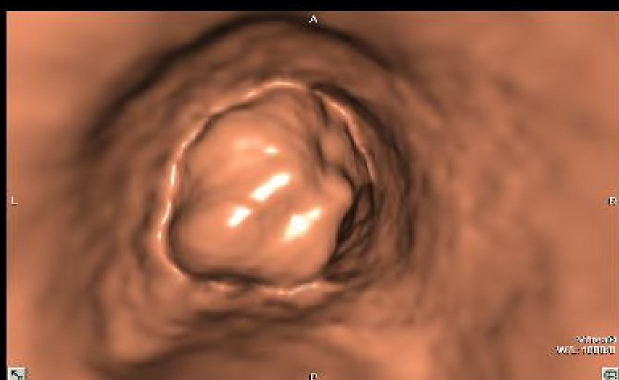
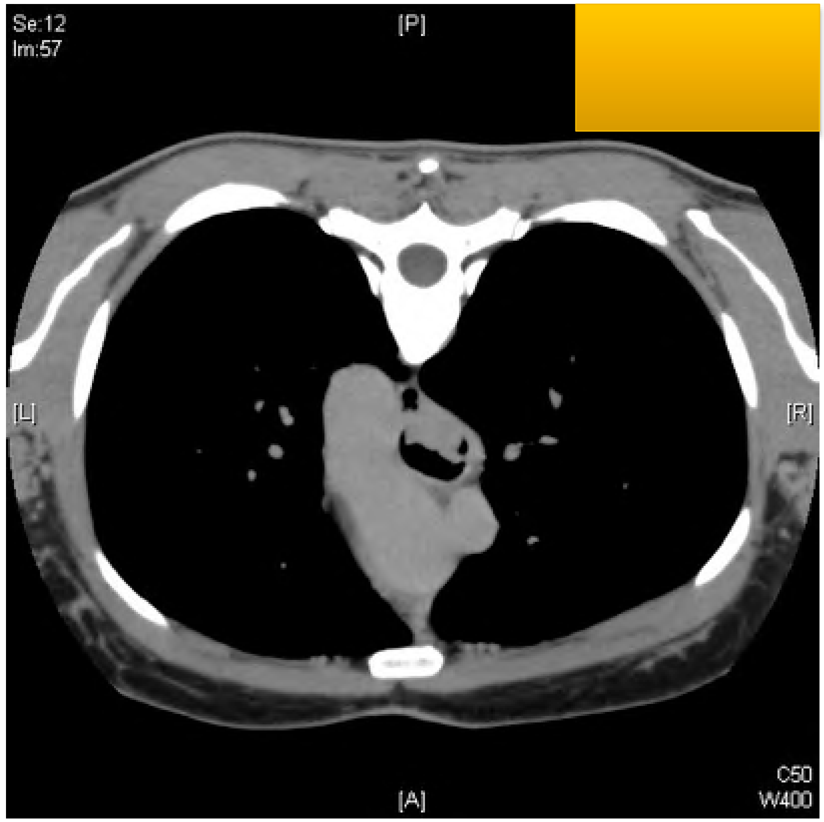
Interventional Pulmonology for Bronchial Carcinoid Tumors



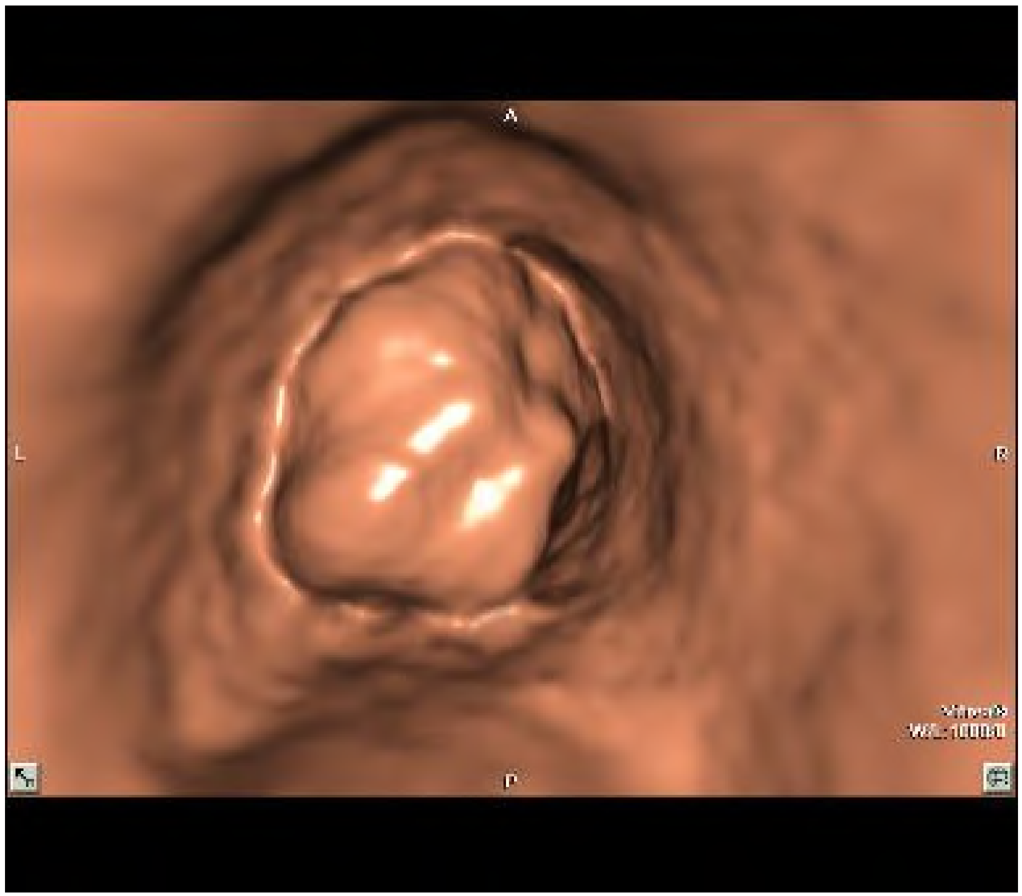
Arthur Sung, M.D., FCCP
Director, Interventional Pulmonology and Bronchoscopy
Clinical Associate Professor of Medicine
Stanford University School of Medicnie

Case

- 40 y.o woman
- Athletic but progressive dyspnea on exertion
- CXR unremarkable
- CT of the Chest



Diagnostic Bronchoscopy



- Diagnosis: Typical Carcinoid Tumor
- Surgery to remove tumor from trachea

Bronchial Carcinoid Tumor

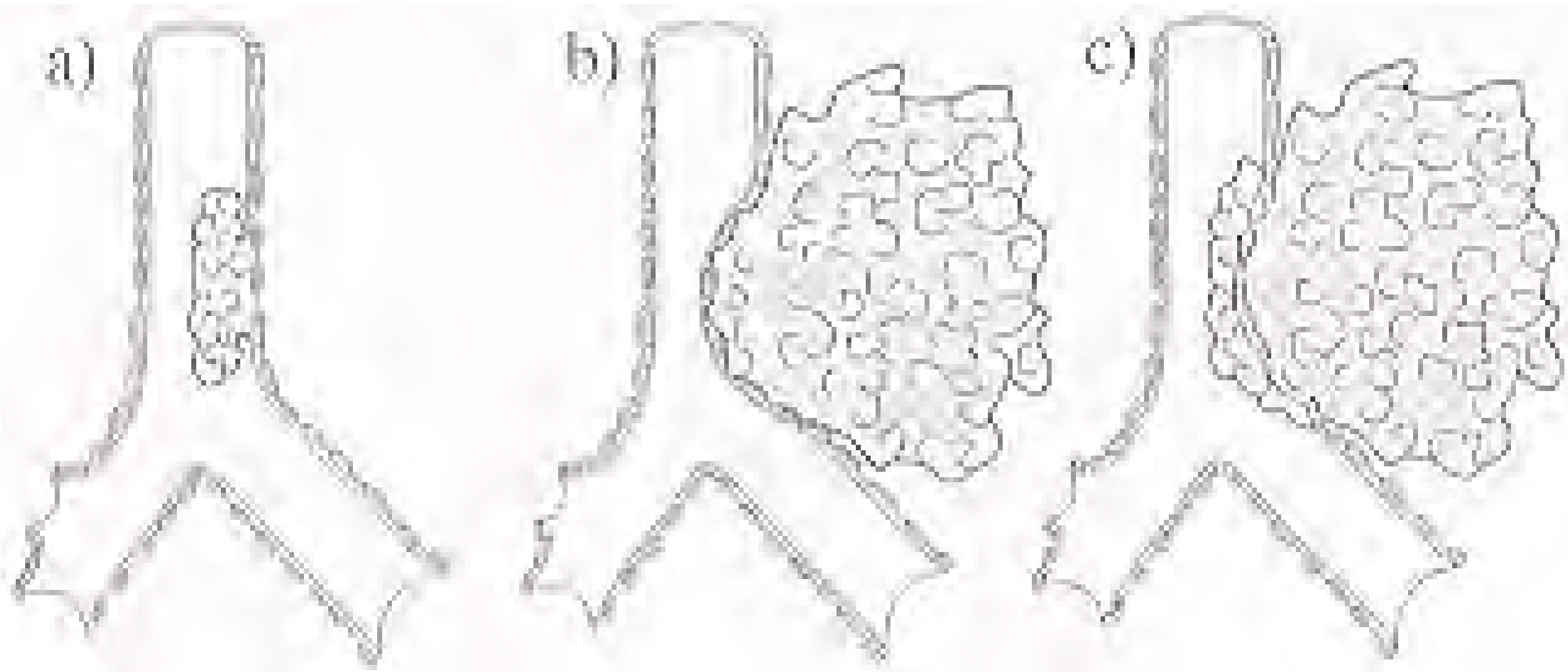
- Uncommon group of relatively indolent neoplasms arising from pulmonary neuroendocrine cells
- 1-2% of all primary lung cancers in adults
- 20-30% of all carcinoid tumors
- Global incidence rates 0.2 – 2 per 100,000 population per year
- 1/3 – 2/3 of pts in studies are smokers

- Well-differentiated neuroendocrine tumor, usually in the GI tract or lungs.
  - Lungs are the second most common site.
  - 1-2% of lung malignancies, 20-30% of carcinoids
- Generally indolent behavior. Presentation often from obstructing mass or bleeding lesion.
  - For typical carcinoids the 5-year survival is 87-89%

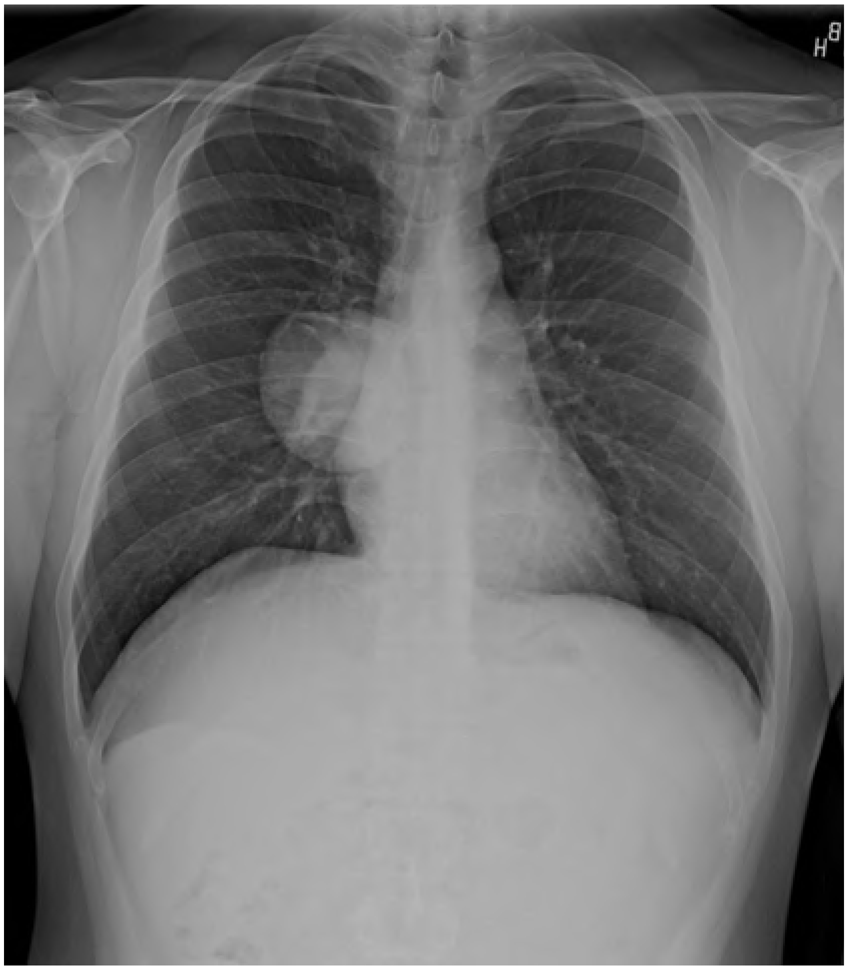
Pulmonary Carcinoid Presentation

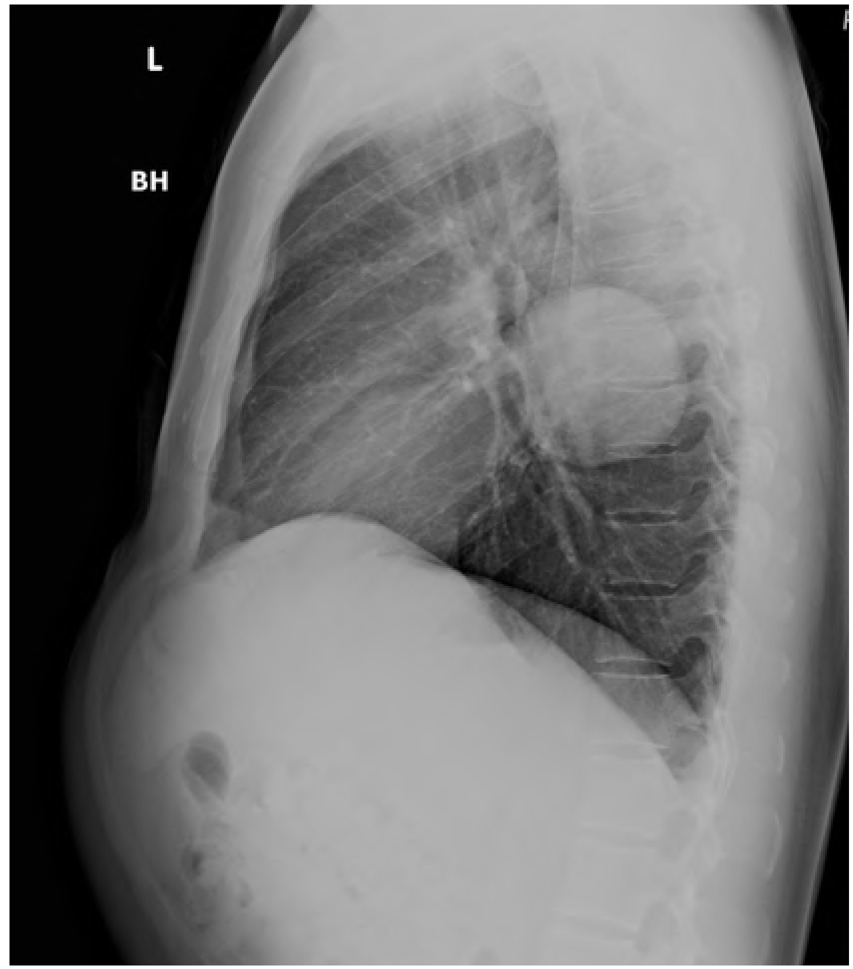
- Mean age at diagnosis 45 y/o
- Majority arise in proximal airways (3/4)
- Minority present as lung nodule (1/4)
- Most symptomatic from obstructing tumor mass or bleeding due to hypervascularity
  - Cough, wheeze, hemoptysis, chest pain, recurrent pneumonia in same segment or lobe
- Lower rate of carcinoid syndrome vs midgut carcinoids

Types of Airway Obstruction



- Plain film: non-specific, round or oval opacities with sharp margins
- CT:
  - Well-defined round or ovoid hilar/perihilar mass
  - Can be any size, typically 2-5 cm
  - Often marked homogeneous contrast enhancement due to high vascularity
  - Calcification (usually eccentric) not common
  - 5-20% typical carcinoids associated with hilar or mediastinal LAD (may be 2/2 local inflammatory rxn)

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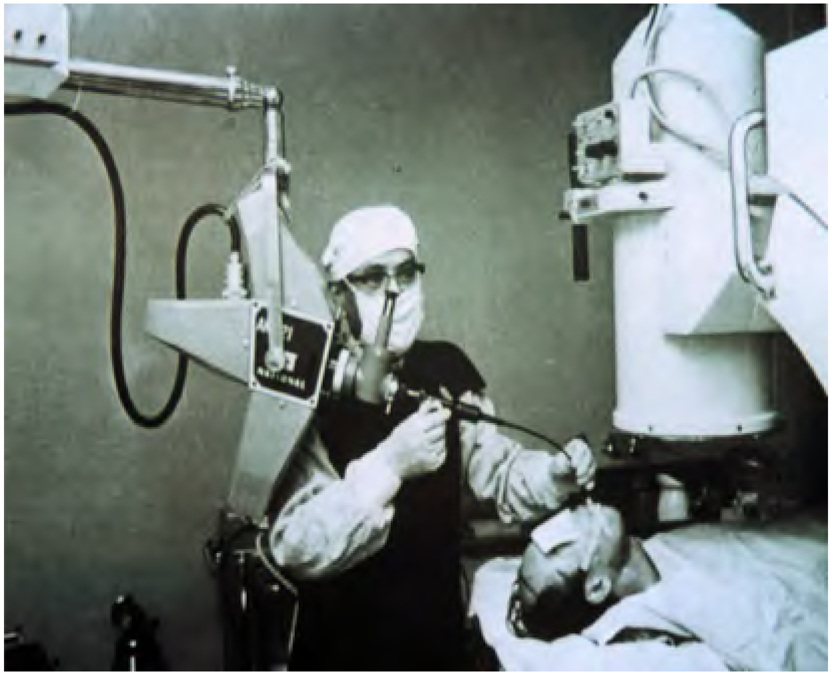
Bronchoscopy to Diagnose and Treat Carcinoids

- Gustav Killian in 1897 – 1st rigid bronchoscopy
- Using Local Anesthetics
- Retrieval of a chicken bone from the right main bronchus

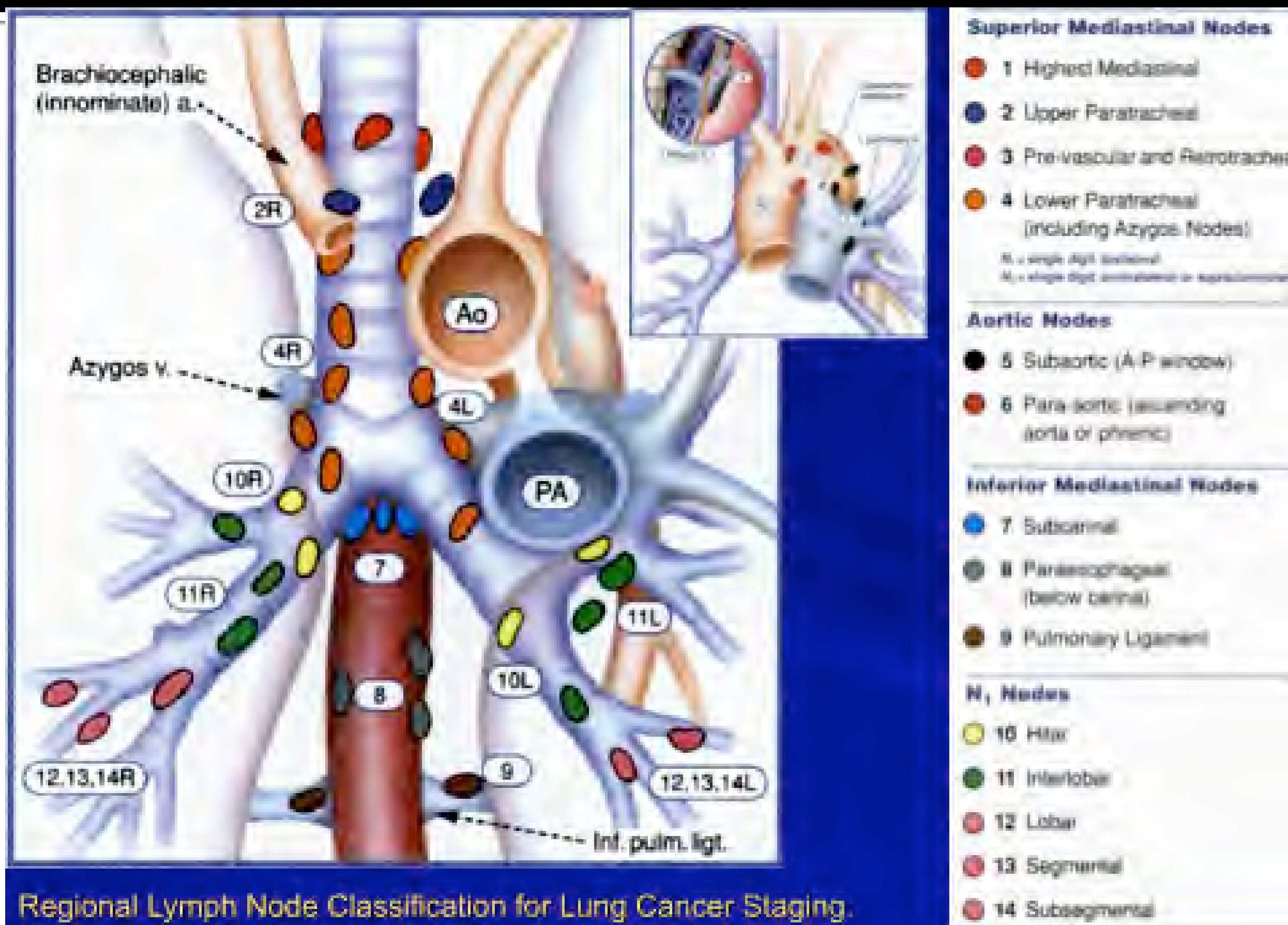
Advancements from the 20th century



- 1966 Ikeda Fiberop-Bronch
- 1974 Reynolds BAL
- 1978 Wang TBNA
- 1978 Toty Nd-YAG
- 1979 Hilarss HDR-Brachy
- 1987 Ikeda VideoBronch
- 1989 Dumon Stent

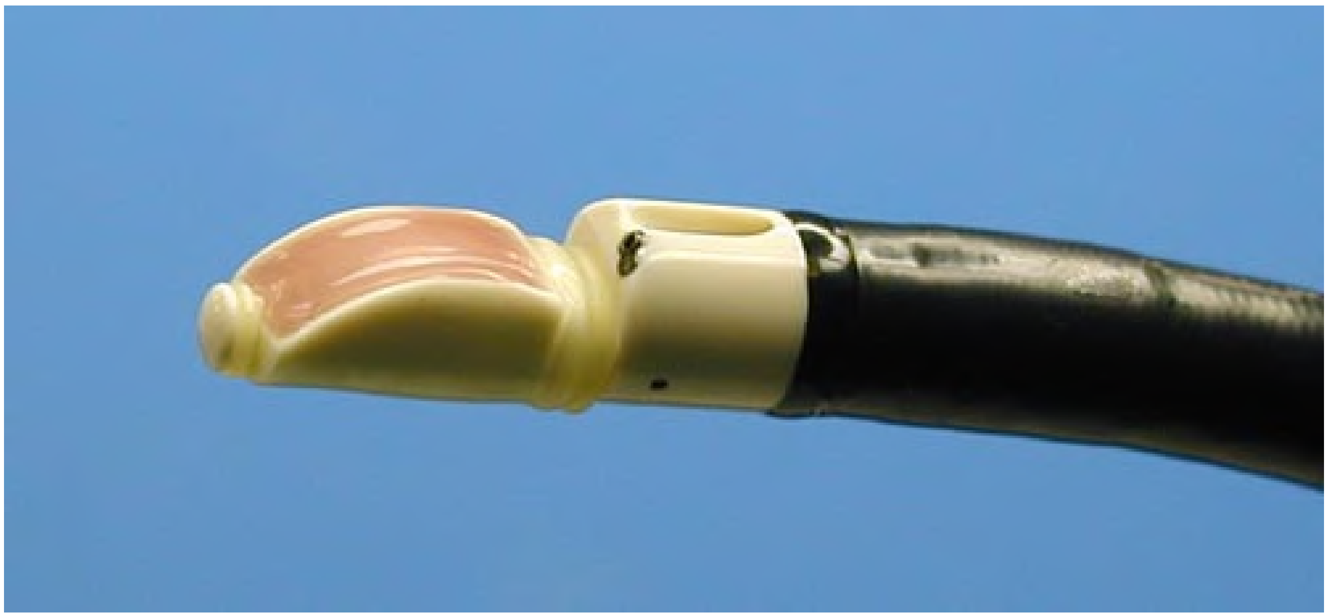
Staging of Bronchial Carinoid

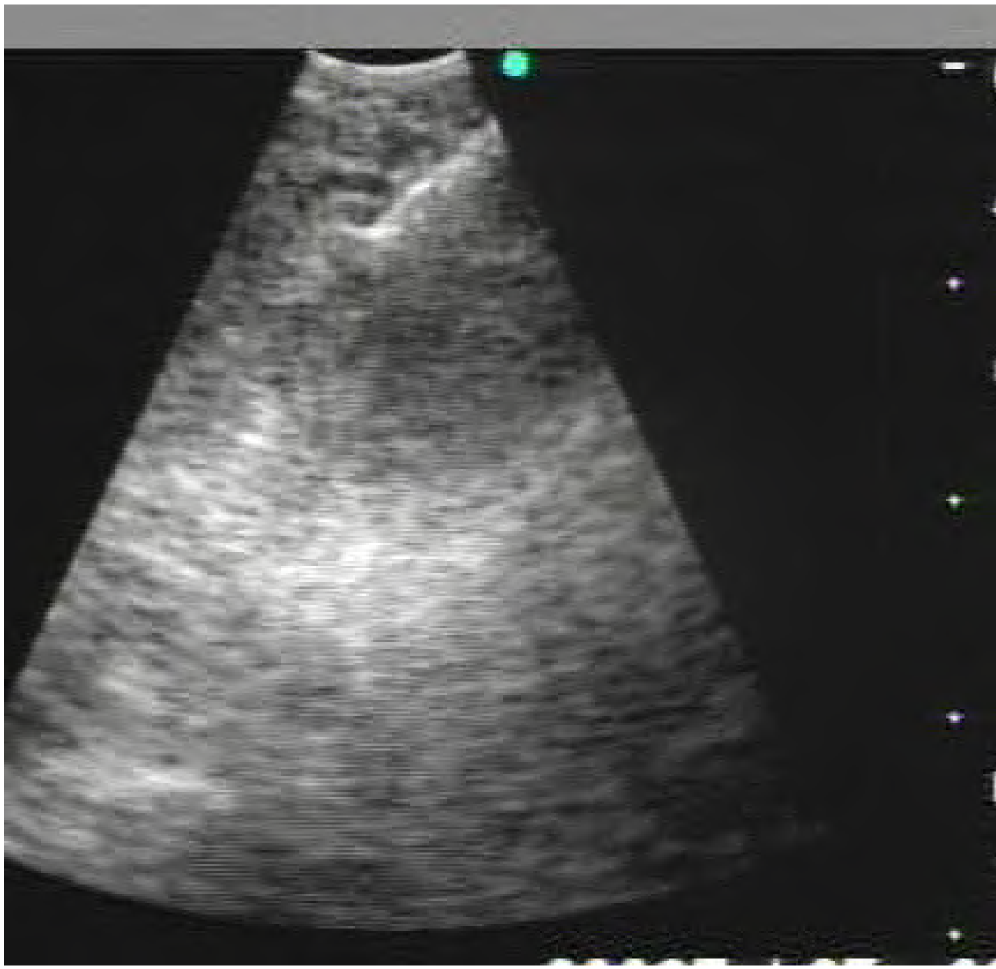
Lymph node Stations

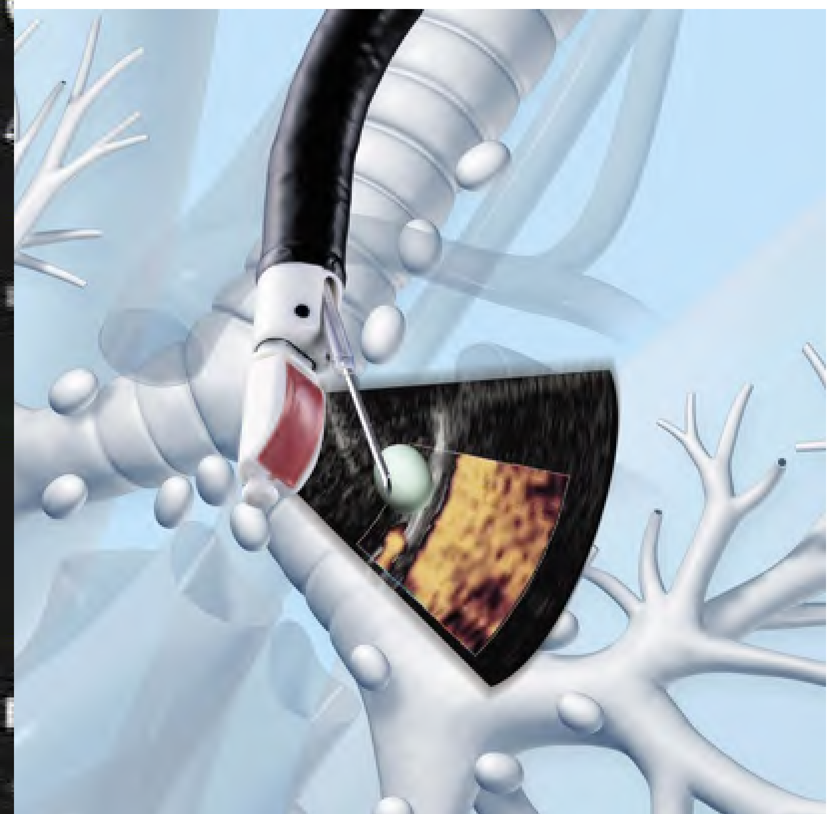


Regional Lymph Node Classification for Lung Cancer Staging.
Clifton F. et al. Chest 1997; 111: 1718-1723.

Convex Probe EBUS



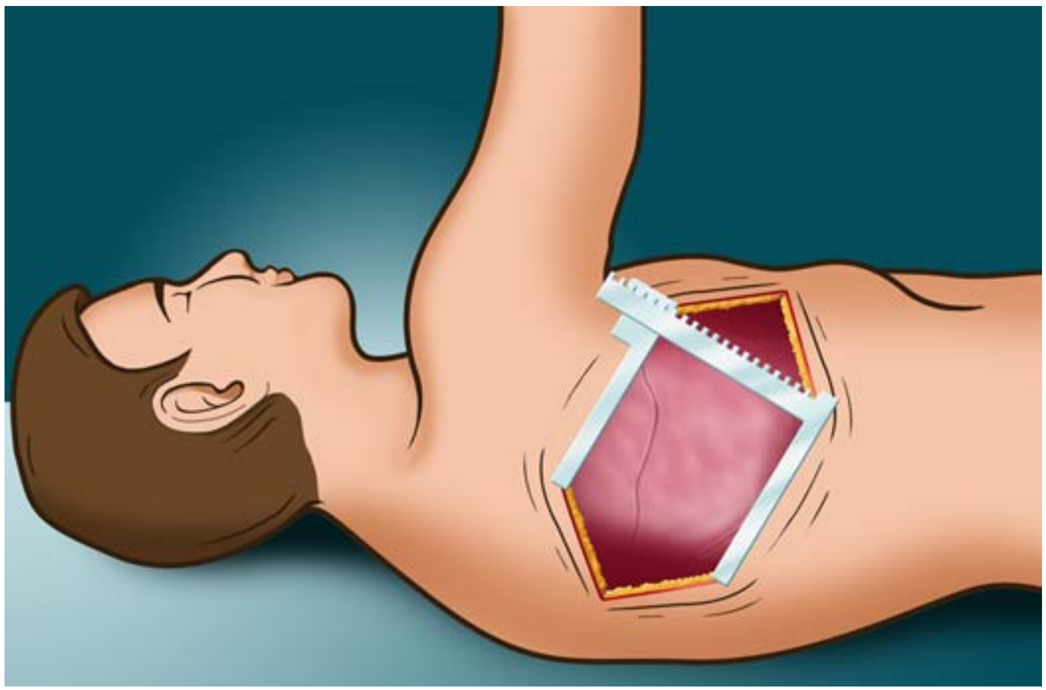




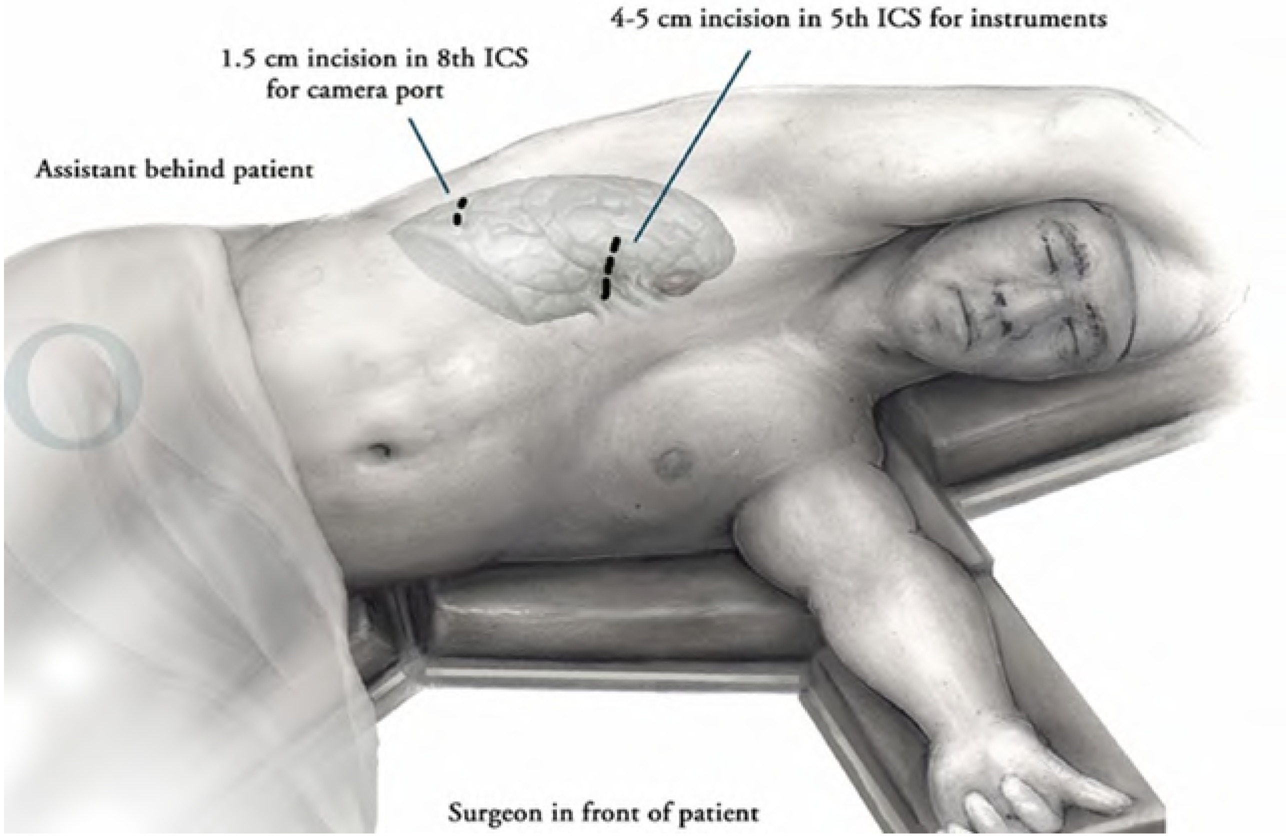
Surgery

- Standard of care
- Curative intent
- Slides courtesy of : Mark Berry , MD. Associate Professor of Medicine, Div. Thoracic Surgery

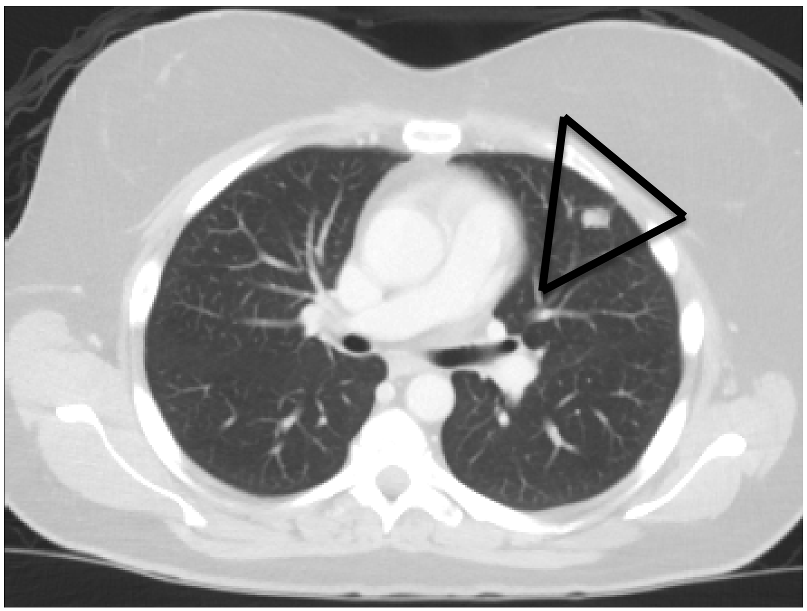
Thoracotomy

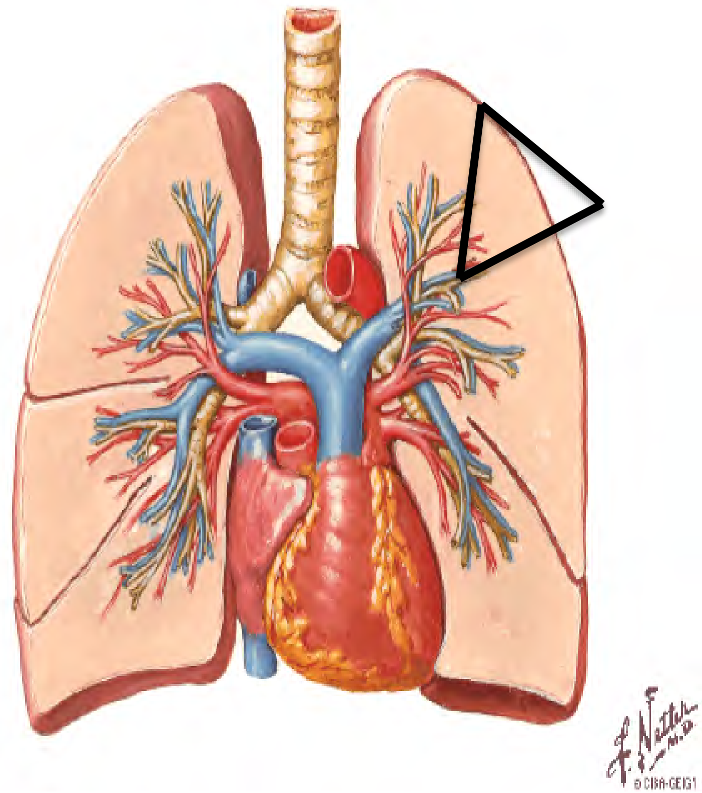


Video Assisted Thoracoscopic Surgery (VATS)

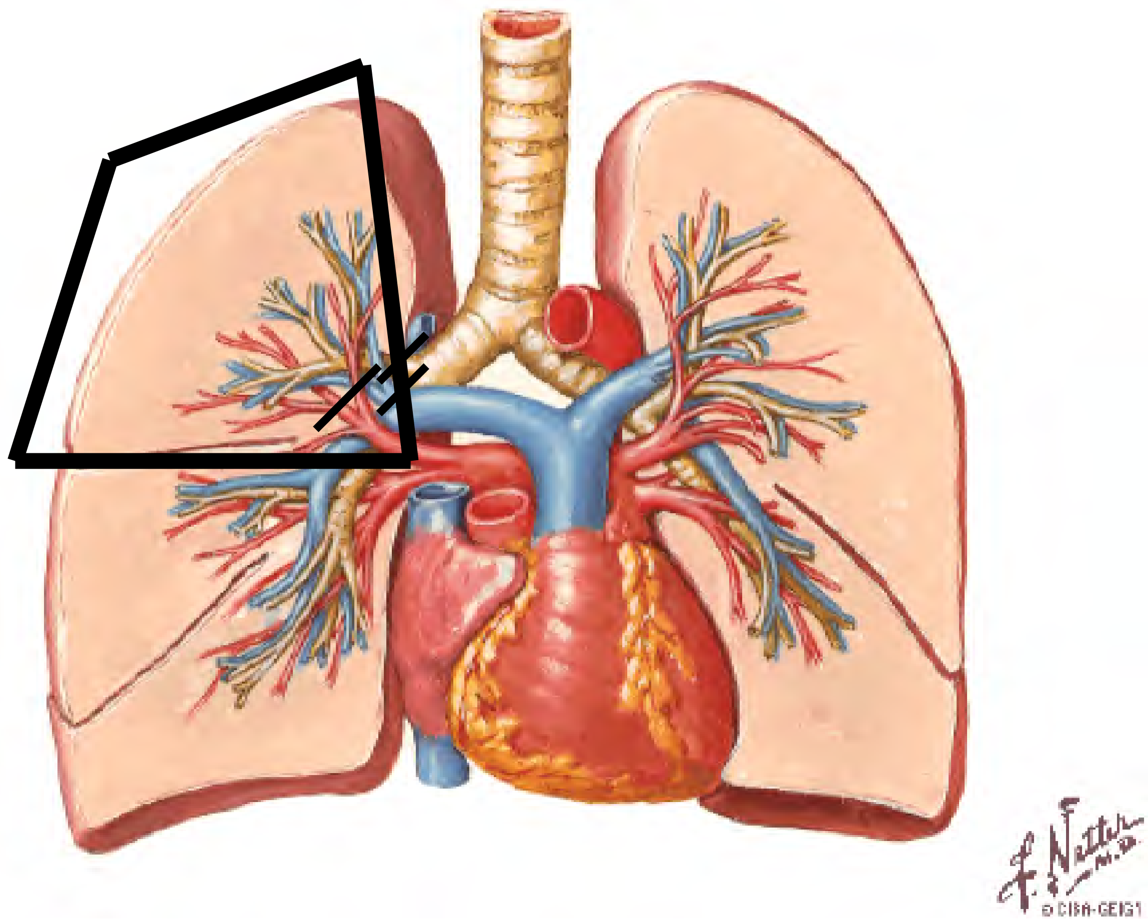


Wedge Resection

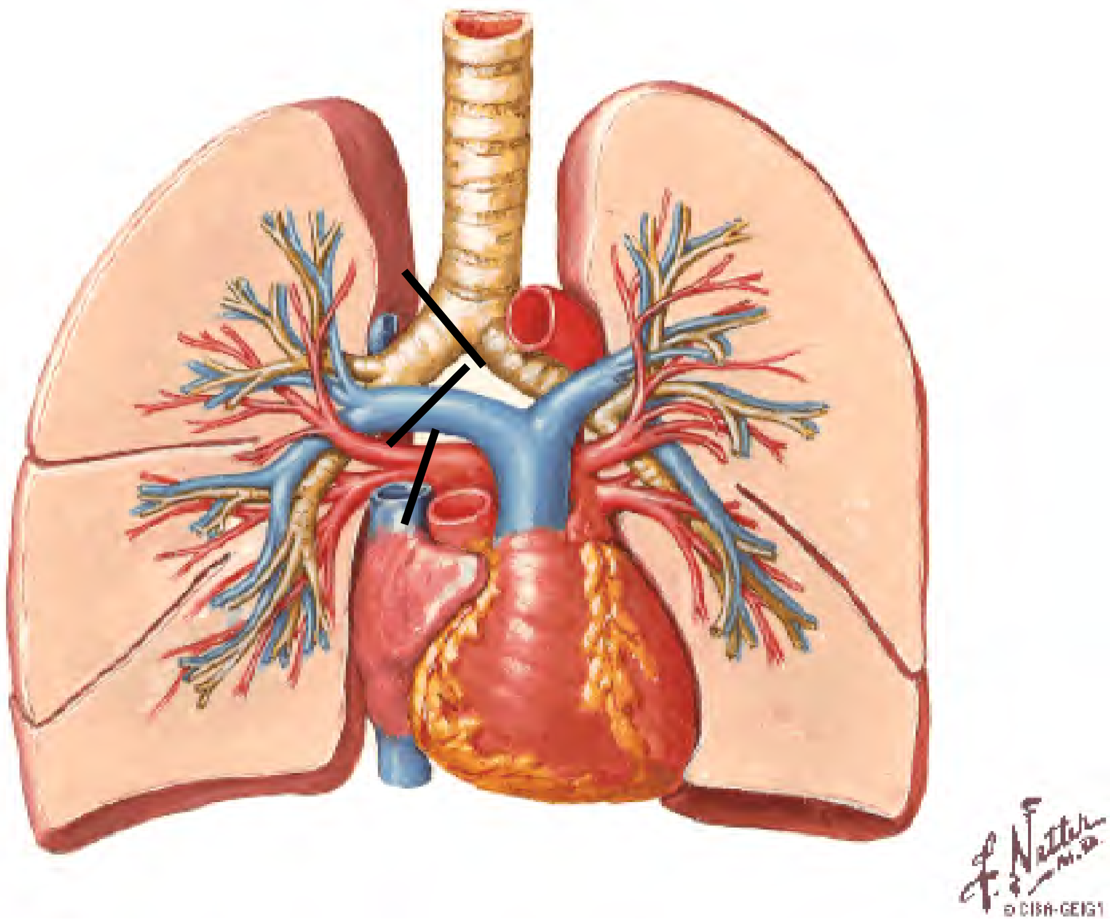




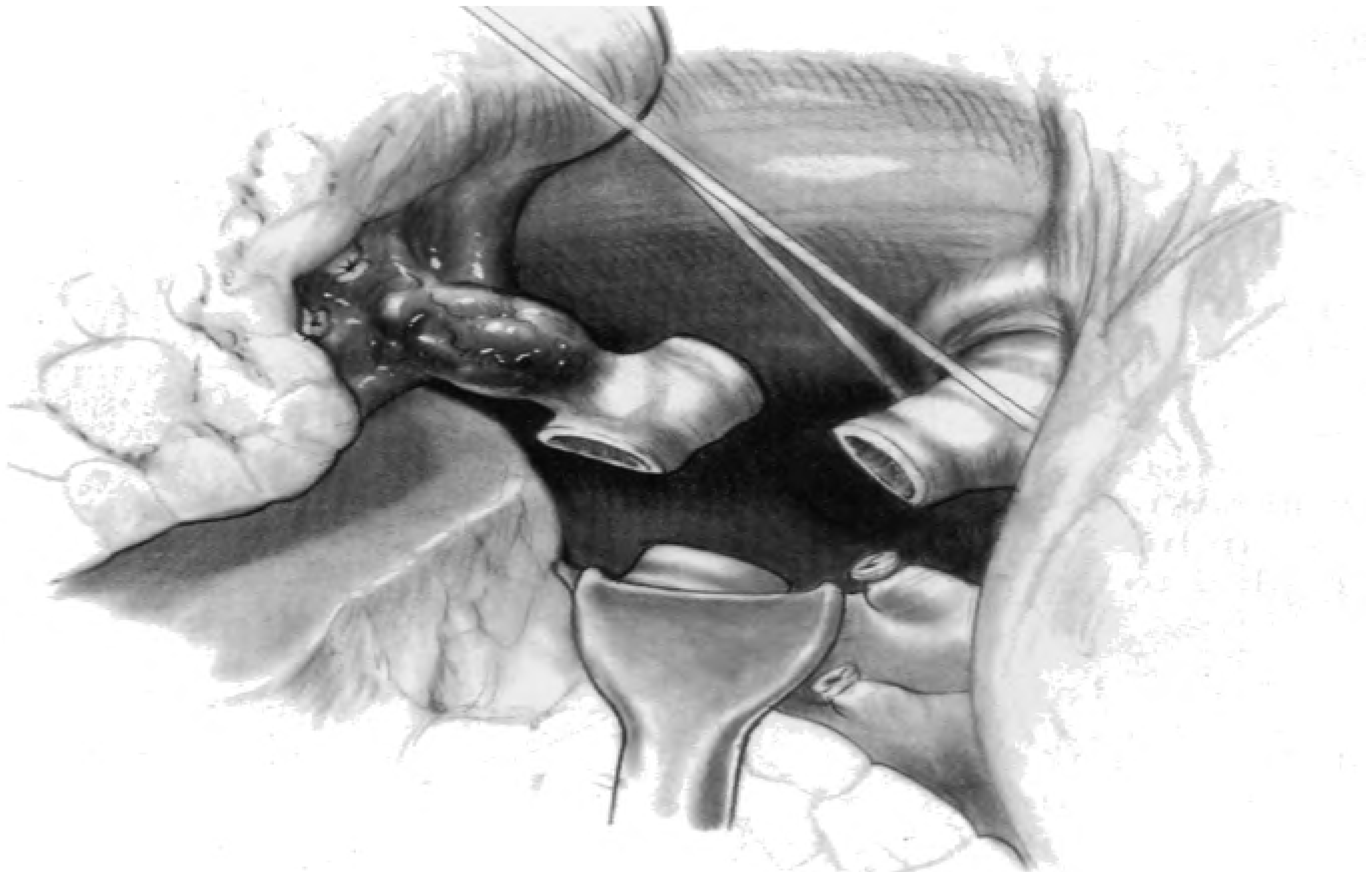
Lobectomy



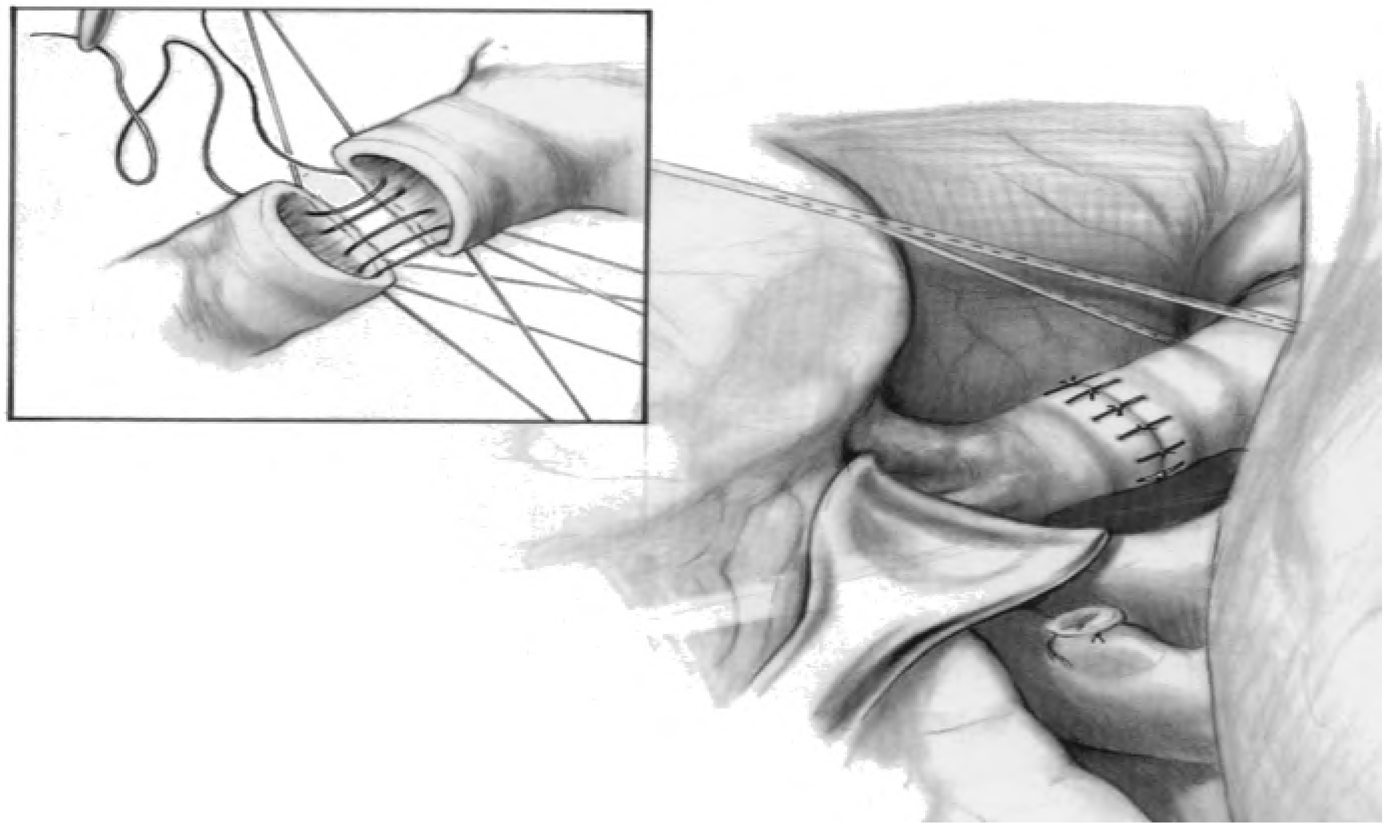
Pneumonectomy



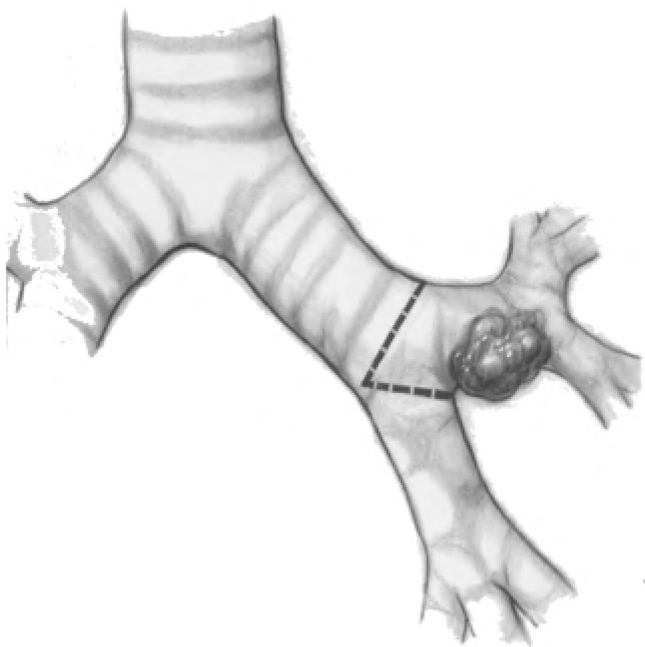
Right Upper Lobe Sleeve Resection



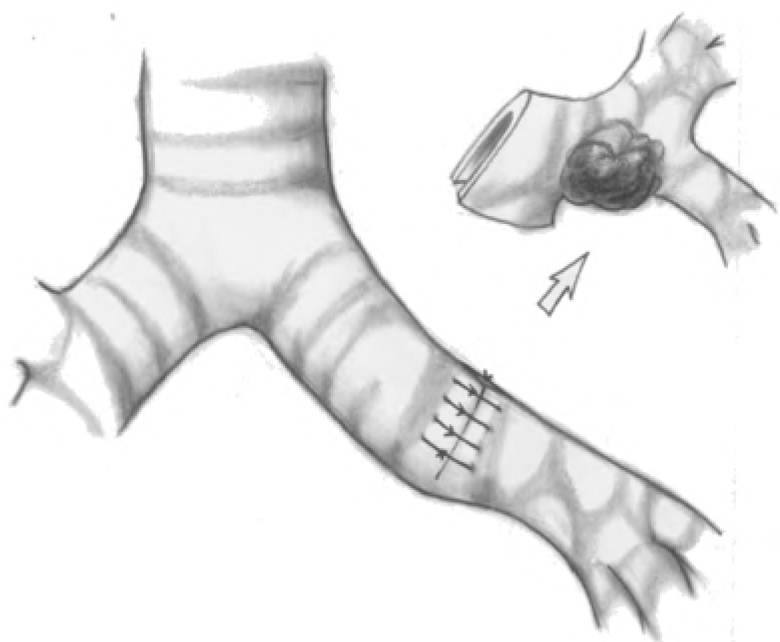
Re-anastamosis of the Bronchus Intermedius to the Mainstem Bronchus



Left Upper Lobe Sleeve Resection

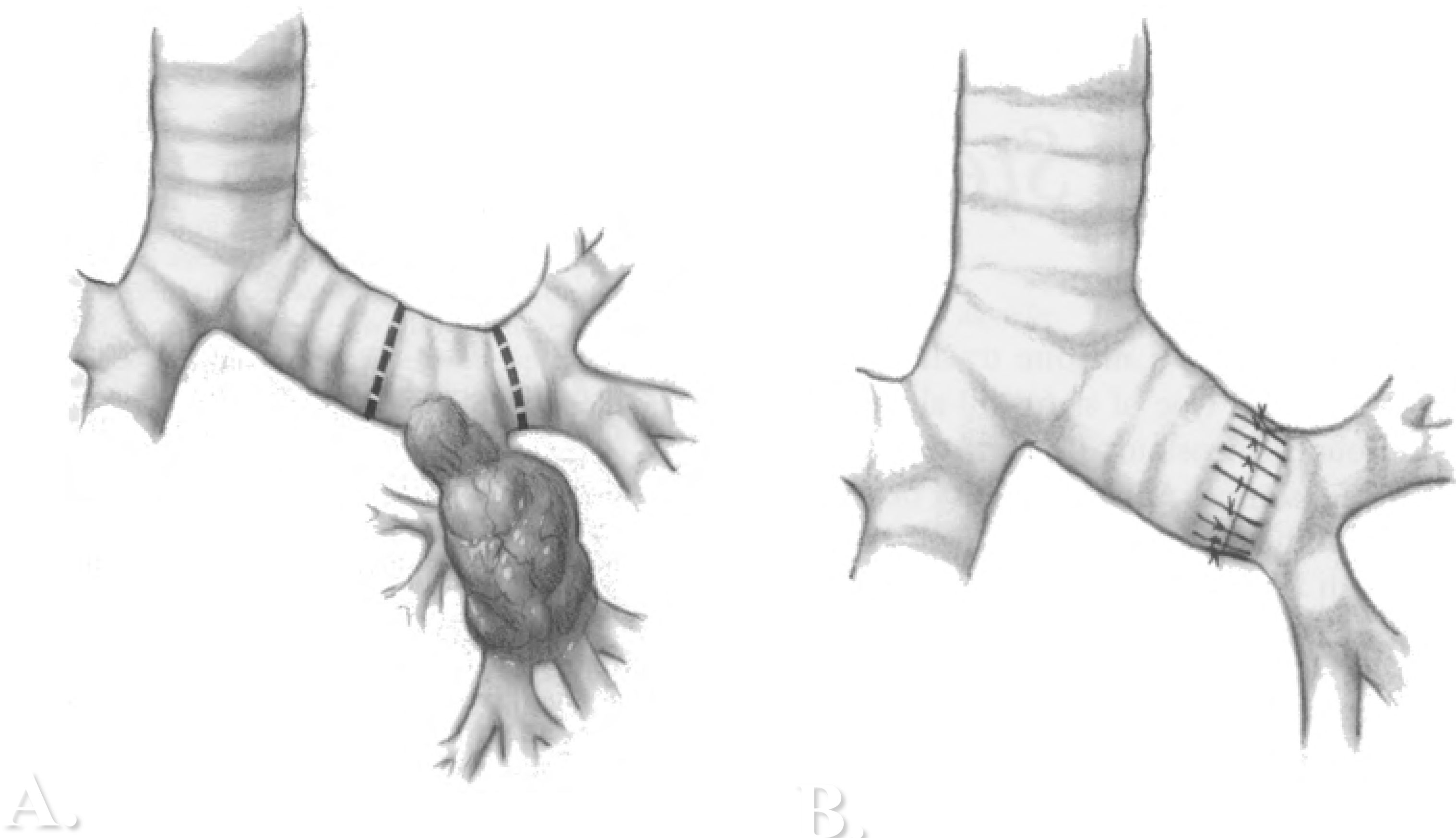


A.

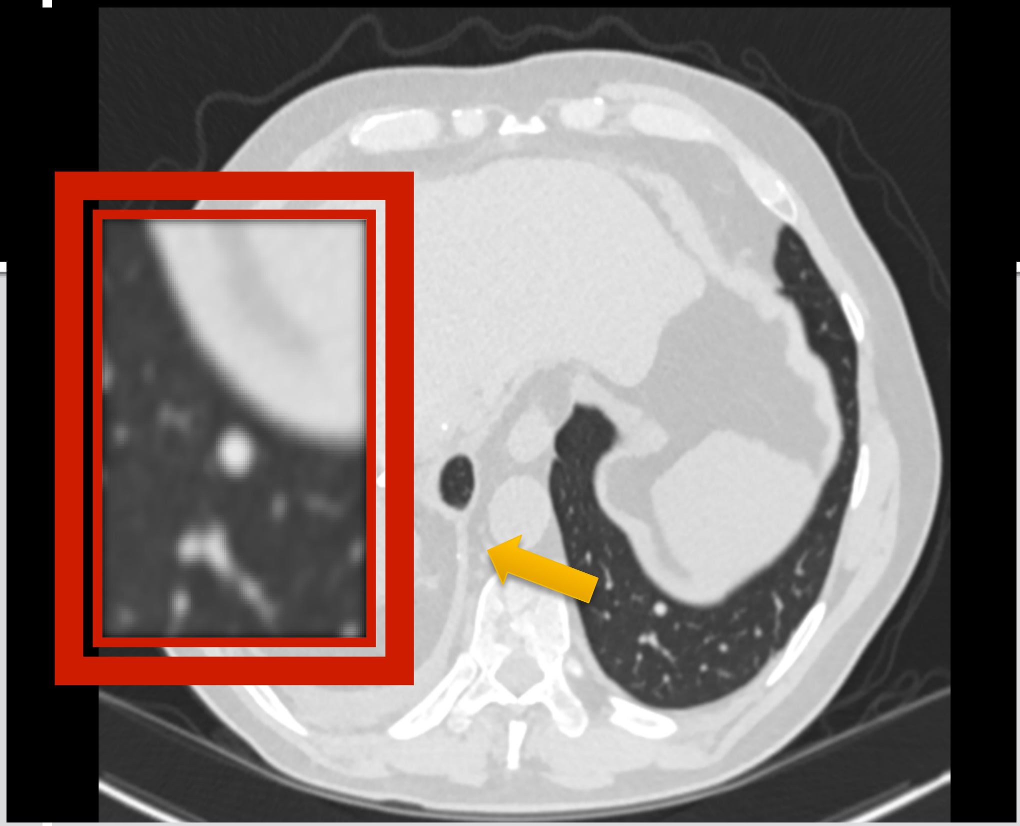


B.

Left Lower Lobe Sleeve Resection



Navigational Bronchoscopy

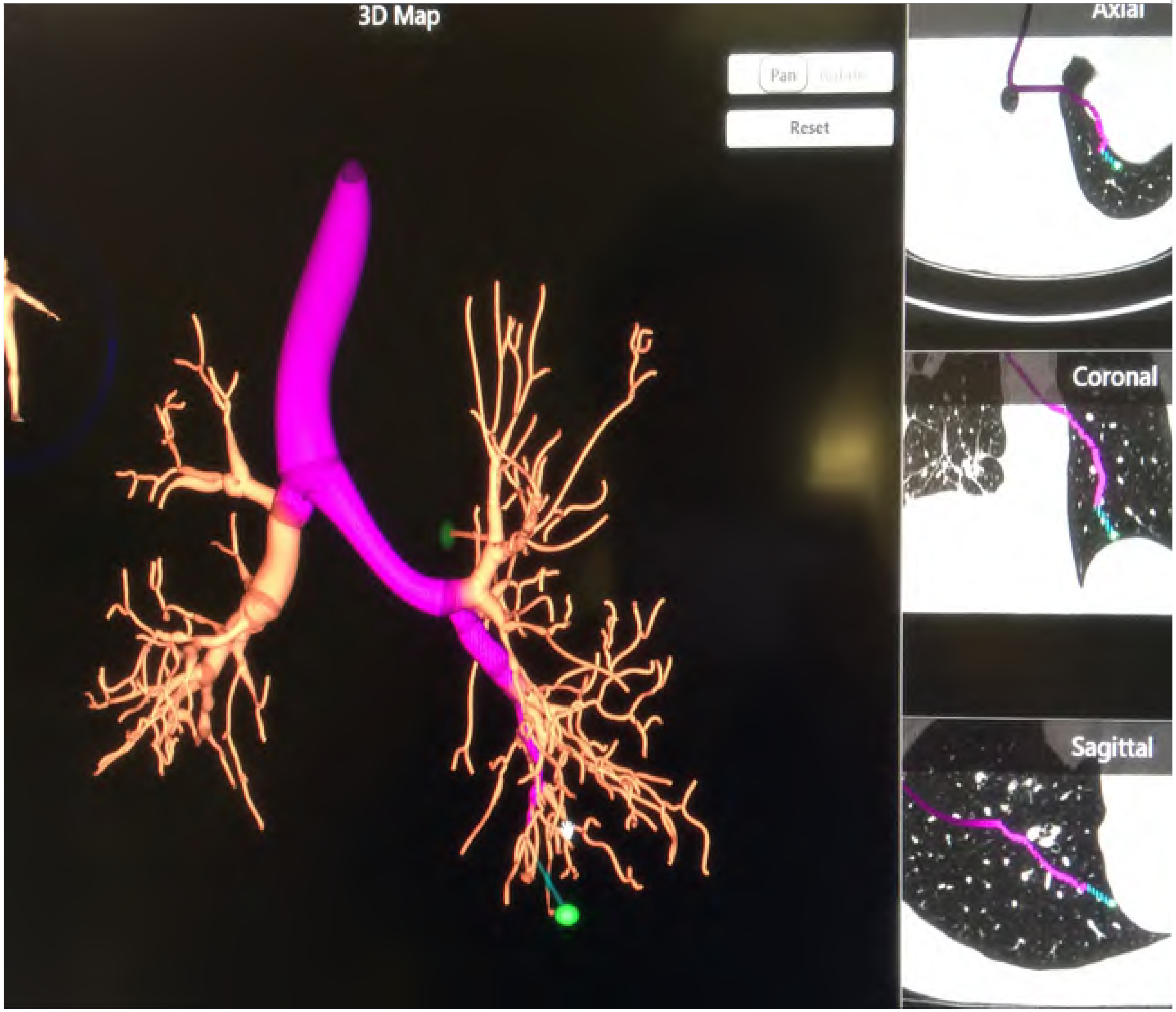


65 Year Old Man with hx of 5 mm Nodule in the left lower lobe proximity to diaphragm

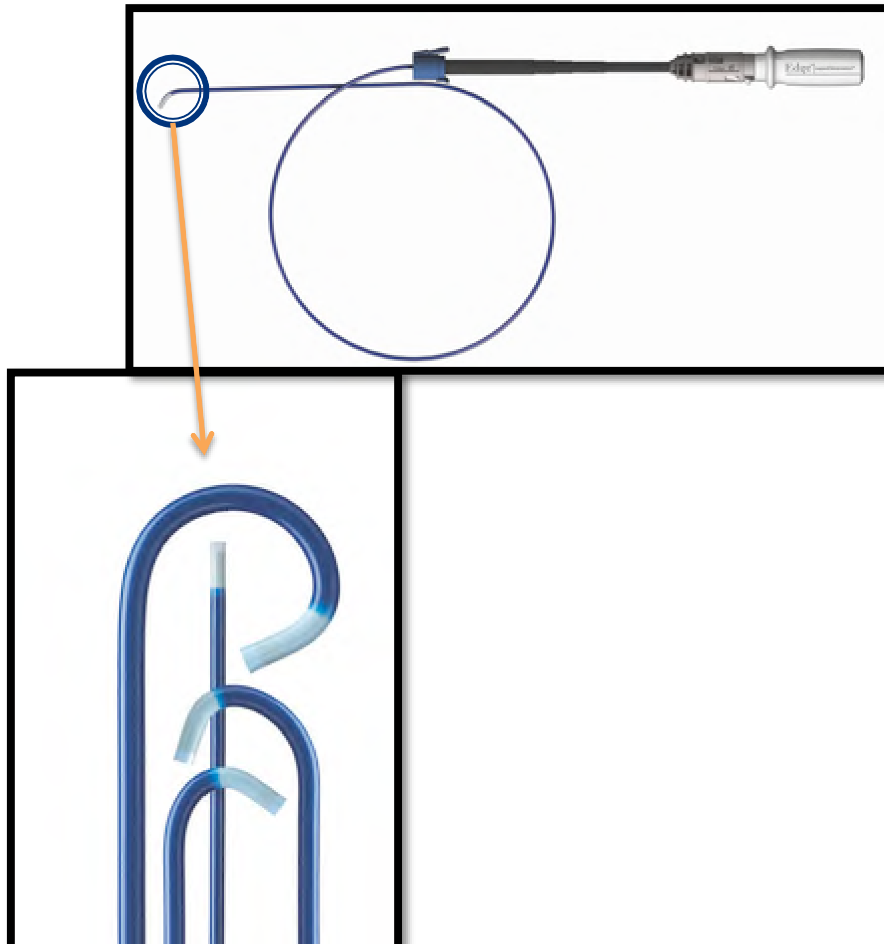
Nodule location is inaccessible for biopsy
High Risk nodule therefore thoracic Surgery is planning
VATS
Size and location difficulty to feel

Thoracic Radiology CT Chest

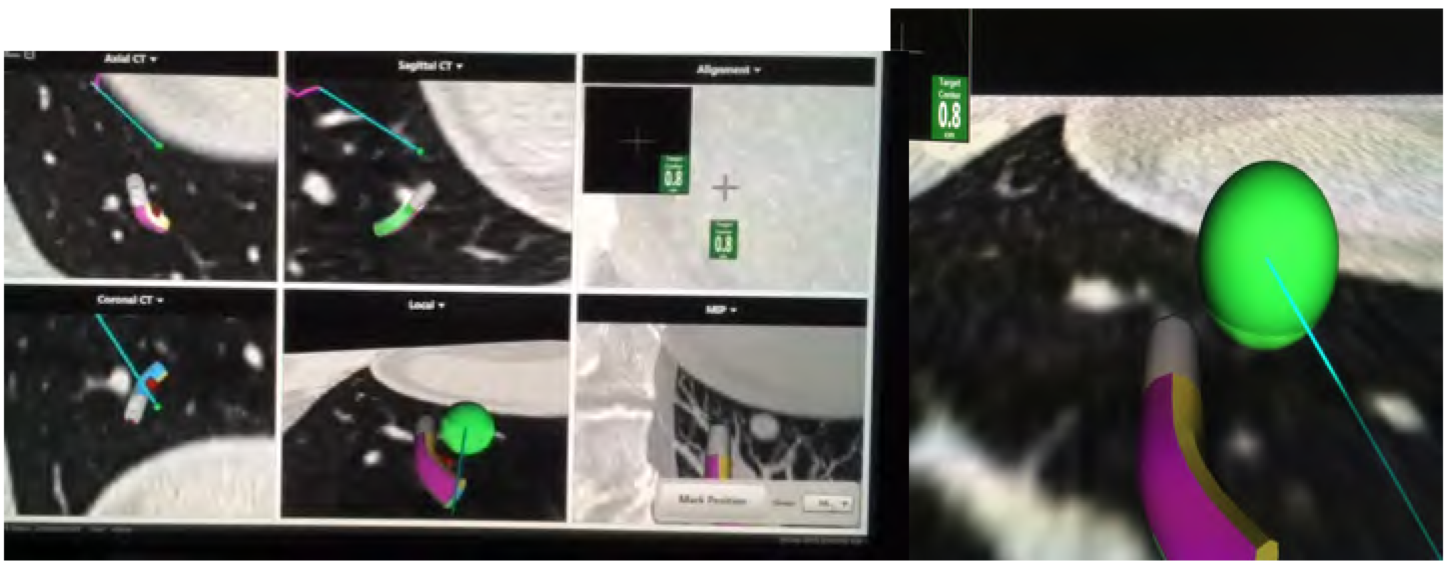
Creating a Virtual Roadmap to the Lesion – "GPS" Guidance system



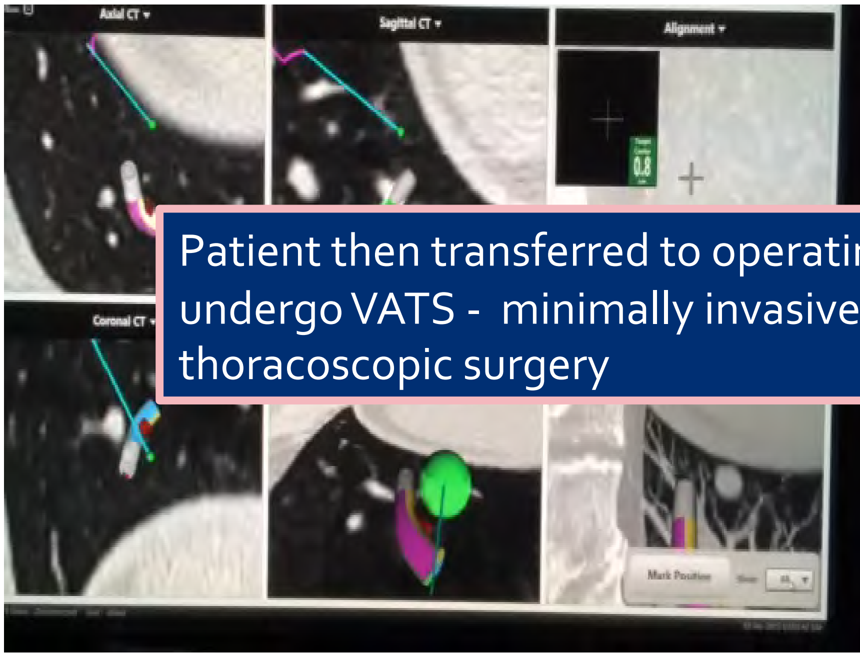
- A High Performance Catheter for the Lung



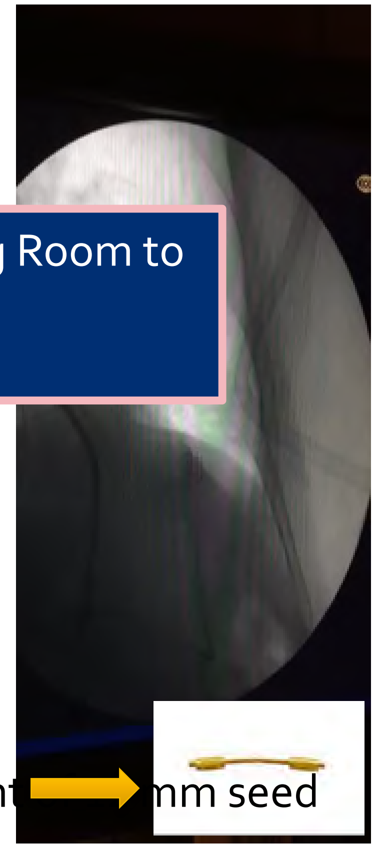
Endoscopy Center – Bronch Room



Injecting Methylene Blue "Tattoo" and Placement of Gold Fiducial Marker



Patient then transferred to operating Room to undergo VATS - minimally invasive thoracoscopic surgery



Navigational Bronchoscopy guided placement mm seed

Therapeutic Bronchoscopy

Thermal Ablation

Pulmonary Workstation – Argon Plasma

VIO 300 D

ENDO CUT IQ

APC 2

FORCED APC
PULSED APC
PRECISE APC

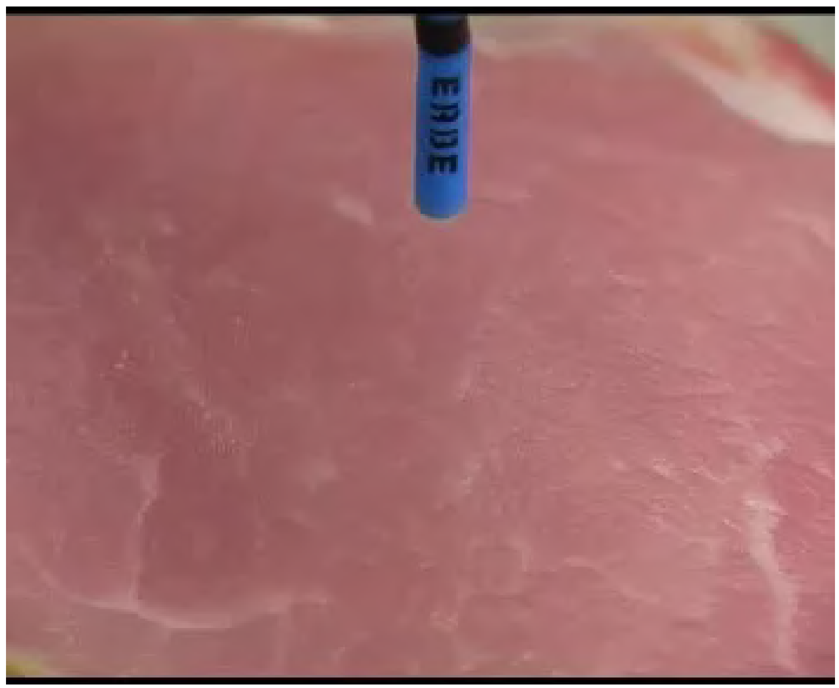
VIO cart

cautery socket 4mm

Foot switch

Argon Plasma Coagulation

- What is APC?
- APC is not a laser
- Argon gas delivers plasma of evenly to tissue
- 6000 volt peak energy delivered by the tungsten wire that terminates just proximal to the probe tip
- This ionizes the argon gas as it is sprayed from the probe tip in the direction of the target tissue
- Argon gas is non-flammable and inexpensive to refill



Cryotherapy

Summary

- Bronchial Carcinoid can commonly involve the lungs
- Central airways are common sites of involvement
- Surgical Cure is the goal
- Bronchoscopy techniques help to diagnose, stage and treat bronchial carcinoids

Subtypes of Carcinoid Tumors

- Type 1, Typical: low-grade (well-differentiated), low mitotic rate, slow-growing, rarely metastasize to extrathoracic structures; 4x more common than atypical carcinoids
- Type 2, Atypical: high-grade (poorly-differentiated), high mitotic rate and/or necrosis, behave aggressively, with rapid tumor growth and early distal dissemination
- Type 3: small cell lung cancer

Endoscopic Techniques of Removal