Mediastinal Cystic Lesions

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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
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
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: 5\textsuperscript{th} ICS anterior axillary line, 8\textsuperscript{th} ICS mid and post axillary line
  - Working port: 3\textsuperscript{rd} 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 Anatomy

Mediastinal Compartments

- Trachea
- Aorta
- Heart in pericardium
- Esophagus
- Thymus
- Diaphragm

Compartment Colors:
- Superior: Yellow
- Anterior: Red
- Middle: Blue
- Posterior: Green
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
- Schwanomma
- 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
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- intramurual 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%)
  

- 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
Clinical Features

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

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

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


Foregut duplications: is there an advantage to thoracoscopic resection?


- 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
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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
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