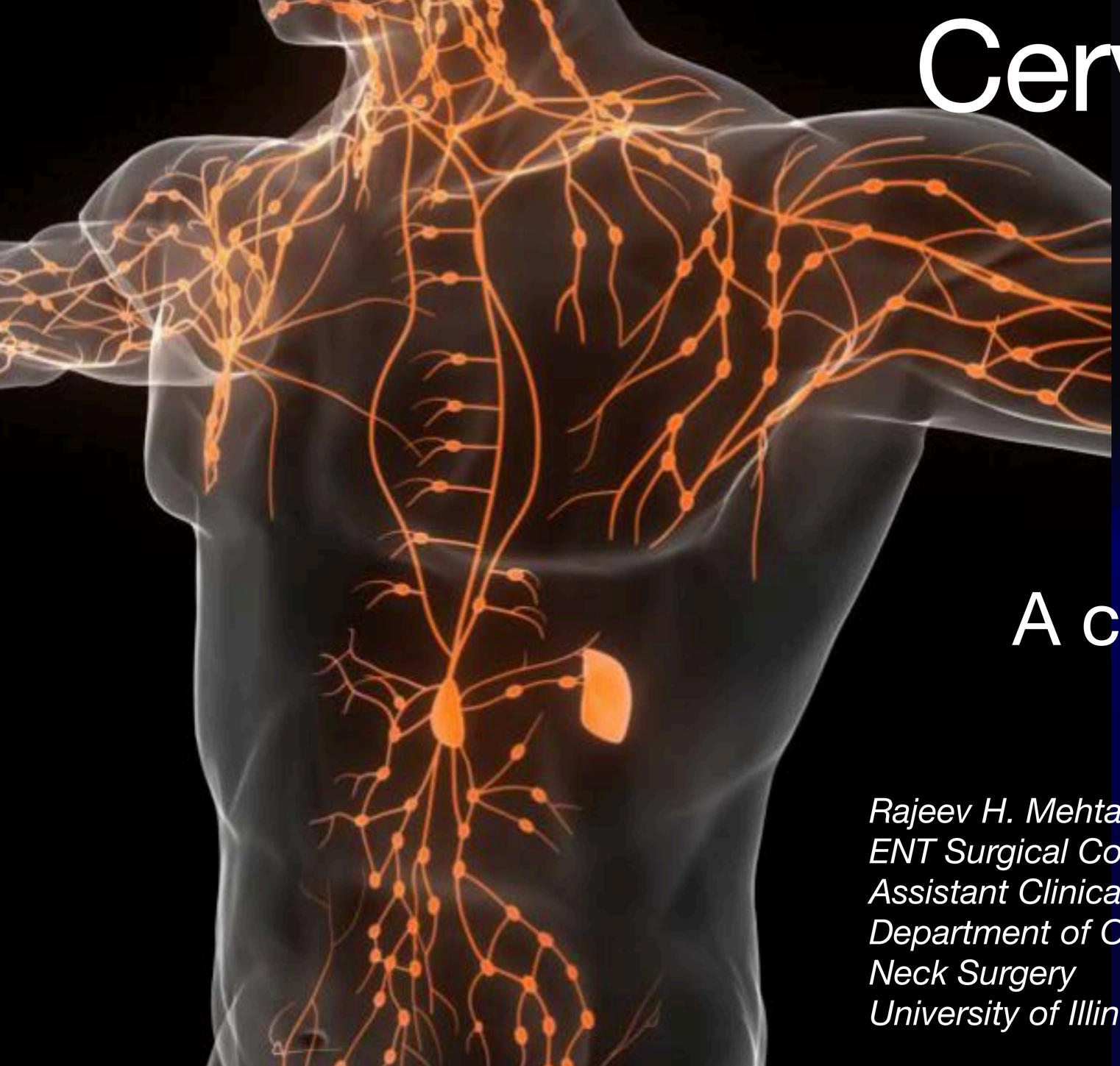

Cervical Thoracic Duct Cyst

A case report

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Cervical Thoracic Duct Cyst

A Case Report

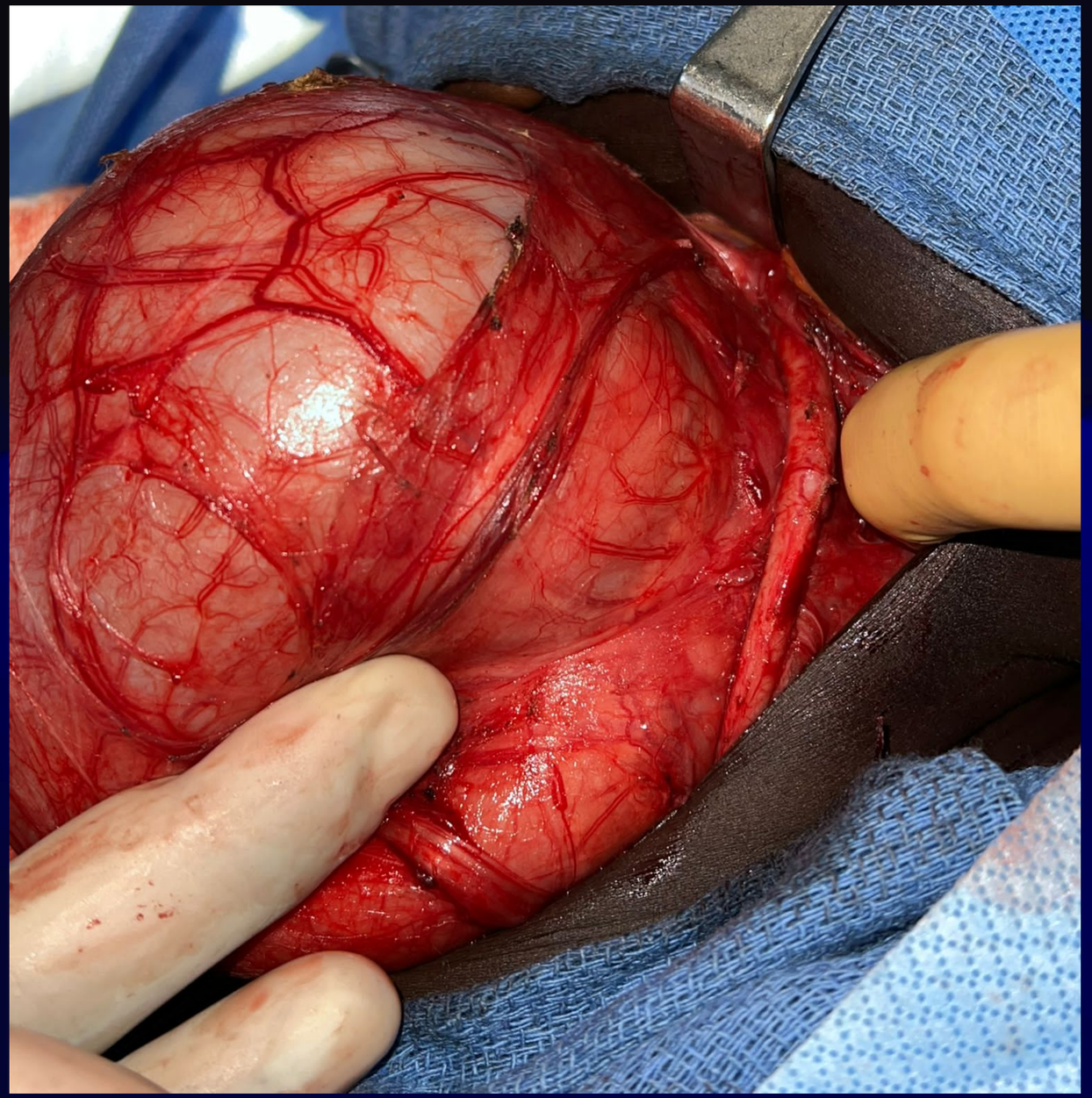
- 8 year old male presents with large congenital cystic mass since birth
- Cyst causes limited neck range of motion, no pain or dysphagia
- CT shows unilocular cyst of entire right lateral neck
- Does not extend into chest
- Patient was in Migori Kenya at www.KenyaRelief.org (mission trip) so limited preop testing available

Steinberg I. Roentgen diagnosis of persistent jugular lymph sac. Radiology 1964;82: 1022

Cervical Thoracic Duct Cyst

Management

- Since it was right-sided, chylous cyst was unlikely
- Surgical excision was performed without rupture of cyst
- Carotid artery and vagus nerve were dissected medially off superficial aspect of cyst



Cervical Thoracic Duct Cyst

Management

- Inferior dissection was done last, encountered copious thick white fluid
- One main thick walled lymphatic duct and another smaller one were ligated
- JP drain was placed and he was kept NPO with TPN for one week.

Cervical Thoracic Duct Cyst

- One year later, he is doing great!

Cervical Thoracic Duct Cyst

Demographic

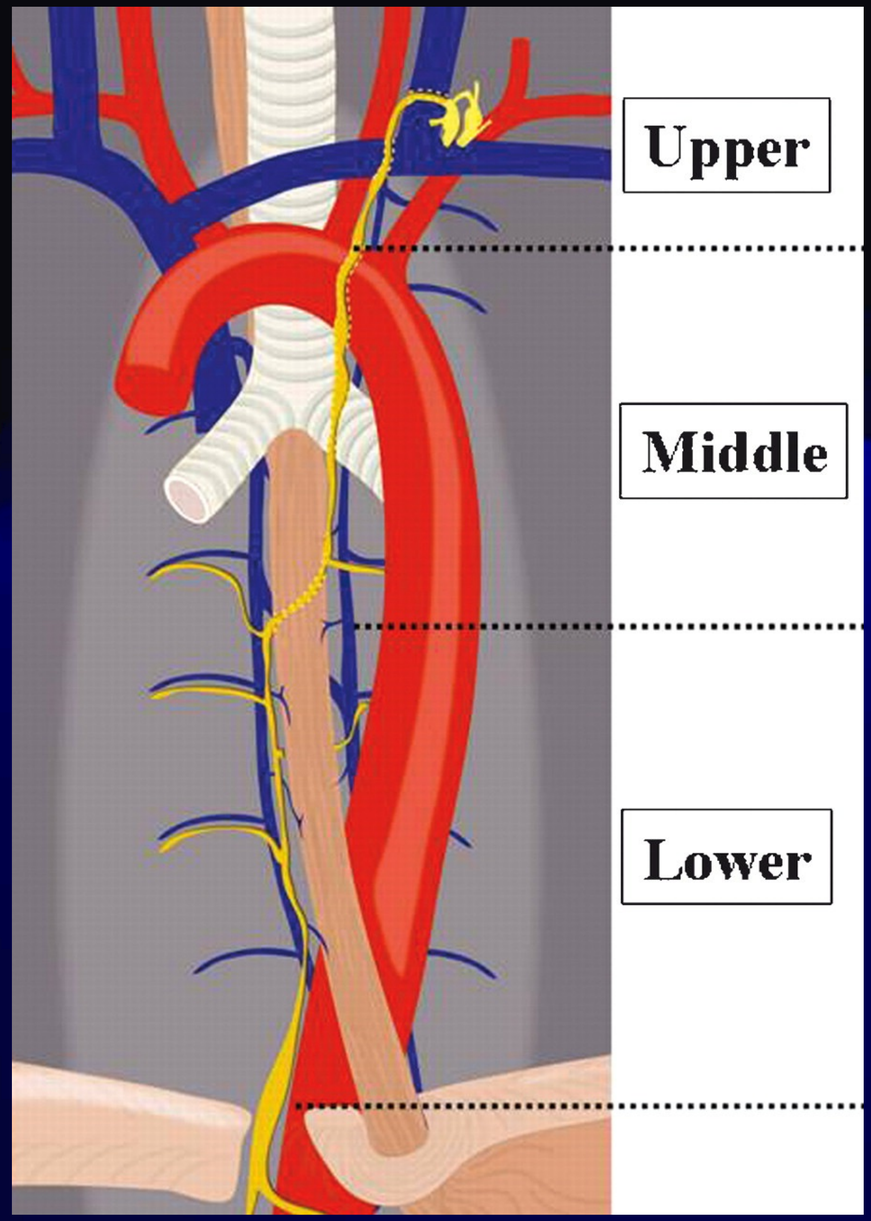
- Male to female ratio 2:3 (more common in females)
- 46/47 cases were left sided (98%)
- Cisterna chyli cysts are most common, thoracic duct cysts of the mediastinum are second, but TD cysts of the neck are rare
- Most thoracic duct masses are post traumatic chylous fistulae after neck surgery or blunt/penetrating trauma.
- This will be the second case report of RIGHT-sided cervical TD cyst since 1964

Steinberg, I. Roentgen diagnosis of persistent jugular lymph sac. Radiology 1964; 82:1022

Abelardo, E., Shastri, P., Prabhu, V. Variations in the management of cervical thoracic duct cyst. Biomedicine Hub 2020, 1-8.

Anatomy of Thoracic Duct

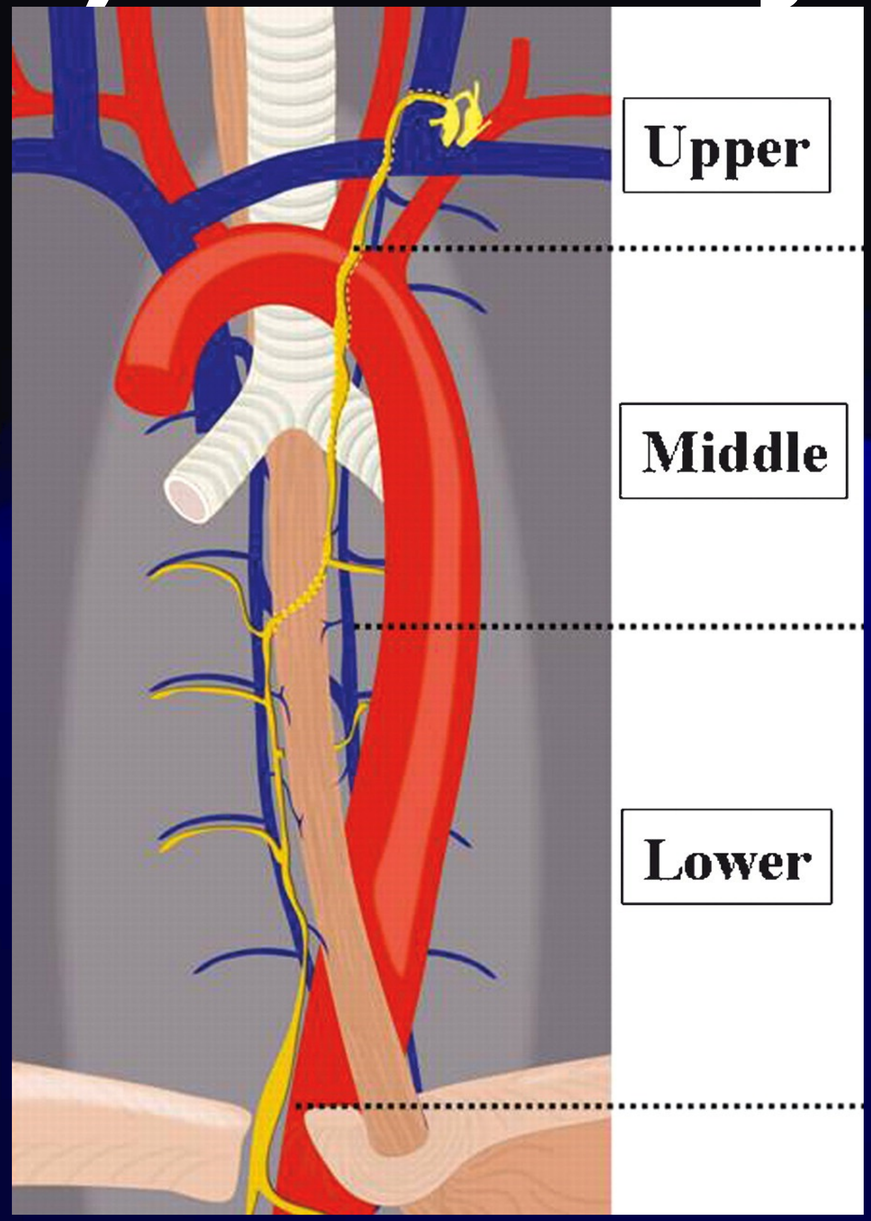
- Originates from cisterns chyli (drains small lymphatics of small intestine)
- Runs in the posterior mediastinum along the anterior aspect of vertebral bodies
- Run on the right side of the esophagus crosses to the left at T5/T6 vertebra
- Then runs superiorly between the aorta and azygos vein.



Hollinshead WH. Anatomy for surgeons: the head & neck. 3rd ed. Philadelphia: JB Lippincott; 1982. p. 475-8.

Thoracic Duct (TD) Anatomy

- Enters the neck posterior to the left common carotid artery, vagus nerve and IJ vein.
- Arches superior, anterior, and lateral to form a loop (anterior to vertebral artery and thyrocervical trunk) 3-5 cm above the clavicle.
- Courses between IJ vein and anterior scalene muscle superficial to the phrenic nerve.
- Usually 2-4 mm in diameter



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Termination of Thoracic Duct

- Usually 3-5 cm above the clavicle (can be up to 8 cm)
- Average diameter 2-4 mm
- Duct opening is always within 2 cm of the IJ-subclavian vein junction
- There is always a valve in the distal 1cm to prevent retrograde flow of venous blood.

Kinnaert P. Anatomical variations of the cervical portion of the thoracic duct in man. J Anat 1973; 115: 45-52.

Termination of Thoracic Duct

- Greenfield & Gottlieb study: Terminal portion is quite variable: — 60% entered IJV, — 34% entered subclavian
- Kinnaert study: — 13% single duct, — 66% multiple channels ending as a short common duct, — 21% multiple channels ending separately
- Rarely, TD rarely does not cross midline and ends in right IJ vein (2-3%)
  - Thoracic duct can empty bilaterally (1-1.5%)

Greenfield J, Gottlieb MI. Variations in the terminal portion of the human thoracic duct. Arch Surg 1956;73:955-9.
Kinnaert P. Anatomical variations of the cervical portion of the thoracic duct in man. J Anat 1973; 115:45-52.

Wall of Thoracic Duct

- Thoracic portion - relatively thick
  - Collagen, elastin, and a few longitudinal smooth muscle fibers
- Cervical portion - relatively thin
  - Thin sub endothelial layer of connective tissue and thin layer of smooth muscle, but no elastic lamina

Right Lymphatic Duct

- A single duct on the right side is rare (< 5%).
- Consists of multiple trunks terminating separately in the region of the right IJ vein-subclavian vein junction.
- Does not arch into the neck so right sided cervical cysts are rare.

Cervical Thoracic Duct Cyst

Symptoms

- Dysphagia (esophageal compression)
- Dyspnea (tracheal compression)
- Neck pain/pressure, sore throat, substernal pain
- Hoarseness (RLN compression)
- Cough
- Arm swelling (superior vena cava compression)
- Recurrent neck swelling
- Palpitations
- Exam: cystic nontender, nonpulsatile supraclavicular swelling above left clavicle

Cervical Thoracic Duct Cyst

Differential Diagnosis

- Thyroid colloid cyst
- Cystic malignant lymphadenopathy (metastatic papillary thyroid cancer or SCCA or lymphomatous lymph node)
- Branchial cleft cyst (lateral)
- Thyroglossal duct cyst (medial)
- Cystic hygroma (both lined with endothelium but CH has no lymphocytes and triglycerides) -
- Lymphangioma - cystic septations on CT
- Lipoma
- Parathyroid cyst
- Thymic cyst
- Pseudoaneurysm of carotid/subclavian artery

Requires high index of suspicion preop to prevent complication of chylothorax.

Cervical Thoracic Duct Cyst

Pathologic findings

- Unilocular cyst
- Thin wall with various fibrous or connective tissue elements
- Endothelial lining
- Immunohistochemistry:
  - Positive staining for CD31, CD34, factor VIII
  - Negative staining for epithelial membrane antigen (confirms endothelial lining)
  - Epithelial components suggests another etiology

Cervical Thoracic Duct Cyst

Theories of Etiology

- Congenital weakness of the TD wall
- Acquired degeneration of the TD due to infection or inflammation
- Obstruction of TD inlet into IJV may cause cystic dilatation
- Following blunt trauma and whiplash injury to the neck, aneurysmal dilation
- More common after surgery (incidence of 1% after neck dissection)

- Thoracic duct cyst aka lymphocele or chylous cyst

Cervical Thoracic Duct Cyst

Historical Imaging Options

- Lymphangiography (inject into cyst) previous gold standard
- Lymphoscintigraphy (sentinel node)
- Image guided cyst aspiration - white milky fluid with:
  - 80-90% lymphocytes (absence of neutrophils, macrophages, & epithelial cells
  - Fluid with triglyceride level > 100 mg/dl or greater than serum level
  - Chylomicrons > 4% (up to 4% can be from fat breakdown during normal healing)
  - Albumin:globuli ratio 3:1 (serum 1:1)
  - Micro exam: presence of fat globules (which clear with alkali and ether or stain with Sudan III) and chylomicrons is diagnostic.

Cervical Thoracic Duct Cyst

Current Imaging Options

- Ultrasound
- CT Neck (now more popular than lymphangiography)
- Chest CT should rule out intrathoracic involvement
- MRI Neck - lymphatics are hypointense on T1 and hyperintense on T2
    - Gadolinium helps distinguish lymphatics from small veins

Cervical Thoracic Duct Cyst

Management Options

- Observation/spontaneous regression (if small and asymptomatic)
- Low fat diet
- Cyst aspiration followed by external pressure
- Sclerotherapy (tetracycline, povidone iodine, sodium tetradecyl sulphate, ethanol, glacial acetic acid, N-butyl cyanoacrylate, OK-432)
- TD embolization
- Lymphovenous anastomosis

Zatterstrom U et al. Spontaneous regression of a supraclavicular thoracic duct cyst: case report with a follow up of 25 years. The British Journal of Radiology 2014; 82(980): 1-6.
Kassel RN, Havas TE, Guloane PJ. The use of topical tetracycline in the management of persistent chylous fistula. J Otolaryngol 1987; 16:174-8.
DeVries C, et al. Cervical thoracic duct cyst: treatment options beyond resection. ENT 2019; 15:233-238.
Dool J et al.Thoracic duct cyst: sclerotherapy as alternative for surgical treatment. Head & Neck March 2007; 292-295.
Veziant, J et al. Lymphovenous anastomosis for recurrent swelling syndrome and chylous effusion due to cervical thoracic duct cyst. Journal of Vascular Surgery 2015; 62(4): 1068-1070.

Cervical Thoracic Duct Cyst

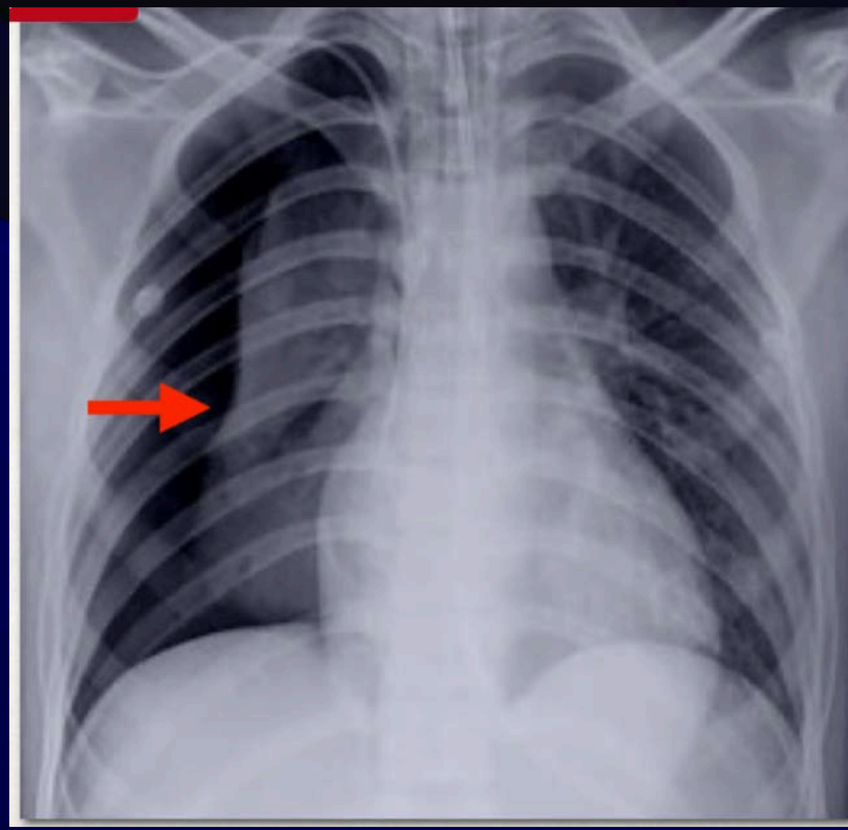
Management Options

- Surgical resection (gold standard)
  - To control symptoms
  - Unpredictable clinical course/establish definitive histology
  - Prevention of cyst rupture and chylothorax
  - Cosmetically unpleasant
  - Sponataneous infection risk is very low (unlike TGDC and branchial cleft cyst)
- Thorascopic ligation (VATSned with supraclavicular cyst removal
  - Ok to ligate thoracic duct due to collaterals (azygos, intercostal, lumbar veins)

Cervical Thoracic Duct Cyst

Potential Complications of Surgical Excision

- Infection, numbness, scars
- Pneumothorax
- Chylothorax
- Chylus fistula
- Adjacent nerve injury of vagus, phrenic, brachial plexus
- Bleeding
- There have been no reports of cyst recurrence after surgical excision in the literature



Cervical Thoracic Duct Cyst

Differential Diagnosis