Surgery for Pulmonary NTM Disease

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Slides Courtesy of John D. Mitchell, M.D.
Disclosures:
Nothing to disclose.
Surgery for Pulmonary NTM Disease
Case Presentation

• 65 year old female
• Chronic productive cough, recurrent infection
• Documented MAC infection by ATS criteria
• Repeated treatment failures, now macrolide resistant
• Referral and evaluation at NJH
• Imaging suggests areas of focal bronchiectasis involving right lung
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Pre-Surgery Treatment

• Initiate multidrug regimen, including IV Amikacin

• Planned VATS RML, RUL anterior segment resection in 8 weeks after initiation of therapy

• 2 – 4 day hospital stay with surgical procedure

• 7 - 10 day stay in Colorado at time of surgery
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“VATS” Approach

- Thoracoscopic Lobectomy
  - Two 1 cm incisions
  - One 3 cm “utility” incision
  - No rib spreading
- Operation otherwise identical to open approach
- Double lumen tube
- No epidural catheter
- Prior surgery not absolute contraindication
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Double Lumen Endotracheal Tube
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Anesthesia / Analgesia

• Double Lumen Tube

• Typically, no epidural

• Intercostal blocks administered at surgery
  – 0.25% marcaine with epi

• Postoperative PCA → oral NSAID ± narcotic
Thoracoscopic Lobectomy/Segmentectomy

Instruments

- 0 - 120 degree scope
- Soft tissue retractor
- Thoracoscopic-specific:
  - Clamps
  - Right angle
  - Forceps
- Small (pediatric) sucker
- Kidney pedicle clamp
- Staplers
- Thoracoscopic clip appliers
- Harmonic scalpel
Thoracoscopic Lobectomy/Segmentectomy

Instruments
Thoracoscopic Lobectomy/Segmentectomy

Wound Protection
Surgery for Pulmonary NTM Disease

Indications for Surgery

Persistent, focal (cavitary or bronchiectatic) lung disease after antimicrobial treatment, usually in the setting of recurrent symptoms, documented treatment failure, or antimicrobial resistance.

Surgical resection should be seen as an adjunct to antimicrobial therapy, which remains the mainstay of treatment.
What is the Goal?
Surgery for Pulmonary NTM Disease
Basics of Surgical Therapy - Goals

- **Eradicate infection**
  - Culture negative
  - Off antibiotics
  - Symptom free

- **Symptom control**
  - Intractable cough
  - Hemoptysis

- **Limit damage to uninvolved lung**
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Presentation

- Middle-aged females, thin, Caucasian, nonsmokers, right middle lobe / lingular disease

- Isolated large, thick-walled cavitary disease.

- Elderly men, smokers, ETOH abuse, underlying COPD. Resembles TB, may progress to complete lung destruction.
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Results of Surgical Therapy

- **Corpe, 1981**: 131 cases, mortality 6.9%, BPF 5.3%, 93% sputum conversion rate

- **Nelson, 1998**: 28 cases, mortality 7.1%, BPF 3.6%, complication rate 32%, 88% sputum conversion rate

- **Shiraishi, 2002**: 21 cases, mortality 0%, complication rate 29%, sputum conversion 100% → 90% at 2 years

- **Mitchell, 2008**: 265 cases, mortality 2.6%, complication rate 18%, BPF 4.2%, 87% sputum conversion rate
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Minimally Invasive (VATS) Approach

• Study period: July, 2004 to June, 2010

• 171 patients → 212 cases
  – 41 patients had bilateral resections

• Mean age: 59 years (26 – 82 years)

• Predominately Caucasian (93%) and Female (93%)

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Minimally Invasive (VATS) Approach

• Prior thoracic surgery in 10%

• Mean duration of medical therapy prior to referral for surgery: 61 months (4-354 months)

• Indications for surgery: Focal parenchymal disease with recurrent hemoptysis or pulmonary infections, or failure or intolerance of medical therapy

## Surgery for Pulmonary NTM Disease

**Minimally Invasive (VATS) Approach**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lobectomy</td>
<td>126</td>
</tr>
<tr>
<td>Segmentectomy</td>
<td>73</td>
</tr>
<tr>
<td>Mixed</td>
<td>13</td>
</tr>
</tbody>
</table>

Conversion to thoracotomy in 10 cases (4.7%)

No operative mortality; Complications in 19 patients (8.9%)

Mean hospital length of stay 3.7 days (1 – 23 days)

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How do patients really do?
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Long Term Outcomes

• Jurand et al: 69 patients treated for M. abscessus. Addition of surgery to treatment regimen significantly improved conversion and culture negativity at one year.

• Asakura et al: 125 patients, MAC in 80%. Culture conversion in 91%, with 10 year relapse rate of 20%. Pneumonectomy, low BMI, advanced age, residual cavitary disease associated with worse prognosis.
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BPF after Pneumonectomy

Shiraishi, 2010: MDR-TB vs. NTM pneumonectomy

• No operative mortality

• MDR-TB: 22 patients (7 right, 15 left)
  – Male 72%, Sputum negative 63%
  – BPF rate 4.5% (1 right)

• NTM: 11 patients (7 right, 4 left)
  – Female 72%, Sputum negative 9%
  – BPF rate 45% (4 right, 1 left)
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Common Questions

• Should I have surgery to treat my NTM infection?

• Can I have my surgery using a minimally invasive (VATS) approach?
Surgery for Pulmonary NTM Disease

Common Questions

• Should I have surgery to treat my NTM infection?

• Can I have my surgery using a minimally invasive (VATS) approach?

• Can I have the surgery and skip the medicine?

• When should the surgery occur?

• What will my breathing be like after the surgery?
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Summary

• Surgical resection in pulmonary NTM disease may lead to improved outcomes in selected cases

• Lung resection and muscle flap use often possible using modern minimally invasive techniques

• Coordination of care best approached in multidisciplinary environment

• Resection for infectious lung disease differs from resection for cancer: experience counts