

AMSER Case of the Month

October 2026

70-year-old-male with milky JP drain output

Henry Knox, MS4

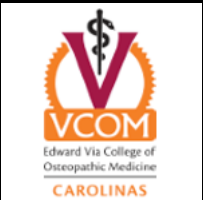
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Patient Presentation

- **HPI:** 70M with recent sternal wound infection s/p sternectomy and flap closure (c/b chylothorax), now re-presenting with milky JP drain output and left pleural effusion
- **PMH/PSH:** T2DM, OSA on CPAP, HD, CAD s/p CABG x1 (LIMA-LAD); tissue AVR (27mm Inspiris Resilia) with root enlargement 4/13/26, c/b sternal wound infection/osteomyelitis s/p I&D, sternectomy, VAC placement, mediastinal washout, and complex bilateral pectoralis/rectus flap closure (7/11/26)
- **Meds:** IV antibiotics, Octreotide, low-fat diet
- **Vitals:** Vital signs stable, denies pain, denies F/N/V
- **Labs:** See Pertinent Labs

Pertinent Labs

Labs on admission:

HgB: 9.3 g/dL

WBC: 8.9 k/mcL

Plt: 329 k/mcL

Lactic acid: 1.1 mmol/L

Cr. 1.11 mg/dL

JP drain fluid sample:

Triglycerides: 2,332 mg/dL

Cholesterol: 77 mg/dL

LDH: 198 u/L

Protein fluid: 4.0 g/dL

Few WBCs seen;

No organisms



Jackson-Pratt (JP) drain containing opaque, milky pink fluid consistent with chylous drainage.

What Imaging Should We Order?

ACR Appropriateness Criteria

Variant: 1 Adult or child. Chylothorax: traumatic or iatrogenic etiology. Pretreatment planning.

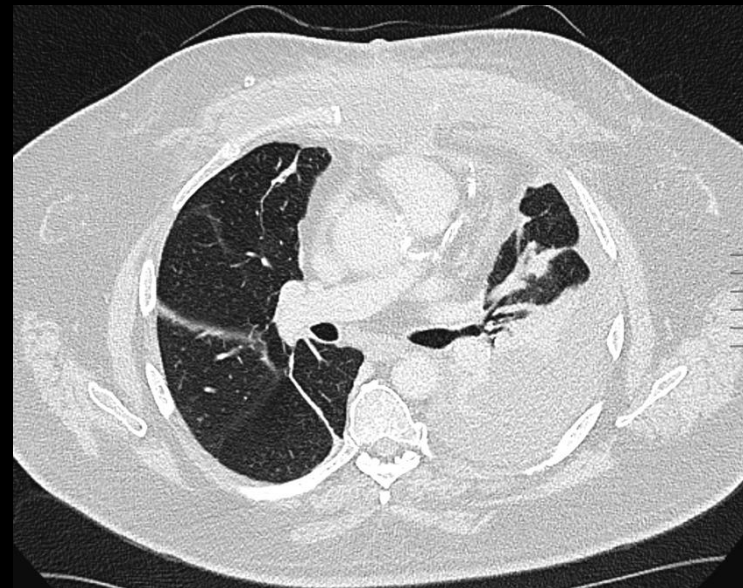
Procedure	Appropriateness Category	Relative Radiation Level
Lymphangiography chest abdomen pelvis	Usually Appropriate	☼☼☼
Lymphangiography chest and abdomen	Usually Appropriate	☼☼☼
MR lymphangiography chest abdomen pelvis	Usually Appropriate	○
MR lymphangiography chest and abdomen	Usually Appropriate	○
Radiography chest	May Be Appropriate	☼
Radiography chest abdomen pelvis	May Be Appropriate	☼☼☼
MRI chest without and with IV contrast	May Be Appropriate	○
MRI chest without IV contrast	May Be Appropriate	○
Lymphoscintigraphy chest abdomen pelvis	May Be Appropriate	☼☼
Lymphoscintigraphy chest and abdomen	May Be Appropriate	☼☼
CT chest with IV contrast	May Be Appropriate	☼☼☼
CT chest without and with IV contrast	May Be Appropriate	☼☼☼
CT chest without IV contrast	May Be Appropriate	☼☼☼
CT chest abdomen pelvis with IV contrast	May Be Appropriate	☼☼☼☼
CT chest abdomen pelvis without and with IV contrast	May Be Appropriate	☼☼☼☼
CT chest abdomen pelvis without IV contrast	May Be Appropriate	☼☼☼☼
US chest	Usually Not Appropriate	○
US chest abdomen pelvis	Usually Not Appropriate	○

This imaging modality was ordered by the CT surgeon

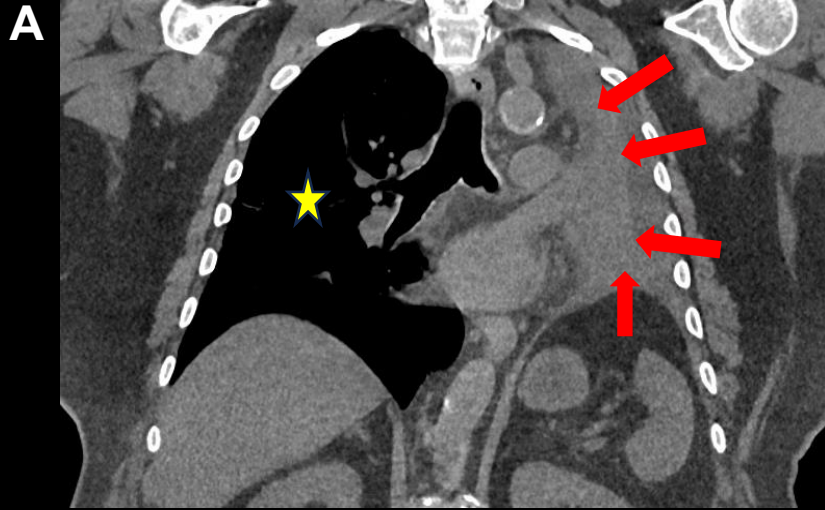
This imaging modality was ordered by the CT surgeon

<https://acsearch.acr.org/docs/3099053/Narrative>

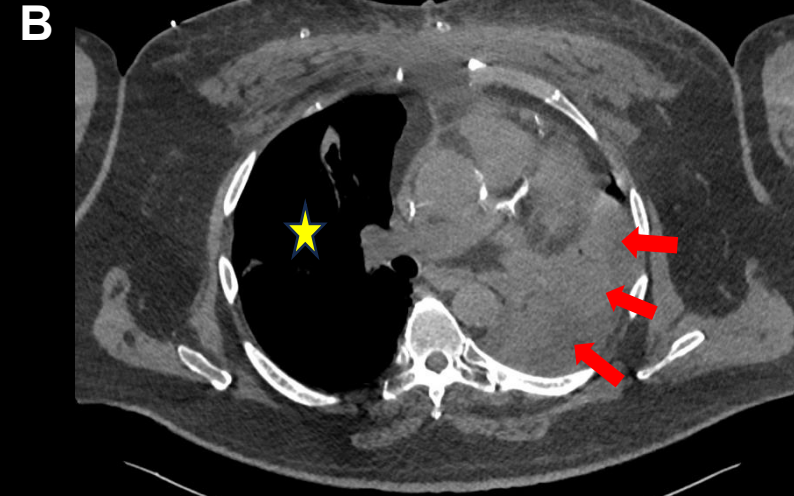
Findings (unlabeled)



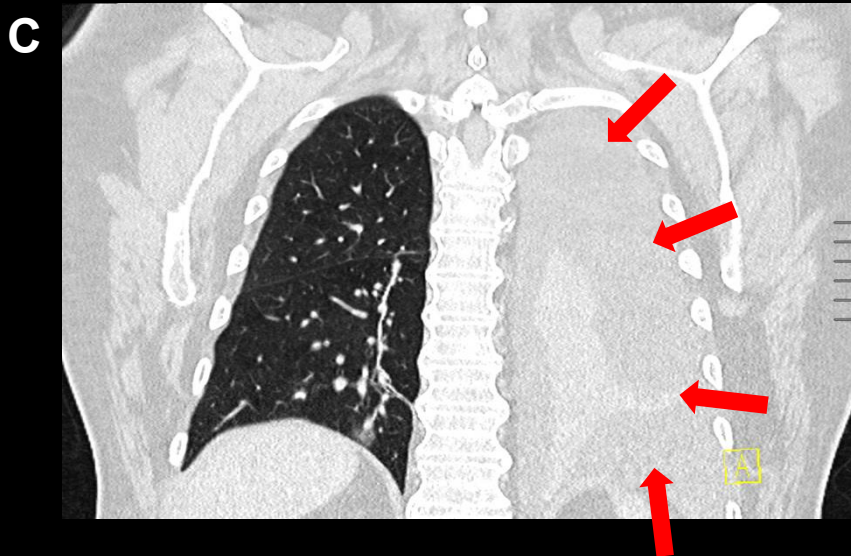
Findings (labeled)



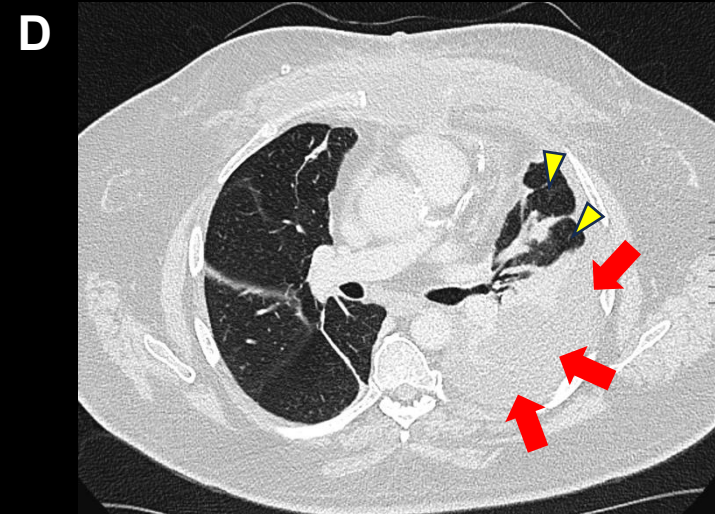
A. Coronal CT, mediastinal window. Red arrows highlight extensive consolidation of the left lung. Normally black, air-containing lung is replaced by dense gray opacity. Compare the affected left lung with the predominantly aerated right lung (star) to recognize the loss of normal pulmonary aeration.



B. Axial CT, mediastinal window. Red arrows identify dense left lung opacification along the lateral chest wall and posterior to the heart. The affected lung has a gray, soft-tissue appearance rather than the black appearance of aerated right lung (star).



C. Coronal CT, lung window. Red arrows demonstrate extensive left lung consolidation, with loss of the normal dark background and obscuration of the branching pulmonary vessels. Compare this appearance with the clearly visible white vessels against the black right lung.



D. Axial CT, lung window. Red arrows highlight dense consolidation in the posterior and lateral left lung. Small areas of residual aeration appear black (yellow arrows) anteriorly, contrasting with the opaque affected lung (red arrows). The lung window makes this difference between aerated and nonaerated tissue particularly visible.

Final Dx:

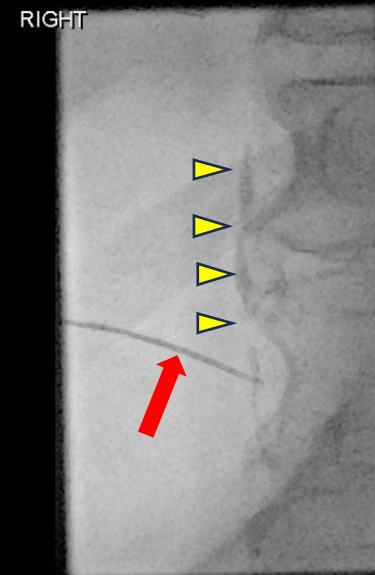
Left chylothorax.

Next Steps in Management

- The patient was sent to Interventional Radiology for lymphangiogram.
 - Access was gained using a 25G needle to inject Ethiodol (Lipiodol®) into bilateral inguinal lymph nodes
 - Lipiodol travels superiorly toward the cisterna chyli and thoracic duct



Early lymphangiogram following bilateral inguinal lymph node cannulation, showing opacification of the inguinal and lower pelvic lymph nodes (arrows).

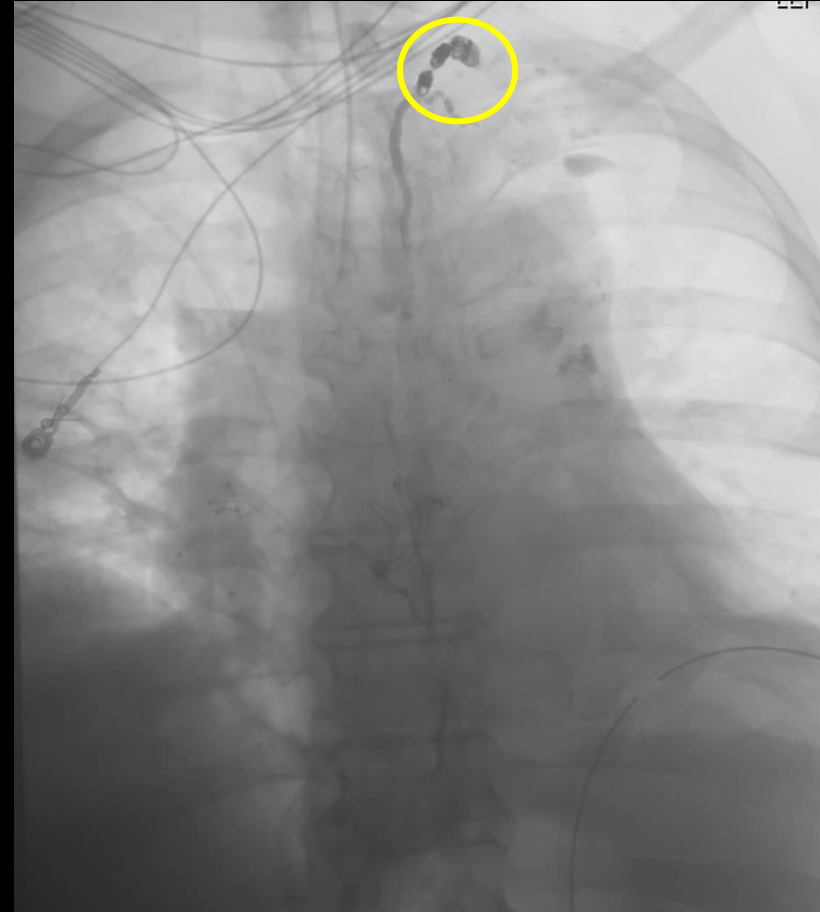


Using a 0.018" microcatheter (red arrow), cannulation of the thoracic duct was achieved and Lipiodol is seen traveling superiorly (yellow arrows)

Case Discussion

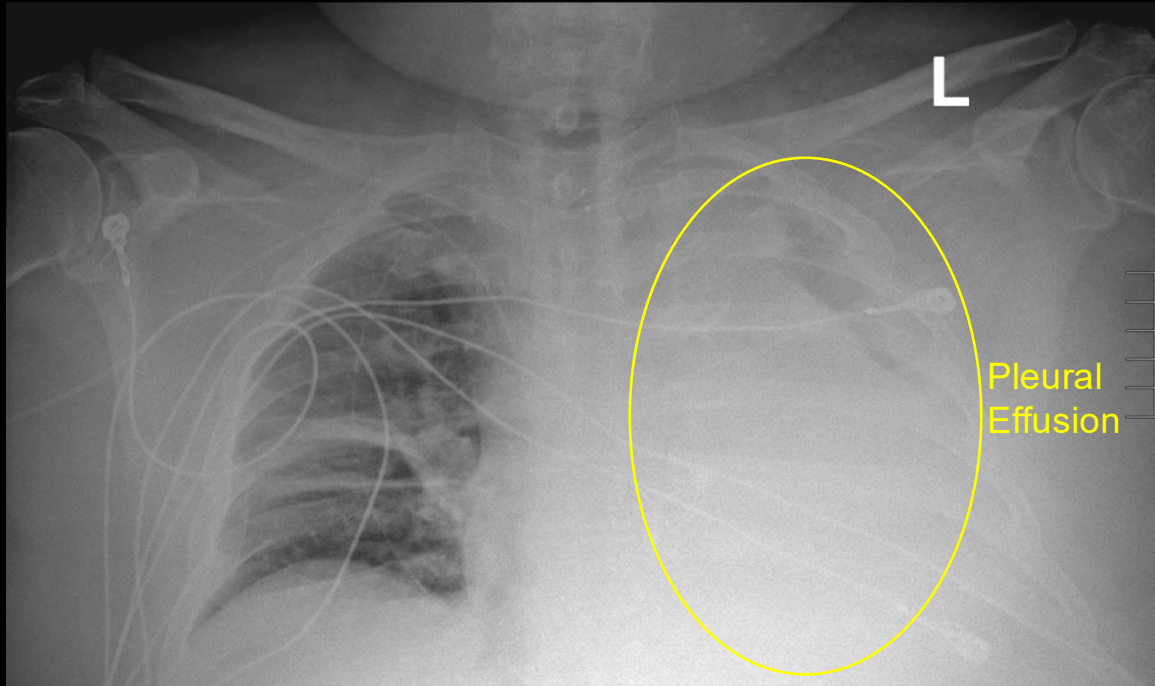


Contrast extravasation identified at the junction of the thoracic duct (**arrows**) and left supraclavicular region (**yellow circle**) using digital subtraction angiography

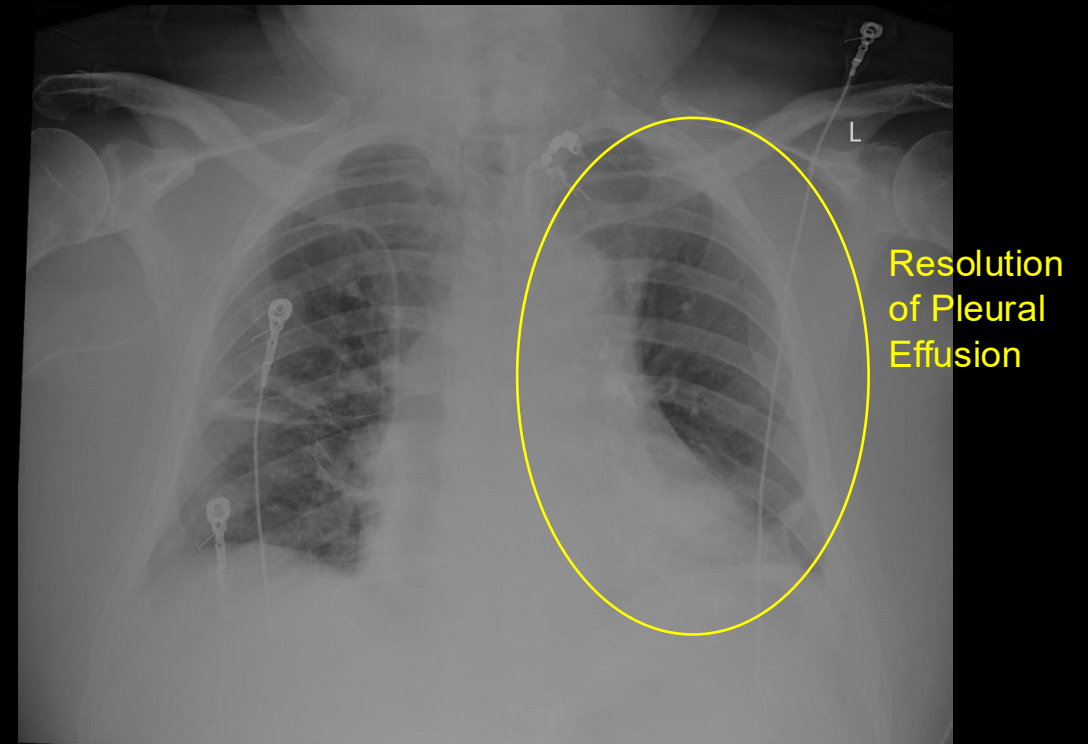


S/P embolization with **Ruby Soft 4mm coil**, **Embold 30cm packing coil**, and **Trufill glue** (**yellow circle**)

Case Discussion



Chest radiograph on admission with left chest tube placed for pleural effusion



Chest radiograph, s/p thoracic duct embolization with chest tube removal

Case Discussion

A chyle leak is disruption of the thoracic duct or lymphatic tributaries leading to leakage of triglyceride-rich lymph.

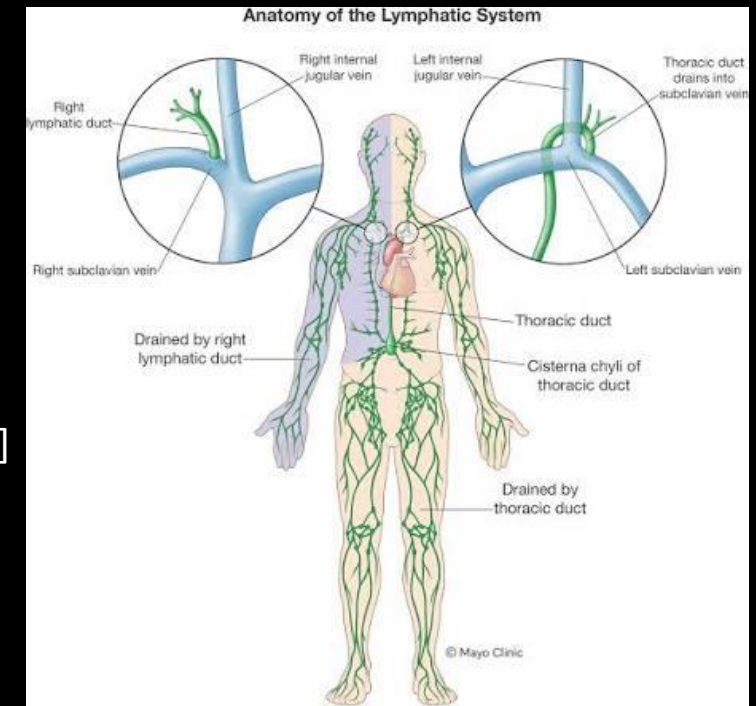
- New milky drain output; triglycerides >110 mg/dL strongly support a chylous source [1,2]
- Patient: 70-year-old male with extensive recent cardiothoracic surgery
 - AVR + CABG/stent history
 - Sternal wound dehiscence → mediastinal washout + pectoralis flap closure
 - 3 postoperative mediastinal JP drains
 - Presented with new milky output from middle mediastinal JP without fever, pain, or systemic illness
- Repeat mediastinal dissection can injure the thoracic duct or smaller mediastinal lymphatic branches causing an iatrogenic chyle leak
- Drain triglycerides 2,332 mg/dL strongly confirmed a chylous process
- Key point: Recent mediastinal surgery + new milky drainage + markedly elevated triglycerides = postoperative lymphatic injury until proven otherwise.

Case Discussion

- For traumatic/iatrogenic chylothorax, the ACR rates the following as “Usually Appropriate” for pretreatment planning: [3]
 - Lymphangiography – chest/abdomen ± pelvis
 - MR lymphangiography – chest/abdomen ± pelvis
- Why conventional lymphangiography in this patient?
 - Defines thoracic duct anatomy and anatomic variants
 - Directly identifies the site of lymphatic extravasation
 - Provides a pathway for same-session therapeutic embolization
- Intranodal access is minimally invasive and allows Lipiodol to opacify the central lymphatic system [3,4]
- Lymphangiography confirmed the diagnosis, localized the exact leak, and enabled immediate treatment.

Case Discussion

- Treatment options
 - Conservative: low-fat/MCT diet, drainage $\pm$ octreotide
 - TD carries 1-2L of lymphatic fluid a day, 80% from intestinal lymphatic ducts [5]
 - Interventional: lymphangiography + thoracic duct embolization
 - Surgical: thoracic duct ligation for refractory cases
- Thoracic duct successfully catheterized
- Leak localized near the left jugular venous angle
- Thoracic duct embolized with:
 - Ruby Soft 4-mm coil, Embold 30-cm packing coil, and TruFill glue + Lipiodol (1:4)
 - Coils $\rightarrow$ mechanical scaffold/flow reduction
 - Glue $\rightarrow$ permanent lymphatic occlusion allowing the leak to seal
- Avoids repeat high-risk thoracic surgery
- Key point: Identifying the leak and embolizing the thoracic duct provided source control through a minimally invasive approach, avoiding another mediastinal operation.



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Evidence for Intranodal Lymphangiography & TDE

- A retrospective study by Parikh et al. (2025) reviewed 150 patients with postoperative/traumatic chylous leaks from 2002 - 2022 [6]
- Evaluated intranodal lymphangiography (IL) + thoracic duct embolization (TDE) for refractory thoracic/neck chyle leaks
- Included cardiac/aortic surgery and chylopericardial/mediastinal leaks
- Overall clinical success: **94.6% (142/150)**
- Modified IL (using pneumatic compression device) improved technical success:
 - 94.2% vs 76.5% ($P = .002$)
- Modified IL reduced:
 - Procedure time: 83 vs 119 min ($P < .0001$)
 - Fluoroscopy time: 34 vs 42 min ($P = .02$)
- Major adverse events were rare: 0.6% (portal vein thrombosis from cannulation)
- Intranodal lymphangiography allows identification of the lymphatic leak and provides access for definitive TDE, offering a highly successful minimally invasive alternative to repeat surgery.



Picture source: Parikh R, Seyferth ER, Palat S, Itkin M, Nadolski GJ. Outcomes of Intranodal and Modified Intranodal Lymphangiography for Treatment of Traumatic Chylous Leaks in the Thorax and Neck. Cardiovasc Intervent Radiol. 2025 Jan;48(1):59-64. doi: 10.1007/s00270-024-03900-z. Epub 2024 Dec 10. PMID: 39658750; PMCID: PMC11706833.

References:

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2. Bhatnagar M, Fisher A, Ramsaroop S, Carter A, Pippard B. Chylothorax: pathophysiology, diagnosis, and management—a comprehensive review. *J Thorac Dis.* 2024;16(2):1645-1661. doi:10.21037/jtd-23-1636. PMID: 38505027.
3. American College of Radiology. ACR Appropriateness Criteria® Chylothorax Treatment Planning. Revised 2024.
4. Itkin M, Kucharczuk JC, Kwak A, Trerotola SO, Kaiser LR. Nonoperative thoracic duct embolization for traumatic thoracic duct leak: experience in 109 patients. *J Thorac Cardiovasc Surg.* 2010;139(3):584-589.e1. doi:10.1016/j.jtcvs.2009.11.025. PMID: 20042200.
5. Chen E, Itkin M. Thoracic duct embolization for chylous leaks. *Semin Intervent Radiol.* 2011 Mar;28(1):63-74. doi: 10.1055/s-0031-1273941. PMID: 22379277; PMCID: PMC3140251.
6. Parikh R, Seyferth ER, Palat S, Itkin M, Nadolski GJ. Outcomes of Intranodal and Modified Intranodal Lymphangiography for Treatment of Traumatic Chylous Leaks in the Thorax and Neck. *Cardiovasc Intervent Radiol.* 2025 Jan;48(1):59-64. doi: 10.1007/s00270-024-03900-z. Epub 2024 Dec 10. PMID: 39658750; PMCID: PMC11706833.