Trans-venous Retrograde Super-Selective Embolization of Lymphatic Duct

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Thoracic duct embolization is an option for patients with post-operative lymphatic leaks.

The standard technique of percutaneous trans-abdominal access to the thoracic duct requires pedal or intranodal lymphangiogram.

We present a case of trans-venous retrograde selective embolization of the transected lymphatic duct branch with coils and EVOH.
• Lymphatic duct injury is a well-known complication of neck surgeries, more commonly seen with neck dissection\(^1\).

• Patients present with lymphatic drainage at the wound site, chylous fistula, chylothorax, chylomediastinum, chylopericardium, lymphocele, persistent lymphorrhea, and secondary lymphedema.\(^2\)
The management options include intra-operative repair of the injury if the lymphatic leak is recognized prior to closure of the surgical site, conservative measures, interventional measures or re-exploration of the wound with repair.³

Interventional management options consist of performing a lymphangiogram and image guided percutaneous access to the opacified cisterna chyli or trans-venous retrograde access to the thoracic duct via its drainage to the subclavian/brachiocephalic vein.
(b) Major lymphatic trunks and ducts in relation to veins and surrounding structures. Anterior view of thoracic and abdominal wall.
• We describe a case to super-selectively embolize the transected lymphatic branch of the thoracic duct utilizing coils and ethylenevinylalcohol (EVOH) instead of embolizing the main thoracic duct.

• This technique, when feasible, eliminates the need for intra-nodal or pedal lymphangiogram and thus saves time, effort, and expense.
Case Description

• 57-year-old woman with history of laryngeal mucosal melanoma underwent tracheostomy, bilateral neck dissection, frono-lateral open laryngectomy and laryngoscopy.

• POD 2, she complained of neck pain and swelling. On POD 3, her pain in the area has increased significantly and the drain output increased and became milky in consistency.

• Approximately two liters of drainage through her JP drain in addition to continued swelling and pain at the left neck surgical site.

• Interventional Radiology was consulted for management options and the decision was made to proceed with a trans-venous retrograde lymphangiogram and possible embolization.
• Patient was put back on bolus feeds by the dietitian on the same day after the procedure.

• Subjectively, the patient reported significant improvement in her neck pain the day after the procedure.

• Objectively, the drain output improved to less than 100 mL/day.

• At six month follow up patient continued to do well with no evidence of late recurrence.
Discussion

• The risk of developing postoperative lymphatic leak due to neck dissections is 1% to 2.5%.

• It is more commonly seen on the left side.¹
• Initial management of this uncommon complication consists of conservative measures.

• Surgical and interventional options are utilized in persistent leaks⁵.
Conservative Management

• Includes dietary modifications such as fat free diet, medium-chain triglyceride diet or TPN\(^5\); Octreotide use\(^6\); and negative pressure wound therapy.\(^7\)

• While waiting for conservative measures to take effect may expose the patient to the risk of the lymphatic leak complications which include conditions such as severe hypostotic hyponatremia and wound infection.\(^8\)
Embolization

• Lymphatic duct embolization procedure was first described by Cope C; et al in 2002

• The main concept remained to embolize the main thoracic duct by performing trans-abdominal puncture of the thoracic duct immediately below or at the level of the cisterna chyli under fluoroscopy.

• Pedal cut-down or intra-nodal lymphangiogram is necessary to opacity the lymphatic vessels for this technique to be feasible.
• Challenges of trans-abdominal approach include body habitus, bowel movement, lymphatic vessel variations, and the need for lymphangiogram.

• Intra-nodal lymphangiogram is preferred to pedal lymphangiogram, which is technically challenging, time consuming and requires a cut-down at the dorsum of the foot.

• Intra-nodal lymphangiogram is time-consuming – injecting ethiodized oil into a groin lymph node at a very slow rate while the lymphatic vessels slowly opacify\(^\text{10}\).
• Retrograde trans-venous access to the thoracic duct at its confluence with the left subclavian vein has been previously reported\textsuperscript{11}

• The advantage of this approach includes significant reduction in procedure time and potentially better clinical outcome as the treatment involves the transected branch itself.
Despite its challenges, this approach when it is technically successful, would save significant amount of procedural time and radiation exposure compared to conventional approaches.