Giant mediastinal lymphocele after esophagectomy successfully treated with thoracic duct embolization

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ABSTRACT

A 64-year old man had developed a giant mediastinal lymphocele after undergoing esophagectomy for the treatment of esophageal squamous cell carcinoma. The thoracic duct was embolized with six micro-coils, followed by embolization using a 1:3 mixture of N-butyl-2-cyanoacrylate (Histoacryl; B. Braun, Melsungen, Germany) and ethiodized oil. Resolution of the lymphocele was achieved within 5 days after embolization. To the best of our knowledge, ours is the first reported case of thoracic duct embolization for the treatment of mediastinal lymphocele. (J Vasc Surg Cases and Innovative Techniques 2021;7:215-8.)

Keywords: Intranodal lymphangiography; Lymphocele; Mediastinum; Percutaneous embolization; Thoracic duct

Because of the close anatomic relationship between the esophagus and thoracic duct, chylothorax is the most common complication of lymphatic leakage after thoracic surgery. However, reports of mediastinal lymphocele are very rare. Thoracic duct embolization (TDE) is an established alternative to surgical ligation of the thoracic duct as a method of treating chylothorax.[1] We report a case of a giant mediastinal lymphocele that developed after esophagectomy that was treated successfully using TDE. The patient provided written informed consent for the report of his case.

CASE REPORT

Institutional review board approval was not required for the report of our case. A 64-year-old man had been referred to our institution with a large cystic mass localized in the posterior mediastinum. The patient had undergone radical thoracoscopic esophagectomy to treat esophageal squamous cell cancer 45 days previously. The cystic mass was found 23 days after the procedure owing to progressive symptoms of chest pain, high fever, dyspnea, and dysphagia. Earlier treatment, specifically conservative management for lymphatic leakage, combined with drainage using an 8.5F pigtail catheter, had failed. The output drainage was ~800 mL/d; however, the cyst volume gradually increased. A contrast-enhanced computed tomography (CT) scan of the chest at admission revealed a large cystic mass with a maximal cross-sectional dimension of 6.4 cm by 9 cm by 19 cm long in the posterior mediastinum (Fig 1). The cyclic threshold was 11. The fluid contained 235 mg/dL of triglycerides. A mediastinal lymphocele was diagnosed, and lymphangiography and TDE were successfully executed.

With the patient under general anesthesia, a 21-gauge spinal needle was placed into a lymph node of the right groin under ultrasound guidance. Ethiodized oil (Lipiodol Ultra-Fluide; Guerbet, Roissy, France) was consecutively injected at a flow rate of 11 mL/h using a syringe pump under fluoroscopic guidance (Fig 2, *A*). A total of 16 mL of ethiodized oil (Guerbet) was injected, and intermittent spot fluoroscopic images were obtained. An abrupt termination of the thoracic duct and the extravasation and collection of ethiodized oil at the level of the fifth thoracic vertebra were observed (Fig 2, *B*). Under fluoroscopic guidance, the cisterna chyli was accessed with a 21-gauge needle transabdominally inserted at a slightly right paramedian location in the supraumbilical region. Next, a 0.018-in. Streaming guidewire (Asahi Intecc Co, Ltd, Hanoi, Vietnam) was directed into the thoracic duct. A 2.6F Stride microcatheter (Asahi Intecc Co, Ltd) was advanced. Contrast medium (Iodixanol; Jiangsu Hengrui Medicine Co, Ltd, Lianyungang, China) was then injected to determine the site of leak through the microcatheter (Fig 2, *C*). After the microcatheter was positioned at the proximal thoracic duct, the thoracic duct was embolized with six 3- to 4-mm-diameter push-able micro-coils (VortX Diamond; Boston Scientific, Cork, Ireland), followed by embolization using ~2 mL of a 1:3 mixture of N-butyl-2-cyanoacrylate glue (Histoacryl; B. Braun, Melsungen, Germany) and ethiodized oil (Fig 2, *D*). Finally, because the drainage catheter placed in the other hospital had become blocked by fibrous tissue, we replaced the catheter with a new 10.2F pigtail catheter for continuous drainage.

After successful embolization, the drainage volume had dramatically decreased to an average of 30 mL/d by the fourth

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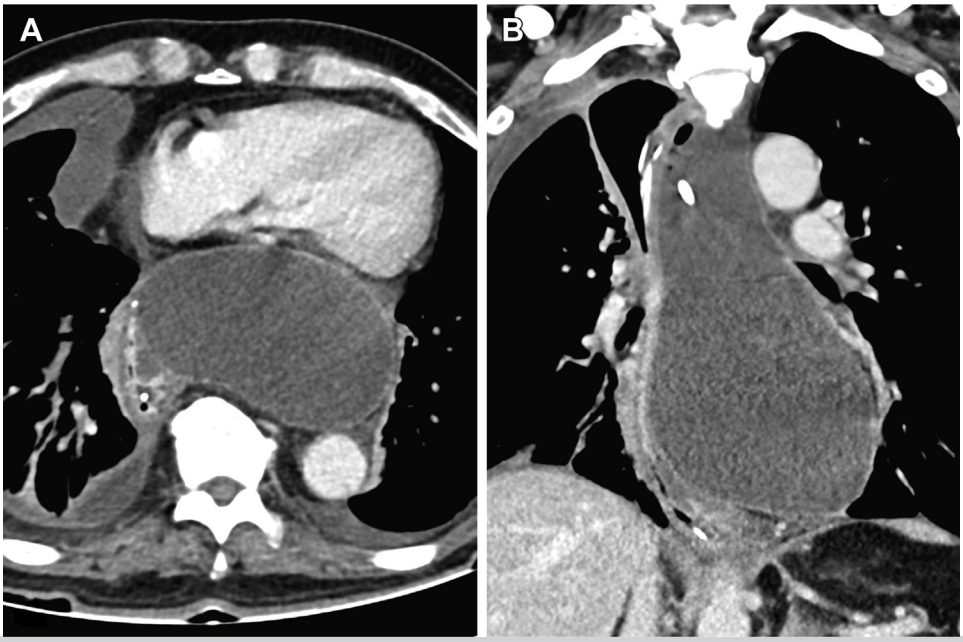

Fig 1. Preoperative axial **(A)** and coronal **(B)** contrast-enhanced computed tomography (CT) scans of the chest showing a giant cystic lesion in the posterior mediastinum.

day after the procedure, the drainage fluid had become clearer, the triglyceride concentration had decreased to 29 mg/dL, and the patient had experienced a significant improvement in symptoms. A chest CT scan 5 days after the procedure showed that the mediastinal lymphocele had shrunk markedly in size (Fig 3). The patient was discharged with a drainage catheter 7 days after the procedure. The drainage had stopped completely 23 days after the procedure. Removal of the catheter was delayed until 40 days after the procedure because of the coronavirus disease 2019 pandemic. At the last follow-up, the patient had remained asymptomatic since the procedure, and the follow-up CT scan demonstrated maintenance of lymphocele resolution.

DISCUSSION

The posterior mediastinum lies between the pericardium and vertebral column. It contains the esophagus, major vessels, nerves, thoracic duct, and paravertebral lymph nodes. Because of the close anatomic relationship between the esophagus and thoracic duct and the different anatomic variations of the thoracic duct, the rate of chylothorax development after esophagectomy varies from 0.2% to 5%. Among these cases, mortality can reach 30%.[2]

It has been reported that squamous cell cancer is a significant risk factor for the development of chylothorax after esophagectomy. Often located in the mid- to upper esophagus, these lesions will be in very close proximity to the duct as it crosses from right to left at the level of the T5 vertebral body.[3] In the present patient, the thoracic duct had deviated to the left in the lower chest, and the upper and middle parts of the thoracic duct were located along the left side of the thoracic vertebra. The site of disruption of the thoracic duct was located at the level of the T5 vertebra, concurrent with the results from previous reports.[3] Mediastinal lymphoceles are far rarer than chylothorax. Most mediastinal lymphoceles are secondary lymph cysts (ie, they occur because of blunt chest trauma or cardiothoracic surgery). In our patient, a mediastinal lymphocele was diagnosed 23 days after esophagectomy.

The treatment of mediastinal lymphocele depends on whether it is associated with a persistent chylothorax or, if not, whether it is causing pressure symptoms. We performed lymphangiography and TDE in the present patient because of the compression symptoms and failure of the conservation therapy combined with catheter draining. To the best of our knowledge, ours is the first reported case of the use of TDE to treat a mediastinal lymphocele and the third reported case of treated mediastinal lymphoceles that we could find in our review of the reported data. Monk et al[4] reported the case of a patient who had undergone an Ivor Lewis esophagogastrectomy and had developed a persistent chylothorax postoperatively, which had necessitated repair of the thoracic duct 10 days later. A mediastinal

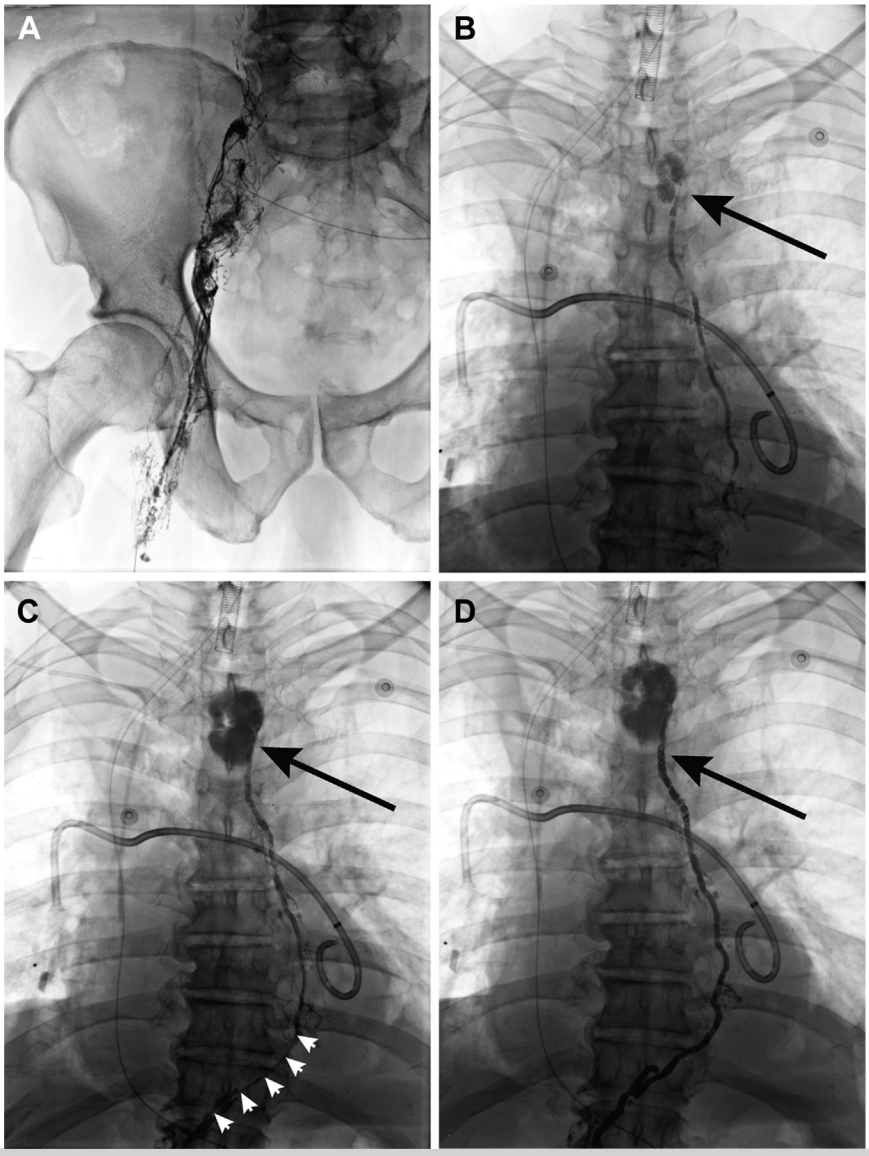

Fig 2. A, Spot fluoroscopic image showing a 21-gauge needle positioned within a right groin lymph node with subsequent ethiodized oil injection and opacification of the lymphatic vessels in the right pelvic region. **B,** Spot fluoroscopic image showing extravasation and collection of ethiodized oil at the level of the fifth thoracic vertebra (*arrow*). The draining catheter is also shown. **C,** Angiographic image through the microcatheter (*arrowheads*) showing abrupt termination of the thoracic duct, extravasation of contrast medium (*arrow*), and no opacification of the proximal thoracic duct. **D,** Spot fluoroscopic image showing embolization of the caudal thoracic duct with glue and coils (*arrow*).

cyst was confirmed 1 year later owing to the presence of progressive dysphagia. The mediastinal cyst was treated using an endoscopic technique given the close proximity of the gastric conduit to the lymphocele. Khwaja et al[5] reported one case of a thoracic lymphocele associated with a chylothorax after radical esophagogastrectomy. A large lymphocele had developed in the posterior mediastinum and compromised respiratory function after a period of conservative management for chylothorax. The lymphocele was treated with surgical excision of the lymphocele and ligation of the thoracic duct.

CONCLUSION

A mediastinal lymphocele is a very rare complication that occurs after esophagectomy. Lymphangiography can be used to identify the site of lymphatic leakage, which causes the transformation of mediastinal lymphocele. TDE is a relatively safe and effective interventional method that is minimally invasive.

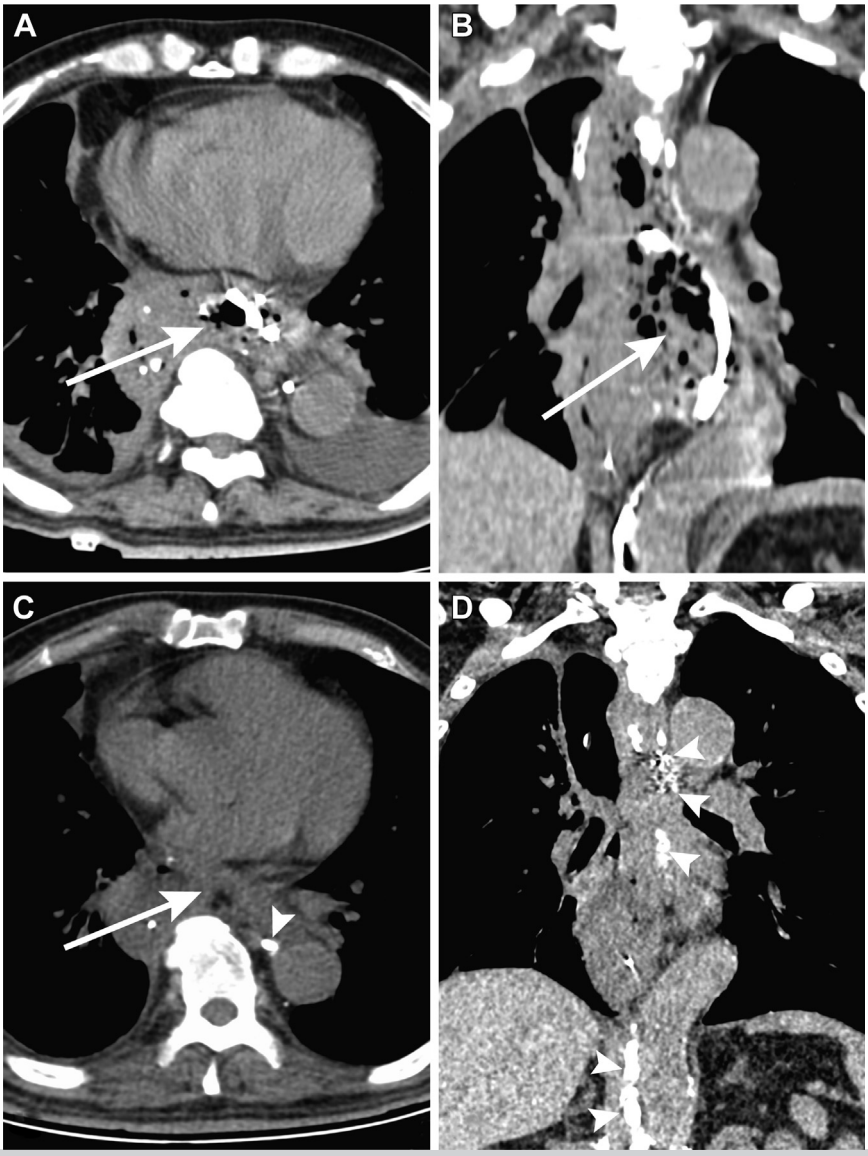

Fig 3. Postoperative axial **(A)** and coronal **(B)** computed tomography (CT) scans of the chest 5 days after the procedure showing the cystic lesion had dramatically shrunk (*arrow*) and bubbles of air in the residual collection. Postoperative axial **(C)** and coronal **(D)** CT scans of the chest after the drainage catheter had been removed (6 weeks after the procedure) showing complete disappearance of the original cyst (*arrow*) and embolization glue and coils (*arrowheads*) in the thoracic duct.

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