Case 16974

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Bilateral inguinal intranodal lymphangiogram with thoracic duct disruption and embolisation for refractory chylothorax

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DOI: 10.35100/eurorad/case.16974 ISSN: 1563-4086 Section: Interventional radiology Area of Interest: Interventional vascular Lymph nodes Thorax Procedure: Embolisation Procedure: Puncture Procedure: Technical aspects Imaging Technique: Lymphography Special Focus: Cancer Metabolic disorders Trauma Case Type: Clinical Cases Authors: Daniel Hynes, MB BCh BAO; Bertrand Janne d'Othe?e, MD, MPH, MBA. Patient: 55 years, male

Clinical History:

55 year-old-male with an idiopathic left-sided chylothorax (500-600 ml/day for >1 week), which became non-chylous after starting total parenteral nutrition. Thereafter, left pleural tube output increased to 850 ml/day.

Imaging Findings:

Ultrasound-guided bilateral inguinal intranodal approach enabled slow continuous Lipiodol infusion and antegrade abdominopelvic lymphangiogram. Bilateral inguinal and iliac lymph nodes and their connecting lymphatic ducts were opacified by slow antegrade, caudocranial flow of Lipiodol. The Lipiodol eventually reached the normal-appearing cisterna chyli after two hours.

Right anterolateral transabdominal puncture of the thoracic duct (TD) near the cisterna chyli was achieved. Transcatheter lymphangiograms of the thoracic duct using iodinated contrast showed multifocal deposits of Lipiodol in the left hemithorax, thus confirming the known chylothorax. TD disruption was performed.

Retrograde transcatheter embolisation of the thoracic duct was executed using a 'sandwich' technique with cranial and caudal packing of detachable and pushable micro coils and ethylene vinyl alcohol (Onyx 34) interposed between both coil packs.

Discussion:

- Background Chylothorax, idiopathic or from chyle leak due to TD injury carries significant morbimortality [1] due to loss of fat, fat-soluble vitamins, proteins, electrolytes, and T lymphocytes rapidly leading to malnutrition, weight loss and impaired immunity [2]. First-line conservative measures (low-fat diet, pleural drain, IV octreotide, total parenteral nutrition) result in resolution of chylothorax in 20-80% of cases, depending on chylous output rate [2], usually within 2-3 weeks [3]. When this fails and/or chyle output is high (>500 ml/day), more invasive options are needed. These include percutaneous TD embolization or disruption techniques, surgical TD ligation, chemical or surgical pleurodesis, thoracic duct ligation, diversion by pleuroperitoneal [4] or peritoneovenous [1] shunting, and pleurectomy [4].
- 2. Procedure planning Pre-procedural MRI can help assessing the size and location of the TD relative to the aorta and renal arteries; a small-sized cisterna chyli (<5 mm) makes catheterization difficult or even unfeasible [3, 5]. It also enables identifying a safe needle path in advance [5]. Lymphangiography is done bilaterally either via pedal or, more rapidly, via intranodal approach [6-7] under ultrasound guidance, with Lipiodol injection at the corticomedullary junction of the accessed inguinal lymph nodes.</p>
- 3. Procedure technical approach TD catheterisation and embolisation and/or disruption is often done via an antegrade transabdominal approach [3], in both traumatic [8] and non-traumatic [9] chylothoraces. Cone beam CT with needle guidance software can help finding a suitable path, avoiding the colon; small bowel transgression is often unavoidable but, with use of small bore (21-22 Gauge) needles, complications are uncommon (major 0.3%, minor 1.3%) [10]. A retrograde (transvenous) approach through the left brachial vein was described subsequently [1]. If the TD cannot be catheterised or the cisternal chyli is not opacified, disruption is performed instead of embolisation [3,5], which is done typically using both coils and glue [3, 5, 8-9].
- 4. Outcome A systematic review including both pedal and inguinal lymphangiographies showed an overall technical success rate of 94% and clinical success rate of 57% [10]. TD embolisation and disruption had technical success rates of 63% and clinical success rates of 79% for embolisation [3, 10] and 61% for TD disruption (71-74%), respectively [3, 8-10]. Major complications occurred only in 1.9% of lymphangiograms and 2.4% of TD embolisation/disruption procedures [2, 10]. Accordingly, the latter is often preferred to surgical options, which carry a 16% morbidity rate [2].
- 5. **Take Home Message / Teaching Points** Bi-inguinal intranodal lymphangiography is faster than the traditional pedal approach and has high success rates. TD embolisation or disruption are technically difficult, yet safe and less invasive than surgical options.

Differential Diagnosis List: Chylothorax treated by percutaneous needle disruption and thoracic duct embolisation, Pseudochylothorax, Pleural effusion, Diaphragmatic slit / hydrothorax, Lymphedema

Final Diagnosis: Chylothorax treated by percutaneous needle disruption and thoracic duct embolisation

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Figure 1





Description: Lymphangiogram by bilateral inguinal intranodal infusion of Lipiodol (0.2 ml/min on each side) via 25-gauge spinal needles (still visible in place in the right groin). Multiple inguinal and iliac lymph nodes and interconnecting lymphatic ducts are opacified. **Origin:** © Division of Interventional Radiology, University of Massachusetts Medical School – Baystate



Description: Intermittent fluoroscopic images were obtained every 5-10 minutes until the Lipiodol reached the cisterna chyli. On the patient's right side, a 20 cm long, 22 Gauge Chiba needle is being advanced under real-time fluoroscopic guidance towards the cisterna chyli using combined fluoroscopic and external laser beam guidance. **Origin:** © Division of Interventional Radiology, University of Massachusetts Medical School – Baystate



Description: The thoracic duct has been catheterized with a microcatheter. Multiple radiopaque droplets of Lipiodol are visible over the left hemithorax; also noted are an endotracheal tube (procedure performed under general anaesthesia), a left-sided pigtail pleural drain, and a right-sided central venous catheter. **Origin:** © Division of Interventional Radiology, University of Massachusetts Medical School – Baystate

Figure 2

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Description: Initially, needle disruption was performed with multiple passes as the TD could not be catheterized. Subsequently, after an 0.018" wire could eventually be advanced into the thoracic duct up to the left lower neck, a 2.4 French microcatheter was advanced over the wire through the TD, up to the base of the left neck. Digitally subtracted lymphangiograms showed the thoracic duct drains through a single ostium into the left brachiocephalic vein. **Origin:** © Division of Interventional Radiology, University of Massachusetts Medical School – Baystate

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Figure 3 ^a



Description: Post-embolization fluoroscopic view shows the TD now embolized with cranial and caudal packs of microcoils and the interposed static ethylene vinyl alcohol liquid embolic agent (polymerized in solid form). **Origin:** © Division of Interventional Radiology, University of Massachusetts Medical School – Baystate