

Surgery for Pulmonary NTM Disease



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Disclosures:

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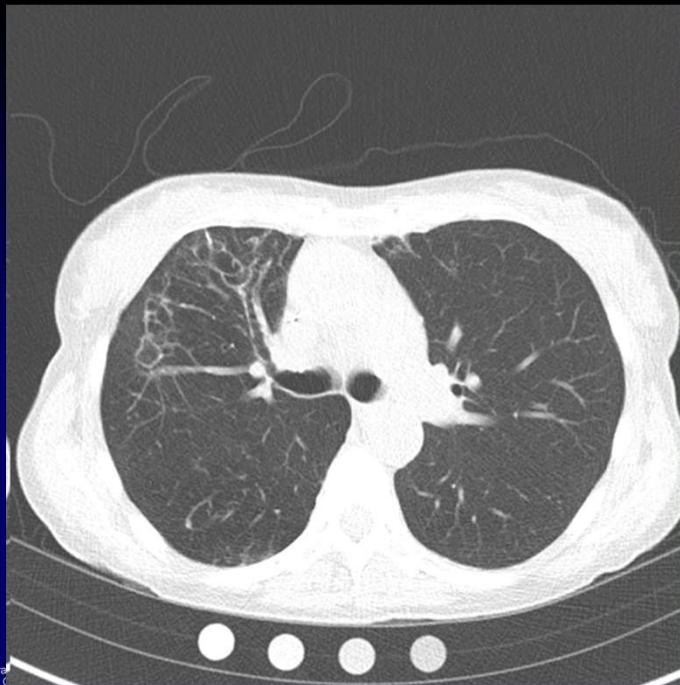
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Surgery for Pulmonary NTM Disease

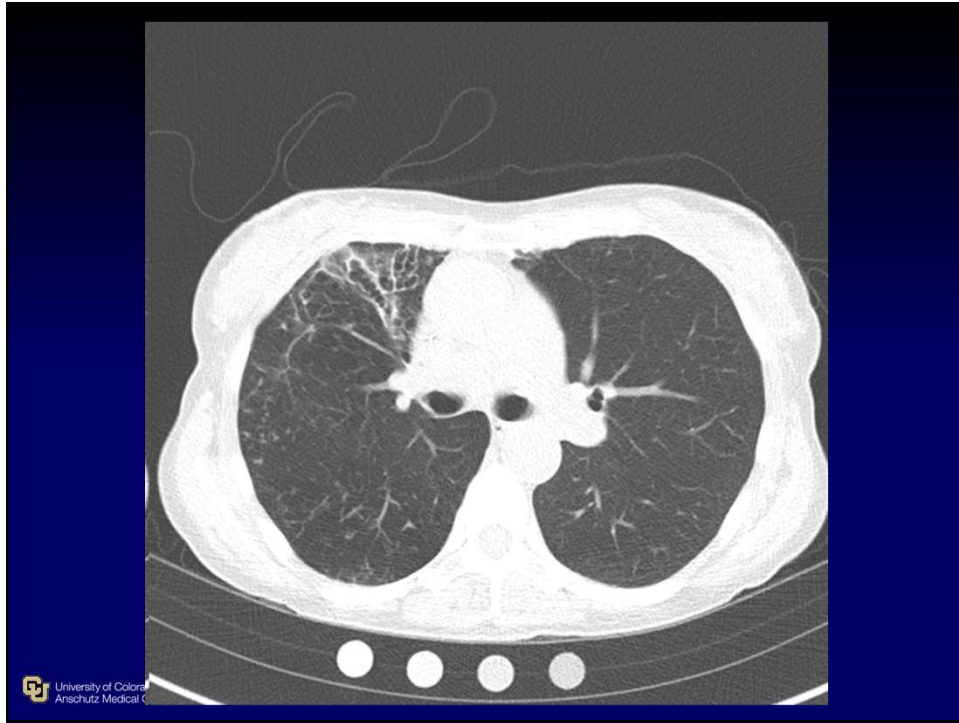
Case Presentation

- 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

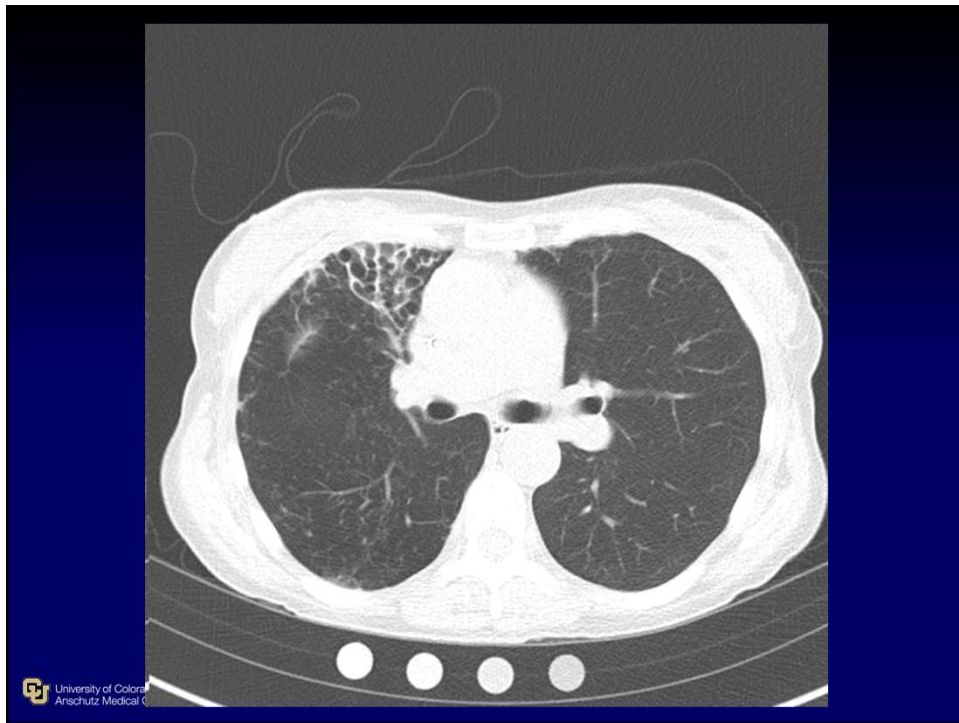
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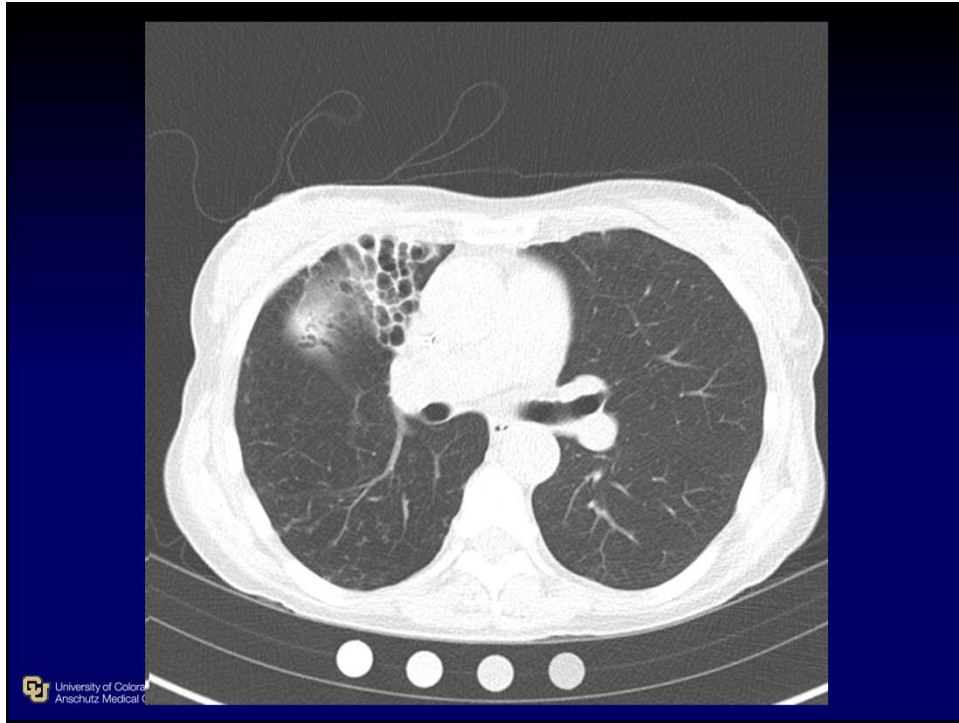
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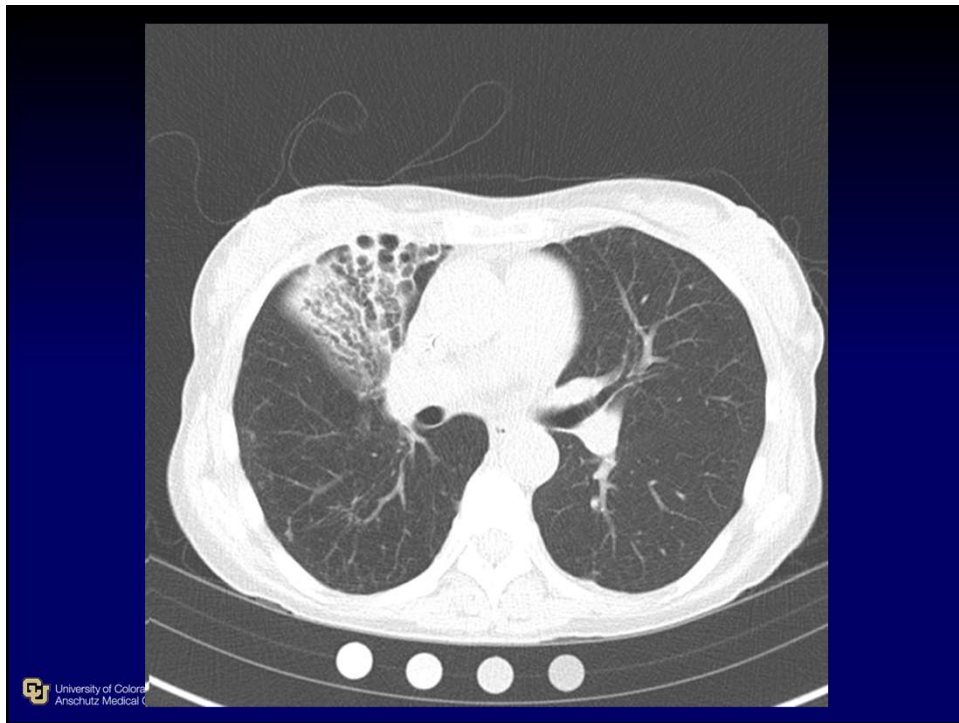
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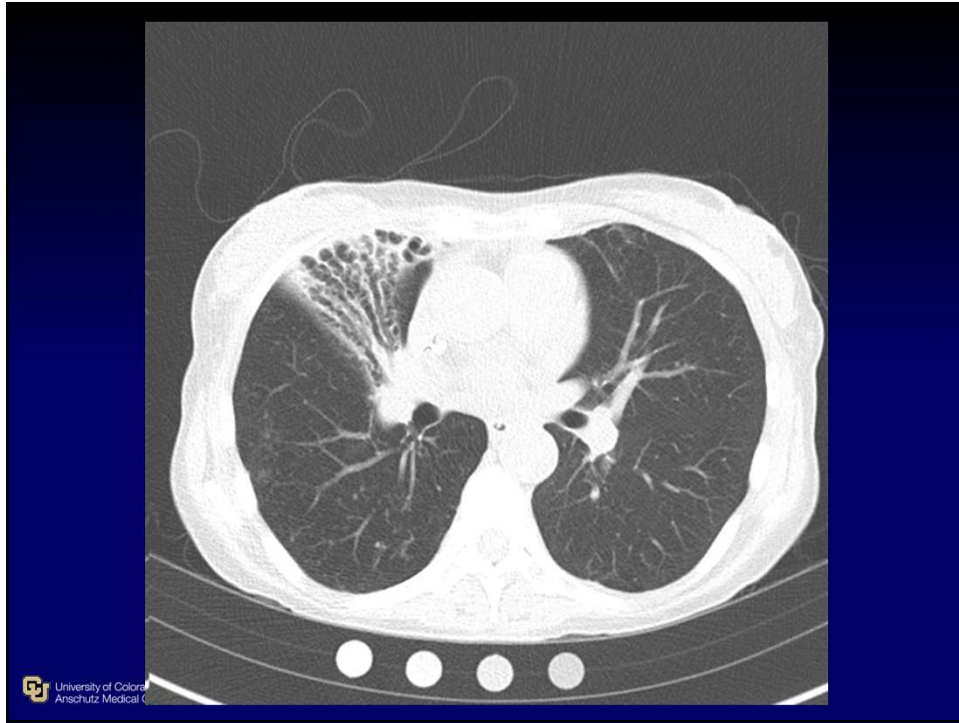
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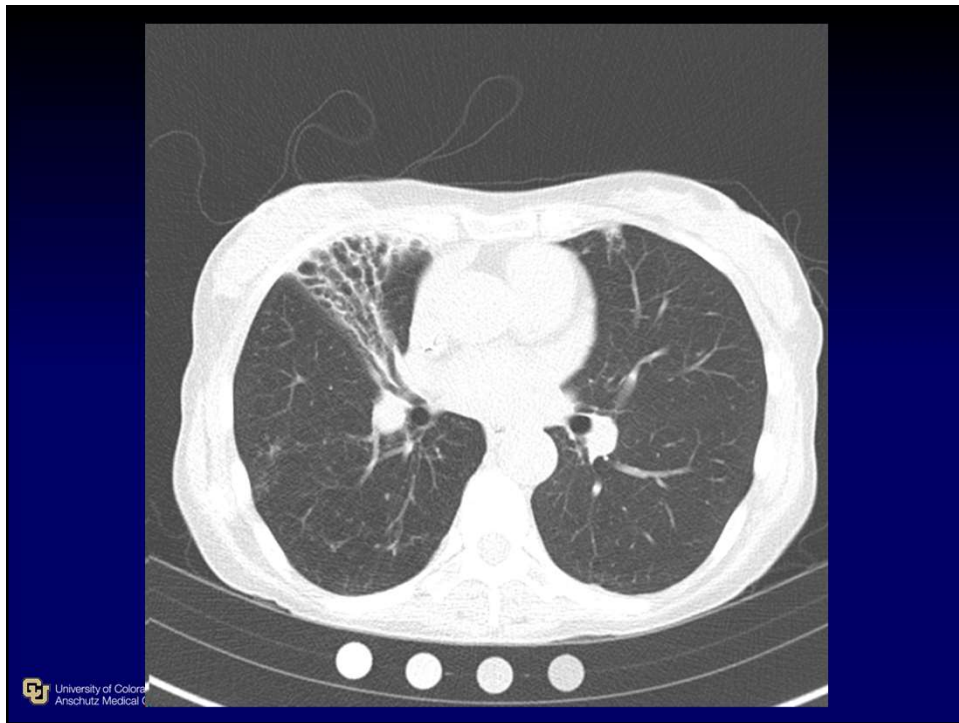
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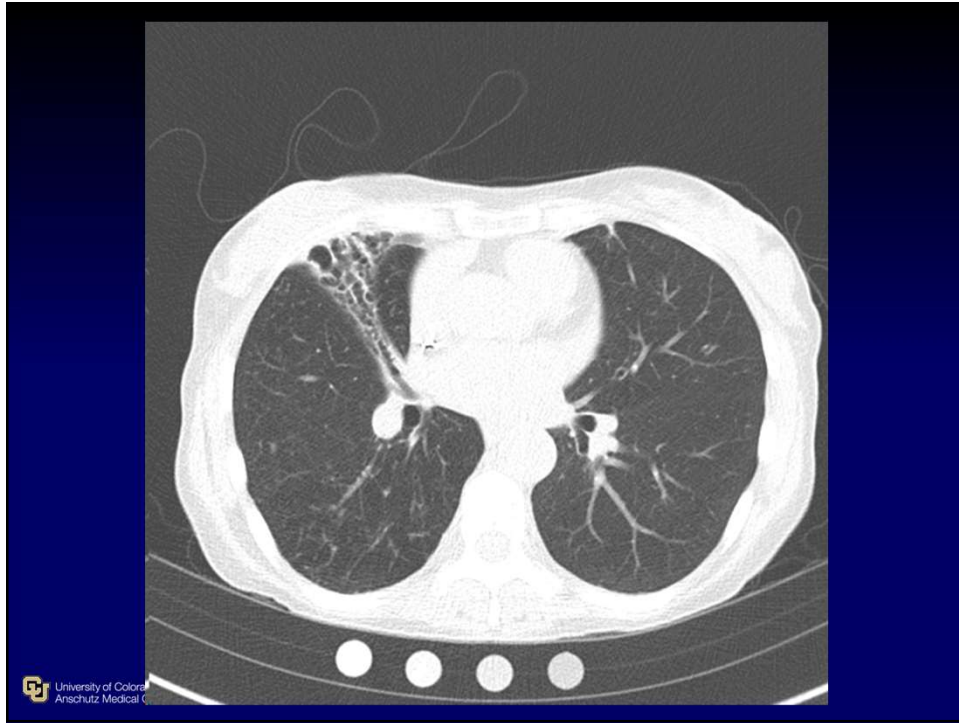
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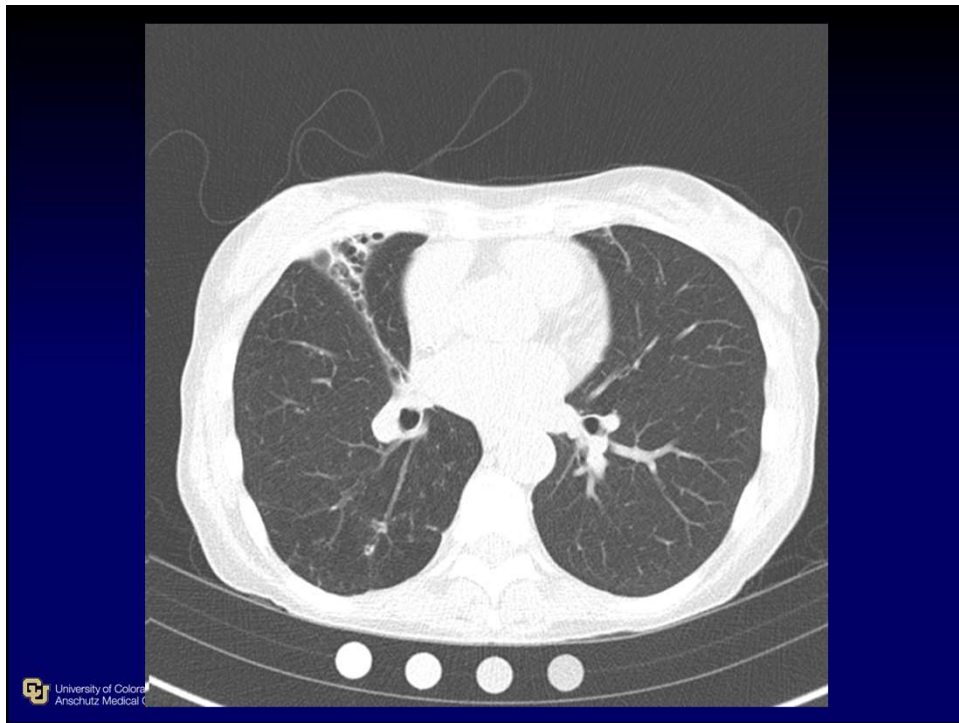
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Surgery for Pulmonary NTM Disease

Pre-Surgery Treatment

- Initiate multidrug regimen, including IV Amikacin
- Planned Robotic 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

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.

Surgery for Pulmonary NTM Disease

Basics of Surgical Therapy

What is the Goal?

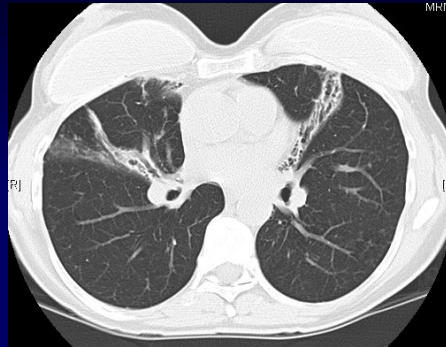
Surgery for Pulmonary NTM Disease

Basics of Surgical Therapy - Goals

- Eradicate infection
 - Culture negative
 - Off antibiotics
 - Symptom free
- Symptom control
 - Intractable cough
 - Hemoptysis
- Limit damage to uninvolved lung

Surgery for Pulmonary NTM Disease 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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Surgery for Pulmonary NTM Disease

Presentation

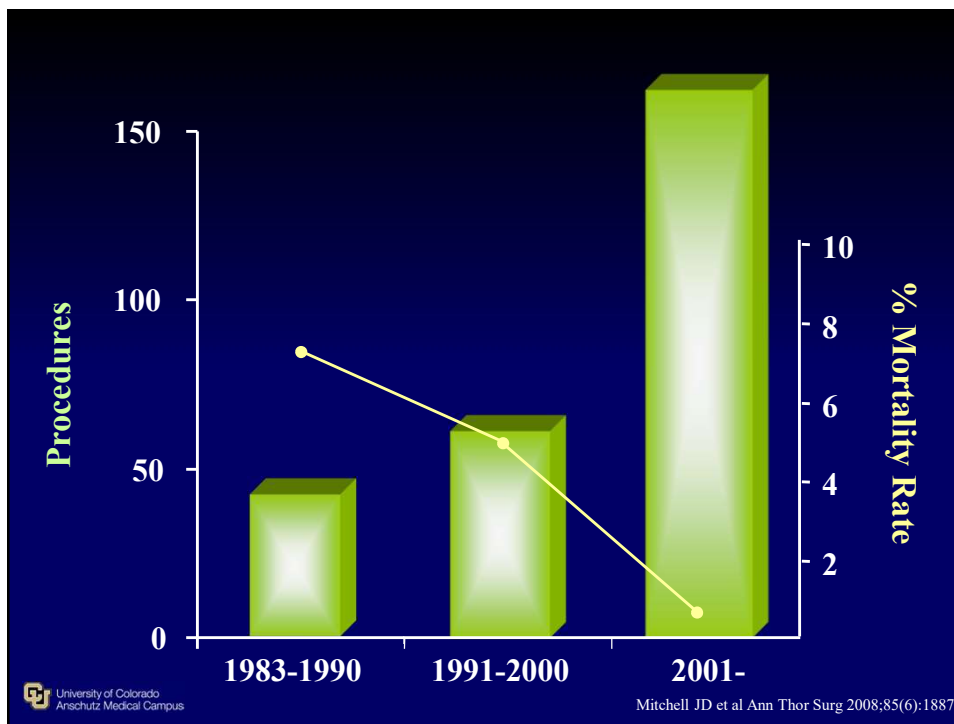
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Surgery for Pulmonary NTM Disease

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
- Mitchell, 2008: 265 cases, mortality 2.6%, complication rate 18%, BPF 4.2%, 87% sputum conversion rate
- Shiraishi, 2013: 60 cases, mortality 0%, complication rate 12%, BPF 8.3%, sputum conversion 100% → 90% at 2 years
- Kang, 2015: 70 cases, mortality NR, complication rate 21%, BPF 7.1%, sputum conversion rate 81%
- Asakura, 2017: 125 cases, mortality 3%, complication rate 22%, BPF 6.4%, sputum conversion rate 94%



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Surgery for Pulmonary NTM Disease

2023 Meta Analysis

- Examined overall outcomes for adjunctive surgery in patients with NTM disease

15 Studies
1071 Patients

→

Sputum Conversion: 93%

Recurrence: 9%

mean F/U 34 months

Complication Rate: 17%

In-Hospital Mortality: 0%

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Kim J-Y et al CHEST 2023; 163(4):763-777

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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

Lobectomy	126	Conversion to thoracotomy in 10 cases (4.7%)
Segmentectomy	73	
Mixed	13	

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

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

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Surgery for Pulmonary NTM Disease

How do patients really do?



6/12: 17 days after surgery #1
4 days after surgery #2

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Surgery for Pulmonary NTM Disease “VATS” Approach

- VATS Lobe/Segmentectomy
 - 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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Thoracoscopic Surgery Instruments



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Surgery for Pulmonary NTM Disease Robotic Approach



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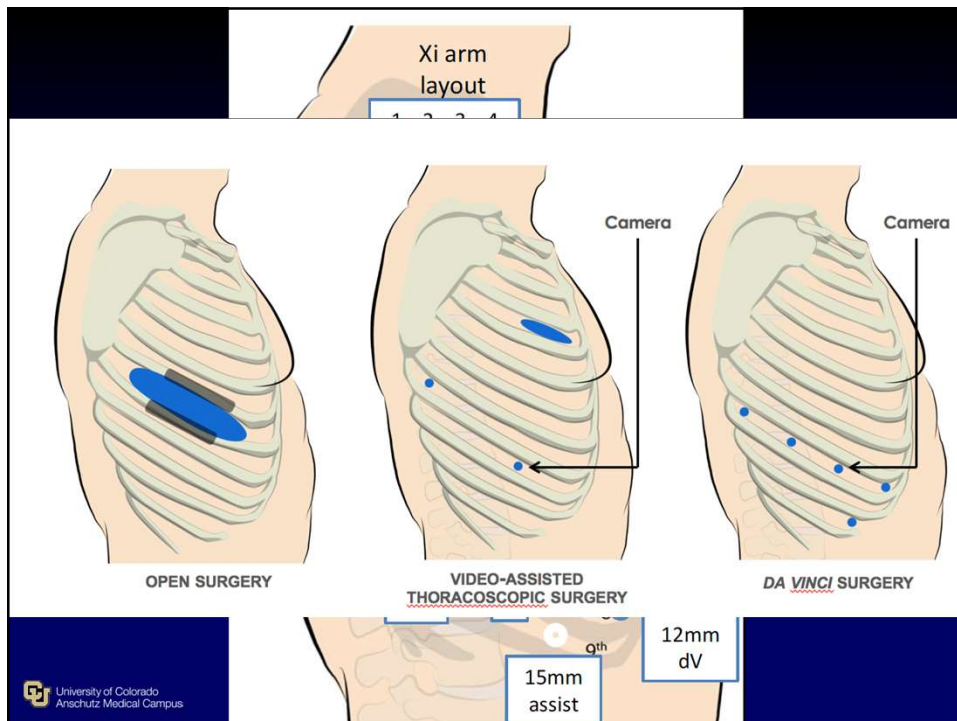
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Robotic Assisted Surgery Instrumentation



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Robotic Assisted Thoracic Surgery

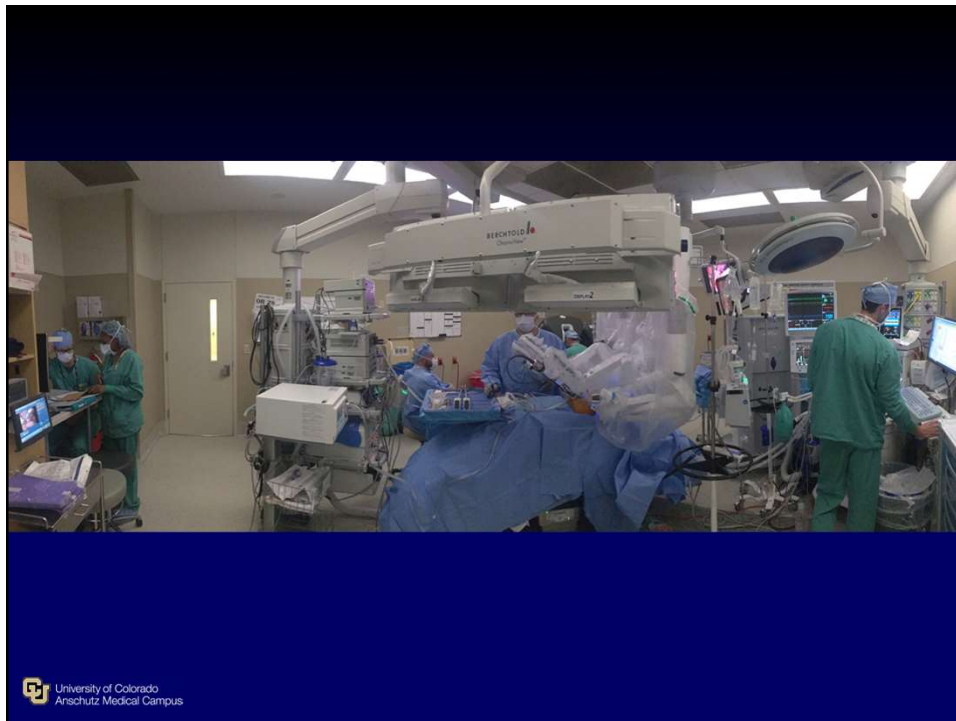
What are the Advantages?

- Optics
 - Magnified 3D HD
 - Immunofluorescence (FireFly)
 - TilePro
- Surgeon Autonomy
 - Integrated energy, stapling
 - 4th Arm = Reliable assistant
- Simulation



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Ergonomics

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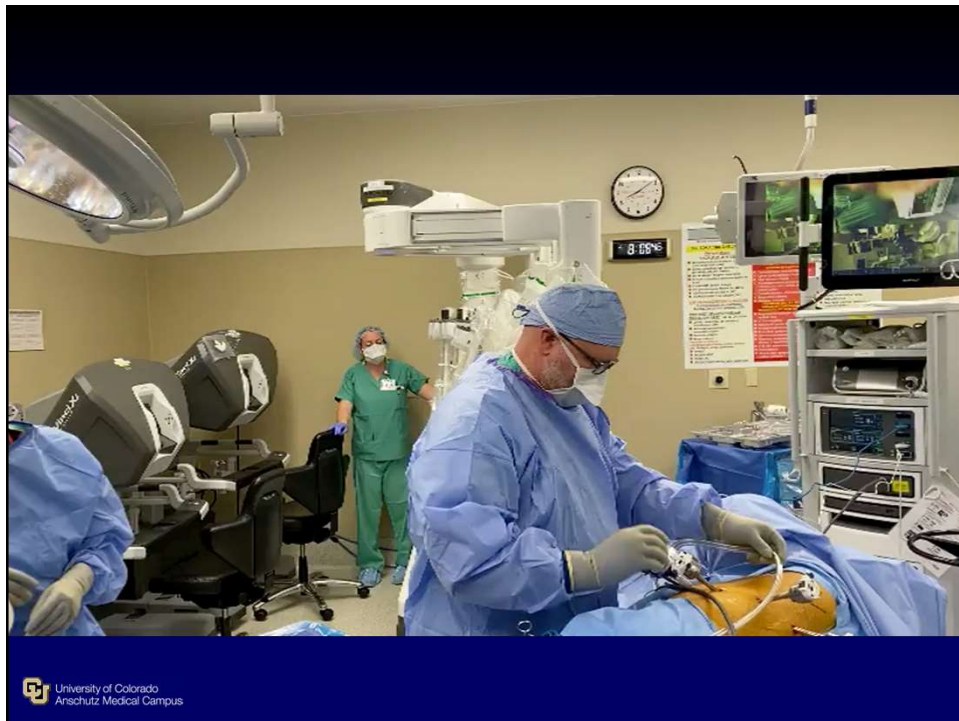


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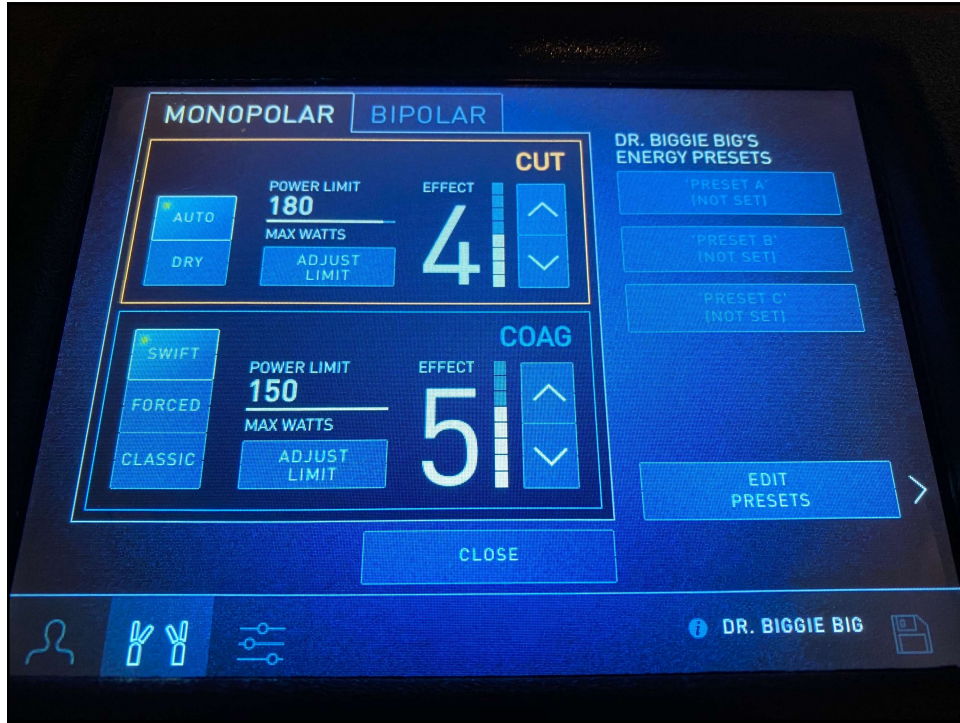
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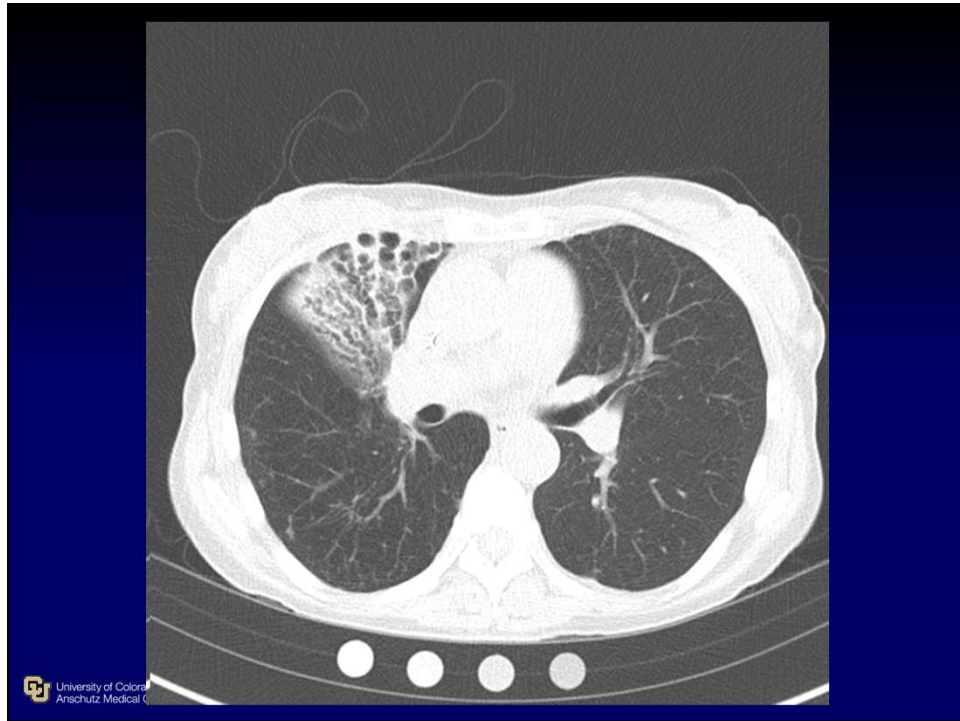
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BPF after Pneumonectomy

Shiraishi, 2010: MDR-TB vs. NTM pneumonectomy

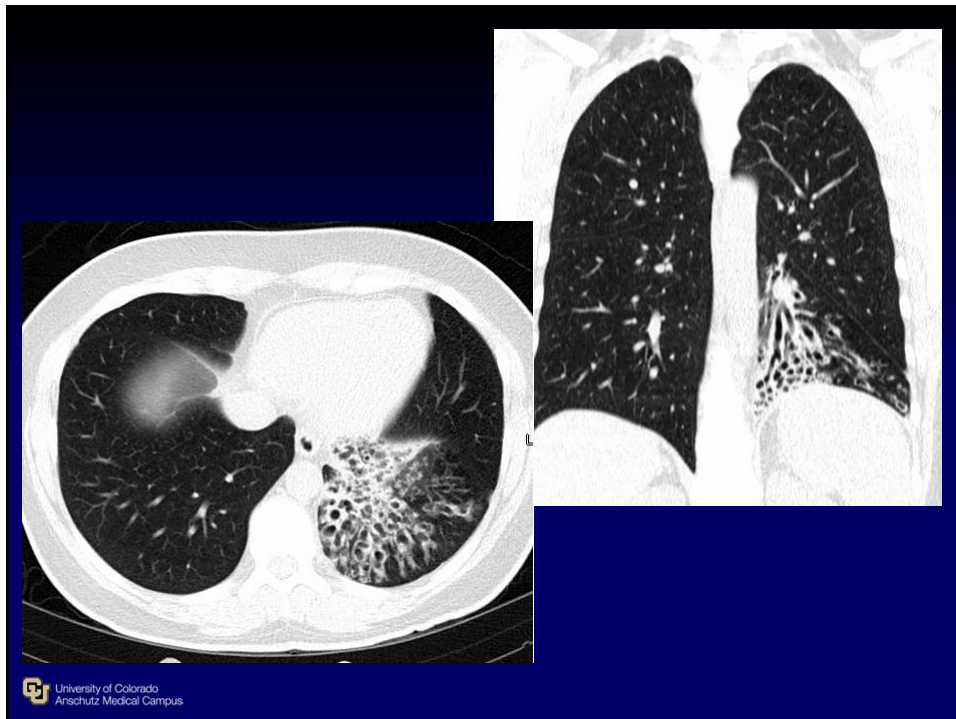
- No operative mortality
- MDR-TB: 22 patients (7 right, 15 left)
 - Male 72%, Sputum negative 63%
 - BPF rate 4.5% (1 right)
- NTM: 11 patients (7 right, 4 left)
 - Female 72%, Sputum negative 9%
 - BPF rate 45% (4 right, 1 left)

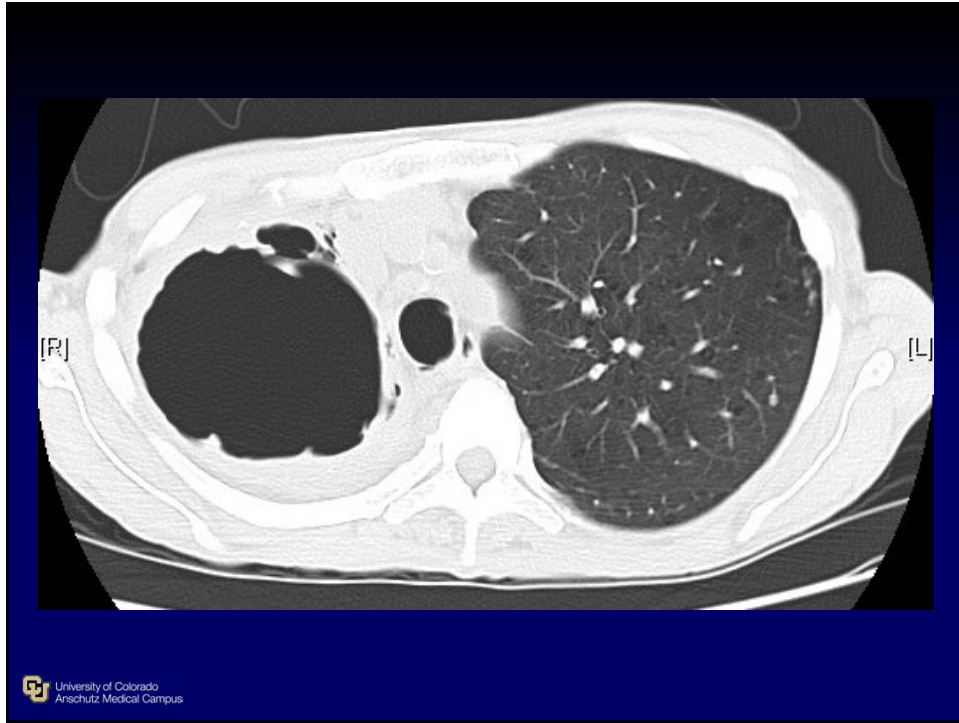
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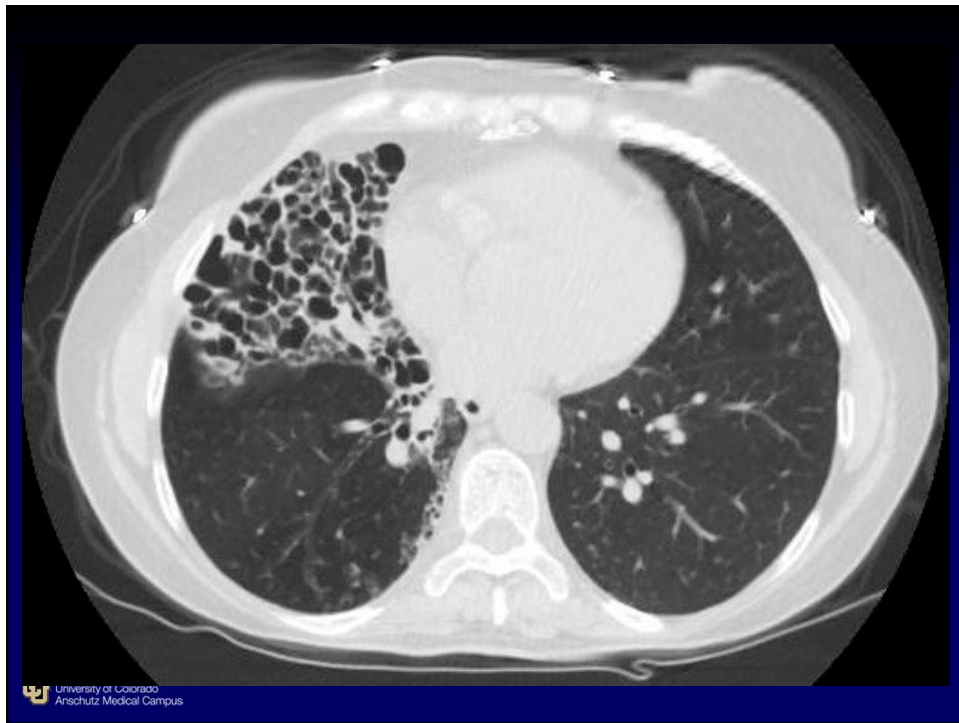
Common Questions

- Should I have surgery to treat my NTM infection?
- Can I have my surgery using a minimally invasive (VATS or Robotic) approach?

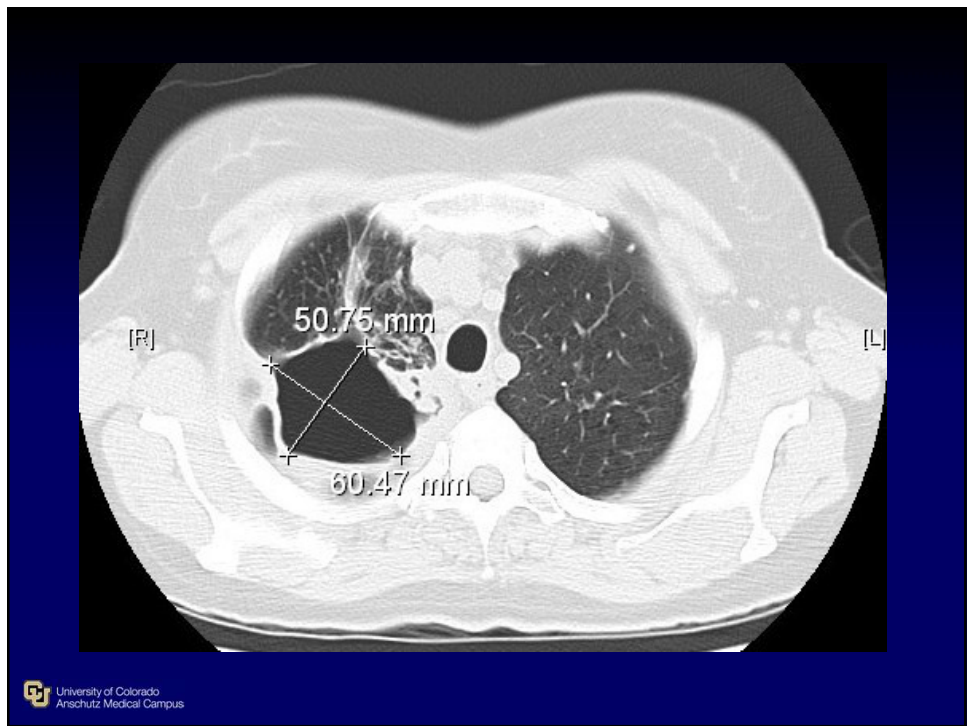




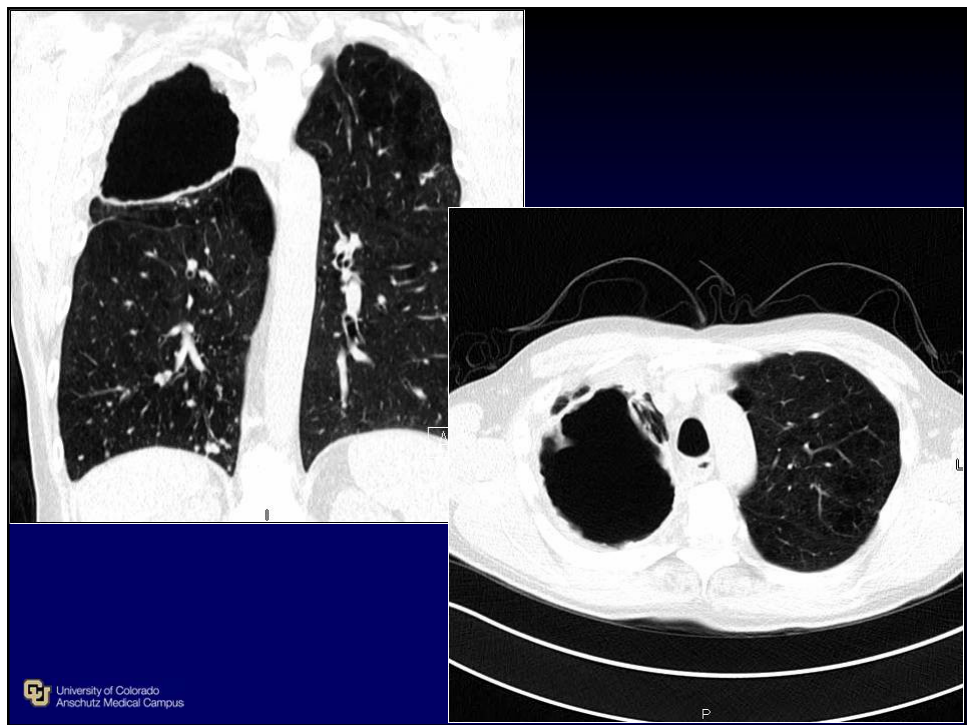
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Surgery for Pulmonary NTM Disease

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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Surgery for Pulmonary NTM Disease

Summary

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



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