

Mediastinal Cystic Lesions

Madhuri Vasudev Rao, MD
PGY-4

Patient Details

- 17 yo female
- PMH: Type I DM
- PSH: nil
- Meds: Insulin
- Social Hx: Denies ETOH, smoking, illicit drugs

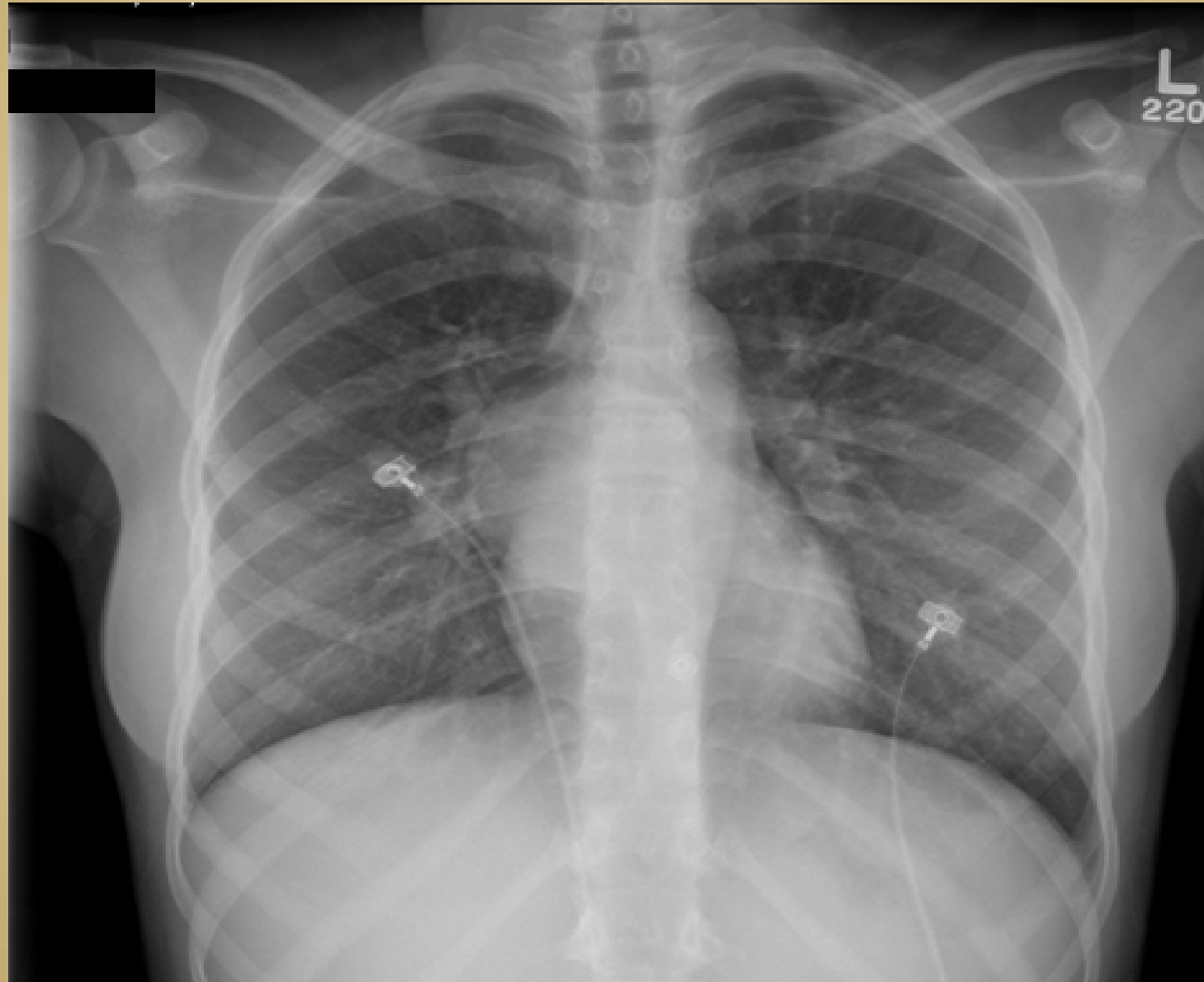
Presenting Complaint

- Non-productive cough – 3 weeks
- Dyspnea – 2 weeks
- Unresponsive to o/p management with azithromycin

Lab Work

- CBC: 8/12.4/38/339
- BMP: 137/4.2/104/10/0.9/113
- LFTs, Coags, UA: unremarkable

www.downstatesurgery.org
Case Presentation 1



www.downstatesurgery.org
Case Presentation 1



www.downstatesurgery.org
Case Presentation 1



OR Details

- Bronchoscopy
 - Edematous trachea
 - External compression of RUL and RML bronchi
- EGD
 - No communication of cyst with esophagus
- Right VATS
 - Ports: 4th ICS posterior axillary line, 7th ICS mid-axillary line, 4th ICS anterior axillary line
 - Working port with wound protector: lateral mammary fold
 - Findings: 6 x 8cm mediastinal cyst, densely adherent to esophagus and bronchus

Case Presentation 1

- Conversion to limited thoracotomy
 - Complete excision of cyst
 - Repair of defect in esophageal muscular layer (3-0 Vicryl)
- EGD
 - No esophageal mucosal defects
- Chest tubes for drainage

Pathology

Foregut cyst, esophageal type

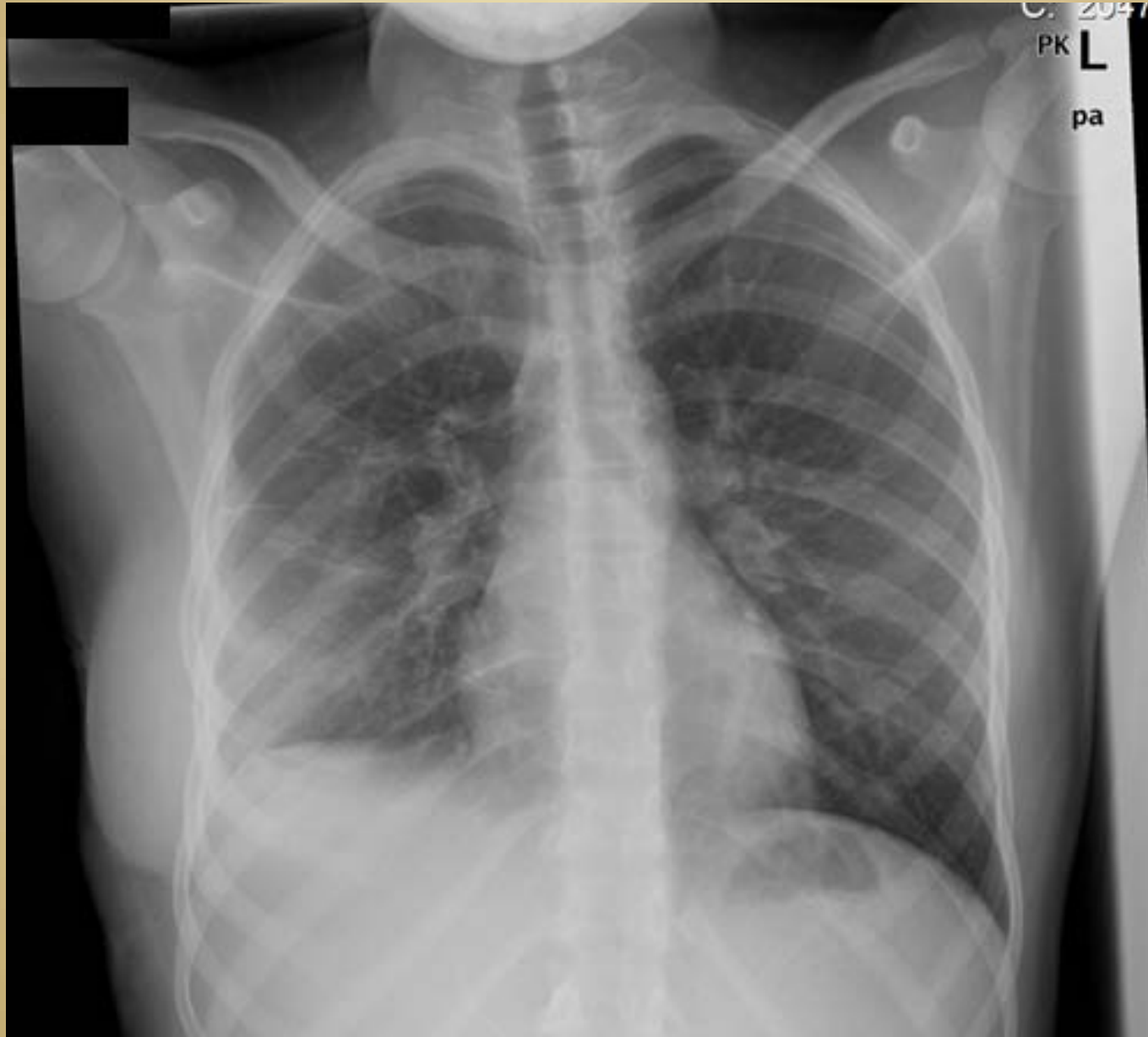
Cytology: no malignant cells

- POD 0 – 2
 - Monitored in SICU – uneventful
 - Chest tube to water seal

- POD 3
 - Chest tube removed

- POD 4
 - Patient discharged

www.downstatesurgery.org
Case Presentation 1



Patient Details

- 77 yo female
- PMH: HTN, depression, dementia, anxiety
- PSH: nil
- Meds: Paxil, Vasotec
- Social hx: denies ETOH, smoking, illicit drugs

Presenting Complaint

- S/p fall, fractured olecranon
- Preop CXR: 5cm mediastinal mass

Lab Work

- CBC: 11.5/15/45/347
- BMP: Ca 10.8, Phos 3.2
- PTH: 179
- Urine studies: ordered but not sent



Operative Details

- Bronchoscopy
 - External compression of bronchus to RUL apical segment
- Right VATS
 - Ports: 5th ICS anterior axillary line, 8th ICS mid and post axillary line
 - Working port: 3rd ICS
 - Findings: large ovoid, cystic mass in middle mediastinum extending into thoracic inlet
 - Excision of thoracic component
- EGD
 - No injury or communication

Pathology

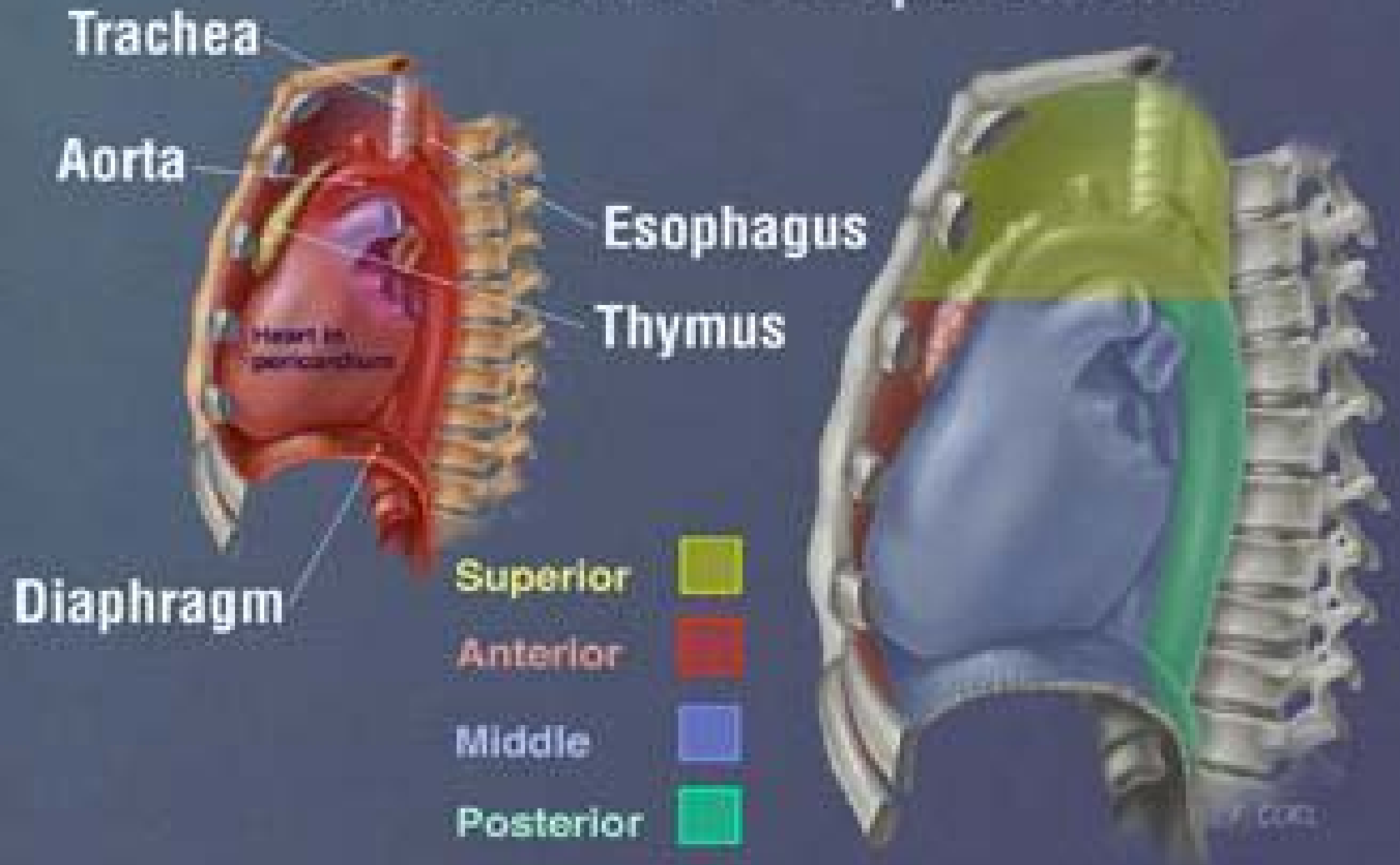
Mediastinal proliferative parathyroid

- POD 0 – 4
 - Uneventful
- POD 5
 - Chest tube removed, CXR – small effusion
- POD 7
 - Found unresponsive, asystolic on floor
 - Anoxic brain injury
 - CXR: stable small effusion
 - PE vs. HCAP
 - Vent and pressor dependent
- POD 20
 - Passed away after DNR request by family

DISCUSSION

- Mediastinal anatomy
- Classification of lesions
- Common mediastinal cysts – salient features, embryology
- Clinical features
- Diagnosis
- Operative vs. non-operative management
- Minimally invasive techniques

Mediastinal Compartments



Classification

18-25% of mediastinal mass lesions

Etiological Classification

Congenital

- Foregut malformations
 - Bronchogenic Cysts
 - Esophageal duplication cysts
 - Neurenteric cysts
 - Gastroenteric
- Mesothelial Cysts
 - Pleural
 - Pericardial
- Lymphatic
 - Lymphangiomatous
 - Thoracic duct cyst

Acquired

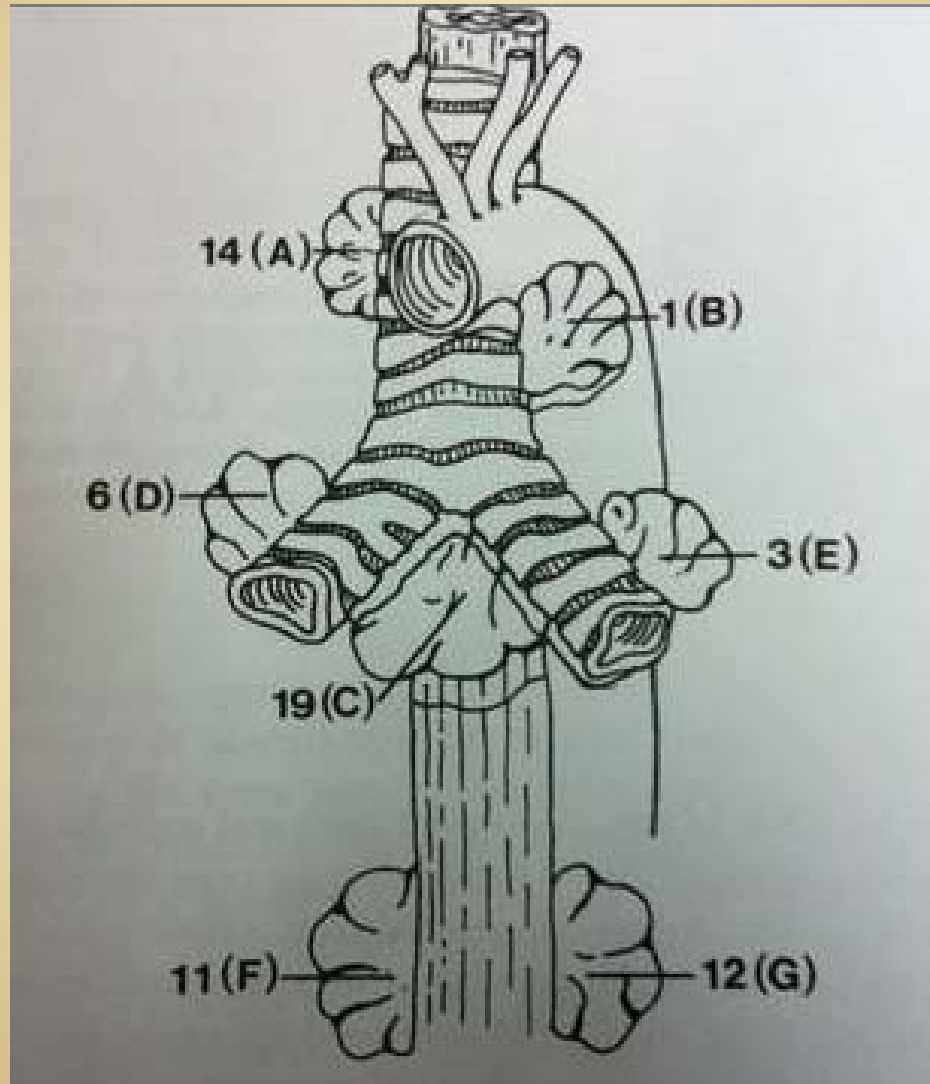
- Thymic
- Thyroid
- Parathyroid
- Meningocele
- Mature cystic teratoma
- Schwannoma
- Inflammatory
- Mediastinal pancreatic pseudocyst
- Mediastinal Hydatid cyst
- Cystic degeneration of solid tumors

Bronchogenic cysts

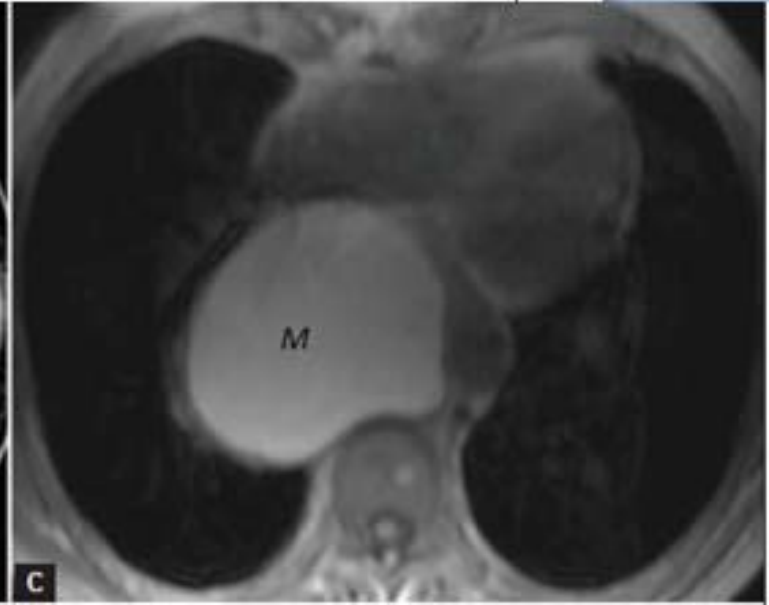
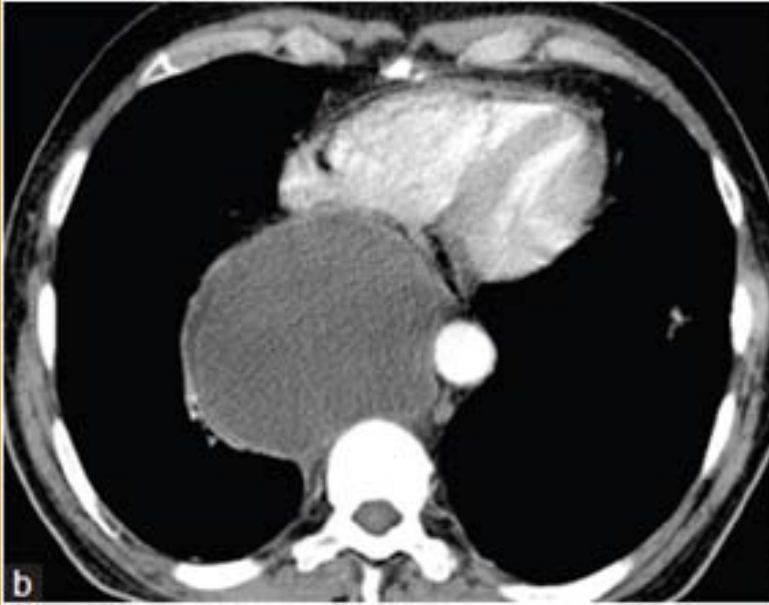
- Embryology:
 - Ventral foregut diverticulum → Tracheobronchial tree.
 - Abnormal development- cystic structures
- Most common (50-60%)
- M > F
- Location: Lung, middle mediastinum-paratracheal, sub-carinal
- Presentation in 4th/ 5th decades
- Histology: ciliated respiratory epithelium, **cartilage**, smooth muscle, fibrous tissue

www.downstatesurgery.org
Foregut Cysts

Bronchogenic Cysts: Maier's Classification



General Thoracic Surgery, Shields, W, Lippincott Williams & Wilkins



Esophageal Duplication Cyst

- Enterogenous cyst/reduplication cyst/
inclusion cyst/gastric cyst
- 7-15%
- Embryology
 - Dorsal Division of foregut → GI tract
 - 4-6 wk of embryonic life - vacuoles in solid esophageal tube → coalesce to form lumen
 - Failure of fusion- intramural cyst
- Smooth wall, muscular coat with GI mucosa

Neurenteric Cysts

- Enteric cysts a/w vertebral anomalies
- Location: Posterior mediastinum
- Embryology
 - Incomplete separation of primitive notochord from endoderm
 - Cyst attached to meninges/spinal cord by a tract
- Presentation: Childhood/Infancy
- MRI: Extension into spinal canal

Esophageal Duplication/Neurenteric Cysts



Pleuropericardial Cysts

- Spring water cyst
- Embryology
 - Failure of fusion of primitive pericardial lacunae
 - Abnormal folds in the embryonic pleura
- Location: Right cardiophrenic angle (50-70%)
(Stoller and associates 1986)
- Benign course

Simple Pleural Cysts

Thymic Cysts

- 2nd most common (28%)

Takeda S et al. Clinical spectrum of mediastinal cysts. Chest. 2003;124:125-32.

- Congenital- unilocular, clear fluid
- Acquired
 - Multiloculated
 - A/W thymic neoplasms

Parathyroid Cysts

- 0.08 - 0.9% (Welti and Gerard-Merchant, Mollinari and associates)
- Thin walled , unilocular with clear fluid
- Location: anterosuperior (58%), retrotracheal, true anterior
- Etiology: Origin- Lower parathyroid, residual cannalicular rudiment,
? Superior vs. 5th parathyroid

Cystic degeneration

- Clinically a/w hyper PTH (40% cases)
- Asymptomatic vs. hypercalcemia vs. pressure symptoms
- Management- surgical excision- neck incision vs. median sternotomy vs. VATS/ thoracotomy

Asymptomatic

- Incidental finding on imaging

Symptomatic

- Depending on location and etiology
- Bronchogenic cysts – 30-80% symptomatic
- PPC –mostly asymptomatic

- Mechanical compression on adjacent structures
 - Airway: Cough, dyspnea, stridor, chest pain
 - Paraesophageal: Dysphagia, regurgitation, abdominal pain
 - Heart and great vessels: Arrhythmias, SVC syndrome

Fontenelle LJ et al: The asymptomatic mediastinal mass. Arch Surg 102:98, 1971.

St-Georges R et al: Clinical spectrum of bronchogenic cysts of the mediastinum and lung in the adult. Ann Thorac Surg 52:6, 1991.

Complications

- Infectious complications- Fever, purulent sputum, hemoptysis
- Bronchogenic cyst complications (27%)
 - Fistulization with airway (4.5%)
 - Inflammation and ulceration (18.1%)
 - Hemorrhage (1.5%)
 - Infection (1.5%)
 - Bronchial atresia (1.5%)
- Enterogenous cysts with gastric mucosa
 - Peptic ulceration, perforation, bleeding
- Parathyroid cyst: RLN palsy
- Malignant transformation

- Detailed H and P
- Labs : CBC, BMP, LFTs, Amylase, Calcium
- Imaging
 - CXR
 - CT scan
 - MRI – esp. for posterior mediastinal lesions
 - ? Pre-op barium swallow
- Endoscopy
 - EGD
 - Bronchoscopy

Indications For Operative Management

- Symptomatic cyst
- Suspected malignancy
- Cyst infection
- Tracheal compression
- Progressive growth
- Presence in children (occupy space needed for the development of normal respiratory tissue)
- Atypical location or characteristics

Asymptomatic Cysts: Operative vs. Expectant Management

- Controversial
- Treatment of choice- complete surgical excision.
- Advantages
 - Prevent potential complications
 - Difficult to remove when infected
 - Establish diagnosis
 - Excellent prognosis
 - Low morbidity and mortality

- Progression from asymptomatic to symptomatic
 - St-Georges R, et al. – 15/66 (22.7%), increase in size/change in symptoms/both
- Risk of serious complications
 - Esophageal cysts – bleeding/perforation

Advantages of Expectant Management

- Small, asymptomatic cysts
- Known to have relatively benign course
- Close monitoring possible with improved imaging
- Avoid morbidity of surgery potentially involving damage to vital structures

Gourin A et al. Bronchogenic cysts. Broad spectrum of presentation. N Y State J Med 1976;76:71&9.

Terry PB. William Tell and technology [Editorial]. Chest 1985;88:486-7

Ginsberg RJ et al. A bronchogenic cyst successfully treated by mediastinoscopy. Ann Thorac Surg 1972;13:266-8.

Operative Approaches

- Thoracotomy (Posterolateral)
- Median sternotomy
- Minimally Invasive Surgery/ VATS

Advantages

Decreased pain
Shorter hospital stay
Rapid return to activity

Drawbacks

Limited exposure
Risk of incomplete excision

Open vs thoracoscopic surgical management of bronchogenic cysts. Tolg C et al. Department of Pediatric Surgery, Hôpital Robert Debré, Paris, France. Surg Endosc 2005 Jan;19(1):77-80

Video-Assisted Thoracoscopic Surgery of Mediastinal Bronchogenic Cysts in Adults: A Single-Center Experience. Weber T et al. Divisions of General Thoracic Surgery and Radiology, University Hospital Berne, Berne, Switzerland. Ann Thorac Surg 2004;78:987-91

Foregut duplications: is there an advantage to thoracoscopic resection?

Bratul et al. Division of Pediatric Surgery, Montreal Children's Hospital, McGill University Health Center, Canada. J Pediatr Surg 2005 Jan;40(1):138-41.

- Retrospective review
- 39 children with bronchogenic and esophageal duplication cysts
- Thoracotomy - 21 pts, thoracoscopy - 11 pts, cervical incision – 6 pts, laparotomy - 1 pt
- Thoracoscopy vs. thoracotomy group:
 - Fewer chest tube days (1.6 vs 3.3 days)
 - Shorter hospital stay (2.6 vs 6.6 days)
 - Complications

Tracheal injury in 3 patients (2 thoracotomy, 1 thoracoscopy)

Esophageal mucosal injury in 2 patients (both thoracotomy)

Mediastinoscopic Procedures

- Techniques
 - Cyst excision
 - Cystotomy drainage with chemical sclerosis
- Location of cyst accessible to conventional cervical mediastinoscopy

Mediastinoscopic Treatment of Mediastinal Cysts

Urschel J et al., Departments of Surgery, University of Alberta, Edmonton, Alberta, and University of Manitoba, Canada. *Ann Thorac Surg* 1994;58:1698-70V

- Case series of 3 pts
- Bronchogenic cyst x 2
 - drainage and sclerosis
 - no reaccumulation at 6 mo f/up
- Mesothelial cyst x 1
 - piece-meal excision
 - no recurrence at 12 months

Drainage of cyst

- Transbronchial
- Percutaneous
- Criticism to drainage procedures
 - Recurrence
 - Potential complications with recurrence

- Congenital or acquired
- Developmental abnormality of foregut – most common cause
- Bronchogenic cyst- most common cyst
- Incidental finding vs. symptomatic cyst
- Symptoms based on location and etiology

Recommended treatment- Complete surgical excision

Thank You

The descending thoracic aorta, esophagus, and thoracic duct are contents of:

- A. Anterior mediastinum
- B. Superior mediastinum
- C. Posterior mediastinum
- D. Middle mediastinum

The descending thoracic aorta, esophagus, and thoracic duct are contents of:

- A. Anterior mediastinum
- B. Superior mediastinum
- C. Posterior mediastinum**
- D. Middle mediastinum

Bronchogenic cysts are:

- A. congenital malformations of dorsal foregut
- B. congenital malformations of ventral foregut
- C. congenital malformations of mesothelial origin
- D. acquired cysts of the tracheobronchial tree

Bronchogenic cysts are:

- A. congenital malformations of dorsal foregut
- B. congenital malformations of ventral foregut**
- C. congenital malformations of mesothelial origin
- D. acquired cysts of the tracheobronchial tree