Thoracoscopic Pneumonectomy

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Disclosures

Consultant Scanlan Instruments

No conflicts of interest related to this presentation
Thoracoscopic Lobectomy: Duke Approach

2 incisions: Camera port (1 cm) + Access incision (4.5 cm)
Thoracoscopic Pneumonectomy

• Introduced with the demonstration of feasibility without the demonstration of advantages (unlike thoracoscopic lobectomy)

• Outcome advantages—QOL, complications, compliance with adjuvant chemo—are inferred

• Nevertheless, widespread experience is not as convincing as VATS lobectomy regarding safety and efficacy
Thoracoscopic Pneumonectomy

Potential Criticisms

1. Safety: inability to manage bleeding
2. Efficacy: inability to determine is sleeve lobectomy is feasible
Does Thoracoscopic Pneumonectomy for Lung Cancer Affect Survival?

• Pneumonectomy for malignancy (2002-08)
• 70 patients: VATS 24, Open 35, Conversions 8
• Complication rates similar among all 3 groups
• VATS: shorter LOS and less blood loss vs Open
• Conversion pts: longer LOS and more blood loss
• 30-day mortality: 1 death in VATS and open groups
Thoracoscopic Pneumonectomy: Duke

- 23 patients underwent attempted VATS pneumonectomy; 17 (73.9%) were completed VATS and 6 required conversion to thoracotomy
- There were no peri-operative mortalities
- Conversions were more likely to have CAD, DM, CHF, poorer pulmonary function and to have received induction chemotherapy or previous thoracic surgery
Thoracoscopic Pneumonectomy

Reasons for Conversion (n=6)

- Anatomical hilar dissection not amenable to VATS (n=4)
- Pulmonary artery bleeding (n=1)
- Adhesions (n=1)
Thoracoscopic Pneumonectomy

Outcome of Conversion:

Higher blood loss ($p = 0.001$)

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<tr>
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<th>VATS</th>
<th>Open</th>
<th>Conversions</th>
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<tr>
<td>EBL (ml)</td>
<td>200</td>
<td>250</td>
<td>1275</td>
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Thoracoscopic Pneumonectomy

Compared to 44 matched thoracotomy patients:

• VATS patients had shorter hospital stay (median LOS = 4 vs. 5 days, p < 0.01)

• Operative time, morbidity, and mortality were not significantly different

• Adjuvant chemotherapy was started sooner in VATS patients

• No differences in short or long term survival
Thoracoscopic Pneumonectomy
An 11-Year Experience

• 107 consecutive pneumonectomies 2002 to 2012
• Open 40   VATS 50   Conversions 17
• VATS cohort had more pre-op comorbidities and were older (65 years vs 63 years, \( P = 0.07 \))
• C-stage lower for VATS (26% vs 50% stage III, \( P = 0.035 \))
• P-stage was similar (25% vs 38%, \( P = 0.77 \))
• VATS approach yielded similar complications with no catastrophic intraoperative bleeding

• Successful VATS rates rose from 50%-82% by the 2nd half of the series \( (P = 0.001) \)

• Completion pneumonectomy cases (13.4% VATS, 7.5% open) had similar outcomes
• No difference in early pain among 3 groups
• More patients undergoing VATS were pain-free at 1 year (53% vs 19%, \( P = 0.03 \))
• Conversions: longer ICU (4 vs 2 days, \( P = 0.01 \))

Median survival stage I-II

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<tr>
<th>VATS</th>
<th>Open</th>
<th>Conversions</th>
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<td>80 m</td>
<td>28 m</td>
<td>16 m</td>
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Thoracoscopic Pneumonectomy
An 11-Year Experience

Athar Battoo, MD; Ariba Jahan; Zhengyu Yang, MS; Chukwumere E. Nwogu, MD; Sai S. Yendamuri, MD, FCCP; Elisabeth U. Dexter, MD; Mark W. Hennon, MD; Anthony L. Picone, MD, FCCP; and Todd L. Demmy MD, FCCP
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![Graph showing the percentage of pain-free patients over time for VATS and Open procedures.](image)
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C

Logrank p = 0.0835 (Wilcoxon p = 0.0371)

Median Survival
- VATS 80
- Open 28
- Conversion 16

D

Logrank p = 0.6102

Median Survival
- Conversion 41
- VATS 18
- Open 7

OS Months (Path Stage 0,1, and 2)
OS Months (Path Stage 3 and 4)
Multicenter Study of Open vs VATS Pneumonectomy for Lung Cancer

- 3 Institutions
- 401 patients: VATS 155 (39%)
  Open 246 (61%)
Thoracoscopic Pneumonectomy

• VATS pneumonectomy at an experienced center appears safe and feasible in selected patients
• Even in the most difficult cases, VATS exploration/lysis of adhesions is advantageous
• Be prepared to convert earlier during VATS pneumonectomy than lobectomy
• QOL advantages not fully demonstrated but there may be long-term pain advantages
Learning Curve for Open Lobectomy

Performance measure

Steep acceleration

Slow beginning

Plateau

Number of trials
Learning Curve for VATS Lobectomy

- Performance measure
- Number of trials
- Steep acceleration
- Plateau
- Slow beginning
Learning Curve for VATS Pneumonectomy

- Difficult to define
- The learning curve is best understood as the overall experience with uncomplicated VATS lobectomy (200-500?) and overall experience with complex VATS lobectomy (>50?)
- Extensive nodal dissection during mediastinoscopy facilitates VATS approach
Right VATS Pneumonectomy

1. VATS exploration, exclude mets, lyse adhesions
2. Inferior ligament, LN 7, 8, 9, posterior pleura
3. Mobilize inferior vein, superior vein, LN 2, 4
4. Staple inferior vein, mobilize bronchus
5. Staple superior vein, mobilize artery
6. Staple artery (from inferior/posterior port)
7. Staple bronchus
Left VATS Pneumonectomy

1. VATS exploration, exclude mets, lyse adhesions
2. Inferior ligament, LN 7, 8, 9, posterior pleura
3. Mobilize inferior vein, superior vein, LN 5, 6
4. Staple inferior vein, mobilize bronchus
5. Staple superior vein, mobilize artery
6. Staple artery (from anterior port)
7. Further mobilize and staple bronchus
Lessons Learned

1. Not all cases can be completed by VATS
2. Mobilize as much as possible prior to stapling
3. Remove all visible hilar and mediastinal LN
4. Stapling the artery requires 2 ports, perfect visualization, no tension on PA
5. Specimen retrieval should be deliberate, not random
Provides the flexibility to use the linear stapler from the “camera” port.
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