reduced pain scores 2-weeks postoperatively compared to SAP patients (p=0.01). Subsequently, fewer VATS patients in the G+SAP group required opioids two weeks postoperatively, compared to the SAP group (41% vs. 58% respectively; p=ns).

Conclusion:
Gabapentin is a safe and effective analgesic in reducing postoperative morphine requirements and pain at two week evaluation post surgery.

Disclosure: No significant relationships.
Keywords: lung cancer, gabapentin, postoperative pain
P-174

CLINICAL FEATURES AND PROGNOSIS OF PATIENTS WITH DIFFERENT CHARACTERISTIC LUNG CANCERS AS THE SECONDARY PRIMARY MALIGNANCY

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Thoracic Surgery, Peking University People’s Hospital, Beijing, China

Objectives:
Limited studies analyzed prognosis of lung cancers as the secondary primary malignancy, but few of them compared extrapulmonary malignancies with lung cancers as the first primary malignancy or considered solid and sub-solid lung cancer nodules separately though they may have different prognosis.

Methods:
From January 2007 to January 2015, consecutive cases of 1881 patients underwent curative surgery of lung cancer. Two hundred and fourteen patients with lung cancer as the secondary primary malignancy were included. The metachronous group were divided into the following two sub-groups. Group I, extrapulmonary malignant tumor as the first primary tumor (n=62); group II, lung cancer as the first (n =27). Consolidation/tumor ratio<0.5 were defined as ground glass opacity (GGO)-dominant tumor.

Results:
The most two frequent types of extrapulmonary malignancy were breast cancer (18.5%) and colorectal (15.2%) cancer. The median interval between the diagnosis of lung cancer and the other malignancy was 100.8 months in group I and 68.3 months in group II, respectively ($P = 0.09$). More GGO-dominant lung cancers were found in group II than in group I (34.4% vs. 16.3%, $P = 0.003$). The five-year overall survival (OS) were 56.5% for group I and 57.0% for group II, respectively ($P = 0.97$). Multivariate Cox analysis demonstrated advanced stage of lung cancer (hazard ratio (HR), 1.869; 95% confidence interval (CI), 1.338–2.611; $P < 0.001$) and age (HR, 1.072; 95% CI, 1.017–1.130; $P = 0.009$) were independent predictors of shorter overall survival for metachronous patients, while for synchronous patients were the advanced lung cancer stage (HR, 2.023; 95% CI, 1.036–3.948.8; $P = 0.039$) and extrapulmonary tumor history (HR, 1.122; 95% CI, 1.016–1.239; $P = 0.023$) with a 76.3% five-year OS.

**Conclusion:**
This is the first study that compared patients with different characteristic lung cancers as the secondary primary malignancy. The clinical feature and prognosis were different between synchronous and metachronous MPC with lung cancers as the secondary primary malignancy.

**Disclosure:** No significant relationships.

**Keywords:** multiple primary cancer, prognosis, lung cancer
P-175

IS THERE A ROLE FOR TRADITIONAL NUCLEAR MEDICINE IMAGING IN THE MANAGEMENT OF PULMONARY CARCINOID TUMORS?

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Objectives:
The clinical utility of the fluorodeoxyglucose positron emission tomography (FDG-PET) and somatostatin receptor scintigraphy (SRS) in the staging of pulmonary carcinoids is still uncertain and remains a matter of debate. This study aims to determine the role of FDG-PET and of SRS in the management of these tumors.

Methods:
We retrospectively collected the data of patients who underwent lung resection for primary pulmonary carcinoid in four centers between 2000-2015. The results of preoperative FDG-PET and SRS were analyzed and compared to the pathological findings after resection to determine the respective utility of the two nuclear tests in managing primary pulmonary carcinoids.

Results:
Data of 246 consecutive patients (male/female 88/158) were analyzed. Typical carcinoid (TC) was diagnosed in 212(86%) cases and atypical carcinoid (AC) in 34(14%). The tumor size was 2.4 cm (IQR 1.2-2.7 cm) with no differences between the two histological subtypes (p=0.142). FDG-PET was performed in 107 patients. Its sensitivity in detecting the carcinoid tumor was 65% with no differences between TC and AC (respectively, 62% and 77%; p=0.190). The tumor SUV max was 3.3 (IQR 2.3-5.0) and was similar for both histologies (respectively, 3.0 (2.3-4.3) and 4.4 (2.7-6.4); p=0.085). SRS was performed in 38 patients. Its sensitivity in identifying tumor was 61% with no differences between the two histological subtypes (59% and 64% respectively; p=0.909). Sensitivity and specificity in identifying nodal involvement were respectively 35% and 91% for FDG-PET and 13% and 100% for SRS, with false negative rates of 13% and 21%.
Conclusion:
Due to their low sensitivity and relatively high false negative rates FDG-PET and SRS have limited utility in guiding the surgical management of pulmonary carcinoids. On suspicion of these tumors we encourage lung biopsy, foregoing nuclear imaging, and subsequent appropriate resection with lymphadenectomy. This will avoid unnecessary additional exams reducing overall costs.

Disclosure: No significant relationships.

Keywords: pulmonary carcinoid tumors, FDG-PET, somatostatin receptor scintigraphy, lung resection
P-176

MODERN METHODS OF ENDOBRONCHIAL SURGERY AND PHOTODYNAMIC THERAPY OF EARLY CENTRAL LUNG CANCER

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Objectives:
Developing and improving of endobronchial treatment methods of early central lung cancer.

Methods:
From 1984 through 2016, endobronchial surgery and therapy were developed and applied in our institute in 128 patients with early central lung cancer (ECLC) /176 tumors/. A solitary tumor of bronchus was detected in 38 (30%) patients, two or more tumors of bronchus were found in 90 (70%) patients. Metachronous ECLC was identified in 75%, synchronous – in 25%. An X-ray negative ECLC was detected in 96% of patients. Squamous cell carcinomas were diagnosed in all those patients. In 38 patients, the tumor was diagnosed at the stage 0 (TisN0M0) and in 90 patients - at the stage I (T1N0M0). To diagnose ECLC white-light bronchoscopy, narrow-band imaging, autofluorescence imaging, ultrasonography, confocal laser endomicroscopy were used. From 1984 through 1991, the electric-laser surgery was applied for the endoscopic treatment of 91 ECLC in 73 patients. From 1992 the photodynamic therapy (PDT) with local photosensitizers (Photohem, Photosens, and Radachlorin) and argon plasma coagulation were applied for the endoscopic treatment in 55 patients with solitary and multiple ECLC (84 tumors).

Results:
A complete response was observed in 157 out of 176 tumors (89%); for the tumors less than 1 cm in size, a complete response rate was 100%. In follow-up after successful endobronchial treatment for the period of one year to 15 years, the recurrence was diagnosed in 17% of cases. All the recurrent tumors were successfully treated by repeated endoscopic or radiation therapies.

Conclusion:
The developed methods of endobronchial surgery and PDT are accepted for treatment in patients with ECLC, and they demonstrate the increase in number of cured patients with severe somatic status.

Disclosure: No significant relationships.
Keywords: bronchoscopy, endobronchial surgery and photodynamic therapy, early central lung cancer
THE GROWTH RATE OF GROUND GLASS NODULE TUMORS FOLLOWED UP FOR 5 YEARS OR LONGER.

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Objectives:
The natural history of Ground Glass Nodule (GGN) is not completely known. Analyzing the CT images of patients observed for 5 years or longer, we evaluated the relationship between the growth rate of GGNs and its properties: (1) histological subtypes, (2) tumor size, and (3) with or without solid component on CT.

Methods:
We reviewed the records of 59 patients who underwent lung resection for lung cancer at our institution between February 2014 and February 2015. In twenty patient, GGNs were followed up by annual CT surveillance for at least 5 years before the operation. The tumor diameter was measured in CT images of each year, and the growth rate was calculated. The tumor without solid component was classified as pure GGN and, otherwise as part-solid GGN.

Results:
Mean follow-up time was 97.4 months and the average tumor diameter at the operation was 14.2 mm. The distribution of the histological subtypes (IASLC classification) were as follows: adenocarcinoma in situ (AIS) in five patients, minimally invasive adenocarcinoma (MIA) in seven, and invasive adenocarcinoma (IA) in eight. The growth rates of each histological subtype were 0.98, 1.33, and 1.71 mm/year respectively. There was no significant difference in the growth rate among the three histological subtypes (P = 0.45). The tumor diameters on the CT at the operation were larger in MIA and IA than in AIS (16.4 and 11.1 mm, P = 0.04). GGNs of 10 mm or larger in size showed significantly high growth rate than GGNs smaller than 10 mm (1.02 and 1.76 mm/year, P = 0.02). The growth rate of part-solid GGNs were also significantly higher than pure GGNs (0.77 and 1.81 mm/year, P = 0.01).
Conclusion:
The growth rate of GGNs are not related to the tumor histological subtypes. The GGNs with solid component and the GGNs larger than 10mm grow rapidly.

Disclosure: No significant relationships.
Keywords: long term observation, CT surveillance, tumor growth rate, GGN
TAT-INTERACTIVE PROTEIN-60KDA INHIBITS THE ONCOGENESIS OF LUNG CANCER IN VITRO

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Objectives:
Histone acetyltransferases (HATs) play vital functions in the tumorigenesis of many solid organ malignancies. We previously screened a human HATs cDNA library and identified Tat-interactive protein-60KDa (TIP60) as a candidate critical HATs in the origination of lung cancer. In this study, the biology activity changes of lung cancer cells regulated by TIP60 was analyzed in vitro.

Methods:
The culture of lung cancer cells, A549 and H1299 cells, and the construction of TIP60 and TIP60-RNAi plasmid was the same with our previously reported methodology. The cell proliferation assay (MTT assay) and transwell assay was used to analyze the cell variability and the migration and invasion ability changes of A549 and H1299 cells with overexpression or inhibition of TIP60. The expression level of AKT1 as well as its downstream molecules was studied through western-blotting assay at the condition of overexpression or inhibition of TIP60.

Results:
Overexpression of TIP60 inhibited the proliferation of A549 and H1299 cells since day 2. Compared to the control group, the growth of these two lung cancer cells was inhibited by 25% and 19% at day 6 with the overexpression of TIP60. The number of cells increased by 36% and 26% when TIP60 was knockdown for 6 days. The migration and invasion ability of these two cells was also restrained. While knockdown of TIP60 had the opposite effects. Inhibition of TIP60 significantly promoted the expression of molecules in AKT1 signaling pathway especially c-Myc.

Conclusion:
TIP60 inhibited the growth and invasion ability of lung cancer cells through down-regulation of AKT1 signaling pathway. We will further study the feasibility of applying TIP60 on clinical practice.

Disclosure: No significant relationships.
Keywords: TIP60, lung cancer, oncogenesis
P-179

POST-RECURRENT SURVIVAL OUTCOMES ACCORDING TO THE ONCOGENIC STATUS IN PATIENTS WITH RESECTED NON-SMALL CELL LUNG CANCER

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Objectives:
Surgical resections are employed for patients with resectable non-small cell lung cancer (NSCLC) as a radical treatment. Despite complete resection, they sometimes experience recurrence in various sites and the prognosis after recurrence are commonly unfavorable. The molecular targeted therapies including epidermal growth factor receptor tyrosine kinase inhibitors (EGFR-TKIs) has been acknowledged to provide drastic response to patients with advanced NSCLC harboring oncogenic driver mutation, the impact of mutation status on the mode of recurrence and post-recurrent survival (PRS) is not understood well.

Methods:
We retrospectively focused on the 401 NSCLC patients with recurrence who underwent complete resection from January 2001 through December 2013. Clinicopathological factors including the mode of recurrence and PRS were reviewed. Prognostic factors for PRS were investigated by using univariate and multivariate analyses.

Results:
Among 401 patients, 185 (46.1%) with EGFR mutation, 46 (11.5%) with KRAS mutation, 15 (3.7%) with ALK rearrangement, and 155 (38.7%) with triple negative mutation (TN) were identified. Patients distribution of sex, age and tumor differentiation were significantly different among four groups. Median survival time after recurrence was 28.7 months, and three and five year survival rate were 42.4% and 25.0%, respectively. According to the multivariate analysis following univariate analyses, adenocarcinoma histology, absence of pleural invasion, presence of adjuvant therapy, single site recurrence and presence of TKI treatment were independent prognostic factors for PRS, whereas oncogenic mutation status was not. PRS of patients with pulmonary recurrence (PR) was better than those with other sites recurrence than lungs (p<0.001). Furthermore, patients with PR harboring EGFR mutation presented extremely favorable survival, whose three and five year survival rate were 68.2% and 58.4%, respectively.

Conclusion:
Adenocarcinoma histology, absence of pleural invasion, presence of adjuvant therapy, single site recurrence and presence of TKI treatment were independent prognostic factors for PRS. Long time survival is prospected in patients with PR, especially after EGFR-TKI treatment.

Disclosure: No significant relationships.

Keywords: recurrence, pulmonary recurrence, oncogenic mutation, molecular targeted therapy
THORACIC METASTASECTOMY IN HEPATOCellular CARCINOMA: COMPARATIVE STUDY BETWEEN LIVER TRANSPLANTATION AND LOCO-REGIONAL TREATMENT

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Objectives:
Liver transplantation offers improved long-term survival in patients with hepatocellular carcinoma (HCC) by complete removal of primary tumor. However, there is a concern whether biologic features of tumor may be influenced by lifelong immunosuppression after transplantation. We compared the long-term oncological outcomes of thoracic metastasectomy between liver transplantation and loco-regional treatment including surgical and interventional treatment.

Methods:
We conducted a retrospective review of 84 patients who underwent 132 operations of thoracic metastasectomy for metastatic HCC from April 2003 to February 2015. We divided the patients by the primary treatment for HCC, Group-I (liver transplantation, n = 28) and Group-II (Loco-regional treatment, n = 56).

Results:
Living- and cadaveric-donor liver transplantations were performed in 13 (46%) and 15 (54%) patients in Group-I. Surgical resection of HCC was performed in 47 (84%) patients in Group-II. Number of resected metastatic nodules was 3.4 ± 4.1 in Group-I and 2.7 ± 2.9 in Group-II (P = 0.211). Five year overall survival was 53% in Group-I and 33% in Group-II (P = 0.601). Three year recurrence-free survival was 22% in Group-I and 22% in Group-II (P = 0.773). Disease-free interval (DFI) ≤1 year (P = 0.009) and extra-thoracic metastasis (P = 0.037) were risk factors for overall survival in Group-I. Alpha-fetoprotein ≥300 ng/mL (P = 0.001), protein induced by vitamin-K absence/antagonist-II ≥100 mAU/mL (P = 0.001), age ≥ 55 years (P = 0.024) and extra-thoracic metastasis (P = 0.007) were risk factors for overall survival in Group-II. Five-year survival in the patients with DFI >1 year were significantly higher in Group-I (72% in Group-1 vs. 29% in Group-II, P = 0.036).

Conclusion:
Long-term oncologic outcomes after thoracic metastasectomy of HCC were comparable between transplantation and loco-regional treatment. In the patients with DFI more than 1 year, liver transplantation group showed excellent long-term survival compared to loco-regional treatment group.

Disclosure: No significant relationships.
Keywords: hepatocellular carcinoma, oncologic outcome, metastasectomy
SURGICAL OUTCOMES OF PULMONARY METASTASIS FROM HEPATO-PANCREATO-BILIARY CARCINOMAS—COMPARISON WITH PULMONARY METASTASIS FROM COLORECTAL CARCINOMAS

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Objectives:
Surgical indication of pulmonary metastasis from hepato-pancreato-biliar (HPB) carcinomas is controversial and very few literature data are available. This study was performed to analyze the surgical outcomes of pulmonary metastasis from HPB in comparison with those from colorectal carcinomas.

Methods:
From 2000 to 2015, 24 patients with pulmonary metastasis from HPB carcinomas and 146 from colorectal carcinomas underwent metastasectomies. Primary diseases were hepatocellular carcinoma (HCC) in seven, pancreatic carcinoma (PC) in 12 and cholangiocellular carcinoma (CCC) in five patients. All patients had sufficient pulmonary reserve, controlled primary disease, and no evidence of other metastatic disease. Various perioperative factors were investigated retrospectively to analyze overall survival (OS), pulmonary metastasis-free survival (PmFS) after pulmonary metastasectomy, and the disease free interval between the surgery for primary disease and for pulmonary metastasis (DFI).

Results:
Perioperative chemotherapies for primary tumors were applied to eight PC (72.7%) and three CCC patients (60.0%). Complete resection was performed in all patients, and types of surgery were lobectomy in 16, segmentectomy in four and wedge resection in three. The one, two and five year OS of HPB patients after metastasectomy were 82.6, 69.8 and 69.8%, whereas those of colorectal carcinoma patients were 98.3, 92.4 and 78.0% (p=0.102). The two-year PmFS of HPB patients was 78.6%, compared to 60.7% for colorectal carcinoma patients (p=0.487). DFI was 42.8 months of HPB patients and 34.6 months of colorectal carcinoma patients (p=0.203). During the clinical courses after metastasectomy, two HCC (28.5%), nine PC (81.8%) and three CCC patients (60.0%) received chemotherapies. Liver metastasis was found in one PC patients who received chemotherapy, one CCC patients who underwent hepatectomy.
Conclusion:
Metastasectomy for pulmonary metastasis from HPB is a choice of treatments in selected patients.

Disclosure: No significant relationships.

Keywords: colorectal carcinomas, surgery, pulmonary metastasis, hepato-pancreato-biliary carcinomas
DOES PLEURAL INVASION TO ADJACENT LOBE INFLUENCE ON SURVIVAL IN COMPLETELY RESECTED NON-SMALL CELL LUNG CANCER?

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Objectives:
Pleural invasion (PL) may have survival influence in completely resected non-small cell lung cancer. The aim of this study was to validate the influence of the extent of PL to overall survival (OS) by using the data gathered precisely from a single institution.

Methods:
We retrospectively studied the clinicopathological features and OS of 2269 NSCLC patients who received completely anatomical resection; at least segmentectomy with lymph-node dissection from 2000 to 2011, especially in terms of PL. Elastic stains was used to examine the depth of pleural invasion.

Results:
Median follow up time was 48.3 months and OS rate at five years was 80.4%. On multivariate analysis, variables which significantly influenced OS were gender, age, clinical and pathological stage, lymphatic vessel invasion, vascular vessel invasion and pleural invasion. To exclude negative impact of lymph-node metastasis, 1822 N0 cases were extracted. PL was still an independent factor for OS and hazard ratio (HR) of PL presence was 3.095 (95% confidence interval 2.361-4.055). PL0 was found in 1466 cases, PL1 149, PL2 135 and PL3 72. HR of PL1 versus PL0 was 2.359 (1.547-3.598, p<0.001), PL2 was 2.359 (1.547-3.598, p<0.001), PL3 was 1.662 (1.425-1.939, p<0.001). OS rate at 5years of each PL status with N0 was the following; PL0 90.0%, PL1 75.0%, PL2 70.0% and PL3 62.6%. But in the PL3, 25 cases classified as T2a which mean adjacent lobe invasion did not show superior survival rate than larger T status 47 cases (51.3% versus 64.1%, p=0.897).

Conclusion:
PL was an independent prognostic factor, and the depth of PL significantly related worse prognosis. But PL3 of adjacent lobe showed as worse survival rate as other PL3. Further evaluation for PL in larger scale is needed for upcoming TNM staging revision.

Disclosure: No significant relationships.
Keywords: lung cancer, pleural invasion, prognosis
ANALYSIS OF PROGNOSTIC FACTORS AND LONG-TERM RESULTS OF PRIMARY PULMONARY PLEOMORPHIC CARCINOMA

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Objectives:
Pulmonary pleomorphic carcinoma (PPC) is a rare neoplasm and factors affecting survival after pulmonary resection, as well as its clinical and pathologic characteristics, are still unknown. For a better understanding we reviewed our large experience with these patients.

Methods:
Records of patients 134 patients (108 men, median age: 65 years) with diagnosis of PPC operated on between January 1999 and May 2015 were retrospectively analyzed from a prospective database; survival was calculated by using Kaplan-Meier method.

Results:
Eighty six patients (64.1%) were smokers. Median tumor size was 4.8 cm (range, 0.6 to 23 cm). Initial histological diagnosis was NSCLC in 88 cases, adenocarcinoma in 21, pleomorphic tumor in 13, and no diagnosis in 12. 62 patients (46.0%) received a platinum based induction chemotherapy. Surgery included lobectomy in 87 patients (65%), pneumonectomy in 27 (20.1%), wedge resection in 12 (8.9%), and segmentectomy in 8 (6%). Four patients (3%) had an incomplete resection. Postoperative staging included 45 stage I (33.6%), 47 stage II (35.1%), and 42 stage III (31.3%). 64 patients (47.7%) received adjuvant treatment. Five-year overall survival and disease-free survival were 36.6% and 35.7%, respectively (median, 28 and 18 months, respectively). Recurrences occurred in 76 patients (56.7%) most of them at distant sites (47/76 [61.8%]). Factors associated with increased survival included no smoke habit (p=.02), no induction therapy (p=.04), right side disease (p=.01); pathological stage I (p=.001), no metastatic lymph nodes (p=.001), and adjuvant treatment (p=.003). At multivariate analysis, pN0, pstage I, and adjuvant treatment were independent prognostic factors (p=.002, 95%CI: 1.54-6.43; p=.003, 95%CI: 1.23-7.32, p=.001, 95%CI: 1.26-4.72, respectively).

Conclusion:
PPC are aggressive tumors usually presented as a large lesion in males. Preoperative diagnosis remains difficult. Prognosis is poor, and distant recurrence rate is high. Long-term survival can be achieved in early stage disease and by an appropriate adjuvant therapy.

Disclosure: No significant relationships.
Keywords: pleomorphic carcinoma, lung tumor, surgery
P-184

OPTIMAL EVALUATION OF THE SOLID COMPONENT IN PULMONARY TUMOR WITH GROUND GLASS OPACITY ON THIN SECTION COMPUTED TOMOGRAPHY

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**Objectives:**
The size of solid part in lung cancer having ground glass opacity (GGO) has been reported to be prognostic marker. On the other hand it is not rare to identify more than one solid part in part-solid GGO, we call this type “island-shape”, and in this case how to measure the size of solid component remains controversial. We investigated the most optimal methods of evaluation which reflect pathological invasiveness or prognosis.

**Methods:**
A retrospective study was done on 530 patients with resected clinical stage IA lung adenocarcinoma between 2009 and 2013. We evaluated the following radiological factors on thin section CT with 1 to 3 mm collimation: maximum tumor dimension, maximum solid part dimension on lung or mediastinal window. We defined island-shape solid part (ISP) as solid part distributing more than one part. When ISP is recognized, we compared the sum of each solid size (SSP) and the maximum size of the largest island (ISP) to predict prognosis. Median follow-up period was 3.4 year.

**Results:**
Males were 233 cases and median age was 64 years. Lymph node metastasis was pathologically confirmed in only 1 patient. The five-year survival rate by the sum of each solid size was 98.7%, 95.2%, 84.7% and 76.2%, for SSP of 0, 1-10, 11-20 and 21-30mm, respectively (p=0.258, p=0.001 and p=0.365). The five-year survival by the largest island size were 98.7%, 93.6%, 86.7% and 72.7%, for ISP of 0, 1-10, 11-20 and 21-30mm were respectively (p=0.089, p=0.044 and p=0.144).

**Conclusion:**
For island-shaped part solid tumor, the maximum size of the largest island appeared to be the best predictor of prognosis in clinical stage IA lung adenocarcinoma.

**Disclosure:** No significant relationships.

**Keywords:** part solid GGO, lung adenocarcinoma, optimal evaluation of the solid component
P-185

PROSPECTIVE COMPARISON OF PARAVERTEBRAL AND EPIDURAL ANALGESIA CONTROL IN PATIENTS UNDERGOING VATS LOBECTOMY

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Objectives:
Video-assisted thoracic surgery (VATS) has evolved as one of the mainstay surgical treatments in patients undergoing lobectomy. While randomized trials have been undertaken in thoracotomy cohorts, there is currently limited evidence comparing paravertebral and epidural analgesia control in these patients. Paravertebral blocks (PVB) are an alternative to epidural analgesia, which may offer similar analgesic efficacy and lower incidence of side-effects.

Methods:
Twenty patients were prospectively allocated based on receiving epidural or paravertebral analgesia postoperatively. Pain was evaluated using the comparative pain scale. The primary outcomes were the average pain score, opioid boluses during the first 96 hours post-procedure and length of stay. The outcomes were compared using two-way ANOVA analysis and Pearson correlation.

Results:
Average and cumulative pain scores were not significantly different between groups. Higher opioid boluses were used in the paravertebral group for the first 24 hours (32.8±39.2 vs. 0 mg of Morphine, p=0.04), but this was not significant at 48, 72 and 96 hours. The length of stay for patients with epidural was longer (5.6 vs 4.5 days, p=0.18), and correlated with a longer epidural catheter in-situ time (72.6 vs. 43.75 hours, p=0.03, r=0.6, p=0.01). This reflected longer in-situ urinary catheter times (78.3 vs 43.2 hours, p=0.07, r=0.46, p=0.04). Both groups had similar haemodynamic parameters and there was no difference in the fluid boluses received or other secondary outcomes. More interventions in dose rate changes were noted in the epidural group (7 vs 0).

Conclusion:
Consistent with similar findings in cohorts of thoracotomy patients, we demonstrated an increase in early (24h) opioid use in the patients receiving paravertebral analgesia. More careful analgesia management planning is indicated in this group. Despite this, there were no differences in the comparative pain scales reported. The longer use of epidural and urinary catheters in situ may contribute to longer hospital stays in this group.

Disclosure: No significant relationships.
Keywords: lobectomy, epidural, paravertebral, pain scale, VATS
CHARACTERISTICS AND PROGNOSTIC ANALYSIS OF 157 PATIENTS WITH LUNG CANCER HARBORING K-RAS MUTATION

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Objectives:
To study the characteristics of patients with lung cancer harboring K-RAS mutation.

Methods:
One hundred and fifty seven patients with lung cancer harboring K-RAS mutation treated at a single institution in Southern China with long-term follow-up were evaluated in this study. We analyzed the clinical characteristics, pathological profiles, epidermal growth factor receptor (EGFR) mutation status, echinoderm microtubule-associated protein-like 4-anaplastic lymphoma kinase (EML4-ALK) fusion status, treatments, and prognosis.

Results:
Lung cancer harboring K-RAS mutation mainly occurred in male patients with a history of smoking. The median survival time (MST) was 12.2 months, and the three year survival rate was 41.7%. The pathology of our patients included adenocarcinoma (140 patients), squamous carcinoma (six patients), large cell carcinoma (three patients), adenosquamous carcinoma (three patients), pulmonary sarcomatoid carcinoma (three patients) and small cell carcinoma (2 patients). In those adenocarcinoma patients, four also had EGFR mutations (three with L858R mutation, and one with S768I mutation). None of the patients had the EML4-ALK fusion. The patients with higher BMI, lower T stage, lower N stage, without distant metastasis, and those who received complete resection had significantly better OS (p<0.05). In a COX regression model, body mass index (BMI), and N stage were independent prognostic factors (p<0.05).

Conclusion:
Lung cancer with K-RAS mutation is a unique lung malignancy with poor prognosis. Patients with lower N stage had better prognosis, likely a reflection of early stage disease. The retrospective design and small sample size limited the generalizability. Future multi-center collaborations may be necessary to determine the optimal treatment.

Disclosure: No significant relationships.
Keywords: lung cancer, K-RAS mutation, EGFR mutation, EML4-ALK fusion, overall survival
P-187

IMPROVED POSTOPERATIVE LUNG FUNCTION AFTER SUBLOBAR RESECTION OF NON-SMALL-CELL LUNG CANCER IN PATIENTS WITH ADVANCED EMPHYSEMA

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Objectives:
Stereotactic ablative radiotherapy (SABR) is recommended as primary therapy for inoperable patients with non-small-cell lung cancer (NSCLC). We hypothesize that selected patients with advanced emphysema are candidates for surgery and low morbidity and mortality as well as improved functional and oncological long term outcome may result when sublobar resection in a lung volume reduction surgery (LVRS) concept is applied.

Methods:
All patients with stage I NSCLC and severe emphysema with FEV1 < 40% and diffusion capacity < 40% who underwent NSCLC resection in a LVRS concept between August 2003 and October 2015 were included for analysis. Postoperative 90-day mortality was the primary endpoint. Postoperative complications, survival and lung function with forced expiratory volume in 1 s (FEV1%) preoperatively and 3 months postoperatively served as secondary endpoints.

Results:
Eleven patients with a median FEV1 of 30% (range 17% - 38%) were included. Two procedures were bilaterally and nine unilaterally, seven have been performed by VATS and four with conversion to an open procedure due to adhesions. In seven patients the tumor was resected atypically and in four patients with an anatomical segmental resection. 90-day mortality was zero. A pneumothorax occurred in three patients after chest tube removal and required a new drain. Stage IA in 10 and Stage IB in one were confirmed (five adenocarcinomas, three squamous cell carcinomas, two giant cell carcinomas and one sarcoma of the lungs). Median survival was 38.3 months. Median FEV1% increased from 30% to 37% (p=0.043).

Conclusion:
Sublobar resection of NSCLC combined with LVRS in patients with severely impaired lung function due to emphysema can be performed with low mortality and morbidity and is an alternative to SABR. This approach allows cancer resection in marginal patients and palliates emphysema symptoms simultaneously.

Disclosure: No significant relationships.
Keywords: sublobar resection, emphysema, NSCLC, LVRS
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THE ROLE OF SURGERY FOR COMBINED SMALL-CELL LUNG CARCINOMA: A SINGLE-CENTER EXPERIENCE

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Objectives:
Combined small-cell lung carcinoma (CSCLC) is a rare subtype of small-cell lung carcinoma (SCLC). The treatment of limited-disease (LD) CSCLC has not been optimized. We evaluated the outcome, long-term results and clinicopathological features of patients with LD-CSCLC who underwent surgery.

Methods:
From January 1993 to November 2015, 1623 patients received surgical resection for primary lung cancer. Of these, 35(2.2 %) presented CSCLC or SCLC on the surgical specimen. Retrospective analysis of these patients was performed. Survivals were estimated by Kaplan-Meier techniques. The log-rank comparison and Fisher exact test were used to compare the groups.

Results:
We identified 20 patients with CSCLC, and 15 with SCLC (Table1). Of these, 25 patients (71%) received platinum-based chemotherapy after surgery. In CSCLC group, nine patients (45%) had lymph node metastasis, whereas five (33%) had in SCLC group. Lobectomy was performed more frequently in CSCLC group than in SCLC group (85% vs 47%; P=0.027). The five year survival rate was similar between patients with CSCLC and SCLC (29% vs 35%; P=0.35). The overall five year survival of patients of CSCLC with lymph node metastasis (n=9) was 0%, whereas that of patients with no lymph node metastasis (n=11) was 47%. There was significant difference between the survival rates of CSCLC with and without lymph node metastasis (P=0.03).
Conclusion:
Surgical resection for LD-CSCLC with no lymph node metastasis was acceptable treatment when it was combined with chemotherapy. Therefore, pretreatment nodal staging is important to select patients for surgical resection.

Disclosure: No significant relationships.

Keywords: lung cancer, thoracic surgery, combined small cell lung carcinoma, small cell lung carcinoma
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DIFFUSING CAPACITY OF THE LUNG FOR CARBON MONOXIDE IS ASSOCIATED WITH TUMOR DIFFERENTIATION, SCAR GRADE, NUCLEAR ATYPIA, AND MITOTIC INDEX OF LUNG ADENOCARCINOMA

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Objectives:
Diffusing capacity of the lung for carbon monoxide (DLCO) is an indicator of damaged lung. We sought to determine if DLCO has any relationship to the aggressiveness of lung adenocarcinoma, using pathological indexes (tumor differentiation, lymphatic permeation, vascular invasion, scar grade, nuclear atypia, and mitotic index) which are known as proven prognostic factors.

Methods:
Between 2005 and 2012, 57 patients with Low-DLCO (≤80% of predicted) and 466 patients with Normal-DLCO (>80% of predicted) who underwent R0 resection of lung adenocarcinoma were retrospectively reviewed. The relationships between DLCO status and each pathological index, and in addition, overall survival (OS) were evaluated.

Results:
Low-DLCO had significant relationships with moderate/poor differentiation (79% vs. 57% [Low-DLCO vs. Normal-DLCO]), scar grade 3/4 (37% vs. 18%), nuclear atypia grade 3 (65% vs. 30%), and mitotic index grade 3 (26% vs. 8%) (p = 0.001, 0.002, < 0.001, and < 0.001, respectively). Meanwhile, Low-DLCO had marginal relationships with lymphatic permeation positive (26% vs. 16%) and vascular invasion positive (19% vs. 11%) (p = 0.060 and 0.075). In the logistic regression in which age, sex, smoking status, and size were adjusted, Low-DLCO still had significant relationships with moderate/poor differentiation, scar grade 3/4, nuclear atypia grade 3, and mitotic index grade 3 (odds ratios, 2.1 and 2.2, 3.6, and 2.6; p = 0.026, 0.017, < 0.001, and 0.013, respectively). In the Cox regression using age, sex, smoking status, size, pathological N status, every pathological index status, and DLCO status as variables, moderate/poor differentiation, lymphatic permeation positive, and nuclear atypia grade 3 were significant predictors for the OS (hazard ratio, 2.2, 2.5, and 1.8; p = 0.239, 0.002, and 0.040, respectively).
<table>
<thead>
<tr>
<th></th>
<th>Low-DL$_{CO}$(n = 57)</th>
<th>Normal-DL$_{CO}$(n = 466)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate/poor differentiation</td>
<td>45 (79%)</td>
<td>265 (57%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Lymphatic permeation positive</td>
<td>15 (26%)</td>
<td>74 (16%)</td>
<td>0.060</td>
</tr>
<tr>
<td>Vascular invasion positive</td>
<td>11 (19%)</td>
<td>50 (11%)</td>
<td>0.075</td>
</tr>
<tr>
<td>Scar grade 3/4</td>
<td>21 (37%)</td>
<td>83 (18%)</td>
<td>0.002</td>
</tr>
<tr>
<td>Nuclear atypia grade 3</td>
<td>37 (65%)</td>
<td>138 (30%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mitotic index grade 3</td>
<td>15 (26%)</td>
<td>38 (8%)</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

**Conclusion:**
The results of the relationships between DLCO and pathological indexes of lung adenocarcinoma suggest that damaged lung with low DLCO is associated with carcinogenesis and adenocarcinoma progression.

**Disclosure:** No significant relationships.

**Keywords:** DLCO, adenocarcinoma, differentiation, scar grade, mitotic index, nuclear atypia
USE OF A DELPHI PROCESS TO IDENTIFY ESSENTIAL COMPONENTS OF VATS LOBECTOMY AND SELECT TARGETS FOR SIMULATION TRAINING

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Objectives:
Fewer than 50% of lobectomies for lung cancer in the West are performed using VATS. This may be in part because of challenges in teaching and learning VATS techniques, which could be mitigated through use of simulation training. We identified essential components of VATS right upper lobectomy most amenable to focused simulation using a reiterative consensus (Delphi) process.

Methods:
Experienced VATS academic surgeons were randomly selected for participation. A custom web interface permitted anonymous voting, commenting, and the ability to modify and propose new components. A component was declared essential when ≥80% of participants agreed or strongly agreed. Once the component list was finalized, participants rated each component for difficulty (Likert-type anchored scale range 1 to 5). Then participants voted for up to three components that were most appropriate for simulation based on their difficulty and suitability for simulation.

Results:
Thirty-five surgeons initially agreed to participate and 30 completed the study. Twenty-four components were identified after three votes, and 21 were considered essential (≥80% agreement). There was 100% agreement that the 24 components included all essential components. Votes for difficulty differed among the components (ANOVA; p<0.001 for each). Procedural components that scored the highest for overall difficulty and those voted the most appropriate for simulation are listed in the Table.

<table>
<thead>
<tr>
<th>Components ranked by difficulty and suitability for simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Highest difficulty components</strong></td>
</tr>
<tr>
<td>Divide truncus anterior</td>
</tr>
<tr>
<td>Divide posterior segmental artery</td>
</tr>
<tr>
<td>Dissect nodes between PA and vein</td>
</tr>
<tr>
<td>Divide RUL bronchus</td>
</tr>
<tr>
<td>Divide pulmonary vein from RUL</td>
</tr>
</tbody>
</table>
Conclusion:
A Delphi approach enabled surgeons of disparate training backgrounds and experience to agree on essential components of a VATS lobectomy. There was general agreement on levels of difficulty for each component and on a small number of components that are most appropriate for simulation. These findings can be used to design simulation exercises for VATS lobectomy using targeted anatomy rather than whole organ preparations.

Disclosure: No significant relationships.
Keywords: simulation training, delphi process, education, VATS, lobectomy
MULTIMODAL TREATMENT FOR OLIGOMETASTATIC NON SMALL CELL LUNG CANCER: AN EXCITING CHALLENGE

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Objectives: Oligometastatic non small cell lung cancer (NSCLC) is a subgroup of tumors presenting a better clinical behaviour than other IV stage tumors. In selected cases aggressive treatment seems to show a good prognosis. We want to identify prognostic factors associated with long survivals in our copious clinical records.

Methods: We enlarged our published experience ranging from January 1997 to December 2013 presenting a retrospective analysis of 67 patients (mean age: 59.4±10.6) with synchronous NSCLC treated with curative intent on both primary and metastatic sites. All patients underwent radical thoracic resection with hilar and mediastinal lymphadenectomy. All patients with radiological suspicion of N2 disease were subjected to mediastinoscopy or, more recently, EUS-EBUS endoscopy. Thirty-five patients underwent induction therapy (chemo or radio-chemotherapy) and 20 had a pathological downstaging. Forty-seven patients received adjuvant therapy.

Results: Forty-six patients had brain metastases, nine had bone or vertebral metastases, eight had adrenal metastases; other sites of metastatization were liver, pancreas, supraclavicular lymph-node. In 11 cases two metastases have been found; four patients had multiple metastatic sites. Surgery was the most commonly treatment for the metastases (50 (74.6%) patients). Radicality was achieved in 54 (80.6%) patients. Overall one and five year survival were 46% and 24%, respectively (median follow-up: 17 months). Kaplan-Meier median overall survival was 19 months.

After stepwise multivariate analysis, weight loss (p<0.02), clinical T-(p:0.008) and N-stage (p:0.011), surgical treatment of metastatic site (p:0.01) and completeness of pulmonary resection (p: 0.039) maintained their independent prognostic value as overall survival determinants.
Conclusion:
Oligometastatic lung cancer is an exciting challenge for oncologic surgeons. In our experience favorable survivals seem to be associated with radicality, clinical status and surgical treatment of metastatic site. Future prospective clinical trials are necessary to identify which subgroup of patients and which therapeutic pathway could be appropriated for a multimodal treatment.

Disclosure: No significant relationships.
Keywords: oligometastatic lung cancer, NSCLC, multimodal treatment
IS THE PROGNOSIS OF OCCULT N2 DISEASE SIMILAR TO THAT OF POSITIVE PET-CT SCAN SINGLE-STATION N2 DISEASE IN PATIENTS WITH NON-SMALL CELL LUNG CANCER TREATED BY SURGICAL RESECTION?

Antonio Francisco Honguero-Martinez¹, M.D. Garcia-Jimenez¹, A. Garcia-Vicente², C. Rodriguez-Ortega¹, M. Genoves-Crespo¹, A. Soriano-Castrejon², P. Leon-Atance¹
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Objectives:
A retrospective study from a prospective database was conducted on patients treated with surgery to analyse the prognosis between two groups: non-small cell lung cancer (NSCLC) patients with occult N2 disease and patients with single station N2 disease observed on preoperative integrated PET-CT scan.

Methods:
From January 2007 to December 2014, 772 patients underwent surgical treatment for bronchogenic carcinoma. All patients had an integrated PET-CT scan in the preoperative work-up and pulmonary resection plus mediastinal lymphadenectomy were performed in all cases. In the selected cases no one received induction treatment. All patients from both groups were N2 disease after pathological specimen examination. Clinicopathological characteristics, disease free survival, and overall survival were analysed in both groups.

Results:
A total of 34 cases were occult N2 disease, whereas 21 cases showed single station N2 disease on preoperative PET-CT scan. Mean disease free survival and mean overall survival for occult N2 disease versus single-station N2 disease on PET-CT scan was 6.7 months (CI 95%: 26.1-52-1) and 6.9 months (CI 95%: 30.1-56.9) p=0.33; and 7.0 months (CI 95%: 38.8-66.3) and 7.1 months (CI 95%: 27.6-55.3) p=0.89, respectively.

Conclusion:
Prognosis of patients with single-station N2 disease on PET-CT scan treated by surgical resection and mediastinal lymphadenectomy as first line treatment was similar to those with occult N2 disease. More studies are needed to support our findings.

Disclosure: No significant relationships.
Keywords: non-small cell lung cancer, surgery, occult N2 disease, PET-CT scan, single-station N2 disease, N2 disease
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COMPARING VATS SEGMENTECTOMY WITH VATS LOBECTOMY FOR NON-SMALL CELL LUNG CANCER: A PROPENSITY SCORE MATCH ANALYSIS

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Objectives:
Purpose of the retrospective study was to compare video-assisted (VATS) anatomical segmentectomy versus VATS lobectomy each plus radical lymphadenectomy in patients with operable non-small cell lung cancer (NSCLC).

Methods:
Between 2012 and 2015, forty-nine patients (age: 44-84; median 70 years) underwent VATS segmentectomy for early stage or selected oligometastatic NSCLC. Quality, safety, and efficacy indicators of VATS segmentectomy were compared with an analogous group of patients undergoing VATS lobectomy selected by propensity score matching method (according to: age, ECOG, c-stage, Charlson age-comorbidity index).

Results:
There were no significant differences in terms of age (P=.153), ECOG (P=.193), comorbidity index (P=.087) between the two groups, although VATS segmentectomy patients had a lower FEV1%pred (median 66% vs. 83%, P=.011). Both groups had comparable duration of surgery (P=.454), need for postoperative mechanical ventilation (P=.418), length of hospital stay (P=.313). Mortality was nil in each group, and morbidity rates showed no differences (mild: 18% vs. 22%; severe: 18% vs 14%; P=.799). Complete tumor resection was achieved in 100% of patients in both groups, and no significant differences were found in the number of dissected lymph nodes (median: 22 vs 25, P=.110). An unexpected nodal involvement was detected on pathologic specimen in 10% of VATS segmentectomy patients vs 14% of VATS lobectomy patients (P=.380).

Conclusion:
Video-assisted segmentectomy is a safe procedure for treating NSCLC in early stage and can be performed with low mortality and morbidity rates. When compared with VATS lobectomy, VATS segmentectomy affords a similar risk profile (mortality, morbidity), but allows the preservation of a major amount of pulmonary parenchyma, and therefore can be performed in patients with limited pulmonary reserve.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, thoracoscopy, surgery, segmentectomy, lobectomy, video-assisted thoracoscopic surgery
IS VIDEO-ASSISTED THORACOSCOPIC LOBECTOMY A FEASIBLE APPROACH FOR LOCALLY ADVANCED NON-SMALL CELL LUNG CANCER FOLLOWING NEOADJUVANT THERAPY?

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Objectives:
To evaluate the feasibility, safety and oncological validity of video-assisted thoracic lobectomy (VATS) for locally advanced non-small cell lung cancer (N2, T4 NSCLC) following neoadjuvant therapy.

Methods:
A propensity score matched study was performed for patients with locally advanced NSCLC treated by lobectomy following neoadjuvant therapy from a prospectively maintained lung cancer database in our institution. Patients who were attempted for thoracoscopic surgery were matched with those undergoing open surgery. An “intent-to-treat” analysis were performed.

Results:
From April 2010 to October 2014, 19 patients were attempted for thoracoscopic lobectomy, including 15 VATS and four conversions. 19 patients who were intended to open surgery were matched. There were 12 squamous carcinoma in VATS group and seven in open group. The stage were 14 N2, 3 T4, 2 IIIB in VATS group and 15, 3, 1 in open group respectively. The type of procedure were 18 lobectomy, one sleeve lobectomy in VATS group and 14 lobectomy and five sleeve lobectomy in open group. The neoadjuvant chemotherapy induced 52.6% PR and 47.4% SD in both group. The VATS group was associated with significantly shorter operation time and less blood loss versus open group. The chest tube duration, postoperative stay and perioperative morbidity were not different for VATS group versus open group. There were no differences in the numbers of dissected lymph nodes (18.8 vs 19.7, p=0.564) and stations of dissected lymph nodes (6.8 vs 7.47, p= 0.091). There were no difference in downstage rate (36.8% in VATS group and 42.1% in open group, p= 0.832). No difference was seen in the recurrent pattern(28.6% local and 71.4% distal in VATS group and 38.5% local and 61.5% distal in open group, p= 0.658). The rates of overall survival and disease-free survival were not significantly different between the two groups.

Conclusion:
Intentional video-assisted thoracoscopic lobectomy demonstrated similar survival for locally advanced non-small cell lung cancer following neoadjuvant therapy.

Disclosure: No significant relationships.
Keywords: lung cancer, thoracoscopy, lobectomy, neoadjuvant therapy
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RISK FACTORS FOR LOCAL RECURRENCE AFTER INTENTIONAL SEGMENTECTOMY FOR SMALL RADIOLOGICALLY INVASIVE LUNG CANCER: ARE THERE ANY SEGMENTECTOMY INDICATIONS FOR THE RIGHT UPPER LOBE?

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Objectives:
In a study on the non-inferiority of intentional segmentectomy versus lobectomy for cT1aN0 non-small cell lung cancer (NSCLC) we found segmentectomies have a higher local recurrence rate for radiologically invasive cancer. In this paper we find local recurrence risk factors, especially for preserved segment recurrence, which are identifiable preoperatively or intraoperatively, and we evaluate additional treatments and their prognoses.

Methods:
From 1995 to 2009, following exclusion criteria, 126 segmentectomies were performed for radiologically invasive cT1aN0 NSCLC. Radiological invasiveness was determined with a consolidation to maximum tumor diameter ratio greater than 0.5.

Results:
The median follow-up time was 103 months. The disease free survival rate was 73.8% five years after surgery and 67.6% at eight years. Twenty five local recurrences were observed (19.8%), 10 in preserved segments (7.9%), seven of which were in the right upper lobe. Multivariate analysis has shown gender (male) (HR 2.93: [1.10-7.80], p=0.032) and tumor diameter (>15mm) (HR 2.42: [1.01-5.82], p=0.048) as significant risk factors for local recurrence. For preserved segment recurrence specifically, tumor location (right upper lobe) (HR 8.17: [1.64-40.62], p=0.010) was the only independent risk factor with seven out of nine local recurrences in the right upper lobe. The five year survival rate for preserved segment recurrences after aggressive treatment (re-resection; 5, chemoradiotherapy; 5) was 60%. Final outcomes were complete remission (2), tumor-bearing survival (1), cancer death (5), and death due to metachronous multiple lung cancer (2).

Conclusion:
For right upper lobe tumors, segmentectomies can preserve two segments at most and pulmonary function-sparing is further reduced when resecting from an adjacent subsegment. Although operators may prefer segmentectomies to spare pulmonary function, lobectomies should be preferred in cases were the surgical margin would be insufficient as recurrence in the preserved segments occur too frequently.

Disclosure: No significant relationships.
Keywords: lung cancer clinical trial, outcomes, segmentectomy
RISK FACTORS FOR RECURRENCE OF PART-SOLID LUNG ADENOCARCINOMA LESS THAN 30 MM

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Objectives:
The frequency of part-solid lung adenocarcinoma is increasing due to computed tomography screening programs. Although the prognostic factors of solid adenocarcinoma were well-known, there were few reports revealing prognostic factors in part-solid adenocarcinoma. This study aimed to examine the prognostic factors in part-solid lung adenocarcinomas less than 30 mm.

Methods:
The data used in this study was collected from the records of 156 patients who had undergone anatomical resection for part-solid lung adenocarcinoma between January 2004 and December 2012. The clinical, radiologic, and pathologic findings were analyzed for predicting recurrence after curative resection.

Results:
The mean size of the entire nodules and the solid component on HRCT were 19.8 (7-30) mm and 11.7 (1-26) mm, respectively. The median GGO ratio of the nodules was 42 % (range, 4-93) and the median SUVmax was 1.2 (0-6.6). Lobectomy was in 132 patients (85%) and segmentectomy was performed in 24 patients (15%). Twenty-two (14%) patients were minimally invasive adenocarcinoma (MIA) and 134 (86%) patients were invasive adenocarcinoma. For predominant pattern of adenocarcinoma, acinar predominant type was seen in 93 (60%) followed by 41 (26%) of lepidic type. Visceral pleural invasion (VPI), lymphovascular invasion (LVI), and lymph node metastasis (LNM) were pathologically confirmed in 24 (16%), 39 (25%), and 11 (7%) patients, respectively. Univariate analysis using log-rank Kaplan-Meier survival analysis showed that a CEA level, solid size on CT, GGO ratio, SUVmax, pathologic total size and invasive size, and LVI were prognostic factors for recurrence. Multivariate analysis by Cox proportional hazards regression showed that LVI was significantly independent prognostic factor.

Conclusion:
The LVI was independent prognostic factors for recurrence in part-solid lung adenocarcinomas of less than 30 mm.

Disclosure: No significant relationships.
Keywords: risk factor, non small cell lung cancer, part solid adenocarcinoma
FEASIBILITY OF MAJOR LUNG RESECTIONS IN THE ELDERLY PATIENTS: A MORBIDITY RISK STRATIFICATION MODEL

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Objectives:
Advanced age is a significant risk factor for mortality in lung cancer surgery. Many factors have been proved to influence 30- and 90-days mortality (including open versus VATS procedures, FEV1%, DLCO%, extent of resection, comorbidities). Instead, surgery has been showed to be safe and appropriate throughout careful selection process. This paper reviews experiences achieved in two thoracic-surgery-units over a five-years period.

Methods:
Retrospective review on patients >75-years undergone major pulmonary resections (January/2010–July/2015). Data regarding demographic, baseline characteristics, comorbidity conditions, and type of surgery were collected. Comorbidities were scored according to adapted Charlson index. Perioperative death was defined as any death within 30-days of operation, morbidity as occurrence of at least one postoperative event. Power analysis was calculated using Wilson-method. Unpaired-Student’s t–tests were used to compare continuous data, Fisher’s-exact-tests for dichotomous data, and $\chi^2$ for categorical variables. Proportional hazards-assumptions were analytically assessed using Schoenfeld residuals. Violations were addressed by inclusion of time-varying covariable. Univariate analysis was performed on postoperative morbidity. Significant variables were entered into Cox multivariable-logistic-regression (morbidity: dependent variable). Significant independent predictors of morbidity were used to construct prognostic-index using natural-logarithms of ratios from multivariable-analysis. Two–tailed p–value <0.05 was considered significant.

Results:
A series of 226 consecutive patients (median:78-years) was identified. VATS resection was accomplished in 73 (32.3%) patients. Median hospitalization was 7 days (range:4—39). Postoperative mortality was 0.44% (1-patient) and morbidity was 23%. On univariate analysis (Table-a) FEV1%, DLCO%, extent of resection, and surgical approach were significantly associated with morbidity, while only DLCO% and extent of resection remained significant in multivariable logistic model (Table-b). A simplified scoring system combining DLCO% (>65%, 65-75%, >75%) and type of surgery (VATS versus open) allowed to stratify patients into morbidity low-risk (score ≤1) and high-risk (score ≥2) group (Table-c).
Table a, b, c. Univariate analysis, logistic regression model of risk factor for morbidity, and simplified scoring system for prevision of morbidity after major lung resections.

### Table a. Univariate analysis of risk factor for morbidity after major lung resections

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Patients WITH complications (n = 53)</th>
<th>Patients WITHOUT complications (n = 173)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Cooperative Oncology Group (ECOG) performance status</td>
<td>32 (60.4%)</td>
<td>111 (64.25%)</td>
<td>0.561</td>
</tr>
<tr>
<td>FEV1%</td>
<td>87.4 ± 20.6</td>
<td>87.7 ± 20.5</td>
<td>0.975</td>
</tr>
<tr>
<td>DLCO%</td>
<td>78.2 ± 17.6</td>
<td>80.1 ± 17.8</td>
<td>0.023</td>
</tr>
<tr>
<td>Smoking history</td>
<td>38 (71.7%)</td>
<td>114 (65.9%)</td>
<td>0.244</td>
</tr>
<tr>
<td>Chronic Obstructive Pulmonary Disease (COPD)</td>
<td>22 (41.5%)</td>
<td>65 (37.6%)</td>
<td>0.192</td>
</tr>
<tr>
<td>Coronary Artery Disease (CAD)</td>
<td>16 (30.2%)</td>
<td>45 (26%)</td>
<td>0.314</td>
</tr>
<tr>
<td>Diabetes</td>
<td>13 (24.5%)</td>
<td>38 (22.0%)</td>
<td>0.134</td>
</tr>
<tr>
<td>Chronic renin failure</td>
<td>4 (7.5%)</td>
<td>15 (8.7%)</td>
<td>0.289</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>3 (5.7%)</td>
<td>9 (5.2%)</td>
<td>0.230</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>2 (3.8%)</td>
<td>4 (2.3%)</td>
<td>0.369</td>
</tr>
<tr>
<td>Surgical approach (open vs. VATS)</td>
<td>39 (73.6%)</td>
<td>114 (65.9%)</td>
<td>0.071</td>
</tr>
<tr>
<td>Extension of resection (major than lobectomy)</td>
<td>6 (11.3%)</td>
<td>18 (10.4%)</td>
<td>0.042</td>
</tr>
</tbody>
</table>

### Table b. Logistic regression model of risk factors for morbidity after major lung resections

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Odds ratio</th>
<th>95% Confidence Interval</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV1%</td>
<td>0.99</td>
<td>0.97 - 1.02</td>
<td>0.495</td>
</tr>
<tr>
<td>DLCO%</td>
<td>1.81</td>
<td>0.36 - 9.05</td>
<td>0.047</td>
</tr>
<tr>
<td>COPD</td>
<td>0.53</td>
<td>0.15 - 1.90</td>
<td>0.330</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1.01</td>
<td>0.88 - 1.17</td>
<td>0.870</td>
</tr>
<tr>
<td>Surgical Approach (open vs. VATS)</td>
<td>2.63</td>
<td>0.92 - 6.89</td>
<td>0.049</td>
</tr>
<tr>
<td>Extension of resection (major than lobectomy)</td>
<td>1.46</td>
<td>0.87 - 2.47</td>
<td>0.153</td>
</tr>
</tbody>
</table>
Table c. Simplified scoring system: low risk morbidity (score ≤1), high risk morbidity (score ≥2)

<table>
<thead>
<tr>
<th></th>
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<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLCO%</td>
<td>&gt;75</td>
<td>65 - 75</td>
<td>&lt;65</td>
</tr>
<tr>
<td>Surgical Approach</td>
<td>VATS</td>
<td>Open</td>
<td></td>
</tr>
<tr>
<td>(open vs. VATS)</td>
<td></td>
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</tbody>
</table>

**Conclusion:**
In elderly, major lung resections can be safely performed. Selection is pivotal to minimize morbidity. DLCO% and VATS approach allow risk stratification and reduces morbidity.

**Disclosure:** No significant relationships.
**Keywords:** morbidity, morbidity risk, elderly patients, VATS
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PULMONARY VENOPLASTY IN LUNG CANCER SURGERY: A CASES SERIES

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Objectives:
To determine the feasibility and long term outcomes of pulmonary venoplasty (PVP) in lung cancer surgery.

Methods:
Between 2006 and 2012, a total of 9 patients with lung cancer underwent anatomic pulmonary resection combined with PVP (partial or sleeve resection). Venoplasty was performed with continuous suture using 5-0 Prolene stitches, followed by systemic lymphadenectomy. Medical records and follow-up data were reviewed.

Results:
There were three female and six male patients with age ranged from 38-62 year (median, 46). Indications of PVP included six cases of middle lobar tumor directly involving superior pulmonary vein (SPV), one case of metastatic lymph node involving SPV, two cases of venous injury. Partial resection and sleeve resection were performed in four and five patients, respectively. The operations were accomplished within 110-410min (median, 270min) with blood loss ranged from 200-600ml (median, 290ml). No blood transfusion was required. A total of 11-25 (median, 16) lymph nodes were removed. Postoperative stage included two cases of stage I, one case of II, five cases of IIIa, and one case of IV. The patients recovered uneventfully and were discharged home 5-10 (median, seven days) after surgery. Postoperative follow up varied from seven to 100 months and ideal patency of the vessels were confirmed. One patient was lost to follow up. Four died of metastasis seven to 60 months during follow-up. Two patients had metastatic disease at 32 and 35 months after surgery, and are still alive 50 and 48 months after surgery. Two patients are disease-free at 57- and 100-month follow-up.

Conclusion:
Pulmonary resection combined with PVP is mainly performed in cases of middle lobar tumor involving SPV. The operation is safe and feasible. It may be beneficial to some patients in preserving more pulmonary parenchyma and long term survival may be achieved in selected patients.

Disclosure: No significant relationships.
Keywords: pulmonary venoplasty, feasibility, outcome, lung cancer
P-199

THE NUMBER OF RESECTED LYMPH NODES IS ASSOCIATED WITH THE LONG-TERM SURVIVAL OUTCOME IN PATIENTS WITH T2N0 NON-SMALL CELL LUNG CANCER

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Objectives:
For the patients with T2a N0 non-small cell lung cancer (NSCLC), the extent of lymph node removal required for survival is controversial. We purposed to clarify the correlation between the number of lymph nodes (LNs) examined and survival for those patients.

Methods:
We reviewed 549 patients pathologically confirmed as T2a stage and lymph node negative. According to Martingale residuals of the Cox model, the patients were classified into 4 groups by the number of examined LNs (1-2 LNs, 3-7 LNs, 8-11 LNs, and ≥12 LNs). Kaplan-Meier analysis and Cox regression analyses were used to evaluate the association between survival and the number of examined LNs.

Results:
The five year cancer-specific survival rate was 59.8% for patients with one to two negative LNs, compared with 67.4%, 69.7% and 77.6% for those with three to seven, eight to 11 and more than 11 LNs examined, respectively (P=0.025). There was a significant drop in mortality risk in patients with more LNs examined. The lowest mortality risk occurred in those patients with 32 or more LNs examined. Multivariate analysis showed that age and the number of examined LNs were strong independent predictors of survival.

Conclusion:
The number of examined LNs is a strong independent prognostic factor. Our study demonstrated that NSCLC patients with T2a N0 should have at least 12 LNs examined. The result might be considered as a reference for the optimal number of resected LNs in surgical strategy for NSCLC patients in T2aN0.

Disclosure: No significant relationships.
Keywords: number of resected lymph nodes, non-small cell lung cancer, survival outcome
FEATURES AND PROGNOSTIC FACTORS OF LARGER THAN 5CM NODE NEGATIVE NON-SMALL CELL LUNG CANCER

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Objectives:
In the 7th edition of TNM, primary tumor size larger than 5 cm shifted to IIA (T2b, >5 but ≤7 cm) or IIB (T3, >7cm) because of worse prognosis than that of 5 cm or less non-small cell lung cancer (NSCLC). This shift raised the issue of adjuvant chemotherapy as a standard management for patients with stage II lung cancer. Therefore, we were to evaluate the characteristics and prognostic factors of larger than 5cm node-negative NSCLC.

Methods:
Between 2004 and 2014 we included 109 NSCLC patients who underwent curative resection for pathologically confirmed node negative tumors larger than 5cm (Group I). We compared these patients with 219 patients who had N1 node positive and tumors smaller than 5cm (Group II) and 85 patients with node positive and tumors larger than 5cm (Group III) in clinicopathologic characteristics and prognosis. We also compared non-recurrent patients with recurrent patients in node-negative and tumors larger than 5cm.

Results:
Compared with Group II, older patients, higher SUVmax, higher frequency of visceral pleural invasion (VPI) and lymphovascular invasion (LVI) were included in Group I. Adjuvant therapy was performed in 48 (44%) patients of Group I and 170 (78%) of Group II, respectively. The five year overall survival (OS) and disease-free survival (DFS) was not significantly different between Group I and II. Compared with Group III, older patients with larger tumor and less LVI were common in Group I. Although five year DFS was not different between two groups, OS was significantly longer in Group I. The VPI was independently significant prognostic factor for DFS in Group I.

Conclusion:
Patients with larger than 5cm node negative NSCLC had distinguishing factors in age, SUVmax, VPI, and LVI. Only VPI was identified as independent prognostic factor in tumor of larger than 5cm node negative NSCLC.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, stage II, prognostic factor
P-201

MICROPAPILLARY CARCINOMA: THE WORST PROGNOSIS AMONG STAGE IA LUNG ADENOCARCINOMAS

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Objectives:
A new WHO classification of lung neoplasms including adenocarcinoma was launched in 2015. In view of this new classification we compared the pathological characters of the stage I A resected adenocarcinomas with the survival.

Methods:
Between 2004-2013, 183 stage IA adenocarcinomas were resected (sublobar resections 13.1%; lobectomy 86.9 %). There were 39.3% men and 60.7% women. Mean age was 62.3 years. The subtypes of the adenocarcinomas were as follows: in situ adenocarcinoma 11 (6%), minimally invasive 9 (5%), lepidic 31 (17%), acinar 45 (24%), papillary 29 (16%), solid 47 (26%) and micropapillary carcinoma 11 (6%). The subtypes of adenocarcinomas, the mitotic count, the nuclear atypia, the presence of lymphovascular-, vascular propagation, necrosis and the survival were compared between the low grade (in situ, minimally invasive, lepidic), intermediate grade (acinar, papillary) and the high grade (solid and micropapillary) adenocarcinoma groups.

Results:
The five year survivals were as follows: in situ (100%), minimally invasive (88.9%), lepidic (87.7%), acinar (89.6%), papillary (85.8%), solid (65.5%) and micropapillary (27.3%). There was no significant difference in five-year survival between low (90.1%) and intermediate (88.3%) carcinomas, but there was significant difference between low+intermediate and high grade (55.6%) groups (p=0.001), and inside the high grade group between the solid (65.5%) and micropapillary (27.3%) carcinomas (p=0.001). Patient with a solid adenocarcinoma has 3.4, with micropapillary carcinoma 6.8 times more chance for death than with low or intermediate grade carcinomas (p=0.001). In Cox regression the subtypes of the adenocarcinomas and the presence of vascular invasion were found independent prognostic markers.

Conclusion:
The subtypes of the adenocarcinomas and the vascular invasion were independent prognostic factors. The micropapillary adenocarcinoma had the worst survival among the different subtypes of stage IA adenocarcinomas. Patients with micropapillary adenocarcinoma and/or vascular invasion can be considered for adjuvant treatment in stage IA.

Disclosure: No significant relationships.
Keywords: stage IA lung adenocarcinoma, micropapillary carcinoma, five-year survival
THE PROGNOSTIC VALUE OF CARCINOEMBRYONIC ANTIGEN LEVELS IN THE BLOOD AND INTRAOPERATIVE PLEURAL LAVAGE FLUID IN NON-SMALL CELL LUNG CANCER

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Objectives:
There is no specific marker for lung cancer but in some lung cancer types carcinoembryonic antigen (CEA) can reach high levels in the blood and pleural fluid. In this study the relationship between CEA levels in blood (CEAB) and intra-operative pleural lavage fluid (CEAP) in non-small cell lung cancer (NSCLC) and the type, stage, extent of lung cancer was investigated.

Methods:
A total of 50 patients, who underwent surgery at our clinic due to NSCLC (Group I) and benign lung pathology (Group II), were assessed. For this prospectively designed study, 25 consecutive patients were included in each group and their CEAB and CEAP levels were investigated.

Results:
When the CEAB levels were measured, the average value was 14.13 ng/ml (0.77-139.3) and 1.70 ng/ml (0.54-3.42) in Group I and II, respectively (p<0.05). When the levels of CEAP were compared, the average value of Group I (1.35 ng/ml), was significantly higher than the average value of Group II (0.04 ng/ml) (p=0.027). When CEA levels were examined separately and average values were taken according to surgical pathology results both CEAB and CEAP levels of the patients with adenocarcinoma diagnosis were found to be higher than the other groups. It was detected that this difference was only significant for the level of CEAP (p=0.026).

Conclusion:
Although the average CEAB levels of patients with adenocarcinoma were higher than other histopathological types, this difference was not statistically significant. However, we found that CEAP levels were significantly high in patients with adenocarcinoma. These results have led us to consider that CEAP elevation is more sensitive than the blood level. Also, it indicated that it is necessary to examine CEAP levels even if the CEAB level of the patient was low.

Disclosure: No significant relationships.
Keywords: non-small cell lung cancer, pleural lavage, Carcinoembryonic antigen
AN INTRAOPERATIVE LUNG FIELD MARKING METHOD USING X-RAY EQUIPMENT FOR HYBRID VASCULAR SURGERY FOR NON-PALPABLE PULMONARY NODULES.

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Objectives:
We herein report our experiences regarding a method to intraoperatively confirm localization of small nodular shadows in the peripheral lung field predicted to be non-palpable upon a preoperative examination using X-ray equipment for hybrid vascular surgery.

Methods:
A fused system including an Allura Xper FD-20 photographing device and Magnus operating table was used. This method was performed on 26 cases and 28 lesions from July 2013 to March 2015.

Results:
The node size before operation ranged from 3-25mm in size, with a lesion indication rate during operation of 100%, and the final pathological diagnoses were as follows: primary lung cancer: 14 lesions; metastatic pulmonary tumor: 10 lesions; atypical adenomatous hyperplasia (AAH): two lesions; and benign: two lesions. The system used in this study is capable of interlocking the X-ray equipment and surgical bed, so that the fixed lateral position of the patient remained stable, allowing scanning from the pulmonary apex to the lung base, with no observed complications accompanying this method.

Conclusion:
This method enables the avoidance of serious complications, such as air embolisms, along with the successful execution of all techniques in the operation room, with potential usage when additional resections become required, making it a promising method for future clinical application.

Disclosure: No significant relationships.

Keywords: small pulmonary nodule, intraoperative marking, air embolism, cone beam CT, ground glass nodule
IMPACT OF DIAGNOSTIC TIME AND SEVERITY OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE ON LONG-TERM SURVIVAL OF STAGE I NON-SMALL CELL LUNG CANCER

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Objectives:
Chronic obstructive pulmonary disease (COPD) is a known risk factor for lung cancer; however, most COPD was incidentally identified at the time of lung cancer diagnosis. We aimed to evaluate the impact of different diagnostic time and severity of COPD on long-term survival after complete resection for stage I non-small cell lung cancer.

Methods:
A cohort of 1391 consecutive patients with primary lung cancer was identified between 2000 and 2010. COPD was diagnosed according to medical records or spirometric results (post-bronchodilator FEV1/FVC<0.70). The time of COPD diagnosis was divided into prior COPD (at least one year preceding lung cancer diagnosis) and concurrent COPD. The severity of COPD was based on criteria of the Global Initiative for Chronic Obstructive Lung Disease (GOLD). Multivariate comparisons of overall survival were performed using Cox proportional hazard model.

Results:
COPD was present in 579 (41.6%) patients, including 121 (20.9%) prior COPD and 458 (79.1%) concurrent COPD; by severity respectively, 23.9%, 59.0% and 17.1% had mild (GOLD I), moderate (GOLD II) and severe (GOLD III/IV) airflow obstruction. Compared to non-COPD group, the presence of COPD was significantly associated with older age, male sex, smokers and squamous cell carcinoma (all p<0.01). Patients with prior COPD had a higher proportion of former smokers and moderate airflow obstruction while those with concurrent COPD were more likely to be current smokers (p<0.01) and have mild airflow obstruction (p=0.04). In multivariate analysis, when adjusted for histologic grade, surgical type and tumor stage, worse survival was significantly associated with prior COPD (HR=1.34[1.04-1.72]) and moderate (HR=1.207[1.005-1.449]) and severe airflow obstruction (HR=1.44[1.09-1.91]), but not associated with mild airflow obstruction regardless time of COPD diagnosis.
Conclusion:
When COPD coexists with lung cancer, both diagnostic time and severity should be taken into consideration in the selection of therapeutic strategies and evaluation of long-term prognosis.

Disclosure: No significant relationships.
Keywords: chronic obstructive pulmonary disease, diagnostic time, severity, survival, non-small cell lung cancer
IMPACT OF LYMPHADENECTOMY ON SURVIVAL IN PATIENTS UNDERGOING ANATOMICAL LUNG RESECTION FOR NON-SMALL CELL LUNG CANCER

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Objectives:
Inadequate nodal sampling in patients undergoing anatomical resection for non-small cell lung cancer (NSCLC) may downstage tumors impacting on adjuvant treatment and overall survival. The aim of this study was to determine the role of local and systemic factors on survival according to nodal status.

Methods:
All patients undergoing anatomical lung resection for pT1-3, N0-2 for NSCLC between April 2011 and March 2013 were included. Univariate and multivariate regression was used to determine the impact of clinicopathologic factors on survival.

Results:
Five hundred and twenty four patients were included. Overall survival was 86.5% and 62.6% at 1- and 4-years respectively (Figure 1a). Median follow-up was 3.5 years. Stage, histological category, parietal pleural and lymphovascular invasion were predictors of decreased survival in both univariate and multivariate models. Subgrouping by nodal status showed significantly worse survival in N1 vs. N0 and N2 vs. N0 patients (p=0.039 and p<0.0001 respectively), however this was not the case for N2 vs. N1 patients (p=0.133) (Figure 1b). Lymphovascular invasion, visceral and parietal pleural involvement were significant uni- and multi-variate predictors of survival in N0 patients. However, these factors did not significantly correlate with survival in N1 or N2 disease. In N2 patients, the presence of N2 skip lesions and completeness of lymphadenectomy (measured as compliance with ESTS guidelines) did not significantly impact on survival. Similarly, no significant difference was observed in survival of single vs. multi station N2 disease (p=0.479).

Conclusion:
Whilst a number of local clinicopathological factors impact on prognosis in N0 patients with NSCLC, the same cannot be applied to N1 and N2 disease. Completeness of lymphadenectomy of N2 station nodes did not correlate with improved survival in this patient cohort. Similarly, the presence or absence of N2 skip lesions and multi-station N2 disease did not impact on overall prognosis.

Disclosure: No significant relationships.
Keywords: lymphadenectomy, non-small cell lung cancer, prognostic factors
LUNG CANCER INCIDENTALLY DISCOVERED IN PREVIOUS EXTRAPULMONARY MALIGNANECIES: WHICH IS THE BEST SURGICAL TREATMENT?

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Objectives:
Lung nodules in patients with previous extrapulmonary cancer are usually approached as metastasis treated with atypical resection, but sometimes they result primitive lung cancers. The purpose of our study is to analyze predictive factors for overall survival (OS) in this group of patients.

Methods:
Data of 83 patients with a previous primary extrapulmonary tumour underwent lung operation between January 2004-December 2013 for suspicious metastatic nodules revealed primary lung cancer were reviewed. The lung operation was performed if the patients met the following criteria: (a) controlled previous neoplasm; (b) completely resectable pulmonary nodules; (c) general condition and pulmonary function to tolerate lung resection. Surgery was performed in three ways: atypical resection, atypical resection with intraoperatory histology and lobectomy, atypical resection and staged lobectomy after definitive histological exam.

Results:
Surgery was lobectomy in 55(66%) and wedge resection in 28(34%) patients. In 29(35%) cases intra-operative histological examination and lobectomy was performed, 31 (37%) patients underwent staged lobectomy. Final pathology showed adenocarcinoma in 55 (66%), squamous carcinoma in 21 (25%), other in seven (9%) cases. Overall two, five and 10-yr survival were 75%, 59% and 29%, respectively. Sixteen (19%) patients died of cancer: ten (12%) died of lung cancer and six (7%) of previous tumor. Overall survival was strictly associated with the lung cancer, with five year survival of 11% in patients dead of lung cancer and 79% in patients dead of previous cancer (p<< 0,001). Stage of lung cancer and lymphoadenectomy were significantly associated with survival (five year survival after lobectomy for stage pT<1b vs pT>2a was 81% vs 27%, p:0,011 and if lymphoadenectomy was associated with lobectomy five year survival was 72% vs 30% in pT<1b vs pT>2a, p:0,003). The site of the previous extrapulmonary neoplasm and the interval between previous tumor and surgery for lung cancer were not significantly associated with survival.
**Conclusion:**
In our experience lung cancer appears the cause of death in case of previous extrapulmonary malignancies. A radical approach with lobectomy and lymphadenectomy seems to be the best treatment also in this group of patients, independently from the timing of surgery and lobectomy.

**Disclosure:** No significant relationships.

**Keywords:** NSCLC, extrapulmonary tumors, lobectomy, lymphadenectomy
P-207

APICAL PERFUSION FRACTION MAY NOT BE A PREDICTOR OF FUNCTIONAL OUTCOMES FOLLOWING BILATERAL LUNG VOLUME REDUCTION SURGERY

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Objectives:
Numerous studies have documented short term improvement in functional outcomes after Lung Volume Reduction Surgery (LVRS). The response to LVRS, has not been uniform potentially limiting the clinical utility of the procedure. A prior study in which 128 subjects who underwent bilateral LVRS suggested that apical perfusion was helpful in predicting improvement in short term functional outcomes. The aim of our study was to determine whether the apical perfusion fraction as measured by lung scintigraphy in our series of 88 patients predicted an improvement in functional outcome following bilateral LVRS.

Methods:
We performed a retrospective analysis of 88 patients who were consented for bilateral LVRS at our institution. LVRS candidates were selected according to CMS inclusion/exclusion criteria and all had upper lobe predominant emphysema based on Computed Tomography (CT). Apical perfusion fraction (AP%), defined as the percentage of total lung perfusion to the apical one third of both lungs, was derived for each patient by quantitative scintigraphy technique. Subjects were classified into three groups according to AP: 32 patients (36.3%) had an AP% ≤ 10%, 45 patients (51.1%) had an AP% from 11 to 20%, and 11 patients (12.5%) had an AP% > 20%. Analysis of variance (ANOVA) models were performed comparing the mean absolute changes (baseline to 6 months) across the three groups with respect to functional outcomes. The main functional outcomes analyzed included: Forced Expiratory Volume in 1 second (FEV1, l), exercise capacity (watts), PO2, UCSD Shortness of Breath Questionnaire, and Carbon Monoxide Diffusing Capacity (DLCO).

Results:
As demonstrated in Table 1 there was no statistically significant association between the AP% and mean absolute change six months post LVRS for any of the outcomes.

Conclusion:
This retrospective analysis suggests that the measurement of apical perfusion by nuclear scintigraphy is not a significant predictor of functional improvement after LVRS.
Table 1. ANOVA results comparing mean functional outcomes by AP% categories

<table>
<thead>
<tr>
<th>Functional Outcome (Absolute change)</th>
<th>Group 1 (AP%≤10%) N=32</th>
<th>Group 2 (AP% 11-20%) N=45</th>
<th>Group 3 (AP%&gt;20%) N=11</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>N</td>
</tr>
<tr>
<td>FEV1</td>
<td>26</td>
<td>0.38</td>
<td>0.41</td>
<td>40</td>
</tr>
<tr>
<td>Max Watts</td>
<td>23</td>
<td>11.61</td>
<td>12.35</td>
<td>37</td>
</tr>
<tr>
<td>PO2</td>
<td>26</td>
<td>1.06</td>
<td>23.95</td>
<td>40</td>
</tr>
<tr>
<td>UCSD</td>
<td>19</td>
<td>-33.7</td>
<td>34.61</td>
<td>34</td>
</tr>
<tr>
<td>DLCO</td>
<td>26</td>
<td>3.81</td>
<td>10.1</td>
<td>40</td>
</tr>
</tbody>
</table>

Disclosure: No significant relationships.

Keywords: outcomes, ventilation-perfusion scan, lung volume reduction surgery
EXTENDING THE BENEFIT OF VOLUME REDUCTION IN EMPHYSEMA –
THE USE OF ENDOBRONCHIAL VALVE THERAPY AS A FURTHER STAGE
AFTER LUNG VOLUME REDUCTION SURGERY

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Objectives:
Traditionally we have performed staged bilateral video-assisted thoracoscopic (VATS) lung volume reduction (LVR). Because redo surgery in emphysema patients involves dealing with postoperative adhesions on fragile lungs we have only in rare exceptions performed VATS on previously operated lungs. With the introduction of bronchoscopic lung reduction (endobronchial valve (EBV) insertion) we have been able to perform lung reduction twice on the same lung and have analysed the outcome.

Methods:
Endobronchial Zephyr valves (PulmonX) were inserted into 10 patients (eight male; two female), median age 59 (47-74) years who had previously undergone VATS LVRS (four patients bilateral; six unilateral). All valves were positioned in a previously operated lung. The time interval between the last LVRS and EBV insertion was 4.6 years (1.2-8.8 years). The patients were followed prospectively after treatment, recording changes in: health status (SF36 questionnaire), dynamic and static lung volumes. Two patients had not reached three months follow up.

Results:
There was no 30 day mortality. None of the patients required a chest drain for a haemato- or pneumothorax after the insertion of EBV. Significant physiological improvements in relief of obstruction and reduction in volume were seen after VATS LVRS. There was a further significant reduction in TLC after EBV insertion.

Table: changes in respiratory physiology

<table>
<thead>
<tr>
<th></th>
<th>Preop first LVRS</th>
<th>Postop first LVRS</th>
<th>Preop EBV</th>
<th>Postop EBV</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV1 %pred (mean+-SD)</td>
<td>27+/-7</td>
<td>35+-11*</td>
<td>24+/-7</td>
<td>28+-8</td>
</tr>
<tr>
<td>TLC %pred (mean+-SD)</td>
<td>141+-15</td>
<td>133+-15*</td>
<td>133+-15</td>
<td>124+-14*</td>
</tr>
<tr>
<td>RV %pred (mean+-SD)</td>
<td>256+-61</td>
<td>218+-41*</td>
<td>239+-55</td>
<td>211+-58</td>
</tr>
</tbody>
</table>

T-test * p<0.05 After LVRS 7 of 8 SF36 health domains showed an improvement, of which 5 were statistically significant. After EBV there was a further improvement in 3 domains (physical function, mental health, general health perception).
Conclusion:
The use of further endobronchial volume reduction in those who have previously received LVRS is feasible and safe and shows potential benefit. However, the patients should not expect the same magnitude of improvement.

Disclosure: No significant relationships.
Keywords: endobronchial valves, emphysema, lung volume reduction surgery
P-209

DOES PPOFEV1 PREDICTS EARLY OBSERVED FEV1 AFTER UNIPORTAL VATS ANATOMICAL RESECTIONS? A PROSPECTIVE EVALUATION

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Objectives:
The objective of this study was to prospectively assess the agreement between predicted FEV1% and early postoperative observed FEV1% in the immediate postoperative period after uniportal VATS anatomical resections.

Methods:
This is a prospective longitudinal study on 94 consecutive patients undergoing Uniportal VATS anatomical resections (78 lobectomies and 16 segmentectomies) in a single centre from April 2014 to November 2015. All patients were prospectively evaluated with complete preoperative FEV1% and repeated on each postoperative day. Postoperative pathways of care were standardized for all patients. Predicted postoperative (ppo) values were compared with the observed postoperative values by Wilcoxon signed rank test. The precision of ppoFEV1% at the postoperative day 1 (POD1), postoperative day 2 (POD2), day of chest tube removal (last) and one hour after chest tube removal (POST) was subsequently evaluated by plotting the cumulative postoperative values against the observed ones by cumulative distribution function (CDF).

Results:
On POD1 observed FEV1% were 14% lower than the predicted FEV1% (p<0.0001). On POD2 observed FEV1% were 10% lower than the predicted FEV1% (p<0.0001), while on the day of chest tube removal (last) the observed values were 8% lower than the predicted (p=0.002). After chest tube removal, no differences were noted between predicted and observed values. Comparing observed values before (Last) and after chest tube removal (post) showed 5% improvement in ventilatory function (p=0.01). Cumulative plots of the predicted and observed values showed that ppo FEV1% predicted worse on the POD1, POD2 and on the day of chest tube removal (Last) but after chest tube removal the measured FEV1% was precisely predicted by ppoFEV1% (Figure1).

Conclusion:
After Uniportal VATS the ppo FEV1% underestimate the real function loss in the immediate postoperative period (POD1, POD2 and the day of chest tube removal) with progressive recovery. After chest tube removal in patients undergoing Uniportal anatomical resections ppoFEV1% predicted precisely the observed FEV1%
Disclosure: No significant relationships.

Keywords: uniportal VATS, anatomical resections, ppoFEV1, FEV1
P-210

UPPER LOBECTOMY COMBINED WITH SUPERIOR SEGMENTECTOMY OF THE LOWER LOBE: A HIGH RISK OPERATION

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Objectives:
Upper lobectomy is not uncommonly performed together with a superior segmentectomy of the lower lobe. However, little is known about how this combination affects operative morbidity. This study is aimed at investigating the risks related to upper lobectomy combined with superior segmentectomy of the lower lobe.

Methods:
We retrospectively reviewed the medical records of 55 consecutive patients who received simultaneous ipsilateral upper lobectomy together with superior segmentectomy in a single center from Jan 2002 to Dec 2014. Mortality and morbidity of surgery were analyzed.

Results:
The reasons for superior segmentectomy were either direct involvement (n=45) of the disease or multiple lesions (n=10). Thirty-two of these were lung cancer, while 23 were benign diseases. One patient died of severe pulmonary infection secondary to early postoperative bronchopleural fistula (BPF). Postoperative complications occurred in 46 patients (83.6%), which included three acute respiratory failure, five BPFs, 33 prolonged air leak, 24 persistent residual space, two empyema without BPF, etc. There were two early BPFs and three late BPFs, three of these occurred after resection of a benign disease.

Conclusion:
Simultaneous LUL lobectomy together with LLL apical segmentectomy carries a high rate of morbidity. The commonest complications are persistent residual space, BPF, empyema, prolonged air leak, etc. Attention needs to be paid for the prevention and treatment of complications after such surgeries.

Disclosure: No significant relationships.
Keywords: segmentectomy, complications, bronchopleural fistula, lobectomy
P-211

INTERVENTIONS FOR CHYLOTHORAX COMPLICATING THORACIC SURGERY

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Objectives:
Chylothorax is a rare but unavoidable complication following thoracic surgery. We reviewed interventions for chylothorax complicating thoracic surgery, focused on those cases required surgical intervention.

Methods:
Medical records on a series of 6738 cases underwent thoracic surgery in a single institution for 12 years, between January 2004 and December 2015, were retrospectively reviewed. Fifty-four cases (0.8%) complicated chylothorax which required interventions before chest tube removal; age 66.1 (39-89) years in average, 12 females and 42 males. Types of thoracic surgery were for lung malignancies in 50 cases out of 3987 cases (1.3%) and for mediastinum tumors in four cases out of 363 cases (1.1%) (p=0.80).

Results:
Non-surgical interventions for chylothorax included dietary control in all cases, chemical pleurodesis in 43 cases (79.6%) and somatostatin analogs administration in two cases (3.7%). Surgical interventions were required in 12 cases (22.2%), 9.3 (1-26) days in average after the initial thoracic surgery. Postoperative chest tube drainage periods were longer in surgical intervention group than in non-surgical intervention group; 15.8 (6-38) days and 10.2 (5-25) days in average (p=0.013). In surgical intervention group, chylous leakage points could not be detected intra-operatively in four cases and one case underwent thoracic duct ligation (Figure).
Chest tube drainage periods in those four cases following re‑explorations were longer than in eight cases leakage points were detected; 14.8 (5‑21) days and 2.4 (1‑5) days in average (p=0.00036). Additional non‑surgical interventions following re‑exploration were required in 5 cases, but no mortalities related to chylothorax and no chylothorax recurrences after completion of interventions were recorded.

**Conclusion:**
Chylothorax complicated 0.8% of thoracic surgery cases in a single institution. In addition to prompt diagnosis, adequate interventional choices including surgical re‑exploration when necessary and the strategy for detecting chylous leakage point intra‑operatively are the key for successful treatment.

**Disclosure:** No significant relationships.

**Keywords:** intervention, mediastinal tumor, lung cancer, chylothorax, postoperative complication, thoracic surgery
QUALITY OF LIFE IN OCTOGENARIANS AFTER GENERAL THORACIC SURGERY

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Objectives:
Surgery in octogenarians is performed with acceptable morbidity and mortality. However, little is known about the quality of life (QoL) after surgery especially in octogenarians. The goal of this study was to retrospectively examine quality of life in octogenarian patients.

Methods:
Patients aged 80 years and older who had thoracic surgery between June 2013 and November 2015 were asked to recall their QoL before surgery and their present QoL by completing the EORTC QLQ-C30 questionnaire. The questionnaires and the medical history of the patients were analysed in SPSS. A statistical significance between pre- and post-operative scores was set at p < 0.05.

Results:
Seventy nine patients (40 male and 39 female) with a mean age of 84 years (range 80 to 98) were included in the study. 24 patients (30.4%) had undergone a thoracotomy, and 55 patients (69.6%) minimally invasive procedures. 59 (75%) of the patients were ASA III. The average hospitalization time was 14 days (SD ±9.4 days) and 30-day mortality was 12/79 (15%). Thirty patients answered the questionnaire, of which 21 were male and nine were female. The average time between surgery and receipt of the questionnaire was 8.4 months (SD ±4.8 months). There was no significant difference in age, hospitalization time, and ASA between the patients who answered the questionnaire and those who did not answer. There was no significant difference in overall QoL before and after the surgery (p=0.157). There were significant differences in physical functioning (p=0.000), role functioning (p=0.032), cognitive functioning (p=0.002), fatigue (p=0.009), and appetite (p=0.048).

Conclusion:
Our results suggest that QoL after thoracic surgery in octogenarians is comparable to preoperative QoL. Since health in elderly people is the most important factor to maintain a good QoL, denial of surgical treatment only due to advanced age should no longer be acceptable.

Disclosure: No significant relationships.
Keywords: quality of life, octogenarians, thoracic surgery, outcome, EORTC questionnaire
P-213

THE EFFICACY OF THORACOSCOPIC FISSURELESS LOBECTOMY IN PATIENTS WITH DENSE FISSURES

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Objectives:
Prolonged air leakage after a lobectomy remains a frequent complication in patients with dense fissures. To avoid postoperative air leakage, we used the ‘thoracoscopic fissureless technique’ for patients with dense fissures. A thoracoscopic approach is useful for the fissureless technique because it gives a good operative view from various angles without dividing the fissure. This study compared the efficacy of thoracoscopic fissureless lobectomy with traditional lobectomy with fissure dissection for pulmonary artery exposure.

Methods:
Between April 2012 and November 2015, 175 patients underwent thoracoscopic lobectomy with three or four ports, of whom 14 underwent fissureless lobectomy because of dense fissures. We compared the characteristics and perioperative outcomes of the patients who underwent the fissureless technique (n=14) and the traditional fissure dissection technique for pulmonary artery exposure (n=161). In our department, fissureless lobectomy is indicated for patients with a fused fissure (fissural grade III or IV as proposed by Craig in 1997) or inflammation makes it difficult to expose the pulmonary artery, while the traditional technique is used for other patients. In the fissureless technique for lower lobectomy, dissection is performed in a caudal-to-head direction, including division of the pulmonary vessels and bronchus. In upper or middle lobectomy, dissection is performed in an abdomen-to-back direction. In all procedures, the fissure is ultimately divided.

Results:
Table 1 lists the patient characteristics and perioperative results in the two groups. No mortality occurred in either group.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Fissureless technique, n=14 (%)</th>
<th>Traditional technique, n=161 (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>67±16</td>
<td>70±9</td>
<td>0.23</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>0.52</td>
</tr>
<tr>
<td>Male (n)</td>
<td>10 (71.4)</td>
<td>101 (62.7)</td>
<td></td>
</tr>
<tr>
<td>Female (n)</td>
<td>4 (28.6)</td>
<td>60 (37.3)</td>
<td></td>
</tr>
<tr>
<td>Operation time (min.)</td>
<td>270±49</td>
<td>222±60</td>
<td>0.0045</td>
</tr>
<tr>
<td>Blood loss (ml)</td>
<td>80±70</td>
<td>90±195</td>
<td>0.85</td>
</tr>
<tr>
<td>Intraoperative massive bleeding (n)</td>
<td>1 (7.1)</td>
<td>19 (11.8)</td>
<td>0.6</td>
</tr>
<tr>
<td>Conversion to thoracotomy (n)</td>
<td>0 (0)</td>
<td>11 (6.8)</td>
<td>0.31</td>
</tr>
<tr>
<td>Duration of chest tube drainage (days)</td>
<td>3.9±1.9</td>
<td>3.5±2.6</td>
<td>0.56</td>
</tr>
<tr>
<td>Length of postoperative hospital stay (days)</td>
<td>15.4±20.5</td>
<td>9.2±14.5</td>
<td>0.14</td>
</tr>
<tr>
<td>Morbidity (n)</td>
<td>5 (35.7)</td>
<td>32 (20)</td>
<td>0.16</td>
</tr>
</tbody>
</table>

**Conclusion:**
Although the patients who underwent thoracoscopic fissureless lobectomy had longer operating times, no significant differences were observed between the groups in the other perioperative results, including the duration of postoperative drainage. Thoracoscopic fissureless lobectomy is feasible and safe, and useful to avoid postoperative air-leakage in patients with dense fissures.

**Disclosure:** No significant relationships.
**Keywords:** thoracoscopy, fissureless lobectomy, dense fissure
P-214

SURGERY FOR BILATERAL CAVITARY TB WITH MULTI- OR EXTRA DRUG RESISTANCE TO MYCOBACTERIUM

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Objectives:
Presently WHO estimates therapy for multi-drug resistant (MDR) or extra-drug resistant (XDR) TB as effective in 48% of cases. Surgery as an adjunct to therapy may be helpful in such patients. The utility of surgery in patients with bilateral cavitary pulmonary MDR/XDR TB should be estimated.

Methods:
We studied 52 patients with bilateral cavitary TB admitted between October 2012 and October 2014, aged 18 to 61. Forty-three were males. Twenty-five patients had MDR TB, 27 had XDR TB, confirmed with smears and cultures. All the patients underwent routine examination for thoracic surgery. Therapy for TB was continued before and after surgery according to Mycobacterium TB drug sensitivity. We performed bilateral surgery consecutively. Patients were divided to groups. In group 1, (n=13) local bilateral lung affection prevailed. Consecutive lung resections (LR) were made. In group 2 (n=19) with total unilateral lung destruction, we performed ipsilateral pneumonectomy combined with contra-lateral selective thoracoplasty (STP) and/or valve bronchial blockade (VBB). In group 3 (n=20) patients had advanced sub-total TB. Facing no utility for LR, bilateral VBB and/or STP were performed.

Results:
We carried out 107 operations, 60 of them in XDR TB patients. Three or more operations were necessary in five MDR TB and in 13 XDR TB cases (p=0.033). No perioperative mortality occur. In group III, one patient with sub-total pulmonary affection and XDR TB to nine drugs died of TB progression 24 months following surgery. Four major complications occur, three of them in XDR TB patients. Clinical and X-ray improvement was achieved in all cases. Results of smear conversion in patients’ groups are given in table 1.
**Conclusion:**
Surgery should be the essential stage of complex treatment for bilateral multi-/extra drug resistant pulmonary TB. Patients with extra drug resistant TB need extended treatment scheme to achieve favourable results.

**Disclosure:** No significant relationships.

**Keywords:** MDR-TB, XDR-TB, thoracic surgery, tuberculosis treatment
P-215

ROBOT-ASSISTED LOBECTOMY FOR MULTIDRUG-RESISTANT OR EXTRADRUG-RESISTANT PULMONARY TUBERCULOSIS

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Objectives:
Limitation factors for using mini-invasive surgery in pulmonary Tuberculosis (TB) cases are the high rate of obliteration of the pleural space, the presence of infected lymph nodes and extensive adhesions (G. Calligaro, 2013). Robotic surgery allows solving these problems (P. Yablonskii, 2013). Nevertheless, the role of robot-assisted thoracoscopic (RATS) pulmonary resections for Multidrug-resistant (MDR) or Extradrug-resistant XDR TB is unclear. Aim: To determine the effectiveness and safety of RATS lobectomy for MDR/XDR–TB.

Methods:
Forty-six consecutive patients with cavitary pulmonary TB divided into two groups based on results of DST on MTB: 1) 22 patients with drug-sensitive-TB; 2) 24 patients with MDR/XDR–TB. Indications for surgery accorded to WHO recommendations (2013). There were no significant differences between groups in duration of disease, comorbidities, pulmonary functional data’s and smoking status. There were more patients with positive sputum smears on MTB than in the second group (9% vs 50%, p<0.01). Operative and postoperative data compared between the groups. Statistical analysis performed using the Wilcoxon rank test and the χ² exact test.

Results:
All patients were successfully underwent lobectomies using Da Vinci Si surgical system. Operative time was higher in MDR/XDR-TB group (173 vs 190 min.). The rate of pleural adhesions (23 vs 50%) and dense of adhesions (9% vs 21% cases with extrapleural mobilization of lung) were higher in second group (p<0.05). Duration of air leak were 3 and 8 days in 1 and 2 groups respectively (p<0.05). Nevertheless, there were no statistical differences in minor (14% and 21%) and major (14% and 12%) postoperative complications between groups. All patients with positive sputum before operation had a conversion of smears on MTB in postoperative period in both groups.

Conclusion:
Robot-assisted lobectomy for treatment patients with MDR/XDR pulmonary tuberculosis accompanied by effectiveness and safety. Careful separation of pleural adhesions in MDR/XDR-TB cases provides a low rate of complications.

Disclosure: No significant relationships.
Keywords: pulmonary tuberculosis, surgery of tuberculosis, robotic lobectomy
P-216

RESULTS OF SURGICAL TREATMENT OF POSTOPERATIVE BRONCHO-PLEURAL COMPLICATIONS IN PATIENTS WITH PULMONARY TUBERCULOsis

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Objectives:
Postoperative complications after lung resections occur in 4-25% of cases. Of these, broncho-pleural fistula (BPF) is a major issue and is associated with a postoperative mortality rate up to 70% after pneumonectomy. Optimal treatment in these patients is challenging, often requiring complicated, multi-staged and aggressive procedures with conflicting results. We report our experience in the treatment of BPFs after lung resections performed for pulmonary tuberculosis.

Methods:
In the period 2013-2015 in thoracic unit, we treated 35 patients with postoperative broncho-pleural complications (BPF, residual cavity, purulent complications). Male 22 (62.8%), female 13 (37.2%). The median age was 35 years. Drug resistant TB were observed in 27 patients. In 18 patients developed complications after pneumonectomy, 17 after lung resection (segment-, lob-, bilobectomy, combined resection). 22 patients had associated pleural empyema.

Results:
Two-step operations were performed in 14 cases (BPF d> 0.4 cm or multiple fistulas with irreversible changes in the lung parenchyma, empyema): transsternal transmediastinal occlusion of main bronchus without opening the pericardial cavity with bronchial stump plasty with thymus tissue (our development) + second stage (six cases pleuropneumonectomy and 8 underwent removal of the distal stump of the main bronchus) and in 22 cases were one-step operation: Thoracomyoplasty using m. latissimus dorsi on the vascular pedicle performed in nine patients (BPF d <0.4 cm, non-empyema, after pneumonectomy), video assisted thoracoplasty was performed in 12 patients (residual cavity without BPF, with/without empyema, after segment-, lob-, bilobectomy, combined resection). The overall efficiency was 94.3% (licvidation BPF, residual cavity, empyema), mortality was not registered.
Conclusion:
The treatment of postoperative bronchopleural complications is a challenging and multi-faceted issue requiring an individualized approach. Our experience supports the use of the transsternal transmediastinal occlusion of main bronchus without opening the pericardial cavity with bronchial stump plasty with thymus tissue and VATS thoracoplasty.

Disclosure: No significant relationships.
Keywords: surgical treatment, postoperative complications, pulmonary tuberculosis.
PREDICTION OF PREOPERATIVE INTRATHORACIC ADHESION USING PREOPERATIVE DETECTION OF THE ULTRASOUND SLIDING LUNG SIGN IN THE DIAGNOSIS OF INTRATHORACIC SEVERE ADHESION

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Objectives:
This study assesses the potential of ultrasonography sliding lung sign to diagnosis intrathoracic severe adhesion before surgery.

Methods:
We performed lung ultrasonography on 168 patients before thoracic surgery. Pneumothorax, pyothorax, hemothorax, chylothorax, hydrothorax were excluded. Two items were assessed: sliding lung sign, a respiratory movement visible when investigating the chest wall on our outpatient, and intrathoracic severe adhesion in the operation room. Severe adhesion was defined as taking longer than 30 minutes to perform adhesiolysis.

Results:
Absent sliding lung sign was observed in 15 cases of intrathoracic severe adhesion vs none of cases without severe adhesion. In this series, sensitivity was 88.2%, specificity 100%, positive predictive value 100%, and negative predictive value 98.7%. False-negative 2 cases had not ‘stuck’ and hard adhesion but soft adhesion like a ‘spider’s web’.

Conclusion:
Ultrasound sliding lung sign can help the thoracic surgeon make a diagnosis in patients with intrathoracic severe adhesion before surgery, although false-negative cases were noted. The value of this test was that it could make a decision about surgical approach.

Disclosure: No significant relationships.
Keywords: ultrasound diagnosis, thoracic surgery, chest ultrasonography
P-218

COMBINED SINGLE-PORT VATS DEBRIDEMENT WITH MINITHORACOSTOMY AND VACUUM ASSISTED CLOSURE – THE NEW WAY TO TREAT CHRONIC PLEURAL EMPYEMA WITH RIGID LUNG

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Objectives:
In treatment of chronic empyema, the main problem is the pleuropneumofibrosis, which needs a traumatic operation - pleuroectomy and decortication. The VATS debridement is not effective, since the restoration of lung is impossible.

Methods:
A method has been developed by us, which allowed to combine the advantages of thoracoscopical sanitation and the reliability of open window thoracostomy. Surgical technique: In case of bronchopleural fistulas at first we make endobronchial valve occlusion of the segmental bronchus. By the lower line of the empyema cavity we perform a mini-thoracostomy length about 3-4 cm. By the performed thoracostomy we execute like a single port VATS sanitation with the removal of necrotic masses, formation of mono-cavity, and ultrasonic cavitation. The sanitized cavity fills out loosely by Kerlix sponges with the drainage between them. After the first dressing we set the exhaustion on 80-120 mm.hg., after the second dressing we use intermittent regime to accelerate the granulation. At subsequent dressing (on 3-5 day) we execute thorascopical revision and sanitation. After cleansing and reduce of the empyema cavity we close the mini-thoracostomy by local tissues.

Results:
We have experience in treatment 36 patients, 28 males, 8 females, the average age was 48,6 (18 - 74). The average time of treatment is 16 days (12 - 22), the average of dressing is 5 (3-7), the cavity size was halved after each dressing. Starting from the 2nd - 3d dressing pathogenic flora was not found. The above mentioned method due vacuum-therapy allows to combine the reliability of open-window thoracostomy with high efficiency, allows to perform a thorascopical sanitation to abandon the final highly traumatic pleuroectomy and decortication.

Conclusion:
The proposed method is characterized by a decrease in the duration of treatment in comparison with traditional methods, low labor costs of surgical staff, good functional and cosmetic results.

Disclosure: No significant relationships.
Keywords: empyema, VATS debridement, minithoracostomy, VAC
UNIPORTAL THORACOSCOPIC DECORTICATION FOR PLEURAL EMpyema: ROLE OF ULTRASONOGRAPHIC PRE-OPERATIVE STAGING

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Objectives:
Surgical approach of chronic pleural empyema (phase III) is still controversial. Studies reported favorable outcomes in term of resolution of disease for VATS debridement and decortication when compared to open thoracotomic approach. The last frontier of minimally invasive thoracic surgery is uniportal approach, but its application in pleural infection is still anecdotal. We report our initial experience with uniportal VATS debridement and decortication for pleural empyema after failure of medical treatment.

Methods:
We performed a retrospective analysis of patients who underwent surgical treatment for stage II or III pleural empyema from January 2012 to December 2015. Pre-, intra- and post-operative data were analyzed for all patients, which were analyzed followed up to evaluate surgical outcomes including post-operative complications and disease recurrence. Results were analyzed according to pre-operative ultra-sonographic (US) appearance of pleural space (stage I - IV) and surgical approach (thoracotomy vs. uniportal VATS).

Results:
We performed 30 (47%) uniportal thoracoscopic pleural decortications and 34 (53%) open decortications for empyema in stage II (40%) or III (60%). Complete debridement and decortication were accomplished in all patients. In-hospital mortality was zero and overall morbidity was 29%. Uniportal surgery was associated with lower blood loss (118±80 ml vs 247±140 ml p< 0,01), lower maintenance of chest tubes (5,6±1,4 vs 10,6±4,4 days p<0,01) and lower hospital stay (6,7±1,9 vs 12,2±4,7 days p<0,01). Elevated US patterns were associated to thoracotomic approach, higher blood loss, operative time and significant incidence of complications.

Conclusion:
Uniportal thoracoscopic decortication for pleural empyema is a safe and efficacious approach for well selected patients based on combination clinical and imaging staging.

Disclosure: No significant relationships.

Keywords: ultrasound, empyema, pleural effusion, surgery
P-220

THORACOTOMY VERSUS VIDEO-ASSISTED THORACOSCOPIC SURGERY FOR PLEURAL DECORTICATION IN STAGE III PLEURAL EMPYEMA - AN ANALYSIS OF 217 CONSECUTIVE PATIENTS

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Objectives:
Pleural empyema (PE) is an infectious disease of the chest cavity, with a high morbidity and mortality. PE gets graduated into three stages (American Thoracic Society / ATS, 1962), with surgery being indicated in stages II (evacuation of fluid-chambers) and III (removal of fibrotic membranes from the visceral pleura / decortication and ad from chest wall, mediastinum and diaphragm). Evidence for the feasibility and outcomes of a minimally-invasive VATS approach in stage III (chronic) empyema is still little.

Methods:
Retrospective single-center analysis of patients conducted to surgery for PE stage III (regarding ATS) from 05/2002 to 04/2014 either by video-assisted thoracoscopic surgery (VATS, n=110) or conventional open surgery (COS, n=107). Multiple regression analysis was used to evaluate the influence of operation technique (COS or VATS) on the length of postoperative hospitalization.

Results:
Operation time was slightly longer in the COS-group (p=0.06). The five conversions in the VATS-group were due to technical reasons (three) and pulmonary arterial bleeding (two). Post-operative complication- (63 patients in COS- and 57 in VATS-group), recurrence- (3 patients in COS- and 5 in VATS-group) and mortality-rate (6.5% in COS- and 9.1% in VATS-group) did not differ between both groups, the length of (post-operative) stay at intensive-care unit was longer in the VATS-group. Duration of chest tube drainage and rate of prolonged air leak (assessed by chest tube duration ≥ 7d and ≥ 10d) were similar among both groups, leading to a similar overall length stay in both groups. Adjusted to clinically and statistically relevant confounders multiple regression analysis showed an influence of the surgical technique on the duration of post-operative hospitalization (B=−0.134 for COS=0 and VATS=1).

Conclusion:
VATS in late-stage PE is feasible and safe. Short-term results are similar or even slightly better for the minimally-invasive decortication compared to COS.

Disclosure: No significant relationships.

Keywords: empyema thoracis, pleural empyema, VATS, video-assisted thoracoscopic surgery
POSTOPERATIVE PAIN WOULD NOT BOTHER PORT PLACEMENTS OF VATS.

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Objectives:
Port placement is very important for video-assisted thoracoscopic surgery (VATS). Many surgeons would thought that length and number of surgical wound was a risk factor for postoperative pain. This study aimed to determine retrospectively the risk factor for post-operative pain after VATS.

Methods:
In this retrospective study, we collected data of patients who underwent thoracic surgery between December 2014 and December 2015 in our hospital. Postoperative pain was measured postoperatively using the visual analog scale (VAS). We compared the VAS at next day of removing a chest drainage tube (rVAS) and at discharge (dVAS). We divided patients into pain group (VAS 4-10) and less pain group (VAS 0-3). Logistic regression analyses were subsequently performed to identify risk factors for postoperative pain.

Results:
There were 116 patients in our study. Partial resection was 41 cases, segmentectomy and lobectomy was 62 cases. The mean length of wound was 3.6±1.9cm, the median number of wounds was 4 (2-5), the median time of operation was 206 min, median amount of intraoperative bleeding was 30 mg (5-1700) and median length of drainage was three days (1-12). gender, age, carrier as a surgery, length of wound, number of wounds, number of using intercostal spaces, operation time and intraoperative bleeding was not predictive factor of postoperative pain. A multivariate analysis indicated that length of drainage and carrier were predictive factor for rVAS, but not for dVAS.

Conclusion:
Our study showed that the number of wounds, intercostal space and length of wounds was not a risk factor for postoperative pain.

Disclosure: No significant relationships.
Keywords: VATS, pain, port
P-222

LAPAROSCOPICALLY HARVESTED OMENTAL FLAP IN CHEST WALL RECONSTRUCTION FOLLOWING DEEP STERNAL WOUND INFECTION

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Objectives:
Deep sternal wound infection is life-threatening complication that associates with high morbidity and mortality rate. Despite a lot of treatment strategies were described, the choice of the best flap for chest wall reconstruction is still controversial. The aim of this paper is to highlight our experience and results of laparoscopically harvested omental flap for chest reconstruction.

Methods:
In a prospective analyses of 10 patients subjected to thoraco-omentoplasty (December 2014-December 2015) we evaluated results after laparoscopically harvested omental flap. Median age was 64 (51; 69) years with male predominance 6/4. All patients had deep sternal wound infection grade IV (Oakley-Wright classification), the wound was prepared with vacuum-assisted therapy in six (60%) of 10 cases following debridement (in all cases). Debridement procedure was needed once in four, twice in four and three times in two cases respectively. Four patients had previously abdominal surgery. Omental flap was transposed on the right gastroepiploic pedicle through enlarged sterno-diaphragmatic triangle, fixed with a separate interrupted sutures to the wound bottom and covered with mobilized skin-flap towards the midline.

Results:
There was not 30-day perioperative mortality and significant complications as an acute intestinal obstruction or postoperative ventral herniation. Recurrence rate was zero in follow up period from two to 12 month. Wound infection occurred in 2 (20%) of 10 (95% CI: 5.67 – 50.98) cases. There was not conversion rate following previous abdominal surgery. All patients have been activated during first postoperative day and median hospital stay was 9,5 (8; 11) days. Median operation time was 257 (220; 285) minutes.

Conclusion:
The laparoscopically harvested omental flap is a safe chest wall reconstruction method for patients with severe sternal wound infection associated with soft tissue deficiency and high risk of local complications even in previous abdominal surgery cases. Preliminary results are encouraging and future investigations are needed to evaluate long-term outcomes.

Disclosure: No significant relationships.
Keywords: omental flap, omentum, sternomediastinitis, laparoscopy
CHEST WALL RESECTIONS: ANALYSIS OF SURVIVAL AND INVESTIGATION OF POSTOPERATIVE MAJOR MORBIDITY.

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Objectives:
To assess survival and to analyze the postoperative major morbidity of patients who underwent chest wall resection (CWR) by means of the Thoracic Morbidity and Mortality(TM&M) classification system and the European Society of Thoracic Surgery (ESTS) classification of major complications.

Methods:
A retrospective analysis of patients submitted to CWR for primary lung cancer (PLC), metastatic disease and other cancers between 2008 and 2015 was performed. Primary outcome was overall survival (OS). All postoperative complications were graded according to the TM&M and their distribution according to the ESTS definition of major complications was also evaluated. OS was estimated using Kaplan-Maier method and compared using the log-rank test. Incidences of major complications were compared using the Fisher exact test.

Results:
Forty three patients were enrolled; 29 had PLC. 2-year OS was 52.8%. PLC Pts’s prognosis was significantly poorer compared to the other groups (2-year OS: 41.0% vs. 80.2%; P=0.0102;Fig.1) and OS by stage did not differ for Stage IIb and IIIa. Lobectomy and CWR was the most common intervention in PLC (n=22; 51.2%); an RO resection was accomplished in 76.7% of cases. Seventeen Pts. (39.5%) required a postoperative Intensive Care Unit recovery. Total major complications according to ESTS were 22; (atelectasis: n=6; 14.0%; ARDS: n=3; 7.0%; mechanical ventilation>24h: n=4; 9.3%; arrhythmia: n=3; 7.0%) and predominantly affected the PLC group (n=9 Pts, 31.0% vs. n=0, 0%;P=0.020). Also TM&M major complications were significantly higher in the PLC group of patients (n=11, 37.9% vs. n=0, 0%; P=0.008). Except for postoperative arrhythmias (n=1), all ESTS major complications were recognized as such by the TM&M classification system.

Conclusion:
OS in patients undergoing lung resection with CWR is encouraging although PLC patients have poorer prognosis and experience more postoperative complications. The distribution of major complications was similar among TM&M and ESTS classification of major complications. FIG.1-OS PLC vs. MTS and Other tumors
Disclosure: No significant relationships.
Keywords: lung cancer, postoperative morbidity, chest wall resection
P-224

EPIDEMIOLOGY OF SPONTANEOUS PNEUMOTHORAX IN GERMANY
2011 - 2013

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Objectives:
The amount of information concerning the incidence of spontaneous pneumothorax in Germany is sparse. In primary care this disease is presented usually as an emergency requiring hospital admission. The German statistic agency provides data regarding hospitalized patients suffering of spontaneous pneumothorax with respect to age, sex, ct-diagnostics, operative and non-operative management.

Methods:
Data from all hospitalized patients with the diagnosis of spontaneous pneumothorax including related OPS-codes in Germany from 2011 to 2013 were retrospectively acquired.

Results:
Thirty-one thousand six hundred and thirty hospital admissions of spontaneous pneumothorax cases were documented as a primary diagnosis. The overall incidence of 20/100,000 and 6/100,000 for men and women respectively is similar to former Investigations. There is a peak in the incidence for men at the age of 15 to 35 years. Mortality in hospital stay with primary diagnosis of spontaneous pneumothorax occurs in an age of more than 45 years. In terms of radiologic diagnosis a ct scan found place in patients younger than 40 years in 30 – 40 %, in older patients up to 75%. Chest tube insertion took place in 75% of the admitted patients, whereas needle aspiration was performed in only 2.3%. Surgical treatments like resection of a bulla, pleurectomy, pleurodesis were performed in younger ages in a third of all admissions. In patients older than eighty years an operation was done in approximately 10%.

Conclusion:
Spontaneous pneumothorax occurs typically to young men (15-35 years). At that age it has nearly no mortality. CT-scan is used too often in Germany as a diagnostic tool in young patients, it could be used more often at the age higher than 40 years. Surgical intervention more invasive than chest tube instillation is not that often performed in older patients due to comorbidities.

Disclosure: No significant relationships.
Keywords: epidemiology, spontaneous pneumothorax, incidence
P-225

VALIDATION OF AN AGGREGATE SCORE FOR PREDICTING THE RISK OF LARGE PLEURAL EFFUSION AFTER LOBECTOMY USING A TRADITIONAL SUCTION DEVICE

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Objectives:
An aggregate score was recently developed for predicting the risk of large pleural effusion (LPE) after lobectomy with the use of an electronic – regulated suction device. The aim of this study was to validate this score in an external population undergoing pulmonary lobectomy for non-small cell lung cancer with the use of a traditional suction device.

Methods:
Eighty-three patients who underwent pulmonary lobectomy for non-small cell lung cancer in a single centre (thoracotomy: 43; video-assisted thoracic surgery: 40) were analysed. Patients requiring chest wall or diaphragmatic resections were excluded. All patients were connected to a traditional chest drainage system and placed on suction at -30cmH2O.

The score was based on the presence of chronic obstructive pulmonary disease, being over 70 years of age, and undergoing a lower lobectomy (scores ranging from 0 to 3). Patients were grouped following three classes of risk: Class A (Score 0), Class B (Score 1), Class C (Score >1) according to their assigned score. The incidence of a large pleural effusion, drainage greater than 400ml in 24hrs, on post-operative day two was assessed using the three risk classes.

Results:
A total of 24 patients (28.9%) developed a LPE on post-operative day 2 (POD2). The average values of pleural effusion measured on POD1 and POD2 were 420 ml and 305 ml respectively. Score categories yielded incremental risks of LPE on POD2 (A: 12%; B: 27%; C: 46%) with statistical significance at p=0.02.
Figure 1: Incremental incidence of large pleural effusion on POD2 according to classes of risk. Class A (Score 0), Class B (Score 1), Class C (Score >1). p=0.02

Conclusion:
This simple scoring system can be used to identify patients at risk of developing a large pleural effusion after lobectomy, with the use of traditional suction devices, guiding the post-operative drain management in this group of patients.

Disclosure: No significant relationships.
Keywords: chest tube management, pleural effusion, lobectomy, score
P-226

AN INNOVATIVE APPROACH TO RADIOPROTECTION IN THE MULTIMODALITY TREATMENT OF EWING SARCOMA OF THE CHEST WALL

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Objectives:
The NICE guidelines definition of radical treatment of Ewing’s sarcoma (ES) include chemotherapy followed by surgical excision and adjuvant radiotherapy. The location of chest wall primary tumours can make the delivery of radiotherapy not feasible for the unacceptably high collateral damage that the organs beyond the area of interest would receive. We describe an innovative approach to overcome this.

Methods:
A 20 year old girl with a past medical history of repair of double outlet right ventricle as a child. She was admitted with presyncopal ventricular tachycardia in March 2011. A CT revealed a 10cm mass originating from the 10\textsuperscript{th} rib abutting the liver and the upper pole of the kidney, a biopsy of which confirmed Ewing’s sarcoma. She completed 6 cycles of chemotherapy prior to surgery. She was scheduled for surgery but adjuvant radiotherapy was considered not possible to deliver for the extensive damage it could potentially cause to kidney, liver and bowels.

Results:
She had en bloc resection of the lower right four ribs including the tumour and part of the diaphragm. The diaphragmatic opening was repaired with a mesh in order to isolate the thorax from the abdominal cavity and then a Becker expander 500mls was inserted with the intent to allow interim radioprotection of neighbouring organs. Reconstruction of the chest wall was completed with a mesh and lcombined latissimus dorsi, serratus anterior and omental flap. She received full dose radiotherapy without complications. After a CT scan confirmed good response to the treatment the expander was removed. She is free from recurrence up to date.

Conclusion:
This report describes a case in which the surgical procedure was tailored to fit the patient’s need for trimodality treatment and introduces a new technique to offer interim protection to delicate organs during radiotherapy. This technique could potentially be applied in selected cases routinely.

Disclosure: No significant relationships.
Keywords: radiotherapy, Ewing Sarcoma, radioprotection, Chest wall
NOVEL POROUS POLYPROPYLENE DISSECTOR WITH SURGICAL SMOKE EVACUATION SYSTEM

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Objectives:
Surgical smoke contains both hazardous chemicals and potentially infectious biological substances and often decreases the precision of the surgical act. A well-designed aspiration device is required to prevent the exposure to surgical smoke. We developed a new endoscopic instrument (Rotary Dissector Premium™) in order to provide reliable friction forces around the tip of the dissector that simultaneously evacuates surgical smoke during video-assisted thoracic surgery (VATS).

Methods:
The newly developed instrument includes a 10-mm hexagonal porous polypropylene tip affixed to a metallic hollow tube of 5-mm in diameter and 45-cm in length. Two air intake holes of 2.5 mm in diameter are placed at the top of the tip and the lateral side of the hollow tube of 5 cm from the tip. Thus, the instrument aspirates not only surgical smoke but also bloody fluid in the surgical field. We measured the time to evacuate the surgical smoke filled in a clear sealed plastic box (120 x 100 x 90 mm) by cauterizing the beef liver, using the new instrument and the normal suction device with two holes of 3.5 mm and 3.0 mm in diameter at the negative pressure of 0.015 MPa. We also measured the time to complete the suction of 100 ml water.

Results:
The new instrument and the normal suction device evacuated the surgical smoke in 15.9 ± 0.80 s and 15.9 ± 0.75 s, respectively. The new instrument and the normal suction device completed the suction of 100 ml water in 26.8 ± 0.44 s and 7.83 ± 0.25 s, respectively.

Conclusion:
The Rotary Dissector Premium™ enables surgeons to keep the lung in the proper position and evacuate surgical smoke at the same instant during VATS. This instrument will prevent the surgical team from the exposure to the hazardous gases and vapors.

Disclosure: No significant relationships.
Keywords: rotary dissector, surgical smoke, porous polypropylene tip, smoke evacuation, hazardous chemicals, infectious substance
THE ROLE OF VIDEO ASSISTED THORACOSCOPIC DELAYED THORACOPLASTY IN THE TREATMENT OF DESTRUCTIVE FORMS OF PULMONARY TUBERCULOSIS

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Objectives:
The main cause of recurrence of pulmonary tuberculosis (TB) and postoperative complications after surgery is the discrepancy between the volume of the hemithorax and the volume of the remaining lung tissue. The efficacy of the existing methods of therapeutic lung collapse operations has been repeatedly confirmed, the associated surgical trauma of the traditional procedures has long been a limitation to its widespread use among thoracic surgeons. We describe a novel technique of video assisted thoracoscopic (VATS) delayed thoracoplasty for the prophylactic of recurrence pulmonary TB and postoperative complications.

Methods:
In the period 2014-2015 53 patients received VATS delayed thoracoplasty 3-4 weeks after massive lung resections and pneumonectomies for destructive pulmonary TB. The procedure was performed: Using paravertebral incision of 4-6 cm, exposed ribs. 2 cm above the upper corner of the wound is set torakoport, introduced videothoracoscopy. Since the III rib made subperiosteal removal of the ribs with transverse process of the vertebrae to the anterior axillary line, without opening the pleural cavity. Analogous method removes ribs 2-1-4-5. In 77.4 % cases produced 4 ribs thoracoplasty. There were 31 men and 22 women with a mean age of 34 years (range 20-69 years). M/XDR-TB was predominant, which amounted to 49 %.

Results:
Postoperative mortality 0%, complication 0%. From the first day, all patients can easily move the upper limbs without restriction. Narcotic analgesics were administered only the first day, followed by non-narcotic analgesics for the next 3-4 days. Over two year follow all 53 patients live without recurrence pulmonary TB (negative culture and cavity absent).

Conclusion:
VATS delayed thoracoplasty is a new method of collapse surgery, which is as effective as other similar techniques. The procedure is associated with a less surgical trauma, less postoperative pain, quicker recovery and less shoulder girdle impairment than open thoracoplasty.

Disclosure: No significant relationships.
Keywords: pneumonectomy, lung resection, VATS thoracoplasty, pulmonary tuberculosis
P-229

IMPLANTING FOREIGN BODIES PRODUCED WITH NYLON 680 CO-POLYMER BY 3D PRINTING INTO RATS FOR ASSESSMENT OF BIOADAPTIBILITY ON ANIMALS

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Objectives:
3D Printing is a novel technology that is getting more important with every passing day in scientific and industrial field. There are new researches about 3D Printing in terms of medical devices, stents etc. everyday. We tried to implant 3D printed foreign bodies into rats for assessment of bioadaptibility on animals.

Methods:
We produced foreign bodies in different shape and size with Nylon 680 Co-Polymer (Taulman3D,Saint Peters , MO, USA) by 3D Printer (Afinia H480,Chanhassen, MO, USA). We operated the animals and implanted 4 different sized and shaped implants subcutaneously into each rat.

Results:
We followed up each rat for 45 days. We couldn’t detect any pathological sign on animals during the follow-up. Then, we sacrificed the animals for evaluation. Histopathologic evaluation reveals minimal chronic inflammation with scattered few macrophages containing pigmented foreign bodies.

Conclusion:
3D Printing is an important evolution also for medical interventions. We need further researches with different animals and numbers. We can use Nylon 680 Co-Polymer for producing devices and implants by 3D Printing for surgical practices and researches.

Disclosure: No significant relationships.
Keywords: chest wall, 3D printing, thoracic, novel technology, Nylon 680 Co-Polymer
BILATERAL VIDEO-ASSISTED THORACOSCOPIC LUNG RESECTIONS. IS IT A SAFETY PROCEDURE?

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Objectives:
To audit our experience regards to the safety and the clinical and surgical outcomes of bilateral VATS procedures. Shanghai Pulmonary Hospital performs more than 8000 VATS procedures per year. Most of the cases are lung cancer in early stage disease (accuracy more than 94%) thanks to the screening program.

Methods:
Between January 2010 to March 2015, 311 selected patients underwent bilateral VATS lung resection with NSCLC early stage disease and benign disease. Indications for bilateral approach include patients with a T status of tumour <5cm (T1, T2) N status for tumour N0, probed synchronic tumours, bilateral GGOs > 0.8 cm. The exclusion criteria includes: chest wall involvement, central masses, previous thoracic surgery, adhesions, N1-N2 disease. Perioperative variables and outcomes were collected prospectively and analysed retrospectively.

Results:
A total of 311 patients underwent the bilateral VATS procedure, 220 cases of lung cancer and 91 benign disease (bullectomy and lung repair) were noted. Bilateral Multiport VATS were 242 cases (77%) Bilateral Uniportal VATS were 42 cases(14%) and Bilateral Subxiphoid VATS were 27 cases (9%). Wedge-wedge (47%) and lobectomy-wedge (24%) were the most common procedures. In patients with lung cancer the total number of lymph node stations sampled or dissected were 2.8±0.3. Prolonged air leak (PAL) was the most common complication. 2 cases were converted to thoracotomy for technical difficulties. There were no deaths 30 days after surgery or readmissions. All cases presented a rate of complete cancer resection RO.
Benign (n=91) | Malignant (n=220) | Total (n=311)
---|---|---
Age (years) | 26 (16-39) | 58 (34-81) | 50 (16-81)
Sex -Male -Female | 68 (75%) 23 (25%) | 98 (45%) 91 (55%) | 165 (53%) 146 (470%)
Smoke -Yes -No | 15 (17%) 76 (83%) | 35 (15%) 185 (85%) | 50 (16%) 261 (84%)
COPD | 0 | 5 (2.3%) | 5 (1.6%)
TB | 1 (1%) | 3 (1.4%) | 4 (1.3%)
Lung Function Test FEV1 (L) FEV1 (%) FVC (L) | 2.1±05 93±6 2.4±0.4 | 2.4±0.7 89±5 3.1±0.6 | 2.3±0.5 90±3 2.9±0.3
Blood loss (ml) | 140±14 | 260±28 | 181±24
Operating time (min) | 168±8 | 234±13 | 197±5
Hospital Stay (days) | 5.2 (2-15) | 6.8 (4-27) | 6.6(2-27)
Air leak >4 days | 8 (8%) | 13 (6%) | 21 (7%)
Chest drain duration (days) | 4(2-14) | 6(3-25) | 6(2-25)
Conversion Rate | 0 | 2(1%) | 2(1%)
Procedures - Wedge-Wedge -Lobectomy-Lobectomy -Segment-Segment-Lobectomy-Segment-Lobectomy-Wedge -Segment-Wedge | 91 (100%) 0 0 0 0 0 | 56 (25%) 21 (10%) 16 (7%) 24 (11%) 76 (35%) 27 (12%) | 147 (47%) 21 (7%) 16 (5%) 24 (8%) 76 (24%) 27 (9%)

**Conclusion:**
Bilateral VATS procedure for benign diseases specially pneumothorax and lung bulla repair are well described with acceptable clinical outcomes. For malignant disease is not performed routinely but with good selection of the patients the bilateral VATS procedures for NSCLC early stage disease (GGOs, synchronic lung cancer, oligometastasis cancer) have longer operating time, longer hospital stay but with a safe surgical and medical outcomes avoiding the need for subsequent operations.

**Disclosure:** No significant relationships.

**Keywords:** bilateral, VATS, uniport, subxiphoid
P-231

NON-INTUBATED UNIPORTAL ANATOMICAL LUNG RESECTION: A PROPENSITY SCORE MATCHED ANALYSIS SHOWS THAT FASTER RECOVERY IS POSSIBLE EVEN IN THE EARLY EXPERIENCE

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Objectives:
Non-intubated uniportal video-assisted thoracoscopic surgery (VATS) has gained considerable interest for major lung resections in recent years. However, characteristics of the learning curve and whether benefits can be shown in the early experience of adapting this technique have hitherto not been investigated.

Methods:
Data were reviewed for the first eight consecutive adult patients receiving uniportal VATS anatomical lobectomy/segmentectomy for lung tumors in our institutes. All operations were performed using a non-intubated technique with target-controlled sedation, no tracheal intubation, and intercostal nerve block (no epidural catheter was placed). Outcomes were compared with a control group of 8 propensity-matched patients who received similar uniportal VATS lobectomy/segmentectomy during the same period – but who received conventional intubated general anesthesia.

Results:
Key characteristics for the two study arms are shown in the Table. The two groups did not differ in all preoperative demographic and clinical characteristics. The non-intubated group included six lobectomies and two segmentectomies. There was no mortality or conversion to a thoracotomy in all patients. The two groups had comparable mean operation time, blood loss, postoperative chest tube drainage, postoperative length of stay, and complication rates. Patients who underwent non-intubated surgery had a lower incidence of sore throat, earlier resumption of eating, and earlier independent mobilization after surgery.
Conclusion:
The learning curve for non-intubated uniportal VATS lobectomy/segmentectomy appears to be short. Even in the initial experience, it is safe and can already demonstrate potentially faster postoperative recovery for patients.

Disclosure: No significant relationships.
Keywords: anesthesia, lobectomy, segmentectomy, VATS, uniportal, non-intubated
THE USE OF PEZZER CATHETER IN PERSISTENT AIRLEAK

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Objectives:
Residual space (RPPS) and persistent air leak is the most common complication after partial pulmonary resection, increasing hospital stay, cost and morbidity. The aim of this prospective study is to assess an anteriorly placed Pezzer catheter for prolonged air leakage and residual pleural space after upper lobectomy/bilobectomy.

Methods:
Out of 385 patients submitted to upper lobectomy or bilobectomy for NSCLC, 47 (12.2%) experienced pleural space problems associated with prolonged air leak (>5days). Patients were prospectively randomized into two homogeneous groups: (A) with anterior Pezzer catheter placed in the 2nd or 3rd intercostal space in the midclavicular line, while chest tubes inserted intraoperatively were removed (n=24) and (B) control group (n=23). All patients were operated by the same surgeon. The multivariate analyses were used to compare the mean duration and quantity of drainage, the length of hospital stay and the need of additional interventions to treat the persistent postoperative alveolar leak.

Results:
No 30-day mortality was recorded. The duration of drainage required (9.2. days vs 17.2 days) and the hospital stay (9.7 days vs 18.1 days) were shorter in Group A compared to Group B (p=0.001), while the mean quantity of blood drained in both groups was not found to be statistically significant (530 ml vs 495 ml). Obliteration of the pleural space was observed in all cases of Group A in a mean time of two days (range one to four days, while five patients of Group B were discharged with a residual pleural space.

Conclusion:
Our experience supports the use of an anterior Pezzer catheter connected to water seal, whenever a space problem associated with prolonged air leak occurs. It reduces significantly the duration of the intrapleural drainages and the length of the in-hospital stay. The procedure is effective, safe, and easy to perform.

Disclosure: No significant relationships.
Keywords: residual space, lobectomy, airleak
THE APPLICATION OF ARGON PLASMA ENERGY FOR THORACIC EMPYEMA DECORTICATION: A NOVEL TECHNIQUE

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Objectives:
Decortication of thoracic empyema can be a challenging procedure associated with significant morbidity and mortality. We present a novel technique in which argon plasma energy (APE) is utilised to perform meticulous decortication while preserving the lung parenchyma, resulting in excellent lung expansion and a significant reduction in post-operative air-leak, bleeding and overall hospital stay.

Methods:
During a six month period, 25 patients with Stage III empyema (American Thoracic Society) underwent open decortication using APE device. Standard posterolateral 5th intercostal space thoracotomy was performed. The parapneumonic effusion was evacuated from the thoracic cavity and the lung fully mobilised from adhesions. An edge of the empyema cortex was identified and simultaneous decortication, aerostasis and haemostasis was performed using the APE. All patients were extubated immediately post-operatively and admitted to the high dependency unit for twenty-four hours monitoring.

Results:
Successful decortication was performed in all cases with preservation of the lung parenchyma, excellent lung expansion, minimal air-leak and no bleeding. Mean operative time was 75 minutes. Residual air leak completely resolved by the first post-operative day in all patients leading to early drain removal. Mean hospital stay was 4.6 days. Mean follow-up period was three months. No complications occurred.

Conclusion:
The application of APE for thoracic empyema decortication allows for simultaneous meticulous lung decortication, aerostasis and haemostasis achieving excellent lung expansion, minimal air-leak and bleeding resulting in significantly reduced post-operative morbidity, mortality and hospital stay.

Disclosure: No significant relationships.
Keywords: lung, thoracic empyema, novel device
P-234

THE CLINICAL DOSAGE-ESCALATION EXPERIMENT OF INDOCYANINE GREEN IN NEAR-INFRARED FLUORESCENT THORACOSCOPE ASSISTED SEGMENTECTOMY SURGERIES

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³Thoracic Department, Peking University People’s Hospital, Beijing, China

Objectives:
The identification of the intersegmental line is essential in video assisted thoracic (VAT) segmentectomy surgeries. Near-infrared fluorescent (NIR) thoracoscopic systems can help to identify the intersegmental line. But the optimal dosage of indocyanine green (ICG) in human is not yet reported. The purpose of this study is to find out the optimal dosage of ICG to identify the inter-segmental line.

Methods:
Fifteen patients who were going to receive segmentectomy or lobectomy surgeries were enrolled. Informed consent was obtained from all patients before surgery. According to our previous animal experiment, 5 patients were assigned to 0.2, 0.3 and 0.4 mg/kg ICG group each. ICG was injected rapidly through peripheral venous after the target segmental artery was ligated. D-light P® system was used to observe inter-segmental lines. The line was marked on the visceral pleura with an electrocautery. The intersegmental line was conformed in three lobectomy patients by selectively inflate the target segmental bronchi in specimen. Intra-operative images were analyzed using ImageJ software.

Results:
All patients’ segmental borders were clearly seen within 5s. The segmental border in three groups lasted visible for 60.2, 85.5 and 98.4 seconds respectively. The time was adequate for marking of the border. The mean signal to background ratio were 2.5, 3.5, 4.4 in Spectra A mode. The marked borders were in compliance with the selective inflation border in the three specimens. The oxygen saturation of blood readings of 3 patients in 0.4 mg/kg group dropped to around 90% after injection and last for around 2-3 minutes before returning normal. No ICG related complications were observed.
Conclusion:
The intraoperative NIR endoscopy enabled an easy, reliable and safe technique to visualize the intersegmental line. 0.3mg/kg is enough for the marking of the segmental border. The oxygen saturation of blood readings may drop temporally after injection.

Disclosure: No significant relationships.

Keywords: dosage escalation study, intersegmental line, near-infrared fluorescent (NIR) thoracoscope, segmentectomy, indocyanine green
P-235

THE INFLUENCE OF PRIOR VATS EXPERIENCE IN THE LEARNING CURVE FOR SINGLE-PORT VATS LOBECTOMY: A MULTICENTRE COMPARATIVE STUDY

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5Department of Surgery, The University of Hong Kong, Hong Kong, Hong Kong, People’s Republic of China

Objectives:
Competency in VATS lobectomy is estimated to be complete after 50 cases. We aimed to explore the impact of previous multiport VATS lobectomy competency in completing this workload of Single-Port procedures.

Methods:
In a retrospective multicenter study six individual surgeons [three with previous competency in multiport VATS lobectomy (Group A) and three without (Group B)] submitted their first 50 cases using single-port VATS lobectomy. Extended and sublobar resections were excluded. Pre, peri and postoperative data were compared between the groups of surgeons. Chi-square and Wilcoxon’s Rank Tests were used. Less experienced surgeons had previously attended dedicated training courses and visits to experts.

Results:

<table>
<thead>
<tr>
<th></th>
<th>GROUP A</th>
<th>GROUP B</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>63 (18-82)</td>
<td>68 (11-85)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>FEV1%</td>
<td>84 (51-137)</td>
<td>86 (32-157)</td>
<td>0.9</td>
</tr>
<tr>
<td>DLCO%</td>
<td>79 (39-117)</td>
<td>71 (33-120)</td>
<td>0.02</td>
</tr>
<tr>
<td>Lower Lobes</td>
<td>31%</td>
<td>41%</td>
<td>0.1</td>
</tr>
<tr>
<td>Tumour size (cm)</td>
<td>2.8 (0.4-12)</td>
<td>2.5 (0.9-10)</td>
<td>0.4</td>
</tr>
<tr>
<td>N2 stations</td>
<td>3 (1-6)</td>
<td>3 (0-5)</td>
<td>0.5</td>
</tr>
<tr>
<td>Operation time (min)</td>
<td>195 (60-420)</td>
<td>180 (55-420)</td>
<td>0.08</td>
</tr>
<tr>
<td>Duration drainage (days)</td>
<td>2 (0-26)</td>
<td>3 (0-35)</td>
<td>0.01</td>
</tr>
<tr>
<td>Hospital Stay (days)</td>
<td>4 (1-21)</td>
<td>4 (1-36)</td>
<td>0.7</td>
</tr>
<tr>
<td>ICU admission</td>
<td>3.3%</td>
<td>2%</td>
<td>0.4</td>
</tr>
<tr>
<td>Hospital death</td>
<td>0.7%</td>
<td>1.3%</td>
<td>0.5</td>
</tr>
<tr>
<td>Conversion to open</td>
<td>4%</td>
<td>12%</td>
<td>0.02</td>
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</tbody>
</table>
Three hundred cases were included. There were three hospital deaths (respiratory failure, sepsis and fatal stroke) and a further patient died after discharge (bilateral pulmonary embolism). There were no significant differences in the practicing times to achieve 50 cases, however surgeons in Group B performed significantly more open lobectomies (58 vs 1, p< 0.001) during the learning curve than surgeons in Group A. Experienced surgeons also performed complex resections (bronchial or vascular reconstruction) via Single-Port VATS during this initial period while none were performed in Group A. There were no differences in operative time, ICU admissions, hospital stay, complications, tumour size or number of N2 stations explored between the groups. Duration of drainage and conversion rates were better in Group A. These differences decreased with experience.

**Conclusion:**
Postoperative outcomes during the learning curve of Single-Port VATS lobectomies are not greatly affected by previous multiport VATS experience. Less experienced surgeons were more selective in order to achieve their competency (more lower lobectomies and more open surgery) and were initially more likely to convert to thoracotomy. Competency in Single-Port VATS lobectomy can be acquired safely with adequate training and case selection, but will be “faster” with previous competency in multiport VATS lobectomy.

**Disclosure:** No significant relationships.

**Keywords:** surgical outcomes, learning curve, single-port VATS
A ONE-STOP VIDEO-LINK PREOPERATIVE ASSESSMENT CLINIC SIGNIFICANTLY REDUCES WAITING TIMES FOR PATIENTS REFERRED TO THORACIC SURGERY FROM PERIPHERAL HOSPITALS

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Objectives:
Increasing pressure is put on health care providers to reduce the time interval between referral and initiation of treatment for both cancer and non-cancer patients. This is particularly challenging for regional tertiary referral centres that serve a large area. We implemented one-stop preoperative clinic for the assessment of newly referred patients for thoracic surgery from a peripheral hospital. The peripheral clinic is staffed by surgeons from our regional centre. We have then implemented a same day video link pre-operative assessment service between our central pre-operative clinic and the peripheral hospital. Our aim was to reduce the waiting time for patients referred to surgery and minimize delays in the treatment pathway.

Methods:
Using a low cost, web based video-conferencing solution we established a link between our peripheral and regional hospitals. From January 2015 we aimed to assess all patients referred from a single peripheral hospital to thoracic surgery by video link. Data were collected on waiting times, length of stay, cancellations and critical incidents. We compared this Video group to a similar Control Group from the same peripheral hospital a year prior to the changes being implemented.
Results:

<table>
<thead>
<tr>
<th>Element of treatment pathway</th>
<th>VIDEO GROUP</th>
<th>CONTROL GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TIME FROM REFERRAL TO CLINIC APPOINTMENT (DAYS)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (Range)</td>
<td>6 (0-15)</td>
<td>10 (0-30)</td>
</tr>
<tr>
<td>Mean</td>
<td>5.4</td>
<td>11.6</td>
</tr>
<tr>
<td><strong>TIME FROM REFERRAL TO READY FOR SURGERY (DAYS)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (Range)</td>
<td>10 (2-43)</td>
<td>24 (0-87)</td>
</tr>
<tr>
<td>Mean</td>
<td>12.9</td>
<td>25.8</td>
</tr>
<tr>
<td><strong>TIME FROM CLINIC TO READY FOR SURGERY (DAYS)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (Range)</td>
<td>5 (1-30)</td>
<td>13 (0-78)</td>
</tr>
<tr>
<td>Mean</td>
<td>7.5</td>
<td>14.9</td>
</tr>
<tr>
<td><strong>TIME FROM GP REFERRAL TO OPERATION (DAYS)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (Range)</td>
<td>12 (7-61)</td>
<td>43 (16-119)</td>
</tr>
<tr>
<td>Mean</td>
<td>22.8</td>
<td>44.6</td>
</tr>
<tr>
<td><strong>CLINIC TO OPERATION (DAYS)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (Range)</td>
<td>6 (4-61)</td>
<td>29 (6-119)</td>
</tr>
<tr>
<td>Mean</td>
<td>17.5</td>
<td>44.6</td>
</tr>
</tbody>
</table>

Patient satisfaction was very high with many patients praising the reduced number of clinic appointments and unnecessary journeys. Clinician satisfaction was also extremely high. Length of stay was identical between the two groups and there were no cancellations due to patients not being adequately prepared for surgery.

**Conclusion:**
Using inexpensive one-stop video link pre-operative assessment for tertiary referral of thoracic patients from peripheral hospital reduces delays in traditional treatment pathways and significantly reduces waiting times.

**Disclosure:** No significant relationships.
**Keywords:** preoperative, assessment, video conference
NEW “TUBELESS” VIDEO-ASSISTED THORACOSCOPIC SURGERY APPROACH FOR SOLITARY PULMONARY NODULE

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Objectives: Problems associated with intubation, chest drainage and urinary catheterisation can have a negative impact of patient’s recovery after thoracic surgery. We therefore evaluated the feasibility of a new “Tubeless” (spontaneous ventilation without tracheal intubation, no post-operative urinary catheter and chest drain placement) approach to perform video-assisted thoracoscopic surgery (VATS) for small pulmonary nodule (SPN) less than 2cm in diameter.

Methods: From 1 January 2012 to 31 December 2014, 34 patients with SPNs were treated using this “Tubeless” VATS in our centre. To be eligible for this approach, the patient must have a body mass index (BMI) of less than 25; ASA grade of II or less; no history of prostate or renal disease and no parenchymal air leak at the end of surgery. All operations were performed using via an anterior uniportal VATS under intravenous anaesthesia and local/regional analgesia, with patient breathing spontaneously.

Results: All patients [29 male: five females; average age: 57.5±18.9 years old] completed their operation under spontaneous ventilation, without conversion to endotracheal intubation. There was good operative exposure and definite diagnosis was obtained in all patients. The anaesthesia and operating time were 22.5±3.4 minutes and 42.5±10.0 minutes respectively. No major intra-operative and postoperative complications were seen. Patients recovered from their anaesthesia within an average of 17.9±2.8 minutes after surgery, and were eating normally on an average of 5.1±1.0 hours postoperatively. No patients had pain on deep breathing or coughing (Bruggemann Comfort Score<2). Within 24 hours after surgery, 26 patients were discharged, while the remaining 8 patients were discharged on the 2nd day. None of the patients needed re-invention with chest drainage or urinary catheterisation even after discharge.

Conclusion: “Tubeless” VATS approach for SPNs is feasible in careful selected patients. Intubation, chest drainage, and/or urinary catheterisation are not necessary in all patients.

Disclosure: No significant relationships.
Keywords: VATS, spontaneous ventilation, chest drainage, tubeless, urinary catheterisation, solitary pulmonary nodules
POTENTIALLY DANGEROUS NEGATIVE INTRAPLEURAL PRESSURES:
PROS AND CONS OF DIGITAL CHEST DRAINAGE SYSTEMS

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Objectives:
To evaluate whether commercially available digital chest drainage systems can protect patients from excessive negative intrapleural pressures.

Methods:
Valved vacuum chambers of three different volumes were set at -100 cmH2O. They were then individually connected to the tubing of five different digital chest drainage units. Hardware and software were engineered to release the set vacuum and to record how each unit would attempt to lower it to -25 cmH2O.

Results:
One unit did not show any vacuum release technology (black curves). Four units showed two vacuum release mechanisms, one controlled by incremental changes (red curves) and the other by step changes (blue curves). The time needed to reach the targeted pressure of -25 cmH2O differed dramatically among units: 15 to 113, 35 to 214 and 68 to 376 seconds when 0.75, 2 and 5 Liters vacuum chambers were used. The time needed to buffer the set vacuum by 50% also differed dramatically: 1.4 to 48, 4.5 to 105 and 7 to 184 seconds when 0.75, 2 and 5 Liters vacuum chambers were used, respectively.
Conclusion:
As the thorax adapts after surgery, pressure changes occur. Evidence suggests that a lower transpleural gradient leads to a lower incidence of complications (es. PALs). Specific diseases (es. ILD) and conditions (es. post-LVRS) are known to cause a negative pressure to build-up in the pleural space and/or to cause wide swings in pleural pressure (with peaks well above -100 cmH2O). Especially when the lung tissue is fragile, these factors can set the stage for serious complications. Their prevention is paramount. In a laboratory setting, only two units fulfilled clinical expectations. Any patient being able to draw as much intrapleural pressure as required to comfortably complete each respiratory cycle throughout the post-operative period may recover better and faster. Doctors need to know these technical details to improve patient care.

Disclosure: No significant relationships.
Keywords: digital chest drainage systems, high negative intrapleural pressure, lower transpleural gradient, fragile lung tissue, post-operative recovery, patients’ care
P-239

A NOVEL HYBRID TECHNIQUE FOR LOCALIZATION OF SUBCENTIMETER LUNG NODULES

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Objectives:
It is technically challenging to locate non-visible, non-palpable subcentimeter nodules of lung during video-assisted thoracic surgery (VATS). Computed tomography (CT)-guided marking of small pulmonary nodules using microcoils has been reported to be a useful method, whereas dislocation of microcoils during surgery remains to be a bothering problem. The objective of this study was to assess a newly developed hybrid technique, which combines induced controllable pneumothorax and CT-guided marking using microcoils in order to reduce the risk of microcoil dislocation.

Methods:
After induced pneumothorax (300-500 ml of air), 19 patients with subcentimeter nodules underwent CT-guided marking with microcoils prior to sublobar resection or lobectomy by VATS. Fig 1. In a 41-year-old male, a ground glass opacity nodule was found in the apical segment of the right upper lobe. (A) A microcoil (indicated with a white arrow) was shown next to the nodule (indicated with a black arrow). (B) The tail of the microcoil remained above the visceral pleura. (C) Wedge resection was performed to remove the nodule and the microcoil. (D) Examination of the specimen conformed that the nodule was successfully resected with the microcoil.
Results:
All of 23 pulmonary nodules were successfully marked before VATS (average size: 7.5 ± 2.2 mm). Segmentectomy was performed in five cases, wedge resection in 10 cases and lobectomy in four cases. Dislocation of microcoils was not observed in all cases and mild pulmonary hemorrhage occurred in two cases. No other complications occurred. Table.1 Clinicopathological characteristics of 19 patients
M, male; F, female; WR, wedge resection; SE, segmentectomy; LE, lobectomy; AIS, adenocarcinoma in situ; MIA, minimally invasive adenocarcinoma; MT, metastatic tumor; ADC, adenocarcinoma; IFM, inflammation.

**Conclusion:**
The hybrid technique which combines controllable pneumothorax and CT-guided marking using microcoils was safe and reliable for VATS resection of subcentimeter pulmonary nodules, meanwhile significantly lowered the risk of microcoil dislocation.

**Disclosure:** No significant relationships.

**Keywords:** VATS, pulmonary nodule, localization
EXPERIENCE IN ADOPTING THE ELECTROMAGNETIC NAVIGATION BRONCHOSCOPY™ PROCEDURE WITH TRANSITION TO VERSION 7.1 SOFTWARE

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Objectives:
Electromagnetic Navigation Bronchoscopy™ (ENB) is an emerging endoscopic technique for the diagnosis of peripheral lung lesions. We describe our initial experience of adopting ENB within our institution, including transition to Version 7.1 software.

Methods:
A prospective analysis was conducted of the first consecutive 10 patients undergoing ENB by two thoracic surgeons between September-December 2015. All patients had a pre-operative CT scan that enabled planning of pathways to target pulmonary lesions. In order to assess the learning curve, the ‘difficulty of target lesions’ were evaluated based on an ENB procedure assessment score which accounts for the lesion location, airway to lesion relationship, and lesion size. Procedures were performed under general anesthesia using rigid bronchoscopy. ENB navigation was performed using Version 6 software for the first five cases before transition to version 7.1; procedures included lung biopsy, bronchial washings and fiducial marker placement.

Results:
Mean patient age was 69.8 (42-79) and mean procedure time 72 (42-147) minutes. Mean lesion size was 28mm (11-71mm) and 70% were upper lobe lesions. The steerable probe tip was navigated to the target lung area in 90% of cases. Two patients developed pneumothoraces (one required intercostal drain insertion). The yield was determined by positive diagnosis from histology results obtained during the bronchoscopy per patient and was 40% using Version 6, 40% using Version 7.1 and 40% overall. Long-term follow-up results with further investigation and imaging for patients with negative biopsies (60%) is awaited to establish overall diagnostic yield. The learning curve is illustrated in Figure 1 and correlates the cumulative positive diagnostic yield with difficulty of target lesions according to the ENB procedure assessment score.
Conclusion:
Adopting ENB has numerous challenges as part of the learning curve and we intend to share our experiences including advice on planning and creating pathways, setting up, registration, trouble-shooting navigation difficulties and biopsy technique.

Disclosure: No significant relationships.

Keywords: electromagnetic navigation bronchoscopy, bronchoscopy, lung lesion
CAN BREATH HOLDING REFLECT PRE-OPERATIVE RISK OF PATIENTS UNDERGOING SURGICAL LUNG RESECTIONS?

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Objectives:
Breath hold time is dependent on cardiorespiratory function and willpower. Voluntary and involuntary breaking points determine the breath hold time, with the voluntary threshold being dependent on willpower. Willpower and training have been shown to override the voluntary breaking point in deep water free divers and pearl divers.

Methods:
Sixteen patients undergoing VATS or open lobectomy were assessed pre-operatively by triplicate measurements of end-expiratory breath hold time. Oxygen desaturation was measured for five minutes following each breath hold with a standard pulse-oximeter. The breath hold time and desaturation were compared with spirometry and shuttle walk test results. The patients were divided into three groups based on the average breath holding time: <20 sec, 20-40 sec and >40 sec. The Pearson test and 2-way ANOVA were used.

Results:
In this prospective cohort, positive correlation trends were found between breath hold time and FEV1/FVC ratio (R square=0.69, 0.8; p=0.04, 0.14) in the 20–40 and >40 second groups respectively. In the <20 second group this correlated with the TLCO (R square=0.65, p=0.09). The breath hold oxygen desaturation correlated with the breath hold time (R square=0.58, p=0.02), and reflected the shuttle walk distance and exercise desaturation only in the >40 sec group (R square=0.94, 0.51; p=0.14, 0.48). There was no difference between the spirometry (p=0.17) and shuttle walk test results (p=0.79) between the three groups. Patients with significant desaturation (>5%) were observed in both 20–40 and >40 sec groups.

Conclusion:
Testing the breath hold time correlates with both lung function and exercise tolerance. In the worst performing group, it is more likely to reflect gas transfer than lung volumes. Willpower could influence both the results of the breath holding time, spirometry and exercise testing. Breath holding, as a surrogate marker of lung function and willpower could influence pre-operative planning and risk assessment of patients undergoing lung resection.

Disclosure: No significant relationships.
Keywords: hold, risk, assessment, lung, resection, breath
P-242

TUMOUR HETEROGENEITY OF PRIMITIVE LUNG CANCER AND METASTATIC LYMPH NODES

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²Pathology, European Georges Pompidou Hospital - APHP, Paris, France,
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⁴Molecular Biology, European Georges Pompidou Hospital - APHP, Paris, France

Objectives:
Intra-tumour heterogeneity may have an impact on tumour biopsy strategy, postsurgical relapse and characterization of actionable targets for adjuvant therapy. The aim of this preliminary study was to assess intra-tumour heterogeneity in a subset of lung cancer with lymph node involvement.

Methods:
Four patients with primitive lung carcinoma and lymph node involvement, without preoperative chemotherapy, were consecutively selected after surgery and screened for somatic mutations by next generation sequencing, with AmpliSeq™Colon and Lung Cancer Panel (Life Technology). For each patient, several fragments of the primitive tumour and a sample of each lymph node station were analyzed. Each sample was macrodissected. All analyzed samples contained at least 50% of tumour cells.

Results:
Eight fragments of primitive lung cancer and 11 lymph node stations were analyzed. Pathological examination showed two adenocarcinomas, one squamous cell carcinoma and one sarcomatoid carcinoma. For each tumour, we found at least one mutation. Mutational patterns were heterogeneous within primitive tumour. Furthermore, different mutations were observed comparing primitive tumour and lymph node metastases: in three cases, mutations observed in primitive tumour were not found in lymph node metastases. For example, one had an exon 6 splice TP53 mutation and a FGFR3 mutation (p.S249C) in the primitive tumour, but only the TP53 mutation was found in the hilar lymph node, with a lower allelic ratio (6% vs 60%). In the fourth case, the same mutations were observed in tumour and all lymph nodes, but allelic ratios differed and were higher in lymph nodes.

Conclusion:
The dedicated Colon and Lung Cancer Panel allowed to identify at least two mutations for each patient. High intra-tumour heterogeneity was observed. We suggest that lymphatic spread might be different considering mutational pattern. We encourage further studies assessing stage IIIA-N2 tumour heterogeneity, to identify subclonal mutations associated with lymphatic spread and to elucidate potential pronostic and therapeutical impact.

Disclosure: No significant relationships.

Keywords: tumour heterogeneity, surgery, stage IIIA-N2 lung cancer, next generation sequencing
PARTIAL EMT CIRCULATING TUMOR CELL PROMOTES THE ANGIOGENESIS OF NON SMALL CELL LUNG CANCER METASTATIC FOCI

Zhidong Liu, C. Su, Y. Li, Y. Han
Thoracic Surgery Department., Beijing Chest Hospital, Beijing, China

Objectives:
Tumor angiogenesis is an important sign of the metastasis formation. EMT has been implicated in circulating tumor cell which carcinoma cells disseminate from their resident environment and metastasize to secondary sites. But not all of the CTC will form tumor metastasis, it remains unproven that those same cells complete the full metastatic cascade in the form of a secondary nodule. Without evidence for the dissemination, metastatic out growth of circulating tumor cells, the role of EMT will remain contested.

Methods:
We employed tumor transplantation model mice, and establishing lung cancer cell lineage (N480-E/N480+E) with characterization of epithelial and mesenchymal markers, to address the appearance of EMT in circulating tumor cell and metastasis. The purified N480-E/+E cells (1 × 10^6 cells with purity > 99%) were injected eight-week-old female SCID mice. For the metastatic lungs and primary tumors, identified EMT express of all the metastasis, then detection of tumor angiogenesis in metastatic lesions by immunohistochemical after eight weeks.

Results:
Flow cytometry results indicate metastatic tumor cells exist different degree of EMT type change, again into the tumor metastasis in vivo animal model, the formation of tumor are invasive differences and further tumor tissue sections by group analysis found that caused by tumor cells with different degree of EMT of tumor angiogenesis. Early disseminated tumour cells detected in the lungs or livers were EMT+ models and 28 lung nodules detected in 18 mice maintained the epithelial phenotype. Even more to explore EMT inhibited cell on metastasis formation in vivo, we injected E-cardherin overexpressing N480+E cells, we identified seven metastases foci in 18 mice. These results demonstrate that inhibition of EMT by E-cardherin overexpression does weakened its ability of tumour cells to form distant metastases (Fig.1).
Conclusion:
EMT tumor cells are more likely to stimulate peripheral tumor angiogenesis.

Disclosure: No significant relationships.
Keywords: circulating tumor cell, non small cell lung cancer, EMT
EXTRACORPOREAL LUNG SUPPORT FOR PATIENTS WITH ACUTE EXACERBATED CHRONIC OBSTRUCTIVE PULMONARY DISEASE FAILING NON-INVASIVE VENTILATION: IMPLEMENTATION OF A NOVEL ALGORITHM OF RESPIRATORY THERAPY

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Thoracic Surgery and Lung Support, Ibbenbueren General Hospital, Ibbenbueren, Germany

Objectives:
Non-invasive ventilation (NIV) is the most important therapy option for treating patients with Acute Exacerbated Chronic Obstructive Pulmonary Disease (AECOPD). In case of NIV failure, other therapeutic options are necessary to guarantee efficient CO2-removal. So far, invasive mechanical ventilation (IMV) was predominantly performed. However, invasive ventilation is associated with several complications such as barotrauma, ventilator associated pneumonia (VAP) or prolonged weaning. In this context, the use of Extracorporeal Lung Support (ECLS) for CO2-removal may be beneficial.

Methods:
From 09/2014 to 03/2015 n=8 patients treated with awake-ELCS due to AECOPD and NIV-failure were included in the current analysis. The results were compared to a historical population (n=9), which was treated with IMV.

Results:
While establishing the ECLS-program in our institution a respiratory therapy algorithm for the treatment of ECLS-patients, based on literary data, was developed. All together n=8 patient (4 female, mean age 59 ± 13) received awake ECLS-therapy due to AECOPD and NIV-failure. The historical population consisted of n=9 patients (4 female, mean age 60 ± 33) receiving IMV. Patients with awake-ECLS were mobilized several times daily. Patients performed respiratory therapy by using different devices such as sustained maximal inspiration trainer. Moreover, mucolytic therapy (oscillating PEP, ACBT, aerosoltherapy) was performed. Within our population a significantly lower rate of bronchoscopy for mucus removal (p= 0,006, t-test) and a significantly shorter ICU-stay (p= 0,001, t-test) were observed in comparison to the historical population.

Conclusion:
ECLS represents a safe and effective alternative to IMV for the treatment of AECOPD and NIV-failure. Advantages are mainly the possibility of early respiratory therapy, mucolytic therapy and breathing exercises with awake patients. Avoiding IMV reduces the rate of VAP. Different randomized and controlled studies showed a positive effect of early pulmonary rehabilitation on the outcome of patients with AECOPD. Future studies shall examine these aspects in the ECLS population.

Disclosure: No significant relationships.
Keywords: ECLS, AECOPD, respiratory therapy
P-245

EARLY TREATMENT OF POST-LOBECTOMY AIR LEAK WITH 50% GLUCOSE PLEURODESIS.

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Objectives:
Post-lobectomy air leaks can lead to delayed hospital discharge, and can be a source of pain and increased risk for postoperative complications. Intraoperative surgical approaches and techniques have been described to minimize air leaks following lobectomy, however no specific postoperative interventions other than drainage are commonly performed to address this problem. This study evaluates the feasibility of using an intrapleural 50% glucose solution to manage post-lobectomy air leaks when present on the first postoperative day.

Methods:
Following informed consent, five patients presenting with an air-leak documented by digital drainage on their first postoperative day underwent pleurodesis using 200ml of a solution of 50% glucose with lidocaine, which was repeated 24 hours later if necessary. The volumes of air leakage and pleural effusion drainage were recorded along with blood glucose levels, pain scores and oxygen requirements.

Results:
Nine pleurodesis treatments were performed on five patients. Four patients (80%) had air leak cessation (less than 40ml/min) on postoperative day 3. When compared to prior to treatment, blood glucose levels were increased (8.5 vs 6.3 mmol/l, p=0.03) as was effusion drainage (1045 vs 525 ml/24h, p=0.03) following pleurodesis. No significant difference in pain score or oxygen requirements was noted. There were no complications.

Post-lobectomy air leak following D50% pleurodesis

![Graph showing air leak progression following pleurodesis]
### Side effects of glucose pleurodesis addressing post-lobectomy day 1 air leaks.

<table>
<thead>
<tr>
<th></th>
<th>before treatment</th>
<th>after treatment</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood glucose (mmol/L)</td>
<td>6.3</td>
<td>8.5</td>
<td>0.03</td>
</tr>
<tr>
<td>Pain (median score)</td>
<td>5</td>
<td>5</td>
<td>n.s.</td>
</tr>
<tr>
<td>Chest effusion 24h-drainage(ml)</td>
<td>525</td>
<td>1045</td>
<td>0.03</td>
</tr>
<tr>
<td>Need for O2 supplementation</td>
<td>56%</td>
<td>44%</td>
<td>n.s.</td>
</tr>
<tr>
<td>Any perioperative complications</td>
<td>0</td>
<td>0</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

**Conclusion:**

Conclusion: Post-lobectomy air leaks can be managed as early as on postoperative day one with a solution of 50% glucose. Increases in blood glucose levels and pleural effusion drainage are to be expected. This approach has the potential to offer an inexpensive way to minimize the duration of hospitalization and its related risks and postoperative complications.

**Disclosure:** No significant relationships.

**Keywords:** pleurodesis, lobectomy, postoperative complication, air leak
P-246

TRANSITION FROM TWO–THREE PORT TO UNIPORTAL APPROACH IN VATS LOBECTOMY: A MULTICENTRE COMPARATIVE STUDY

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²Thoracic Surgery, National Institute of Oncology, Budapest, Hungary,
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⁵Thoracic Surgery, Marmara University Hospital, Istanbul, Turkey

Objectives:
Minimal invasiveness is currently aimed in most surgical interventions. In thoracic surgery VATS lobectomy has become a standard, a step further would be uniportal approach. The current study aimed to compare main indicators of VATS lobectomies before and after switching to uniportal approach in 5 European thoracic surgery centres with significant previous 2–3 port VATS lobectomy experience.

Methods:
Last 20 (consecutive) VATS lobectomies before implementing the uniportal approach were compared to first 20 (consecutive) uniportal VATS lobectomies in each of the five centres. Data were extracted from medical records. In two centres by end of data collection less than 20 uniportal operations had been performed. Student’s T-test and Mann-Whitney U test were used for statistical analysis.

Results:
Data from 100 2–3 port VATS lobectomies were compared to 72 uniportal VATS lobectomies. The study groups did not differ in terms of age, gender, BMI, diagnosis, or lobe removed. In 8 cases (11.1%) the uniportal approach was converted to a 2–3 port approach. Main results are presented in the table.

<table>
<thead>
<tr>
<th></th>
<th>Two–three port lobectomy</th>
<th>Uniportal lobectomy</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median (range) duration of operation (min)</td>
<td>139 (53–360)</td>
<td>140 (65–420)</td>
<td>0.81</td>
</tr>
<tr>
<td>Median (range) intraoperative blood loss (ml)</td>
<td>100 (0–800)</td>
<td>45 (0–500)</td>
<td>0.39</td>
</tr>
<tr>
<td>Conversion to thoracotomy (%)</td>
<td>6 (6)</td>
<td>3 (4.2)</td>
<td>0.60</td>
</tr>
<tr>
<td>Median (range) duration of pleural drainage (days)</td>
<td>3 (1–16)</td>
<td>2.5 (1–26)</td>
<td>0.23</td>
</tr>
<tr>
<td>Prolonged air-leak &gt;5 days (%)</td>
<td>11 (11)</td>
<td>9 (12.5)</td>
<td>0.76</td>
</tr>
<tr>
<td>Median postoperative stay (days)</td>
<td>8 (2–29)</td>
<td>5 (2–27)</td>
<td>0.003</td>
</tr>
</tbody>
</table>

No intrahospital mortality occurred in either of the groups.
Conclusion:
Transition from 2–3 port to uniportal approach in VATS lobectomy did not prolong the operation, increase the rate of complications and conversion to thoracotomy. Postoperative stay after uniportal lobectomy was significantly shorter compared to the 2–3 port technique. There was no evidence of a learning curve while implementing uniportal VATS lobectomy.

Disclosure: No significant relationships.

Keywords: VATS, lobectomy, uniport, learning curve
P-247

INTRAOPERATIVE NEAR-INFRARED IMAGING CAN DISTINGUISH TUMOR IN ANTERIOR MEDIASTINUM FROM NORMAL TISSUE

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²Key Laboratory of Molecular Imaging of Chinese Academy of Sciences, Chinese Academy of Sciences, Beijing, China,
³Thoracic Department, Peking University People’s Hospital, Beijing, China

Objectives:
For anterior mediastinum tumors such as thymoma and thymic carcinoma, the completeness of resection is the most important predictor of outcome. The margin of the tumor and small seeding metastasis lesions can be obscure in conventional white light thoracoscopic surgeries. The purpose of this study was to evaluate the feasibility and safety of near-infrared (NIR) imaging technology in identifying the tumor margins and metastasis nodules of anterior mediastinum tumors.

Methods:
Six patients with masses in anterior mediastinum were injected intravenously with 4 or 5mg/kg indocyanine green (ICG) 18-26 hours prior to surgery. Two NIR thoracoscopic platforms, PinPoint technology (Novadaq, Canada) and D-light P thoracoscope (KARL STORZ GmbH & Co, Germany) were used to detect near-infrared fluorescent light during surgery. NIR thoracoscopes were used to identify the tumor margin and to thoroughly explore thoracic cavity for seeding metastasis lesions. Images and videos were retrieved. The ImageJ software was used to objectively evaluate the fluorescence intensity.

Results:
The median tumor size was 6.56 cm (range 5.0–8.0 cm) on preoperative imaging. All patients underwent video-assisted thoracoscopic tumor resection except one biopsy. The pathology diagnosis were type B1 thymoma for two patients, thymic carcinoma for two patients, one type AB thymoma, and one mature teratoma. All the tumors were fluorescent under laser excitation, with a mean signal-to-background ratio of 6.27 (Figure). The tumors were clearly distinguished from non-tumor tissue in all patients. In addition, two metastasis nodules of one thymic carcinoma on the pulmonary pleura and pleural effusion of teratoma were also fluorescent. No ICG related complication was observed.
**Conclusion:**
NIR imaging with prior injection of ICG can safely provide excellent tissue contrast and distinguish tumor in anterior mediastinum from normal tissues, which facilitates the completely resection of tumors.

**Disclosure:** No significant relationships.

**Keywords:** thymic carcinoma, near-infrared imaging, video-assisted thoracoscopic surgery, thymoma
THE GUIDING LIGHT: CONTRALATERAL PHRENIC NERVE VISUALISATION DURING ROBOTIC THYMECTOMY

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Objectives:
Thymectomy is a radical but effective treatment for generalized myasthenia gravis (MG) and has now become an essential tool in the integrated armamentarium for treatment of MG. With the unilateral approach to minimally invasive extended thymectomy, there is always a concern regarding adequate clearance of the opposite pericardial fat and the visualisation of opposite phrenic, particularly in patients with excessive pericardial fat. We report here the use of an additional 5mm port on the contralateral side for visualisation of the opposite phrenic nerve and guiding the opposite pericardial fat resection during a unilateral robotic assisted extended thymectomy for myasthenia gravis.

Methods:
In 25 consecutive patients undergoing robotic thymectomy for myasthenia gravis using a three port unilateral approach a 5mm port was placed in the 5th or 6th intercostal space just anterior to anterior axillary line into the contralateral pleural cavity. A 5 mm 30 degree thoracoscope is inserted through the port to visualise the contralateral phrenic nerve on a separate screen. The robotic dissection along the contralateral phrenic nerve from the opposite pleural cavity was then guided by the bedside surgeon to ensure a safe and radical dissection of all the tissue medial to the nerve. The console time for the procedure was recorded and compared to 25 cases immediately preceding the study period where a contralateral port was not used.

Results:
The mean duration of console time in the study group was 129.96 minutes (SD = 23.28) which was shorter than the mean in control group (Mean = 162.6 minutes, SD = 32.95). This difference was significant (p value= 0.0002).

Conclusion:
The use of the 5mm thoracoscope to provide guidance for visualisation of and dissection along the contralateral phrenic reduces the console time significantly and ensures adequate clearance of all thymic tissue and pericardial fat with much more safety and confidence.

Disclosure: No significant relationships.
Keywords: robotic thymectomy, radical thymectomy, myasthenia gravis
IS THYMOMECTOMY APPROPRIATE FOR “SELECTED” NONMYASTHENIC THYMOMA PATIENTS?

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²Medical and Surgical Sciences, University of Bologna, Bologna, Italy,
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⁴Department of Medical Oncology University of Perugia, Medical Oncology, Perugia, Italy

Objectives:
The treatment of choice for myasthenic patients with thymoma is extended thymectomy while the optimal therapy for nonmyasthenic is matter of debate. Aim of the study is to evaluate if thymomectomy is appropriate for “selected” nonmyasthenic patients.

Methods:
We retrospectively reviewed the management and clinical outcome of 123 completely resected patients, 105 with total/extended thymectomy (43 myasthenic) and 18 with thymomectomy over a 20-year period. Comparative analyses to identify differences were performed using the χ² test or Fisher’s exact test for categorical variables and independent t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant.

Results:
Characteristics are summarized in table. Not significant differences in age, gender, histology, tumor size, stage, adjuvant therapy, complications were observed. A significant higher percentage of patients in thymomectomy group complained with thoracic symptoms. In total/extended thymectomy group 103 patients had a median sternotomy while two had a combined approach. R-0 thymomectomy was performed through thoracotomy in 12 cases (66%), thoracoscopy in 4 (22%), cervicotomy in 1 (6%) and clamshell incision in 1 case (6%). No postoperative mortality was recorded. Complications were 23 (22%) in total/extended thymectomy group (12 arrhythmia, five respiratory failure, three bleeding, two osteomyelitis, one lymphorrhea) and two (11%) in thymomectomy group (pericardial effusion, respiratory failure). At a median follow-up of 64 months (range 3-236) in total/extended thymectomy group 8 patients developed postoperative myasthenia gravis, eight patients had recurrence and three of them died for thymoma. We did not observe any case of postoperative myasthenia gravis or recurrence in thymomectomy group. No case of multiple thymoma occurred in both groups.

Conclusion:
In “selected” nonmyasthenic thymoma patients, R-0 thymomectomy seems to have the same oncological outcome than total/extended thymectomy without increased risk of developing postoperative myasthenia.
<table>
<thead>
<tr>
<th></th>
<th>Total/extended thymectomy (n=105)</th>
<th>Thymomectomy (n=18)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean ± SD</td>
<td>58.6 ± 15 years</td>
<td>63.7 ± 13.2 years</td>
<td>0.178</td>
</tr>
<tr>
<td>Gender Male Female</td>
<td>56 (53%) 49 (47%)</td>
<td>9 (50%) 9 (50%)</td>
<td>0.794</td>
</tr>
<tr>
<td>Histology A AB B1 B2 B3</td>
<td>9(9%) 27(26%) 20(19%) 37(35%) 12(11%)</td>
<td>2(11%) 8(44%) 1(6%) 4(22%) 3(17%)</td>
<td>0.312</td>
</tr>
<tr>
<td>Size, mean ± SD</td>
<td>6 ± 2.7 cm</td>
<td>7.4 ± 4.5 cm</td>
<td>0.066</td>
</tr>
<tr>
<td>Stage I II III IVA IVB</td>
<td>51 (49%) 36 (34%) 14(13%) 2(2%) 2(2%)</td>
<td>9(50%) 7(38%) 0 1(6%) 1(6%)</td>
<td>0.382</td>
</tr>
<tr>
<td>Thoracic symptoms No Yes</td>
<td>82(78%) 23(22%)</td>
<td>9(50%) 9(50%)</td>
<td>0.012</td>
</tr>
<tr>
<td>Adjuvant therapy No Yes</td>
<td>80(76%) 25(24%)</td>
<td>15(83%) 3(17%)</td>
<td>0.480</td>
</tr>
<tr>
<td>Complications No Yes</td>
<td>82(78%) 23(22%)</td>
<td>16(89%) 2(11%)</td>
<td>0.286</td>
</tr>
</tbody>
</table>

**Disclosure:** No significant relationships.

**Keywords:** total/extended thymectomy, thymoma, thymomectomy
ADENOCARCINOMA OF THE ESOPHAGUS AND CARDIA (SIEWERT TYPE I-II) DOES COMPREHEND THREE DIFFERENT BIOLOGICAL PATTERNS

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²Division of Thoracic Surgery, Maria Cecilia Hospital; Ausl Area Vasta Romagna, GVM Research & Care, Bologna, Italy
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⁴Area Vasta Romagna, AUSL, Ravenna, Italy

Objectives:
It has been shown that in Siewert type I- II adenocarcinomas three CK 7-20 patterns are present: Ck7+/20-, CK7-/20+, Ck7+/20+ furtherly characterized by the absence or presence of intestinal metaplasia in the gastric corpus and antrum mucosa. Other studies have shown that in adenocarcinoma of the esophagus and cardia different nodal metastases and cancer specific survival patterns occur according to the presence/absence of Barret’s intestinal metaplasia in the esophagus and of intestinal metaplasia in the stomach. We investigated the relationship between the histology/CK 7-20 patterns and the presence/absence of Barret’s/gastric intestinal metaplasia.

Methods:
We assessed histology according to to Lauren classification (intestinal and diffuse types) the positivity, negativity of CK 7-20 in groups 1) Barret’s intestinal metaplasia +, gastric intestinal metaplasia-; 2) Barret’s intestinal metaplasia - , gastric intestinal metaplasia +, 3) Barret’s intestinal metaplasia – gastric intestinal metaplasia -.

Results:
Distribution of cases in groups according to histology and CK patterns are reported in table

<table>
<thead>
<tr>
<th>Intestinal type</th>
<th>Diffuse type</th>
<th>CK7/CK20</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>8 (36.4%)</td>
<td>14 (63.6%)</td>
<td>22 CK7+/CK20- (100%)</td>
</tr>
<tr>
<td>Group 2</td>
<td>3 (42.9%)</td>
<td>4 (57.1%)</td>
<td>7 CK7-/CK20+ (100%)</td>
</tr>
<tr>
<td>Group 3</td>
<td>15 (75%)</td>
<td>5 (25%)</td>
<td>20 CK7+/CK20+ (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>23</td>
<td>49</td>
</tr>
</tbody>
</table>
Conclusion:
Histology and CK7-20 patterns distribute differently in groups characterized by the presence/absence of Barret’s and gastric intestinal metaplasia. This finding supports the existence of three different types of adenocarcinoma of the esophagus and cardia. As to different biology do correspond different metastases/cancer specific survival patterns, histology and CK7-20 assessment may help to tailor therapy.

Disclosure: No significant relationships.
Keywords: adenocarcinoma, esophagus, cardia, oncology
PER ORAL ENDOSCOPIC MYOTOMY IS AN ACCEPTABLE INTERVENTION FOR A RECURRENT ACHALASIA AFTER FAILED HELLER MYOTOMY.

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¹Cardiothoracic Surgery, University of Iowa Hospital and Clinics, Iowa City, United States of America,
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Objectives:
Per oral endoscopic myotomy (POEM) is an acceptable treatment option for achalasia and is proven to be safe with reasonable short-term outcomes. However, its role in the management of a recurrent achalasia after failed Heller myotomy is unclear. We present our experience with POEM for failed Heller myotomy.

Methods:
We performed a retrospective chart review of all POEM cases between the period January 2014 - December 2015. Patients with no prior Heller (group 1) were compared to patients with failed myotomy (group 2). Details of previous myotomy, demographics, co-morbidities, type of achalasia, Eckardt scores, length of hospital stay (LOS), duration of surgery (DOS), morbidity, length and location of myotomy (LOM) were analyzed.

Results:
Thirty one patients underwent POEM for achalasia during the study period. 4/31 (12.9%) were done for failed Heller myotomy. Except for one patient with type II achalasia, all cases were type I in the redo group. Patient in groups 1 and 2 had no significant difference in median pre-operative (6 and 5, p = 0.73), and improved postoperative (0 and 2.5, p = 0.1) Eckardt scores. The DOS (106 and 112 min, p=0.92) was also similar. All patients had significant symptomatic improvement in swallowing after the POEM. Median LOM was 13 cm (12-13) and median LOS was one day in both groups. In all re-do patients submucosal tunneling and myotomies were performed on the posterior wall of the esophagus. One study patient had contained leak that was managed non-operatively and oral intake was resumed in five days after the operation.
<table>
<thead>
<tr>
<th>Characteristics, mean (range)</th>
<th>primary POEM</th>
<th>Poem after Heller myotomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>27</td>
<td>4</td>
</tr>
<tr>
<td>Length of myotomy (LOM), cm</td>
<td>13 (10-15) cm</td>
<td>13 (12-13) cm</td>
</tr>
<tr>
<td>Duration of surgery (DOS), min</td>
<td>106 (60-148) min</td>
<td>112 (80-135) min, p 0.92</td>
</tr>
<tr>
<td>Length of hospital stay (LOS), days</td>
<td>1 (1-5) days</td>
<td>1 (1-5) days</td>
</tr>
<tr>
<td>Eckardt score preoperatively</td>
<td>6 (3-10)</td>
<td>5 (4-10), p 0.73</td>
</tr>
<tr>
<td>Eckardt score postoperatively</td>
<td>0 (0-8), data available for 22 patients</td>
<td>2.5 (2-5), p 0.1</td>
</tr>
</tbody>
</table>

**Conclusion:**
The POEM procedure has initially demonstrated its success in the treatment of newly diagnosed achalasia. With increasing experience it may become a viable alternative for the treatment of recurrent achalasia in place of a redo surgical myotomy.

**Disclosure:** No significant relationships.

**Keywords:** minimally invasive, per oral endoscopic myotomy, failed Heller myotomy, achalasia, recurrent, failed
P-252

EPIRUBICIN/OXALIPLATIN/XELODA VERSUS OTHER PLATINUM BASED DOUBLETS FOR NEOADJUVANT CHEMOTHERAPY IN PATIENTS WITH LOCALLY ADVANCED ESOPHAGEAL ADENOCARCINOMA

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Objectives:
Platinum-based neoadjuvant chemotherapy or chemoradiation remains the standard of care for locally advanced esophageal cancer. The optimal chemotherapy agents are controversial. The primary objective of this study is to assess the effectiveness of neoadjuvant chemotherapy with epirubicin, oxaliplatin, and xeloda (EOX) versus other platinum based doublets in patients undergoing esophagectomy for locally advanced esophageal adenocarcinoma.

Methods:
From our institutional prospectively maintained esophageal cancer database, patients with locally advanced esophageal adenocarcinoma undergoing treatment with the neoadjuvant regimens described above were selected. A total of 134 patients were identified: EOX (n = 36) vs. other platinum doublets (n= 98). Demographic and clinical factors were compared and the influence of neoadjuvant chemotherapy regimens on metabolic/pathologic response and overall survival (OS) were studied.

Results:

<table>
<thead>
<tr>
<th>Clinical factors, treatment response, and survival</th>
<th>EOX (n=36)</th>
<th>Platinum doublet (n=98)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age (IQR)</td>
<td>63 (54-69)</td>
<td>61 (52-68)</td>
<td>0.344</td>
</tr>
<tr>
<td>Male gender</td>
<td>28 (78%)</td>
<td>83 (85%)</td>
<td>0.347</td>
</tr>
<tr>
<td>Clinical stage (6th ed)</td>
<td>IB-II</td>
<td>12 (34%)</td>
<td>0.316</td>
</tr>
<tr>
<td></td>
<td>III-IV</td>
<td>24 (67%)</td>
<td></td>
</tr>
<tr>
<td>Complete metabolic response (SUV=0) of 29 EOX and 57 doublet patients w/ post-induction PET</td>
<td>10 (34%)</td>
<td>9 (16%)</td>
<td>p=0.048</td>
</tr>
<tr>
<td>Median decrease in SUVmax (IQR)</td>
<td>74% (50-100%)</td>
<td>56% (25-80%)</td>
<td>0.057</td>
</tr>
<tr>
<td>Complete pathologic response</td>
<td>2 (6%)</td>
<td>3 (3%)</td>
<td>0.499</td>
</tr>
<tr>
<td>3 year OS (95% CI)</td>
<td>72% (55-90%)</td>
<td>45% (35-55%)</td>
<td>0.068</td>
</tr>
</tbody>
</table>

Groups were well matched regarding age, gender, and clinical stage (Table). Following neoadjuvant chemotherapy, in patients undergoing repeat PET (n=86), a higher proportion of EOX patients had complete metabolic response (34% vs. 16%, p = 0.048). Similarly, the median de-
crease in SUVmax was greater in EOX than in other platinum-based doublet patients (74% vs. 56%, p=0.057). In the total EOX group, there was a doubling of complete pathologic response compared to the platinum doublet group (6% vs. 3%), although not statistically significant in this small cohort (p=0.499). With limited median follow-up in the EOX group (29 months vs. 80 months in doublet group), there was a trend towards improved 3-year OS (Kaplan Meier) in patients receiving the EOX regimen (72% vs 45%, p = 0.068).

**Conclusion:**
Our results suggest that in the neoadjuvant setting for resectable esophageal adenocarcinoma, EOX may be more effective in achieving metabolic and pathologic response rates than other platinum-based doublets. Further studies are warranted to assess whether a long term survival benefit exists with the EOX regimen.

**Disclosure:** B. Stiles: Wife employed by Pfizer

**Keywords:** esophageal cancer, neoadjuvant therapy, complete pathologic response
PROGNOSTIC IMPACT OF LYMPH-NODE METASTASIS SITE IN PATIENTS WITH ESOPHAGEAL SQUAMOUS CELL CANCER

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Objectives:
The location and clinical impact of lymph node metastasis from esophageal squamous cell carcinoma (ESCC) have not been evaluated sufficiently. This study examined the incidence of lymph node metastasis by tumor location to determine the optimal extent of the lymph node dissection.

Methods:
A consecutive series of 651 patients who underwent curative surgery for ESCC was investigated by primary tumor site. The remote stations of lymph node were defined according to the primary tumor site. The prognostic impact was evaluated by univariate analysis and multivariate analysis using Cox’s proportional hazards model.

Results:
The overall 1-, 3- and 5-year survival was 85.2%, 57.8% and 47.0%, respectively. The median survival time was 48.0 months. Compared with non-remote lymph node metastases, station 7, 8M, 8L and 17 lymph node metastases are independent risk factors for the upper third ESCC (HR 7 2.08, 95%CI 1.04 - 4.19, p = 0.040; HR8M 1.99, 95%CI 1.18 - 3.36, p = 0.010; HR8L 2.30, 95%CI 1.34 - 3.95, p = 0.003; HR17 2.08, 95%CI 1.27 - 3.41, p = 0.004); station 2L and 17 lymph node metastases are independent risk factors for the middle third ESCC (HR2L 5.00, 95%CI 1.56 - 16.04, p = 0.007; HR17 2.42, 95%CI 1.47 - 3.99, p = 0.001); station 7 lymph node metastases was an independent risk factor for the lower third ESCC (HR 2.72, 95%CI 1.40 - 5.27, p = 0.003).

Conclusion:
The lymph node metastasis site is an independent prognostic factor in patients with ESCC. The future of cancer staging should regard the lymph node site as a new outcome prediction classifier in ESCC.
Disclosure: No significant relationships.

Keywords: esophageal neoplasm, lymph node, metastasis
ENDOSCOPIC VACUUM-ASSISTED CLOSURE THERAPY FOR POSTOPERATIVE LEAKAGE AFTER ESOPHAGEAL RESECTION

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²Internal Medicine, Seoul National University Bundang Hospital, Seongnam-Si, Republic of Korea

Objectives:
Postoperative leakage after esophageal resection is a serious complication with high morbidity and mortality rates. The endoscopic vacuum-assisted closure (VAC) therapy is a novel option for the management of anastomotic leakage after esophageal resection.

Methods:
From January 2012 to July 2015, one hundred six cases of esophagectomy were performed by thoracic surgeons in our hospital. During the period, ten cases of postoperative leakage were diagnosed. Among them, the seven cases were managed by the endoscopic VAC therapy. In addition, the three other postoperative leakage cases; two from general surgery in our hospital and one from the other hospital, which were also managed by the endoscopic VAC therapy in our thoracic department, were enrolled in the study. Total ten cases of the endoscopic VAC therapy were reviewed.

Results:
The median age of the patients was 69 years (range, 59 to 80 years) and eight cases were male. In two cases, the jejunum was used as a conduit and in the other eight cases, the stomach was applied. The intrathoracic leakage was developed in nine cases and the cervical leakage in one case. The size of fistula was larger than 2 cm in five cases. The median duration of the therapy was 13.5 days (range, 7 to 110 days). The ulcer bleeding was developed in one case and no mortality was observed during the endoscopic VAC therapy. Complete restoration of the fistula was achieved in nine cases (90%). The patient who did not recover from fistula was transferred to the other institution during the therapy by patient’s request.

Conclusion:
The endoscopic VAC therapy showed high success rate of the fistula restoration. It might be an effective treatment option for postoperative leakage after esophageal resection.

Disclosure: No significant relationships.
Keywords: esophagus, VAC therapy, postoperative leakage
CLINICAL APPROACH TO PNEUMOMEDIASTINUM AFTER BLUNT CHEST TRAUMA

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Objectives:
Pneumomediastinum (PM) can be observed after blunt and penetrating chest trauma as it can be seen spontaneously or iatrogenic. We aimed to evaluate the cases with PM on thorax computed tomography (CT) after blunt chest trauma (BCT) in this study.

Methods:
The records of 93 patients who were hospitalized with the diagnosis of PM between January 2000 and December 2014 were analyzed retrospectively. Pneumomediastinum was verified with thorax CT in all patients. Twenty-four patients were excluded due to the different causes (penetrating trauma, iatrogenic, spontaneous) of PM. We evaluated the data of sixty-nine patients (59 males, 10 females) with the diagnosis of PM secondary to BCT and who were observed without any further procedure for the cause of PM, retrospectively.

Results:
The mean age of the patients was 47.60 ± 17.47 years (range, 16 to 80 years). The type of BCT was traffic accident in 38 (55.06%), fall from height in 25 (36.24%), compression in 3 (4.35%) and drub in 3 (4.35%) patients. The mean duration of chest tube drainage which were performed for accompanying pathologies like pneumothorax and hemothorax was 12.46 ± 6.42 days (range, 6 to 28 days). The mean hospital stay was 9.12 ± 7.02 days (range, 6 to 28 days). All of the hospital records of the patients were analyzed in the means of complication and any complication was not determined for the short and long term follow-up.

Conclusion:
Further invasive procedures are frequently needed for the determination of etiological factors of PM like tracheobronchial and esophageal rupture. In this study we observed 69 PM patients in good general status and no need for intensive care management, as a result we concluded that conservative treatment without any invasive procedure is a sufficient method for the PM patients with uneventful clinical course.

Disclosure: No significant relationships.
Keywords: blunt chest trauma, pneumomediastinum, thoracic surgery
VIDEO-ASSISTED MEDIASTINAL LYMPHADENECTOMY - DIFFICULT OPERATIVE PROCEDURE AND DANGEROUS FOR PHONATION

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Objectives:
Despite many years of experience with video assisted mediastinoscopy it remains difficult to establish video assisted mediastinal lymphadenectomy (VAMLAL) as a standard procedure in our institution. Although the visual identification of the left recurrent laryngeal nerve (RLN) was performed in some cases dysphonia occurred. To avoid further recurrent laryngeal nerve paralysis during the “surgical learning curve” we implied the strict standardised technique in thyroid surgery: Intraoperative neuromonitoring (IOMN) of the left RLN with NIM response 3.0 designed by Medtronic.

Methods:
In order to perform an IOMN of the RLN during VAMLAL the patient has to be intubated with a specially designed endotracheal tube. The integrated system of tube- based surface electrodes allows the contact to the mucosa of the vocal cords. The VAMLAL is performed in well-known technique. The pretracheal space is prepared. The video mediastinoscope is inserted. After visualisation of the trachea and both main bronchi lymphadenectomy is carried out. After resection in stations 7, 8, 4 R the videomediastinoscope is positioned to view the left paratracheal region. First the preparation and visualisation of the RLN is performed. The nerve is stimulated with intensity of 1,5- mA using a stimulator probe. Positive identification of the RLN is recognizable by audible signal and visualisation as electromyography wave on the monitor. The dissection and lymphadenectomy in this region is done under continual control of the RLN.

Results:
The implementation of IOMN makes the lymphadenectomy during VAMLAL in 4L more radical and lowers the injury risk of the RLN.

Conclusion:
IOMN makes VAMLAL safer for the patient and increases the quality of mediastinal staging in lung cancer.

Disclosure: No significant relationships.
Keywords: VAMLAL, neuromonitoring, recurrent laryngeal nerve
P-257

ORGAN DONORS FROM ASPHYXIATION ARE VALUABLE SOURCE OF LUNG ALLOGRAFTS.

Thoracic Surgery, Columbia University Medical Center, New York, United States of America

Objectives:
The use of lung allografts from donors, whose mechanism of death was by asphyxiation carries concerns due to the risk of secondary barotrauma and post obstructive pulmonary edema. Few small cohort studies have been reported the utilization of these lungs present opposing views offering no general consensus. We report our center’s experience on lung allografts from asphyxiated donors.

Methods:
In the period between 2009 and 2015, 259 donors were evaluated with consistent team and assessment protocol, in 15 the mechanism of donor death/injury was by asphyxiation; seven underwent Donation after Cardiac Death Donors (DCD) and eight Brain Dead Donors (BDD). Donor and recipient characteristics were collected, as well as post-transplant pulmonary graft dysfunction (PGD) and survival.

Results:
Lungs were procured from 8/15 (53%) donors with death from asphyxiation (3 BDD and 5 DCD) providing allografts for 9 transplant recipients (4 Double, 2 Right and 3 Left). The PGD 2 score at 72 hours was in 1/9 and the PGD 3 1/9 at 72 hours. To date the 90-day and one year recipient survival was 100%.

Conclusion:
Our experience, from a relatively small cohort of patients, indicates that asphyxiation as a cause of death should not determine a refusal of the donor a priori. In fact, our results suggest that asphyxiation as a cause of death does not negatively affect post-transplant outcomes and these donors should be considered a source of viable lung allografts.

Disclosure: No significant relationships.
Keywords: organ donor, lung transplant, marginal donor, asphyxiation
MARGINAL LUNG RECONDITIONING WITH THE ORGAN CARE SYSTEM LUNG: A SINGLE INSTITUTION CASE SERIES

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²Anesthesiologic Unit, Azienda Ospedaliera di Padova, Padua, Italy

Objectives:
Lung transplantation is a life-saving procedure limited by suitable donors. Among the strategies to increase the number of transplants, marginal donor reconditioning and assessment by EVLP systems represent a new tool to expand the donor pool. In this study we describe our experience with the portable Organ Care System (OCS) lung device to preserve and recondition marginal lungs.

Methods:
From January 2014 to December 2015, out of 52 donors evaluated, 4 marginal lungs have been identified as potentially treatable with OCS. We analyzed data from these donors before and after reconditioning and the outcome after transplantation.

Results:
The causes of marginality were: lung edema in two cases, poor gas exchange (PaO2/FiO2<300 mmHg) and expected time of cold ischemia >6 hours in one case each, respectively. All donor lungs improved during OCS perfusion, in particular concerning median PaO2/FiO2 from 340 mmHg (IQR 282-417 mmHg) (final donor assessment) to 554 mmHg (IQR 542-563 mmHg) (final assessment in OCS) leading to bilateral lung transplantation without ECMO support in all cases. Median OCS time was 361 min (IQR 331-399 min) with median cold ischemic time for the first and second lung of 194 (IQR 178-216) and 313 (292-368) min, respectively. Concerning post-operative results, no in-hospital deaths were recorded and PGD score was 0 at 72 hours for all patients. Median mechanical ventilation time was three days (IQR 2-3 days), while median ICU and hospital stay were 10 (IQR 8-13) and 32 (IQR 30-33) days, respectively. Three patients experienced acute rejection, successfully treated with steroid. At present, all the 4 patients are alive in satisfactory conditions after a mean follow up of nine months.

Conclusion:
This case series demonstrates the feasibility and value of marginal lung retrieval and reconditioning with the OCS system. A prospective trial is ongoing to validate the role of OCS to safely increase the number of donor lungs.

Disclosure: No significant relationships.
Keywords: lung transplantation, marginal donor, EVLP, OCS lung
P-259

LUNG TRANSPLANTATION: 10 YEARS OF EXPERIENCE WITH A FINAL TREATMENT FOR END-STAGE LUNG DISEASES

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Objectives:
Lung transplantation (LT) remains a life-saving treatment for end-stage lung diseases. We aim to review the results of our experience in a 10 year period using brain death donors and to identify risk factors for primary graft dysfunction grade 3 (PGD III) and mortality.

Methods:
A retrospective analysis was undertaken of the 292 consecutive LT using brain death donors performed in our institution between 2002 and 2012.

Results:
Mean age of recipients was 48.5 (±14.8) years. Recipient’s diagnoses were: idiopathic pulmonary fibrosis 100 (34.2%), chronic obstructive pulmonary disease 94 (32.2%), cystic fibrosis 56 (19.2%), lymphangioleiomyomatosis 11 (3.8%), bronchiectasis 9 (3.1%), histiocytosis 8 (2.7%), and other less common diseases 14 (4.8%). Ex-Vivo assessment was carried out in 4 cases. Bilateral procedures were performed in 187 (64%) patients. Cardiopulmonary bypass was required in 87 (29.8%) cases, mainly due to secondary pulmonary hypertension (60, 69%). Most common early complications were acute rejection (115, 39.4%), pulmonary infections (106, 36.3%), cardiovascular (91, 31.2%) and PGD III (70, 24.0%). The frequency of chronic lung allograft dysfunction (CLAD) at 1, 3, 5 and 10 years was 7.5%, 31.8%, 47.2%, and 69.4% respectively. CLAD subtypes identified were: bronchiolitis obliterans syndrome (BOS) 94 (32.2%), Neutrophilic Reversible Allograft Dysfunction (N-RAD) 19 (6.5%) and Restrictive Allograft Syndrome (RAS) 8 (2.7%). Overall survival at 1, 3, 5 and 10 years was 75.0%, 66.0%, 58.4 and 38.1%, respectively. Univariate analysis showed that Severe Pulmonary Hypertension (PH) (p=0.01), Cardio pulmonary Bypass (CBP) (p= <0.001) and Donor age >= 55 years (p=0.03) are associated with developing of PGD III. Severe PH (p=<0.001), CBP (p=<0.001) and PGD III (p=<0.001) were risk factor for early mortality (three months).

Conclusion:
Lung transplantation is a satisfactory therapeutic option for end-stage lung diseases in our institution. PGD III is an inherent lung transplantation problem that impacts early and late outcomes.

Disclosure: No significant relationships.
Keywords: CLAD, lung, transplantation, PGD
SINGLE-CENTER EXPERIENCE WITH INTRAOPERATIVE EXTRACORPOREAL MEMBRANE OXYGENATION USE IN LUNG TRANSPLANTATION

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Objectives:
It has been shown that survival after lung transplantation is impaired if extracorporeal membrane oxygenation (ECMO) support is implemented. We investigated the outcome and potential independent risk factors on survival in recipients undergoing lung transplantation with intraoperative ECMO support.

Methods:
Medical records of recipients were retrospectively evaluated (January 2000 - December 2014). Retransplantation and bridge to transplantation on ECMO were excluded. Recipients (N=291) were grouped by ECMO implementation: those with intraoperative ECMO support (Group 1, N=134) and without ECMO support (Group 2, N=157). Independent risk factors were identified by a step-wise backward regression analysis.

Results:
One-year survival was 84.2% in Group 1 vs. 90.4% in Group 2 and 5-year survival 52.8% in Group 1 vs. 70.5% in Group 2 (p=0.002) (Figure1). Recipient age (p=0.000), postoperative renal replacement therapy (p=0.000) and intraoperative ECMO support (p=0.03) were significant risk factors for mortality in multivariate analysis. The rate of postoperative early surgical complications was comparable between the two groups (p=0.09). Patients requiring renal replacement therapy was significantly higher in Group 1(p=0.02).
Conclusion:
Despite the limitation of our study being a retrospective single center study with a rather small study population, our data show that lung transplantation with intraoperative ECMO support has worse outcome compared to those transplanted without ECMO support.

Disclosure: No significant relationships.

Keywords: lung transplantation, renal replacement therapy, extracorporeal membrane oxygenation
CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND BRONCHIECTASIS: ASSOCIATION OF RISK FOR LUNG TRANSPLANTATION

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Objectives:
The aim of this study is to make a retrospective analysis of the influence of the association between Chronic Obstructive Pulmonary Disease/Bronchiectasis (COPD-BQ) in the early 30-day mortality and long-term survival in patients who received a LT for COPD.

Methods:
A retrospective review was undertaken of the 107 lung transplants for COPD performed at our institution from January 1991 to December 2008. Demographic data, diagnosis, type of transplantation, BQ etiology, histological variables, the early 30-day mortality and long-term survival were analyzed. Continuous variables were expressed as mean ± standard deviation and categorical variables with absolute frequencies and percentages. Kaplan-Meier method and Chi-square test were used for analyses. A P-value of ≤0.05 was considered statistically significant.

Results:
The median age was 52.58 ± 8.05 years, and there were 94 males and 13 females. Seventy six bilateral LT were performed. (71%) Histological findings showed BQ in 13 patients (12.1%). (9 bronchiectasis and 4 bronchiolectasis). They all showed signs of inflammation and 11 presented lesions in the airway. In most of the patients analyzed it was unable to establish the etiology of BQ, one case was attributable to Tuberculosis and two cases to fungal infection. The early 30-day mortality was 14%. The overall rate 5-years survival was 40.9%. The presence of BQ affected significantly to the early mortality. (OR of 8.2 (95% CI 1.2 - 55.9) p = 0.032) and long-term survival (RR 3.061 (95% CI 1.649 - 5.684) p = 0.0001) with a mean survival of 0.16 years in the COPD + BQ group vs. 3.23 years in the COPD with no BQ group (p = 0.0001).

Conclusion:
The association of BQ + COPD in LT affected the early 30-day mortality and long-term survival, thus it might be a considerable risk factor.

Disclosure: No significant relationships.
Keywords: COPD, lung transplantation, bronchiectasis
P-262

BRONCHIAL AND ARTERIAL RECONSTRUCTION FOLLOWING PULMONARY ROOT INJURY

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Objectives:
The frequency of lung injury following chest trauma is approximately 76 %. Injuries of pulmonary root occur rare, but it is always difficult to make a surgical strategy decision.

Methods:
From January 2008 to December 2014 yy. 494 patients with pulmonary wounds were treated, and in 27 (5,5 %) cases there were pulmonary root invasion with bronchial or arterial involvement. In all cases revision of pleural cavity was started with VATS when oblique signs (tension intrapulmonary haematoma or mediastinal emphysema) of the deep pulmonary wound could be found. Injuries of main, lobar and segmental bronchus were found in three, nine and 10 cases respectively. According to the pulmonary vessels injuries lobar arteries and veins were involved in two and three cases respectively. In all cases were deep pulmonary wound signs were found mini-thoracotomy with pulmonary wound revision, arterial and bronchial reconstruction were done.

Results:
In cases of main and lobar bronchus injuries circular resection with anastomosis were done. Following arterial and venous injuries vascular sutures were performed in five cases. In seven cases circular anastomosis were performed following complete intersection of segmental bronchus. In 1 case polybronchial anastomosis (B9-10) was done following basal pyramid bronchus injury. In two cases bronchial injury size was less than ½ of circumference and simple suturing was done. Middle operation time was 145 + 39 min. and maximal intraoperative blood loss was 600 ml. Control CT and bronchoscopy in 14 and 28 days showed adequacy parenchymal ventilation in all cases.

Conclusion:
Reconstructive bronchial and vascular surgery following pulmonary root injury is effective way to preserve the lung parenchyma, that is operation of choice following main, lobar and segmental bronchus injury. Lobectomy should be done just in cases of massive blood loss and subtotal parenchymal wounds.

Disclosure: No significant relationships.
Keywords: chest trauma, lung root damage, reconstructive operations
SURGICAL TREATMENT OF TRACHEO-BRONCHIAL MALACIA USING PATCH PLASTY

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Objectives:
Tracheo-bronchial malacia is a progressive disease characterised by cartilage flaccidity and membranous wall widening and redundancy. The outcomes are reduced anterior-posterior airway caliber and an array of severe respiratory symptoms. Different surgical approaches have been described. We report our experience with tracheoplasty of the membranous component using polypropylene mesh (Marlex).

Methods:
Following rigid bronchoscopic assessment patients are turned into right thoracotomy position. Through a high posterolateral thoracotomy the azygous vein is divided. The membranous components of the trachea and both main bronchi are exposed. A double layered Marlex mesh is fashioned to the shape of the diseased component (bronchoscopic findings) using endo-GIA staplers (image). The edges are anchored using 4/0 prolene onto cartilaginous borders starting from the most lateral line using tension free approach. A midline single suture line is secured without penetrating the mucosa. Following closure, repair is confirmed bronchoscopically before extubation.

Results:
There were nine patients (seven females, age 60±10 years (range 50-75 years)) with symptomatic tracheomalacia (SOB (n=6) and incessant “barking” cough (n=3)). Underlying diagnosis were asthma (n=6), COPD and post-tracheostomy malacia (n=1), 3-years post right upper lobectomy for stage I NSCLC (n=1), and incidental finding (n=1). Bronchoscopic assessment revealed involvement of: entire trachea and both main bronchi (n=5); entire trachea with one main bronchus (n=3); main trachea to the origin of the left main bronchus (n=1). Eight patients were discharged within 10 days, one patient had post-op pain and social issues and discharged on day 40. At follow-up seven patients had resolution of their main symptoms, one had dysphonia (resolved within 2-months), and one continued to suffer from SOB due to incomplete repair of the LMB for technical difficulty; a stent was inserted.

Conclusion:
Complete support of the malacic posterior membranous component of the airway with Marlex mesh restores the anatomic configuration and provides permanent support of the trachea.

Disclosure: No significant relationships.
Keywords: Marlex mesh, tracheo-bronchial malacia, tracheoplasty
P-264

DOES PULMONARY LANGERHANS’ CELL HISTIOCYTOSIS HAVE A RECURRENCE PATTERN AFTER LUNG TRANSPLANTATION?

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Objectives:
Pulmonary Langerhans’ cell histiocytosis (PLCH) is uncommon indication for lung transplantation (LuTx); recurrence of disease after LuTx is rare.

Case description:
A 48-year-old woman with PLCH and secondary PAH (sPAB: 90 mmHg) had undergone double-LuTx with alemtazumab induction and under-assistance of central veno-arterial ECMO; 25 months ago. She was discharged from operating room to ICU with a peripheral veno-arterial ECMO; she had a grade III PGD on 5th day; ECMO was weaned on 7th day. On the 8th day she had fever (39°C) with infiltrations on chest x-ray. Bronchoscopic biopsy revealed an acute fibrinous and organizing pneumonia and pulse steroid therapy was initiated. She had polyuria from the first day of ICU follow-up; diabetes insipitus was diagnosed without any sign on pre-operative evaluation and received demopressin management.

She reached best FEV1 at 11th month (75%); on 12th month she resumed smoking and we recognized cavitary reticulonodular infiltrates in bilateral upper lobes. After cessation of smoking lesions were regressed. On 24th month during follow-up, thoracic CT revealed reticulonodular pattern in bilateral upper lobes again. Bronchoscopic biopsy revealed non-specific histological pattern without any rejection (A0Bx). Smoking history was detailed and we recognized that she again resumed smoking, half packs per day during 3 months. The radiological and pathological signs were diagnosed as recurrence of PLCH; steroid therapy (1 mg/kg) was initiated and complete radiological regression was observed after one-month treatment (Figure 1a,b,c).
Conclusions:
PLCH is an uncommon, granulomatous-disease which destroys more than one tissue and system. Cigarette was major etiological-factor. Progressive paranchymal infiltrates could be observed without any clinical symptoms. Recurrence of primary disease afterLuTx is uncommon; recurrence commonly could be observed in the patients who had extra-pulmonary disease and the patients who resumed smoking. During ICU-follow-up our patient diagnosed as central diabetes insipidus; this revealed the extra-pulmonary disease of PLCH and she resumed smoking afterLuTx. Treatment was cessation of smoking and steroid therapy. According to Dauriat et al. recurrence of primary disease did not affect survival. She is on 27th month without any symptom.

Disclosure: No significant relationships.

Keywords: recurrence, steroid therapy, lung transplantation, Langerhans’ cell histiocytosis
THE RARE CASE OF RECURRENT BENIGN MEDIASTINAL MESENCHYMOMA WITH SUPERIOR VENA CAVA INVASION

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Objectives:
Benign mesenchymoma is a rare mediastinal tumor that occurs in less than 1% of all mediastinal neoplasms. We present case report of extensive resection for recurrent benign mediastinal mesenchymoma and superior vena cava (SVC) reconstruction.

Case description:
A 30 year old woman was admitted with complains of discomfort in the right hemithorax, swelling of the face and upper limbs. The patient had a mediastinal fibrous tumor removal in 13-year-old. A CT-scan at admission revealed a right upper mediastinal tumor 33,9x30,4 mm in size. Upper side of the tumor was at level of brachio-cephalic veins (BCV) confluence, lower side extended under the right main bronchus. SVC was involved in the tumor mass in length of 40,9 mm. The tumor had close contiguous with ascending aorta, brachio-cervical truncus, tracheal bifurcation and pulmonary artery. Bronchoscopy indicated rounded deformity in the middle third of the trachea without invasion. We performed EBUS-guided fine-needle aspiration; cytological investigation showed the epithelial and connective tissue cells without atypia. Recurrent mediastinal benign tumor with SVC-syndrome was diagnosed and patient underwent the surgery. Right-side thoracotomy was done. After an adhesiolysis we confirmed solid rounded mediastinal mass nearly 40 mm in maximal size. Tumor involved SVC, right BCV was thrombosed and collateral veins were dissected. Mediastinal tumor was precisionly exposed, SVC was cutted under the BCV confluence and 3 cm above the right atrium. Tumor and SVC removed unblock. Morphology - benign mesenchymoma. SVC was reconstructed by the Gore-Tex Vascular Graft between the left and right BCV and the right atrium. According to CT-angiography in 6 month and 1 year after operation - left and right BCV and SVC-graft are patent, no local recurrence of the tumor. Swelling of the face decreased after operation.

Conclusions:
Treatment of benign recurrent locally advanced mediastinal tumors with SVC involvement provide good results and it was radical.

Disclosure: No significant relationships.

Keywords: recurrent benign tumor, SVC reconstruction, rare tumor mesenchymoma
SURGICAL TREATMENT OF DESCENDING THORACIC ANEURYSM OF AORTA WITH DESTRUCTION OF VERTEBRAL BODIES

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Objectives:
The real incidence of thoracic aortic aneurysm is difficult to detect due to the fact that many of them take place undiagnosed. The role of the etiological factors in the occurrence of aneurysms of the thoracic aorta different departments varies. After sampling of open surgical treatment, the mortality rate during the first 30 days was 4.8%.

Case description:

Patient: Male 24. MSCT revealed an aortic aneurysm dimensions 8.7-5.3-8.2sm. with the destruction of bodies Th8-9-10 density +28 55ed HU. as well as the narrowing of the spinal
canal. Operations: Remove from aortic aneurysm, resection of vertebral spondylodesis with bone autograft. At 10 hours after surgery to restore the movement of major joints of the lower extremities. Immediately after surgery, pain disappeared, which greatly disturbed when moving the patient. In the conduct of the patient, we could not exclude the aneurysm from the combination of a tumor lesion in the spine. The bone tissue - bone demineralization, fibrosis, necrotic mass. MRI revealed after 5 month Transplant stable condition.

**Conclusions:**
Often the cause of aneurysms of the thoracic aorta at a young age is a chest injury. Pain syndrome is not a common symptom of aneurysm of the thoracic aorta. If the patient has long flowing back pain also need to explore the higher parts of the spine, ie, thoracic and cervical. As in our case, the patient saw a neurologist until the development of the lower paraparesis due to destruction of the vertebral bodies. At the stage of diagnosis and treatment strategies should be applied all the tools and invasive research methods, such as magnetic resonance imaging, multi spiral computed tomography with contrast. Operative intervention in such diseases, in far advanced stages with a high risk of perioperative complications justified and must be carried out in the presence of highly qualified personnel.

**Disclosure:** No significant relationships.

**Keywords:** surgical treatment, aortic aneurysm, vertebral destructions
PRIMARY CANCER OF THE DIAPHRAGM

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Objectives:
Malignant primary tumors of the diaphragm are extremely rare. We present a primary adeno-
carcinoma developed from a diaphragm foregut cyst. Such primary malignant lesion of the
diaphragm has not yet been reported in literature.

Case description:
In a 66 year old woman with chest and abdominal pain, chest CT verified a large mass (10x6x5,5
cm) located in the left diaphragm, suggesting infiltration of the stomach and the left lobe of
the liver. The patient had no previous malignant tumor, and there were no distant metastases
present. Gastroscopy was negative. Left sided atelectasis and pleural fluid were also described.
Biopsy suggested a malignancy consisting of epithelial cells. After VATS exploration excluded
pleural dissemination, a left sided posterolateral thoracotomy was performed. The tumor was
located in the left diaphragm and infiltrated the left lower lobe of the lung and left lobe of
the liver. Resection- and reconstruction (Gore-tex Dual Mesh) of the left diaphragm, wedge
resection of the left lower lobe of the lung and resection of the left liver lobe were performed.
Postoperative phase was uneventful. The patient was discharged after seven days. Histology
revealed a primary well-moderately differentiated adenocarcinoma of the diaphragm, arising
from a foregut cyst. Immunphenotypes CK7, MucAc and CDX2 were positive, while TTF1,
CK20, Napsin A and Supfactant were negative. Despite adjuvant FOLFOX4 (Oxaliplatin, Leu-
covorin, 5-FU) chemotherapy, six months later PET-CT showed distant metastases at the less-
er- and greater curvature of the stomach, the left lobe of the liver and left sided supraclavicular
lymph nodes. Eight months after the operation, the patient is under oncological treatment.

Conclusions:
Adenocarcinoma of a foregut cyst of the diaphragm has not yet been described. Local extension
and local/distant recurrence show the aggressively of the tumor. With multivisceral resection
the tumor can be removed, but despite oncological treatment, prognosis remains poor.

Disclosure: No significant relationships.
Keywords: diaphragm, foregut cyst, adenocarcinoma
P-268

INSTITUTION OF EXTRA-CORPOREAL MEMBRANE OXYGENATION SUPPORT IN THE AWAKE PATIENT TO FACILITATE SURGERY FOR HEART LUNG BLOCK TRANSPLANTATION.

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Objectives:
We demonstrate the safe induction of anaesthesia and revision sternotomy in an adult congenital heart case undergoing heart lung transplantation facilitated by the awake institution of extra-corporeal membrane oxygenation (ECMO) support in the awake patient prior to general anaesthesia.

Case description:
We present a congenital heart case who was a candidate for heart lung transplantation. Her background was significant for pulmonary atresia with VSD at birth. She had undergone a left BT shunt and also a right BT shunt in the past. She had also undergone a corrective pulmonary outflow tract procedure with Hancock valve conduit placement. However her contemporary performance had deteriorated and she was suffering severe cardiovascular failure. She was listed for heart lung block transplantation. She had suprasystemic pulmonary artery pressures (PA 138/65) with an anticipation of cardiovascular collapse on induction of anaesthesia. To facilitate the surgical procedure the patient was placed on ECMO support while awake, prior to anaesthesia for surgery. She subsequently underwent a safe re-sternotomy and completed her heart lung transplant successfully. Regional anaesthesia was achieved with an ilioinguinal and iliohypogastric block performed with ultrasound guidance using lignocaine 1%. This was supplemented with direct local infiltration around her right femoral vessel incision. Once regional anaesthesia was achieved, the right femoral artery and vein were exposed. An 8mm side arm graft was anastomosed to the artery and the femoral vein cannulated directly. Once ECMO support was instituted, general anesthesia was achieved safely and the sternum re-opening safely completed. The patient was subsequently switched to full cardiopulmonary bypass with central access and the heart lung transplant completed safely.

Conclusions:
This strategy offers an alternative to high risk anaesthesia and offers a stable platform to perform a sternal re-opening. The awake procedure was well tolerated.

Disclosure: No significant relationships.

Keywords: pulmonary hypertension, anaesthesia, heart lung transplantation, induction, mechanical support, regional anaesthesia
A PROBLEM WITH BREATHING POST OESOPHAGECTOMY

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Objectives:
We present a very interesting case and rare complication following an oesophagectomy for adenocarcinoma of the gastro-oesophageal junction in a 68-year-old male patient. We describe the findings and our management of this complex case.

Case description:
Our patient developed adenocarcinoma on a background of Barrett’s oesophagus. He received three cycles of neoadjuvant chemotherapy followed by left thoracolaparotomy, oesophagectomy and left neck anastomosis. The procedure was uneventful and the patient was extubated. Few hours later he developed respiratory failure and needed reintubation. He had bronchoscopy which showed severe degree of tracheobronchomalacia, mainly involving the left main bronchus. This wasn’t evident preoperatively neither clinically nor from investigations. He had CT scan which showed that the gastric conduit has somehow caused compression of the posterior wall of the trachea and left main bronchus. This was the first time we face such scenario. We initially managed the patient with tracheostomy, nasogastric tube suction and trial of weaning from ventilator, however this failed. Reviewing literature we could only find very few cases that described such a problem. Options of management included a revisiting surgery via right thoracotomy to pull the conduit into the right pleural cavity, or airway stenting with removal of the stent three to four months later. As our patient was sick, we felt that a contralateral thoracotomy was not in his best interest. We adopted the stenting option and deployed a stent in his trachea and left bronchus, converted to a Y-stent later. We managed to wean him off on day 38 and discharge him home on day 51. Trial of removing the stent 6 months later showed that his airway collapsed again within minutes. Since then he had a long-term Y-stent inserted and has been doing well.

Conclusions:
Although very rare, gastric conduits can cause tracheobronchomalacia. Our patient was managed successfully with stenting.

Disclosure: No significant relationships.
Keywords: oesophagectomy, airway stenting, tracheobronchomalacia
SEQUENTIAL SINGLE LUNG TRANSPLANTATION AND LUNG VOLUME REDUCTION SURGERY. CASE REPORT

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Objectives:
Describe a case report regarding the feasibility of SLT and LVRS performed sequentially in the same surgical stage.

Case description:
A 65 year old male with severe COPD was referred to LT consult. He had a 60 year/pack history of smoking and suffered of a class 3 dyspnea. Body mass index (BMI) was 22 and spirometry demonstrated: FEV1 23.8%, FEV1/FVC 32%, FEF 25 - 75 7%, DLCO 36.6%, RV 145%. He walked 238 meters in the 6 minute walk test. BODE scale was 7. Right heart catheterization showed no pulmonary hypertension. A CT scan demonstrated severe panacinar emphysema predominantly in upper lobes. In a multidisciplinary committee the patient was accepted for left SLT and right LVR in the same surgical procedure. The lung donor was a 54 year old female with an intracerebral hemorrhage. PaO2/FiO2 was 424. Through an anterior bilateral thoracotomy first, left SLT was performed in a standard fashion, subsequently right LVR was done. Cold ischemia time of the graft was 270 minutes. He was weaned from mechanical ventilation in the operating room and stayed in the intensive care unit for 24 hours. Postoperative was uneventful. Chest drains were removed on day 5 to 8 after surgery. He was discharged on day 27 after surgery. The patient is currently alive and with an acceptable quality of life. Postoperative spirometry is shown in table.

<table>
<thead>
<tr>
<th>SPIROMETRY</th>
<th>1º POSTOPERATIVE MONTH</th>
<th>6º POSTOPERATIVE MONTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV 1</td>
<td>66.6%</td>
<td>79.2%</td>
</tr>
<tr>
<td>FEF 25 -75</td>
<td>36%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Conclusions:
In the present case sequential SLT and LVRS was shown to be a safe procedure with no surgical complications, no persistent air leak and short hospital stay for LT, thus it could be a feasible surgical approach for end-stage COPD-emphysema, in selected patients. The morbidity caused by NLH could be decreased with this procedure.

Disclosure: No significant relationships.
Keywords: single lung transplantation, lung volume reduction surgery, emphysema
P-271

DELAYED PRIMARY REPAIR OF COMPLEX TRACHEO-ESOPHAGEAL INJURY FOLLOWING FAILED PRIMARY REPAIR

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Objectives:
Complex trachea-esophageal injuries in the neck are common with both blunt as well as penetrating trauma but the survival of patients with such complex injuries is uncommon. From 1980-2011, only 27 cases [1] have been reported. We report a case of twice attempted repair of this complex entity within seven days of trauma.

Case description:
This 20 year young man presented to casualty with alleged history of blunt trauma neck on 13.08.15 by wire. He was taken to nearby hospital where emergency neck exploration revealed complete transection of cervical trachea and near total transection of esophagus. After debridement primary closure of trachea and esophagus with tracheostomy was done and patient was referred to us on day seven with anastomotic disruption of the tracheal and esophageal repair with tracheostomy in situ with esophageal leak. We explored the neck and esophageal defect was repaired using pectoralis major myocutaneous flap. A complete laryngeal drop was done and end to end anastomosis between tracheal end and lower margin of thyroid cartilage was done with maintenance of tracheostomy. He was kept in postoperative ICU on elective ventilation for three days with care to avoid neck extension. Enteral feeds were initiated through his feeding jejunostomy tube on post operative day two and he was discharged in stable condition with tracheostomy tube, nutrition through the feeding jejunostomy tube on postoperative day 10. He is currently able to take normal oral diet and is being evaluated for decanulation of tracheostomy

Conclusions:
Delayed primary repair of complex tracheoesophageal injuries is safe and feasible in expert hands when airway is secure.

Disclosure: No significant relationships.
Keywords: Complex trachea-esophageal injury, delayed repair, esophageal injury, failed tracheal repair
A RARE POST-LOBECTOMY COMPLICATION OF RIGHT-TO-LEFT SHUNT VIA FORAMEN OVALE

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Objectives:
Postoperative hypoxemia is a serious problem in patients who undergo major lung resection. We present a case of post-lobectomy right-to-left shunt via foramen ovale.

Case description:
A 71-year-old man with a lung tumor in the left upper lobe was referred to our hospital. He was originally healthy but had a 33 pack-year smoking history. His preoperative respiratory and circulatory conditions were normal. Lung cancer was strongly suspected, and thoracotomy biopsy followed by left upper lobectomy, combined resection of parietal pleura, and systematic lymph node dissection were performed under posterolateral thoracotomy. Histological examination revealed that the tumor was lung cancer (T3N0M0, Stage IIB, adenocarcinoma). Dyspnea developed postoperatively, and gradually deteriorated. Dyspnea was worsened by sitting or standing and was relieved in a recumbent position. Eventually, due to this severe dyspnea, he could not remain standing even under oxygenation. Oxygen desaturation in a standing position was remarkable; SpO2 was about 80% while standing, and 98% in a recumbent position. Contrast echocardiogram and right cardiac catheterization revealed a right-to-left shunt via foramen ovale. To address this complication, we initially tried endovascular treatment with implantation of a transcatheter device (Amplatzer®) across the interatrial communication, but in vain. Eventually, open-heart closure of the patent foramen ovale (PFO) was performed. The patient completely recovered from the symptoms after the closure of PFO.

Conclusions:
This case suggests that PFO that was not evident preoperatively could be caused by cardiac deformation postoperatively, and could be triggered by changes in position. Symptoms that appear while sitting or standing and are relieved in a recumbent position are characteristic of platypnea-orthodeoxia-syndrome (POS).

Disclosure: No significant relationships.
Keywords: complication, lobectomy, patent foramen ovale, hypoxemia, shunt
BILATERAL LOBAL LUNG TRANSPLANTATION ON EXTRACORPOREAL MEMBRANE OXYGENATION IN JEHOVAH’S WITNESS PATIENT

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Objectives:
The present case reports the challenging perioperative management of bilateral lobar lung transplantation on Extracorporeal Membrane Oxygenation (ECMO) for a Jehovah’s Witness patient.

Case description:
A 42 year old Jehovah’s Witness patient (157 cm, 64 kg), was listed for unilateral lung transplantation because of end stage non-specific interstitial pneumonia in November 2015. Because of clinical deterioration of the patient with the rare blood group AB, we accepted an organ offer of a donor with substantial size mismatch (+27cm) and changed our initial strategy to bilateral lobar transplant on ECMO. Given the particular situation of Jehovah’s Witness faith to refuse red packed blood cells, platelets and fresh frozen plasma, we want to describe the meticulous perioperative planning and management of this case. According to our standardized institutional patient blood management, we administered preoperatively erythropoietin, vitamin B12 and iron for a hemoglobin level of 177 g/l and hematocrit of 43%. After anesthesia induction, 380 cc of the patient’s own blood was scavenged, which was preoperatively agreed by the patient. During surgery, careful intraoperative hemostasis was performed as well as cell salvage and reinfusion (240cc) as accepted method of blood reuse by the Jehovah’s Witness patients. Central cannulation for Veno-Arterial ECMO was performed under standardized heparin protocol. Intravenous fluid solutions were limited to 1500cc crystalloid and 500ml colloidal fluid. Perioperative blood loss was estimated 660cc, cell saver blood as well as patient’s own scavenged blood was reinfused at the end of the bilateral left lower lobe lung transplantation. The patient was weaned from ECMO and transferred to ICU without further bleeding complication.

Conclusions:
To our knowledge this is the first report of bilateral lobar transplant on ECMO for a patient of Jehovah’s Witness which will be presented for the perioperative management.

Disclosure: No significant relationships.

Keywords: ECMO, Jehovah’s witness patient, bilateral lobal lung transplantation
MULTIPLE ESOPHAGEAL LEIOMYOMAS: A CASE REPORT

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Objectives:
Primary intramural benign tumors of the esophagus are rare. They account for 2% of all esophageal tumors. Leiomyomas are the most common benign esophageal neoplasms but rare condition. Incidence in autopsy is 0.005% to 5%. Multiple esophageal leiomyomas are extremely rare. There are only few reports of more than ten lesions.

Case description:
We are presenting a case of male patient with progressing dysphagia and tumor of the esophagus involving the esophageal wall more than ten centimeter in length, diagnosed by thoracic computed tomography scan, and transesophageal ultrasound examination. No changes of esophageal mucosa were found. Surgical exploration by right thoracotomy revealed multiple extramucosal tumors of various sizes from 5 millimeters to 2.5 centimeters. All of the lesions were enucleated without opening esophageal mucosa. After removal there were sixteen tumors counted. Patient recovered completely and dysphagia was not reported in the follow up period.

Conclusions:
Multiple esophageal leiomyomas are extremely rare, especially cases with over ten lesions. Surgery should be performed in all symptomatic cases, especially if dysphagia is present, when histopathological diagnosis is necessary, when malignancy must be ruled out or present with leiomyomas. Size of the lesion itself is a risk factor for malignancy and should be taken into consideration even if asymptomatic. That is why an early detection is important for appropriate treatment.

Disclosure: No significant relationships.
Keywords: diagnostic imaging, dysphagia, esophageal tumor, multiple leiomyomas
FATAL PULMONARY HYPERTENSION AFTER SURGICAL RESECTION OF LARGE PULMONARY ARTERIOVENOUS MALFORMATIONS

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³Internal Medicine, Clinical Hospital Mostar, Mostar, Bosnia and Herzegovina

Objectives:
Need of individualized approach in the treatment of large, high-flow arteriovenous malformations to avoid fatal physiological misbalance.

Case description:
We present a case report of a 46 year old woman with symptomatic high-flow arteriovenous malformations of the left lung and multiple minor malformations in both lungs associated with hereditary hemorrhagic teleangiectasia. Patient exhibited severe, life threatening hypoxemia and dyspnea. Radiology imaging showed one large AV malformation in the left lobe measuring 49,4 x 88 mm with the afferent and efferent vessels diameter of 10 and 12 mm and one smaller AV malformation size 32 x 31,3 x 28,3mm with vessels diameter of 9,6 x 11 mm.

Both malformations were surgically resected and patient was free of symptoms. In later onset, smaller malformations were treated by embolization. The patient was discharged and reported again in our unit after eight months with severe pulmonary hypertension refractory on medications leaving heart and lung transplantation as an only choice of treatment. The outcome was fatal before the transplantation took place.

Conclusions:
Treatment recommendations suggest that all pulmonary AV malformations should be treated with embolization therapy and that surgery is to be reserved for individuals that are not amenable to embolization. However management of large, high-flow malformations with severe symptoms should be balanced and individually approached, weighing the benefits and risks of specific treatments.

Disclosure: No significant relationships.

Keywords: pulmonary hypertension, surgery, lungs, arteriovenous malformation
SUBARACHNOIDAL-PLEURAL FISTULA WITH INTRACRANIAL HYPOTENSION SYNDROME: A RARE COMPLICATION OF EXTENDED LUNG RESECTIONS

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Objectives:
Lung surgery with chest wall resection is an established procedure for treatment of non-small cell lung cancer (NSCLC). In paravertebral localisation of the tumor an opening of the dura can occur during resection. Subarachnoidal-pleural fistula (SAPF) with development of a subdural hygroma and an intracranial hypotension syndrome (IHS) is a very rare complication after extended lung resections. In literature there are only a few case reports about this complication.

Case description:
We report about a 62 year old male patient who underwent a lower lobectomy with chest wall resection due to a NSCLC. During resection at the costovertebral joint the dura was opened and a few ml of cerebrospinal fluid (CSF) were lost. This injury was sealed with a fibrin patch (TachoSil®). On the 5th postoperative day the patient developed nausea, vomiting, confusion and headache. He also lost high amounts of pleural effusion. The cranial MRI showed a bilateral subdural hygroma with narrowing of the ventricles with a maximal width of 8 mm. Due to the clinical worsening up to somnolence the patient had to be mechanically ventilated. A high level of beta-trace protein was measured in the effusion. The myelography confirmed a persistent SAPF in the resection area. Due to the decreasing amount of effusion and improved neurology a surgical fistula closure was not necessary. The neurological symptoms disappeared under conservative treatment.

Conclusions:
SAPF with subdural hygroma and IHS occurs rarely after extended lung resections. It represents a significant perioperative complication, which entails respiratory and neurological impairment. It has to be considered if a persistently high pleural effusion or signs of cranial hypotension exist. It should not be underestimated, as it can result in tension-pneumocephalus, cerebellar insult, -bleeding or meningitis. SAPF can be confirmed by laboratory tests and imaging. The type of treatment depends on clinical picture and amount of pleural effusion.

Disclosure: No significant relationships.
Keywords: extended lung resection, subarachnoidal-pleural fistula, subdural hygroma
APPLICATION OF STERILE ABSORPTIVE FOAM DRESSING IN OPEN WINDOW THORACOSTOMY

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Objectives:
Post-pneumonectomy empyema associated to bronchopleural fistula is probably the most serious life-threatening postoperative complication of pneumonectomy. We describe our experience using a new dressing to cover the pleural cavity in open window thoracostomy to promote granulation.

Case description:
Between January 2014 and December 2015, two patients developed bronchopleural fistula following pneumonectomy for malignant disease. Both cases were surgical approach similarly. Open debridement of the cavity, bronchopleural fistula was repaired with direct closure and reinforcement with muscle flaps, followed by packing with povidone-iodine dressings, which had to be changed three times a day. During the management of the thoracostomy, we used a sterile absorptive foam dressing with open cell structure, made of bacteriostatic polyvinyl alcohol sponge, metilen blue and crystal violet. The foam microscopic structure achieves a capillary vacuum that pulls bacteria-laden exudates up and away from the surface which may facilitate healing. Our department has a good experience using it in the management of descending necrotizing mediastinitis to promote granulation and healing of exposed tissues, and therefore we tested in these patients. No complications related with the use of the dressings, and an improvement on the thoracostomy surface was observed, associated to a better quality of granulation tissue. This foam allowed us to decrease the times of dressing changes from three times per day to one change every two days, which represented a benefit for the patient and physicians. No morbidity or mortality related. One year follow up without complications in open window thoracostomy.

Conclusions:
The use of this foam is a complement in the management of the pleural cavity in the open window thoracostomy. It is a dressing with easy application, safe and comfortable for the patient that helps the healing of the tissues. All these properties allow the use of the dressing with both inpatients and outpatients.

Disclosure: No significant relationships.
Keywords: open window thoracostomy, post-pneumonectomy empyema, bronchopleural fistula, foam dressing
P-278

NATIVE LUNG SQUAMOUS CELL CARCINOMA AFTER SINGLE LUNG TRANSPLANTATION

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Objectives:
Active neoplastic disease is the contraindication to the chest organs transplantation. Despite thorough preoperative diagnostics it is sometimes possible to miss growing tumor in the diseased lungs.

Case description:

<table>
<thead>
<tr>
<th></th>
<th>0 Before LuTx</th>
<th>1 mth post LuTx</th>
<th>6mth post LuTx Before lobectomy</th>
<th>9mth post LuTx 3mth post lobectomy</th>
</tr>
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<tbody>
<tr>
<td>FEV1%</td>
<td>22</td>
<td>62</td>
<td>68</td>
<td>80</td>
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<tr>
<td>FVC%</td>
<td>29</td>
<td>72</td>
<td>80</td>
<td>96</td>
</tr>
<tr>
<td>PaO2mmHg</td>
<td>43</td>
<td>61</td>
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<td>76</td>
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A 61 year old female underwent left single lung transplantation (LuTx) due to COPD, because preoperative perfusion scintigraphy showed predominance of the right lung blood flow Right : Left as 65:35%. 3 months later the routine chest CT scan revealed pulmonary embolism and presence of the right native lung hilar tumor, which preoperatively was interpreted as the pulmonary vessel. The tumor size did not enlarge. Anticoagulation therapy was introduced and the PET-CT scan showed increased Standard Uptake Value of 18 U. On the sixth postoperative month right lower lobe lobectomy followed by systematic lymphadenectomy was performed. It was assessed as T1bN0M0/IA Bronchogenic Squamous Cell Carcinoma (SCC). Postoperatively the mediastinal shift towards the native lung and increase in FEV1 was observed (Table). On the 9th month 8mm right native lung tumor was found to be checked in six weeks’ time.
Conclusions:
The single lung Tx was unintentionally conducted in the patient with active contralateral SCC, found retrospectively on the preoperative CT scan. Left lung was transplanted due to significantly lower perfusion and the patient’s advanced age. Paradoxically, the left lung Tx improved lung function in the extent enabling to do the oncological resection of the native lung. The native lung lobectomy led to further lung function improvement due to kind of Lung Volume Reduction Surgery.

Disclosure: No significant relationships.

Keywords: single lung transplantation, lung cancer, lobectomy
P-279

NEOADJUVANT CRIZOTINIB RESPONSE IN ALK-POSITIVE STAGE IIIA-N2 NON–SMALL-CELL LUNG CANCER

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Objectives:
Traditionally, in stage III-N2 non–small–cell lung cancers (NSCLCs), neoadjuvant chemotherapy or chemoradiotherapy is the standard of care. However, targeted therapy is still rare in preoperative applications. To our knowledge, this is the first report of an inspiring response of locally advanced NSCLC after induction therapy with Crizotinib.

Case description:
A 61-year-old woman is described, immunohistochemical (IHC) staining results were positive for her anaplastic lymphoma kinase (ALK) protein in the cytoplasm. Crizotinib was prescribed at a dose of 250 mg twice daily for a 4-week period. Radiologic assessments were performed at baseline and generally after one month of treatment. The PET/CT scan after 30 days of treatment showed a striking response (Figs 1E, 1F, 1G). We observed an overall response rate of 58.3% (confirmed partial response) and decreases of all mediastinal lymph nodes. Adverse effects were confined to mild nausea (grade 1). Seven days thereafter, right lower lobectomy and mediastinal lymph nodes dissection were planned for the patient. Postoperative recovery was uneventful. Pathological examination of the right lower lobe showed a 1.0 cm rest lesion. Hematoxylin and eosin staining revealed an invasive adenocarcinoma. Three out of 20 lymph nodes revealed metastases.

Conclusions:
In conclusion, the response of NSCLC to treatment with Crizotinib can be fast, with a remarkable response after only four weeks of treatment, and can allow for complete tumor removal. Thus, biomarker-guided neoadjuvant treatment should be further evaluated in neoadjuvant settings for locally advanced but operable diseases. Only an appropriately sized, randomized trial of this type can answer this question definitively.
Disclosure: No significant relationships.
Keywords: NSCLC, crizotinib, anaplastic lymphoma kinase (ALK), neoadjuvant, III-N2
P-280

STABILIZATION OF FLAIL CHEST AND BILATERAL RIB FRACTURES BY NUSS BAR INSERTION

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Objectives:
Flail chest is caused by complex fractures of multiple ribs as a result of severe chest trauma, which can result in respiratory failure. We present the case of a patient who sustained trauma following out of hospital cardiac arrest who had stabilization by Nuss Bar insertion. This method of treatment for flail chest is rarely reported in the literature and we explain our rationale for using this technique in our case.

Case description:
We report a case of 58 year old man who was found collapsed in the street with VF arrest. He sustained multiple rib fractures bilaterally following aggressive external cardiac compression. Admission ECG showed Anterior ST segment elevation and a diagnosis of myocardial infarction was confirmed on coronary angiogram which demonstrated occlusion of the left anterior descending artery. Subsequently a drug eluting stent was inserted and the patient was transferred to the ICU, intubated and ventilated for immediate recovery. After two days of difficulty with weaning from ventilation he was referred for surgical consideration of chest wall stabilisation. The NUSS bar procedure was performed for stabilization of severe anterior flail chest while the patient was on clopidogrel without need for Video-Assisted Thoracoscopic Surgery (VATS). Bilateral Mid axillary incisions were performed and the Nuss Bar Inserted under the lower part of the sternum (size 17”). The patient was weaned from mechanical ventilation and extubated on the first postoperative day and was discharged from hospital without complication.

Conclusions:
Surgical stabilization of severe bilateral flail chest with NUSS bar by is a safe and useful treatment modality in carefully selected cases such as these when other stabilisation techniques may result in significant bleeding due to patients being anticoagulated.

Disclosure: No significant relationships.
Keywords: Nuss bar, flail chest, trauma
A RARE COMPLETE REMISSION CASE OF STAGE IVB COMBINED THYMIC EPITHELIAL TUMOUR 10 YEARS AFTER SURGERY

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Objectives:
Thymoma is an epithelial tumour with malignant potential that tends to recur locally and rarely metastasize. However, there are few reports on the treatment of metastatic thymoma, especially combined thymic tumour. Here, we report a rare complete remission case of Masaoka stage IVb combined thymic tumour successfully treated by using a multimodal strategy including thymothymectomy, resection of liver metastasis, and chemoradiotherapy followed by weekly low-dose chemotherapy.

Case description:
A 73-year-old man presented with multiple liver nodules on an abdominal echogram during a periodic medical examination. Fluorine-18-fluorodeoxyglucose (FDG)-positron emission tomography computed tomography (PET-CT) showed several FDG-positive nodules: 30- and 12-mm nodules in the liver (S7 and S2), 26- and 15-mm nodules in the anterior mediastinum, and a 20-mm nodule beside the inferior pulmonary vein. As needle biopsy from a liver nodule led to a suspicion of poorly differentiated hepatocellular carcinoma, primary hepatocellular carcinoma with thymic epithelial tumour was diagnosed. Thymothymectomy with lymph node dissection was first performed through a video-assisted thoracoscopic surgery. The resected specimens showed a combined thymic epithelial tumour (type B3 thymoma and small cell carcinoma) with lymph node metastasis of type B3 thymoma. Moreover, liver nodules were completely resected through a right lobectomy and S2 partial resection of liver, and a diagnosis of metastasis of type B3 thymoma was concluded. The final diagnosis was combined thymic tumour with multiple mediastinal lymph nodes and liver metastases. As a follow-up PET-CT scan 3 months after surgery revealed multiple rib and celiac lymph node metastases, concurrent radiation (40 Gy for these metastases) and chemotherapy followed by weekly low-dose paclitaxel (45 mg/m²) and carboplatin (AUC 2) were performed for two years. He remains in complete remission 10 years after the initial surgery.

Conclusions:
We present a rare complete remission case of combined thymic epithelial tumour with multiple metastatic B3 thymoma treated by multimodality treatment.

Disclosure: No significant relationships.
Keywords: thymoma, combined thymic tumour, small cell carcinoma
EFFECTS OF RESPIRATORY THERAPY ON THE OUTCOME AFTER LUNG VOLUME REDUCTION SURGERY: INITIAL RESULTS AFTER THE IMPLEMENTATION OF A NOVEL ALGORITHM OF RESPIRATORY THERAPY

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Objectives:
Lung Volume Reduction Surgery (LVRS) is an important option for treating terminal lung emphysema in well-selected patients. To prevent postoperative pulmonary complications (PPCs) and improve the outcome after surgery, we developed a respiratory therapy algorithm adapted to the individual needs of the patients. In the current study, results of LVRS before and after the implementation of the therapy algorithm were compared.

Methods:
Between 05/2012 and 08/2015, n = 66 patients underwent minimally invasive LVRS. Data was documented prospectively and analyzed in a retrospective fashion. Pre- and postoperative blood gas analysis (BGA) and six-minute-walk-trial (6MWT) were compared before and after introducing the algorithm in 03/2014.

Results:
After 03/2014, a novel respiratory therapy algorithm was applied to n = 35 patients (6 females, mean age 59 ± 18 years) undergoing LVRS. This algorithm refers to the typical pathophysiology of COPD and lung emphysema, its systematic and priority orientated therapy and the beginning and intensity of inspiratory muscle training (IMT). In the 2012/2013 group, a total of 31 patients (11 female, mean age 65 ± 10 years) were included. LVRS lead to a significant improvement of 6MWT-distance and oxygenation in capillary BGA was observed. The novel respiratory therapy algorithm led to a significant improvement of 6MWT-distance and oxygenation in group 2014/2015 in comparison to group 2012/2013 (p< 0.05). The duration of hospital stay was extended in group 2014/2015 because of a more intense treatment. However, this did not reach statistical significance.

Conclusions:
After the successful implementation of this novel therapeutic algorithm we observed a positive effect of outcome in patients after LVRS. A major focus of the algorithm is to adapt different therapeutic options to the patients’ risk factors and thereby specifically and efficiently recognizing the individual patients’ needs.

Disclosure: No significant relationships.
Keywords: respiratory therapy, LVRS, therapy algorithm
EVALUATING WALKING CAPACITY DURING HOSPITALIZATION FOR LUNG CANCER RESECTION

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Objectives:
Exercise capacity during hospitalization for lung resection could be considered a basal parameter for the evaluation of quality of life during long-term follow-up. To our knowledge, immediate postoperative walking capacity has never been reported. In this study we are observing non-supervised daily physical activity in the immediate days following anatomical lung resection.

Methods:
Observational study on consecutive patients admitted for anatomical lung resection in a four-month period of time. All cases were approached by minimally invasive technique. Patients were instructed by nursing and physiotherapy staff and asked to wear a portable pedometer (Omron HJ-720T-E2) from admission up to hospital discharge, excluding operation day and the first hours at the recovery room. Variables collected: gender, age, BMI, type of lung resection, total steps, aerobic steps (walking at least 10 minutes without interruption) and daily total strolled distance in meters.

Results:
We have included 50 cases (33 males, 66%); 34 patients underwent lobectomy or bilobectomy and 16 segmentectomy or wedge resection. Average patients’ age was 64±10.5 years, BMI: 26.9± 5.7. The average walked distance on the first day was 6100 m and on the 4th one, 7400 m. Compared to preoperative, total steps were statistically different on days 1 and 2 (day 1 p=0.0001; day 2 p=0.049) The rate of aerobic to total daily steps was comparable after the second postoperative day (Figure 1). All patients were able for walking on the first postoperative day.
Conclusions:
After anatomical lung resection, patients are able to perform a relevant amount of physical activity. These data could be useful for designing postoperative physical recovery programs to be implemented after surgery. The influence of several functional preoperative values on exercise capacity should be investigated in larger series of cases.

Disclosure: No significant relationships.

Keywords: lung resection, perioperative care, adverse surgical events, pedometer
NURSE AND PATIENT PERCEPTIONS OF THE ABC APPROACH FOR SMOKING CESSATION WITH OPERABLE LUNG CANCER PATIENTS

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Objectives:
Up to 40% of patients diagnosed with lung cancer smoke. Up to 50% of these continue to smoke after diagnosis or relapse quitting smoking. Smoking has implications for the treatment of lung cancer, the risk of cardiovascular disease, and other primary cancers. A survey from 2013 showed that 27% of patients undergoing lung cancer surgery did not feel sufficiently informed about the impact of smoking on health. Therefore the aim of this project is to implement and evaluate the ABC approach for smoking cessation and gain knowledge on how patients admitted for lung cancer surgery experience the ABC approach for smoking cessation and how do nurses experience working with this approach.

Methods:
A group of six nurses was established and trained in the ABC approach for smoking cessation. Subsequently they tried the approach with patients who underwent surgery for lung cancer. The intervention was evaluated qualitatively within a phenomenological framework of a semi-structured life-world interviews with 1 patient, and a group interview with 3 nurses.

Results:
Different themes emerged from the interviews. Themes from the patient interview was; Motivation, Individual focus and Dialogic space. Themes emerged from the interview with the nurses was; Smoking is a sensitive subject, Relation to the patient, time and priority, and the informal and non-counselling conversation about smoking.

Conclusions:
The patient experienced the ABC approach for smoking cessation as a dialogic space where the focus was on the individual. The nurses experienced the ABC approach as a good structure for conversations on smoking cessation, but they had difficulties in identifying themselves as consultants and did not want the conversations to be formal.

Disclosure: No significant relationships.
Keywords: smoking cessation, nursing intervention, lung cancer
N-285

NURSING CARE FOR SIMULTANEOUS BILATERAL VATS LUNG RESECTION

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Objectives:
For patients with bilateral early stage lung cancers, simultaneous bilateral lung resection is an option. This study aims at identifying characteristics of such procedure and improving the nursing management accordingly.

Methods:
We retrospectively reviewed 225 consecutive cases of simultaneous bilateral video assisted thoracoscopic surgery (VATS) lung resection in a single center from Aug 2005 to Dec 2014.

Results:
Among these 225 patients, 14 received bilateral lobectomy, 111 received unilateral lobectomy and contralateral segmentectomy or wedge resection, 100 received bilateral segmentectomy and/or wedge resection. One patient died of pulmonary embolism eight days after surgery. Postoperative complications included 12 tachycardia, seven prolonged airleak, four severe pulmonary infection, one reoperation for hemostasis, one atelectasis requiring bronchoscopic aspiration, one respiratory failure requiring mechanical ventilation. Specific nursing management consisted of improved nebulization, original rehabilitation exercise, assistance in early ambulance, measures against chest drainage dislocation and intensified pain management.

Conclusions:
Simultaneous bilateral lung resection perplexed its nursing care. Specifically designed nursing measures could overcome its disadvantages, reduce postoperative complications and contribute to patient’s restoration.

Disclosure: No significant relationships.
Keywords: VATS, bilateral lung resection, postoperative nursing
TIME USED FOR PREPARATION OF PATIENTS UNDERGOING THORACOTOMY AND VATS LOBECTOMY: A MULTICENTER OBSERVATIONAL STUDY.

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Objectives:
In recent years, scientific literature and signs laws have led to focus on surgical hospitals activities, considered critical in economic and financial terms. In our surgical unit, the perception is that patient’s preparation, which occurs inside the room the day of surgery, requiring prolonged periods leading to a delay in timetable planned for early intervention and the postponed or cancellation of subsequent operating sessions. The objective of this study is twofold: understand how patient’s preparation, undergoing thoracotomy or vats lobectomy, is organized according to scientific literature, and in other Italian’s reality and then analyze our operating theater technical time used for patient’s preparation.

Methods:
A literature search and two observational studies were conducted. Bibliographic research used three databases (PubMed, CINAHL and Cochrane Database of Systematic Review). For the first study we opted for a telephone interview to thoracic surgery’s operating rooms of Northern and Central Italy. The second study analyzed timing in our operating room in a sample period of 2015.

Results:
The literature search resulted in the retrieval of 100 articles submitted to critical evaluation. The first study obtained the interview of seven centers. It showed that in two of the seven, patient’s preparation takes place in the operating room the day before the surgery. Instead the remaining centers (5) introduced new procedures that reduce preparation time.

Finally the second study observed 50 operations (45 thoracotomy and 5 vats lobectomy) in our reality. Average time of patient’s preparation is one hour and ten minutes, turn-over time is 35 minutes. Average daily operations is 2.60, room’s utilization rate 0.7.

Conclusions:
We observed that in our reality patient’s preparation requires prolonged periods. These procedures may be conducted, according with literature, outside operating room before surgery, or new procedures could be introduced to reduce preparation time, as other Italian centers.

Disclosure: No significant relationships.
Keywords: surgical hospitals activities, turn-over time, timing
N-287

POSTOPERATIVE PULMONARY REHABILITATION AFTER LUNG CANCER SURGERY LESSENS THE IMPACT OF PARENCHYMAL LOSS. A PILOT STUDY.

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²Respiratory Physiotherapy, Rotherham District General Hospital, Rotherham, United Kingdom,
³Cardiothoracic Surgery, Sheffield Teaching Hospitals, Sheffield, United Kingdom,

Objectives: We aimed to review the initial results of our first cohort of patients attending a postoperative rehabilitation centre, in terms of pulmonary lung function and exercise tolerance after a complete cycle of postoperative respiratory physiotherapy.

Methods: The patient-centred progressive programme included a combination of endurance and strengthening exercises to include treadmill walking, bike and rowing alongside functional strengthening. All lung cancer patients operated by a single surgeon in 2015 were offered entry to this program. The initial group of patients who entered the course agreed to undergo post-rehabilitation pulmonary (FEV1%, TLCO%) and functional ability (ISWT E SWT and Oxygen Saturations) tests. The data was analysed using Wilcoxon Signed Ranks test for paired data.

Results:

<table>
<thead>
<tr>
<th>Pre rehab</th>
<th>Post rehab</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental SWT</td>
<td>210 (80-500)</td>
<td>Incremental SWT 300 (120-460) 0.05</td>
</tr>
<tr>
<td>Endurance SWT</td>
<td>576 (118-1812)</td>
<td>Endurance SWT 1654 (330-2757) 0.006</td>
</tr>
<tr>
<td>PpoFEv1%</td>
<td>62 (38-107)</td>
<td>FEV1% 71 (32-109) 0.2</td>
</tr>
<tr>
<td>PpoTLCO%</td>
<td>59 (35-93)</td>
<td>TLCO% 66 (26-103) 0.7</td>
</tr>
<tr>
<td>O2 sats at rest</td>
<td>97 (92-98)</td>
<td>O2 sats at rest 97 (94-99) 0.7</td>
</tr>
<tr>
<td>O2 sats after exertion</td>
<td>94 (81-98)%</td>
<td>O2 sats after exertion 93 (86-98) 0.5</td>
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</table>

The initial 12 patients [7 female and 5 male, median age of 75.5 (range 55 to 84) years] who completed a full course of postoperative rehabilitation were included in this study. They had undergone lobectomy or anatomical segmentectomy via Single port Vats (10) or thoracotomy (2). The outcomes following the six week course of pulmonary rehabilitation were extremely positive. Improvements were seen in the functional ability of 83% of patients tested, with the vast majority demonstrating significant improvements in both domains tested: incremental shuttle walk test (ISWT) and endurance shuttle walk test (ESWT). TABLE 1. There was also a significant subjective improvement in respiratory symptoms, and the feedback received from the patients about attending the course was exceptional.
Conclusions:
In our experience with this initial cohort of patients, the postoperative pulmonary rehabilitation offers a maintaining of the lung function along with the improvement of exercise tolerance and respiratory symptoms. This pilot has encouraged us to continue with this program and offer it widely after surgery. Quality of life studies might help the understanding of the effects of the course.

Disclosure: No significant relationships.
Keywords: lung surgery, rehabilitation, lung function
FEASIBILITY OF THE FIT 4 SURGERY APP- CAN IT REPLACE CONVENTIONAL PRE AND POST OP PULMONARY REHABILITATION IN THE GERIATRIC POPULATION?

Salma Kadiri¹, A. Kerr², T. Arvanitis², C. Golby², G. Mannion², K. Brunton², N. Taylor², S. Lightfoot², E. Bishay³, R. Steyn³, P. Rajesh³, M. Kalkat³, B. Naidu³

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Objectives:
Pulmonary rehabilitation is associated with a reduction in post-operative complications, enhanced recovery and improved quality of life. The best way to deliver such rehabilitation has not yet been established. Currently COPD type rehabilitation programme, in our unit improves complications and hospital readmission rates but access to care is variable. The aim of this study is to establish the feasibility of delivering a pulmonary rehabilitation service at home, at the convenience of elderly patients through a tailored smart home device app.

Methods:
A cohort study running for 18 months tested the efficiency of the rehabilitation classes. The compliance rates were examined further to develop a more effective programme. Using patient feedback the issues in the initial programme were addressed. A rehabilitation programme which provides remote feedback to both patients and clinicians was developed. Hospital based testing of the app with patients was conducted to establish any technical problems.

Results:
Patients’ motivation was good in the initial rehabilitation programme but there were delays getting patients to attend sessions prior to surgery. Only 48% patients re-joined the classes after surgery (see table 1). The app has been improved with a set of rehabilitation exercises where the patients train at up to 60% of their maximum exercise capacity. The bluetooth enabled oximeter alongside the app provided the patients a reading of their heart rate and oxygen saturations.

<table>
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<tr>
<th>Reasons for not attending pulmonary rehabilitation post-surgery</th>
<th>N=30</th>
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<tr>
<td>Undertaking Chemotherapy</td>
<td>11 (37%)</td>
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<tr>
<td>Medically unfit</td>
<td>7 (23%)</td>
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<tr>
<td>Personal choice</td>
<td>9 (30%)</td>
</tr>
<tr>
<td>Capacity issues</td>
<td>4 (13%)</td>
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<tr>
<td>Unknown</td>
<td>2 (7%)</td>
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</table>
Conclusions:
It is evident that there is a need for an at home pulmonary rehabilitation service which can be provided at the patient’s ease. The app, used daily, increases the efficiency of the programme and is implemented as soon as the patient is ready for surgery. This will ensure the time taken to start the programme is minimized and therefore surgery is never delayed. Further evaluation is currently undergoing of the applicability and compliance of this service with pre-surgical patients.

Disclosure: No significant relationships.

Keywords: lung surgery, elderly, smart device, compliance, pulmonary rehabilitation
THE STATUS QUO OF ESOPHAGEAL SURGERY PATIENTS VISIT THORACIC SURGERY NURSES OUTPATIENT

Hongxia Zhou
Department of Thoracic Surgery, West China Hospital of Sichuan University, Chengdu, China

Objectives:
To understand the importance of esophageal surgery patients to visit the thoracic surgery nurses outpatient. Discuss the methods to setting up nurse comprehensive outpatient for esophageal surgery patients.

Methods:
Four hundred and twenty seven esophageal surgery patients visit the thoracic surgery nurses outpatient were enrolled. The objects including 407 patients with esophageal carcinoma, 20 patients with esophageal benign tumor, 163 were VATS, 264 were thoracotomy surgery. Of the 427 respondents, male were 255 and female were 172, their average age was 59 years old (SD = 11).

Results:
Content of nurse comprehensive outpatient: 1. Wound treatment: 263 cases of normal wound dressing, 18 cases abnormal wound dressing, 265 cases of stitches. 2. Health consultation: 267 cases of patients with active consultation, focus on the content of the diet, wound treatment, follow-up treatment, physical exercise, postoperative survival rate. 3. Make the postoperative checklists: 131 cases of chest X-ray, 19 cases of gastroscopy, 48 cases of CT, 146 cases of barium meal examination, 12 cases of bone scanning. 4. Psychological nursing were 127. 5. It took 5~90 minutes for outpatient treatment, the average time were 19.3 minutes. 6. Using the analysis of variance to compare different postoperative follow-up period: the average time was 63.19±119.58 for postoperative time; the VAS mean score was 2.51±1.56 for different period pain (F=1.01, P=0.3886); the mean score was 0.73±0.94 for gastroesophageal reflux (F=1.56, P=0.1979); the mean score was 0.40±0.80 for dysphagia (F=6.29, P=0.0004).

Conclusions:
1. Thoracic surgery nurses outpatient is an effective way for esophageal surgery patients on postoperative check and health consultation. 2. Thoracic surgery nurses need to pay more attention to rehabilitation exercise, wound treatment, diet management, medication management, follow-up treatment, postoperative survival rate for esophageal surgery patients. 3. Wound dressing and stitches are urgent problems within one month after discharge, thoracic surgery nurses need to make the appropriate treatment plan for abnormal wound.

Disclosure: No significant relationships.
Keywords: esophageal disease, nurses outpatient, comprehensive treatment
LIVING WITH INCURABLE ESOPHAGEAL CANCER. A PHENOMENOLOGICAL HERMENEUTICAL INTERPRETATION OF PATIENT STORIES

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²Enhed for Sundhedstjenesteforskning, Sygehus Lillebælt/Syddansk Universitet, Vejle, Denmark

Objectives: The study explores how patients diagnosed with incurable esophageal cancer experience living with the illness, and provides insight into and an understanding of the patients’ situation, reality and phenomena in their life world.

Methods: The method takes a phenomenological-hermeneutic approach, inspired by the French philosopher Paul Ricoeur’s narrative theory on mimesis as the structure and process of the method, and Ricoeur’s theory of interpretation for the analysis of patient stories. The stories materialise from narrative interviews, and the phenomena of the patients’ life world results in an analysis of these stories.

Results: Through the analysis of the narrative interviews, phenomena of the patients’ life world appear which are described in themes such as debut of the illness, denial, the person’s own suspicion, existential turning point, despair, hope, the body, affirmation of irrevocable illness, acknowledgment of dying, life phenomena, relations and feeling of independence. The understanding of the patients’ experiences is augmented and improved through a discussion of the themes in a philosophical perspective, drawing upon theoretical and philosophical viewpoints of Kierkegaard, Løgstrup, Merleau-Ponty, Ricoeur, Benner & Wrubel, and on empirical research.

Conclusions: Based on the phenomena in the ill person’s life world brought about by analysis, it seems that incurably ill esophageal cancer patients find themselves in a complex life situation, in which they need more than an objective estimate and fulfilment of need from hospital service. Our study illustrates some perspectives on the life situation of the incurably ill, which will contribute to the improved development of supportive care in nursing.

Disclosure: No significant relationships.
Keywords: esophageal cancer, experiences, palliation, philosophy
N-291

THE ENHANCED ADMINISTRATION OF EARLY AMBULATION WITH A MOVABLE INFUSION CARRIAGE COULD ACCELERATE PATIENT’S POST-OPERATIVE RECOVERY AFTER MINIMALLY INVASIVE ESOPHAGECTOMY: A COMPARATIVE STUDY

M. Hu¹, H. Wang², Jiawen Zhang¹, Y. Wang¹, L. Yang¹, Y. Ou¹, L. Tan², J. Xu¹
¹Department of Nursing, Zhongshan Hospital, Fudan University, Shanghai, China,
²Department of Thoracic Surgery, Zhongshan Hospital, Fudan University, Shanghai, China

Objectives:
Early ambulation is one of the key points for the patient’s postoperative recovery, which has been confirmed in abdominal surgery. However, this strategy is still difficult to practice in the esophagectomy surgery, because of the heavy burden of thoracic drainage devices as well as long-time intravenous infusion for fast (about 7 days) after esophagectomy. Herefore, we designed and made a movable infusion carriage which could not only carry the thoracic drainage devices (tubes and bottles), but also support the intravenous infusion equipments (liquid bottles, perfusion tube and pump). Moreover, it could give a support strength for the patients when walking. With this carriage, we attempted a protocol of enhanced administration of early ambulation TID for the patients after esophagectomy which were implemented and supervised by ward nurses. This study was to examine the effect of this enhanced administration with comparison to conventional care.

Methods:
A total of 120 consecutive esophageal cancer patients between September 2014 and October 2015 were included. All patients underwent minimally invasive esophagectomy by one surgical team. The initial 60 patients implemented conventional care (Group CC), and the later 60 implemented enhanced administration (Group EA). Patients’ demographics and clinical outcomes were recorded and statistically compared.

Results:
The two groups were comparable in demographics and surgical data (including operative-time and blood-loss). However, the first-time out of bed was much earlier in Group EA than Group CC (32[24-56]h vs 48[40-80]h, p=0.000); the first time of expel gas was earlier in Group EA than CC (70.9±15.7h vs 106.2±20.3h). As a result, pulmonary complications were less in Group EA than CC (5.3% vs 16.7%, p=0.040), and the postoperative hospital stay was less in Group EA than Group CC (10[8-35]d vs 12[9-48]d, p=0.026).

Conclusions:
The enhanced administration of early ambulation with a movable infusion carriage could accelerate patient’s postoperative recovery after minimally invasive esophagectomy.

Disclosure: No significant relationships.
Keywords: patient’s postoperative recovery, enhanced administration, ward nurse, minimally invasive esophagectomy
NOTES

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### Abstract Author List

**24th European Conference on General Thoracic Surgery**  
29 May – 1 June 2016  
Mostra d’Oltremare, Naples, Italy

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**Mostra d’Oltremare, Naples, Italy**

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