Updates in Interventional Pulmonary Medicine
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Learning Objectives
- Who is an Interventional Pulmonologist?
- What are the tools?
- What can we diagnose?
- What can we treat?

Brief History of IP
- 1897 – Dr. Gustave Killian performs a rigid bronchoscopy to remove a bone from the mainstem bronchus of a patient
- 1966 – Dr. Skigeto Ikeda – Japan – first flexible bronchoscopy

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Who becomes an Interventional Pulmonologist?

• Most did a residency in internal medicine
• Then a fellowship in Pulmonary CCM
• And then a formal or informal fellowship in Interventional Pulmonary Medicine
• This is a non-ACGME fellowship
• Evolving board exam, but not required

What does an Interventional Pulmonologist do?

• It depends on their tools
• In general involved in the work-up and diagnosis of thoracic malignancies
• Also involved in therapy
  – Airway Recanalization
  – Tumor Ablation
  – Fiducial placement
• Tools offer access to:
  – Pleural Space, Airways, Lung Parenchyma

What are the tools?

Traditional Bronchoscopy

Anatomic Considerations

17-25 generations
Trachea 20-25 mm
Mainstem 12-16 mm
Segmental 5-8 mm

Therapeutic scope 5.8 mm
Diagnostic 5.2 mm OD
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But there is so much more...LNs

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But there is so much more...nodules
Endobronchial Ultrasound (EBUS)

But there is so much more... LNs
EBUS

EBUS – Image with Doppler

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Mediastinoscopy?
What LNs are accessible?
Endobronchial Ultrasound

– Obtain tissue from enlarged LNs
  • cancer, sarcoid, lymphoma, granulomatous infections
– Allows for LN staging for lung cancer
– Can place fiducials for XRT
– Can be performed at the same time as EMN
– Come and go procedure
– Can deliver Ampho to Aspergillomas
– Can obtain enough tissue for molecular diagnostics

EMN(B)
(electromagnetic navigation bronchoscopy)

EBUS-Therapeutic options.

Comparable to GPS in the lungs
EMN- case illustration

- 57 yo man of Japanese ancestry
- Presented with respiratory symptoms including cough
- Found to have a 1.2 cm nodule in lung
- Mildly PET positive
- Recommended lobectomy
- Small hilar lymph nodes
EMN (electromagnetic navigation bronchoscopy)

- Performed through ETT (fluoro vs. OR)
- Can biopsy lesions almost anywhere in the lung down to 5 mm in size
- Can biopsy, place fiducials, dye for localization
- Easily combined with EBUS for full staging
- Overlap with CT-FNA, if touching pleura or no “easy airway” would send for CT-FNA
- Faster diagnosis and staging with combined EMN/EBUS
68 yo smoker with severe emphysema
High risk TTNA
Not a surgical candidate

1. Tissue DX with EMN
2. Staging with EBUS
3. If EBUS is negative fiducials could be placed for XRT

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Rigid Bronchoscopy
Rigid Bronchoscopy - Why would we do this?

- Requires Jet Ventilation
- Allows more stable access to distal trachea
- Allows access for larger tools
- Provides opportunity to remove large objects (tumor, foreign body)
- Provides access for advanced airway tools

Cryotechnologies

- **Contact**
  - Cryoprobe
  - Freezes to -90
  - Cryogen is NO₂ or CO₂
  - Adheres to everything
  - Good for:
    - Tumor extraction
    - Foreign body extraction
    - Parenchymal lung biopsy?

Cryoprobe extraction: Case

**Before**

Cryoprobe extraction, cryospray, bronchoplasty
Cryoprobe extraction: Case

Before

After

Cryoprobe extraction, cryospray, bronchoplasty

Cryotechnologies

- **Non Contact**
  - Cryospray
  - Usually via Rigid Bronch
  - Obviates need for stent
  - Gas expands 700 x
    - risk of barotrauma
  - Cools to -196 F
  - Can be combined with bronchoplasty or cryoprobe extraction of airway tumor
  - ECM resistant to cryo-injury due to lower water content

Bronchial Thermoplasty (BT)

Castro et al AJRCCM 2010

- **Bronchial Thermoplasty for Severe Asthma**
  - 3 Procedures, 3 weeks apart
  - Deliver Thermal Energy to airway smooth muscle
  - Most common side effect is asthma exacerbation
  - Unclear which population might benefit most
Trials in IP

• Endobronchial Lung Volume Reduction
  – Lung volume reduction coils
  – Lung volume reduction valves

• Endobronchial Valves for BPF

RePneu Trial for Emphysema

• PneumRx – coils for LVRC in emphysema
• RCT finished
• Now entering cross over

PulmonX – Lung Volume Reduction for Emphysema – LIBERATE TRIAL

* Requires screen for colateral ventilation before insertion of valve

Spiration trial for BPF (VAST)

• Compassionate use for BPF
Conclusions

• IP allows for access to lung beyond the optical reach of a traditional bronchoscopy
• Can be used for the diagnosis, staging and therapy in lung cancer
• Advanced tools allow for extraction/ablation of airway tumors
• New tools may provide additional options for asthma, emphysema, BPF

Questions?