

» **Case Report** «

Management of Aortic Replacement-Induced Chylothorax by Lipiodol Lymphography

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Chylothorax is a rare but serious complication of thoracic aortic surgery, leading to malnutrition, respiratory insufficiency, and prolonged hospital stay. In this article, we describe the successful treatment of a case of intractable chylothorax by lipiodol lymphography. The patient was a 39-year-old man who underwent descending aortic replacement for a remaining dissected aneurysm after total arch replacement. Chylothorax developed postoperatively. After complete oral intake cessation, total parenteral nutrition, and plasmatic factor XIII administration, lipiodol lymphography detected the chyle leakage location and subsequently decreased pleural effusion. The patient recovered uneventfully and was discharged on postoperative day 30 without any complications.

Keywords: chylothorax, lipiodol lymphography, aortic surgery complication

Introduction

Chylothorax is a type of pleural effusion in which chyle-containing lymphatic fluid accumulates in the pleural cavity. Chylothorax resulting from injury of the thoracic duct or its small branches rarely occurs after thoracic aortic surgery. Allaham et al. reported an occurrence rate of 0.4% following descending and thoracoabdominal aortic surgery.¹⁾ In their report, surgical treatment of the chyle leakage was necessary in 40% of the patients with chylothorax. Chyle leakage is a serious problem that leads to malnutrition, dehydration, respiratory insufficiency, immunogenic disturbance, and prolonged hospital stay. It is also associated with mortality and morbidity.

We describe the successful treatment of intractable chylothorax by lipiodol lymphography in a 39-year-old man

who underwent descending aortic replacement for a dissected aneurysm after total arch replacement.

Case Report

A 39-year-old man was admitted to our hospital for aortic surgery for a remaining descending aortic dissected aneurysm. He previously underwent emergency total arch replacement for the treatment of ascending aortic dissection Stanford type A 5 years ago. Physical examination and laboratory data revealed no remarkable findings. Computed tomography (CT) detected a 70-mm-diameter descending aortic aneurysm. Descending aortic replacement was performed following posterolateral thoracotomy. Venoarterial bypass was established by femoral venous and arterial cannulation. Intraoperatively, the adhesion around the lung and aneurysm was not dense. The descending aortic replacement was carried out using a 28-mm-diameter woven graft. Surgery was completed uneventfully with no significant bleeding. One day postoperatively, hoarseness developed. A nasogastric tube was then inserted and enteral nutrition was initiated. Non-fat diet was given because the amount of pleural drainage was higher than the usual 300 mL/day, with a suspicion of chylothorax. Subsequently, the pleural drainage started to decrease. Thereafter, a fat-included diet was started on postoperative day 6, changing the pleural effusion to chyle. Chylothorax was confirmed by chemical analysis indicating triglyceride in the pleural drainage (1325 mg/dL) and blood (295 mg/dL). Oral intake cessation and total parenteral nutrition through a central venous catheter were started. As the factor XIII activity was 46%, factor XIII products were administered at 20 mL/day for 5 days. However, pleural effusion remained after these treatments. To specifically identify the location of and reduce the chyle leakage, lipiodol lymphography was attempted in the supine position through bilateral inguinal lymph nodes. A 23-G needle was inserted to the inguinal lymph nodes, followed by the injection of 7 mL of lipiodol in the right lymph node and 8 mL in the left lymph node (Fig. 1). Thirty minutes later, CT scan detected the location of the chyle leakage in the pleural cavity near the distal anastomosis (Fig. 2). Two days after this procedure, the amount of pleural effusion decreased. Following chest

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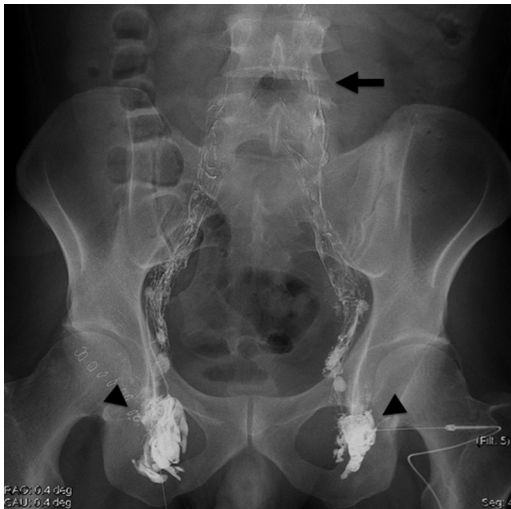


Fig. 1 Lipiodol lymphography. The injected lipiodol flowed up through the lymph duct (arrow) from the bilateral inguinal lymph nodes (arrowheads).

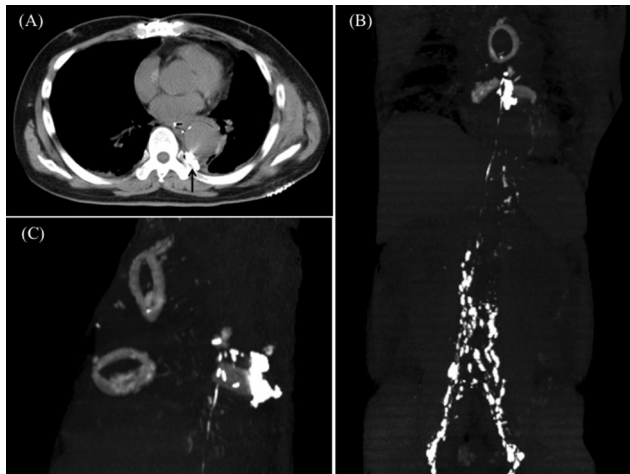


Fig. 2 Postprocedural CT scan images. (A) The black arrow indicates the lipiodol leakage. (B) Three-dimensional reconstructive CT showing leakage of the injected lipiodol near the site of the distal graft anastomosis. Anterior view. (C) Lateral view.

drain removal, chest radiography and CT scan detected only a small amount of pleural effusion 7 days postoperatively. Hoarseness was relieved and oral intake was started on postoperative day 12. The patient was discharged 30 days postoperatively with no other complications. Chylothorax has not recurred 6 months postoperatively.

The patient has provided permission to publish the features of his case, and his identity has been protected. This report has been reviewed and approved by the Ethics Committee of our institution.

Discussion

There are two types of treatment for chyle leakage: surgical and conservative. Surgical treatment is preferred for

the elderly and infants because of their vulnerability and intolerance to prolonged chyle leakage. Ohtsuka et al. performed VATS thoracic duct division in 6 patients with chyle leakage after thoracic aortic surgery.²⁾ Fahimi et al. considered the use of VATS for postoperative chylothorax when the daily leakage exceeded 200 mL after 2 weeks of conservative therapy.³⁾ Non-surgical treatments have also been used. Oral intake cessation, total parenteral nutrition through a central venous catheter, and pleural drainage are usually initially attempted, but not all patients are responsive. Octreotide acetate was shown to induce the rapid cessation of chyle production. It can also be used in adults with abundant chylothorax, avoiding surgery in patients with high operative risks or poor general condition.⁴⁾ Plasmatic factor XIII, which is essential for fibroblast proliferation and wound healing, was previously used for chylothorax treatment.⁵⁾ In the present patient, we also administered plasmatic factor XIII but the chyle leakage persisted.

Lipiodol lymphography is a diagnostic tool for identifying chylothorax. It enables the detection of the leakage site, and provides useful information for making a surgical plan if surgical intervention is needed. Because of the irrigating effect of lipiodol, chyle leakage can be occluded. Alexandre-Lafont et al. found that even if the pleural drainage was higher than 500 mL/day, lipiodol lymphography facilitated effective treatment in 35% of the patients with chylothorax. The successful treatment rate in patients with failed non-surgical treatment was reported to be 51%.⁶⁾ The mechanism of chyle leakage cessation after lipiodol lymphography was speculated to involve the accumulation of lipiodol at the leakage point, inducing an inflammatory reaction and acting as an embolic agent.⁶⁾ Matsumoto et al. stated that 89% of patients with postoperative chylothorax avoid surgical intervention after lymphography.⁷⁾ As an other percutaneous intervention, thoracic duct embolization was reported by Chen et al.⁸⁾ A microcatheter is inserted into the thoracic duct and embolization of thoracic duct was achieved with microcoils and Truefill glue. We performed lipiodol lymphography in our patient and successfully treated his chylothorax, which was intractable for several already known conservative treatments. Our case demonstrated that lipiodol lymphography can be one of the effective conservative treatments for chylothorax, particularly for high-risk surgical patients.

In summary, we report the case of aortic replacement-induced chylothorax which was successfully managed by lipiodol lymphography. Chylothorax is a rare and intractable complication following cardiovascular surgery. Additional cases of successful treatment must be accumulated to further investigate and confirm the definitive efficacy of lipiodol lymphography against chylothorax.

Disclosure Statement

The authors declare that they have no financial or other conflicts of interest associated with this study.

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References

- 1) Allaham AH, Estrera AL, Miller CC, et al. Chylothorax complicating repairs of the descending and thoracoabdominal aorta. *Chest* 2006; **130**: 1138-42.
- 2) Ohtsuka T, Ninomiya M, Kobayashi J, et al. VATS thoracic-duct division for aortic surgery-related chylous leakage. *Eur J Cardiothorac Surg* 2005; **27**: 153-5.
- 3) Fahimi H, Casselman FP, Mariani MA, et al. Current management of postoperative chylothorax. *Ann Thorac Surg* 2001; **71**: 448-50; discussion 450-1.
- 4) Barili F, Polvani G, Topkara VK, et al. Administration of octreotide for management of postoperative high-flow chylothorax. *Ann Vasc Surg* 2007; **21**: 90-2.
- 5) Schroth M, Meissner U, Cesnjevar R, et al. Plasmatic [corrected] factor XIII reduces severe pleural effusion in children after open-heart surgery. *Pediatr Cardiol* 2006; **27**: 56-60.
- 6) Alexandre-Lafont E, Krompiec C, Rau WS, et al. Effectiveness of therapeutic lymphography on lymphatic leakage. *Acta Radiol* 2011; **52**: 305-11.
- 7) Matsumoto T, Yamagami T, Kato T, et al. The effectiveness of lymphangiography as a treatment method for various chyle leakages. *Br J Radiol* 2009; **82**: 286-90.
- 8) Chen E, Itkin M. Thoracic duct embolization for chylous leaks. *Semin Intervent Radiol* 2011; **28**: 63-74.