Jpn J Radiol (2013) 31:71–74
DOI 10.1007/s11604-012-0146-8

CASE REPORT

A case of refractory chylous ascites after nephrectomy successfully treated with percutaneous obliteration using adhesive glue

Chihiro Itou · Jun Koizumi · Kazunori Myojin · Tomohiro Yamashita · Naoko Mori · Yutaka Imai

Received: 1 August 2012 / Accepted: 24 September 2012 / Published online: 13 October 2012

Abstract Here we report a case of uncontrollable chylous ascites that developed after nephrectomy and was successfully treated with percutaneous obliteration of the lymphocele-like extravasation using ethiodized oil during lymphangiography. Under computed tomographic and fluoroscopic guidance, an *N*-butyl cyanoacrylate–ethiodized oil mixture was used with metallic coils to obliterate the extralymphatic leakage site. The volume of intraperitoneal drainage decreased steadily over the next 5 days, and the tube was removed. Percutaneous obliteration can be characterized as filling of the leakage site from outside the lymph vessel with no flow disruption, which contrasts with the conventional embolization approach via the cisterna chyli.

Keywords Lymphangiography · Chylous ascites · Lymphocele · Percutaneous obliteration · *N*-butyl cyanoacrylate

Introduction

Although chyle leakage after surgery is uncommon, it may become life threatening if not controlled because of the severe malnutrition and susceptibility to infection that result from the significant loss of plasma protein, fat, and immunoregulatory lymphocytes [1, 2]. Here we report a case of refractory chylous ascites that developed after laparoscopic nephrectomy and was successfully treated by percutaneous obliteration of the lymphocele-like extravasation during lymphangiography.

C. Itou (✉) · J. Koizumi · K. Myojin · T. Yamashita · N. Mori · Y. Imai
Department of Diagnostic Radiology, Tokai University School of Medicine, 143 Shimokasuya, Isehara, Kanagawa 259-1193, Japan
e-mail: qq4d52gf9@sirius.ocn.ne.jp

Case report

A 37-year-old woman presented to the Department of Urology with an indolent mass in the left kidney that had been present for approximately 1.5 years. The mass had been detected accidentally during computed tomography (CT) prior to enucleatic myomectomy. She did not complain of any symptoms, including hematuria or left back pain. Unenhanced CT showed a 41 × 32 × 37-mm, well-defined, uniform, solid lesion with no definite calcification or gross fat in the lower portion of the left kidney. Contrast-enhanced CT revealed a well-enhanced solid mass with no invasion into the left renal vein. The preoperative diagnosis was renal angiomyolipoma with minimal fat, although abdominal magnetic resonance imaging was not performed. She subsequently underwent laparoscopic nephrectomy, and the tumor was pathologically confirmed as an angiomyolipoma.

The woman suffered from postoperative chylous ascites probably caused by lymph vessel injury at the hilum of the left kidney during nephrectomy. Total parenteral nutrition following a low-fat, medium-chain diet with somatostatin treatment for more than 14 days was not effective. Although the medical treatments decreased the maximum chylous leakage from 1,680 to 700 ml per day, chyle leakage from the drainage tube in the rectouterine pouch persisted at an approximate rate of 500 ml per day. She was subsequently referred to the radiology department for lymphangiography and additional percutaneous interventions if possible.

We performed a lymphangiography after obtaining written informed consent from the patient. After skin incision on the dorsal side of the foot under local anesthesia, a 27-gauge winged needle was cannulated into the superficial lymph vessel and fixed immediately with silk thread as well as a drop of *N*-butyl cyanoacrylate (NBCA) (histoacryl blue; B. Braun, Germany) as the silk thread alone was insufficient for fixing the needle in place. An injector was used to continuously inject ethiodized oil (Lipiodol Ultrafluid; Guerbe, France) through the winged needle at a rate of approximately 8–10 ml per hour. Although the ethiodized oil ascended to the left inguinal lymph nodes in only approximately 15 min, more than 3 h was required until the confluence of the left thoracic duct was opacified with the left brachiocephalic vein. By that time, we could identify the lymphocele-like extravasation of the retroperitoneal lymph vessel at the level of the third lumbar vertebra (Fig. 1). Because the extravasation site was below the cisterna chyli, percutaneous embolization following catheterization through the cisterna chyli was not considered possible. Thus, we decided to use adhesive glue to obliterate the leakage from outside of the lymph vessel.

A transvertebral approach was selected, and the retroperitoneal lymphocele-like extravasation was accessed on the left side of the third lumbar vertebra with the use of a 19-gauge, 20-cm needle (Elaster Needle, Hakko, Japan) under CT guidance after the administration of local anesthesia. The needle was advanced into the lymphocele-like lesion (Fig. 2). Contact with the lesion was confirmed by slow draining of the chyle through the outer tube of the needle.

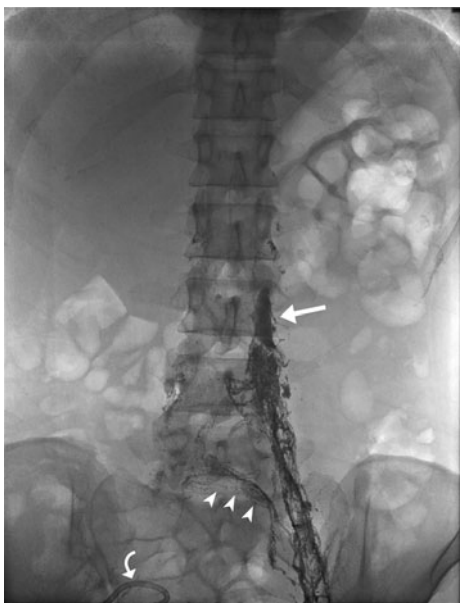

Fig. 1 Ethiodized oil lymphangiography at the lumbar region revealed lymphocele-like extravasation of the retroperitoneal lymph vessel at the level of the third lumbar vertebra (*arrow*) and crossover of the lymph vessels from left to right of the fifth lumbar vertebra (*arrowheads*). Note the drainage tube in the rectouterine pouch (*curved arrow*)

Fig. 2 The pool of ethiodized oil opacified by the lymphangiography (*arrow*) was punctured under computed tomographic guidance with a 19-gauge needle via a transvertebral approach

A 2.2-F microcatheter (Akatsuki, selective type; CATHEX, Japan) was cannulated into the lesion over the preceding 0.014-inch micro-guide wire (Synchro2; Stryker, USA) through the outer tube of the needle coaxially under fluoroscopy (Fig. 3a). First, three metallic coils (Complex helical-18, 11 mm × 17.0 mm; Stryker, USA) were inserted into the leakage site as markers to avoid additional lymphangiography if the obliteration failed or if chyle leakage recurred. Next, percutaneous obliteration was performed using approximately 1.5 ml of a 3:2 mix of ethiodized oil:NBCA injected through the microcatheter (Fig. 3b).

After percutaneous obliteration, the amount of chyle leakage from the drainage tube decreased gradually and nearly reached zero 5 days after the procedure. The drainage tube was removed 7 days after obliteration, and the patient was soon discharged. Chylous ascites has not recurred in the 2 months since the patient was discharged.

Discussion

It has been reported that conventional ethiodized oil lymphangiography is effective for detection of a specific site as well as closure of chyle leakage to some extent when conservative treatment including a low-fat diet fails [3–5]. However, the effect of lymphangiography is limited to

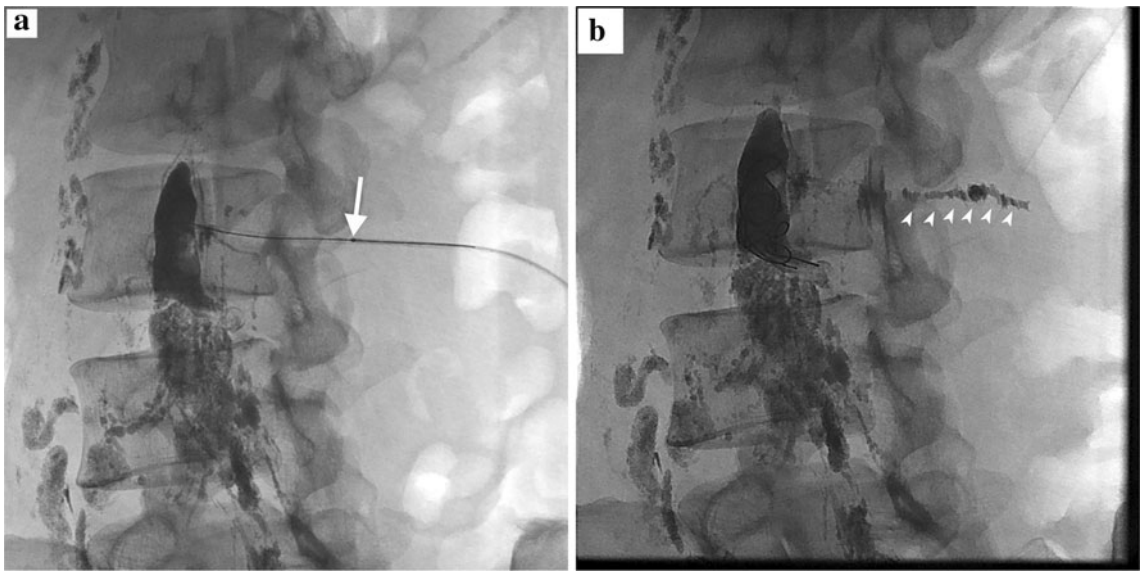

Fig. 3 Cannulation into the lymphocele-like pool of ethiodized oil on lymphangiography and obliteration of chyle leakage by NBCA. **a** A 2.2-F micro-catheter (*arrow*) was advanced over the preceding micro-guide wire through the outer tube of the needle into the lymphocele-like pool. **b** A total of 1.5 ml of 40 % NBCA was injected after the placement of three metallic coils. A small amount of NBCA migrated along the tract of the puncture during the removal of the outer tube and was visible as tract embolization (*arrowheads*)

low-output chyle leakage with less than 500 ml per day of lymphatic drainage [5]. Surgical interventions, such as thoracic duct ligation for chylothorax, can be adopted for high-output leakage, but they have high incidences of mortality and morbidity [6]. Thus, a less invasive treatment method for high-output chyle leakage has been sought. Percutaneous transcatheter embolization through the cisterna chyli or retroperitoneal lymph ducts opacified by lymphangiography was first described in patients with postoperative chyloperitoneum or chylothorax in 1998 by Cope [7]. Recently, some cases have been reported in which percutaneous transcatheter embolization of injured thoracic ducts, a less invasive therapeutic method than surgical intervention, cured refractory high-output chylothorax after chest surgery with an approximately 70–80 % effective rate [8, 9]. It has also been reported that disrupting the main retroperitoneal lymphatic vessels by multiple punctures percutaneously with a small-gauge needle was effective when the cisterna chyli could not be identified or the injured thoracic duct could not be catheterized [8, 9].

In the conventional technique, catheterization of the thoracic duct via the cisterna chyli is required. Embolization of the injured thoracic duct causing high-output chylothorax is subsequently performed inside the lymph vessel, which results in duct occlusion. Metallic coils with an NBCA–ethiodized oil mixture or 500–710 μm polyvinyl alcohol particles are used as embolic materials. In this case, adhesive glue was used to perform the obliteration from outside the lymph vessel. The NBCA–ethiodized oil mixture injected through the cannulated catheter may function as a tamponade for the extralymphatic cavity without occlusion of the lymph vessel.

The time from the day of the procedure to the day when chyle leakage stopped was 5 days in this case. This was shorter than that of a previous study of nine patients with relatively low-output chyle leakage (mean 533 ml, range 200–1500 ml) treated with only ethiodized oil lymphangiography. In the above-mentioned study, the mean time from lymphangiography to cure was 17 days (range 4–31 days), and one patient with 1500 ml per day drainage before lymphangiography required additional surgical procedures [4]. In addition, the relatively immediate relief of chyle leakage in this case was similar to that obtained with the conventional transcatheter embolization technique via the cisterna chyli [9].

We considered a lymphocele-like pooling adjacent to the hilum of the left kidney that was opacified on lymphangiography as the chyle leakage site because normal lymph vessels at the lumbar lesion were apparent just below the lymphocele-like lesion. However, lymphocele-like extravasation may occasionally be separated from the lymphatic injury point, in which case continuous observation by fluoroscopy is required after lymphangiography to confirm the leak site.

We assume that this obliteration technique performed from outside the injured lymph vessel is the most suitable for lymphocele-like extravasation because the injection of the glue into the lymphocele-like lesion may not only obliterate the injury site, but also function as a tamponade.

One possible disadvantage is that the effectiveness of the glue outside the disrupted lymphatic duct is unknown compared with that of intravessel administration. However, we believe that extravessel administration of the glue may be effective, especially for relatively low-pressure lymph duct leakage, because the glue was originally developed and used for tissue adhesion during surgery [10]. On the other hand, a higher-pressure lymphatic duct leak may require a much higher density of NBCA to prevent its dilution or washout by extravasated lymph fluid. The much higher density of NBCA will reduce visibility on fluoroscopy. Moreover, the higher the density of NBCA used, the tighter the adhesion of the tip of the microcatheter to the surrounding tissue, which may lead to retrieval failure. If complete adhesion of the micro-catheter to the injected glue should occur, we would be forced to percutaneously implant the micro-catheter at the proximal side to avoid injuring the surrounding tissue or the microcatheter itself.

In conclusion, percutaneous obliteration using adhesive glue may be feasible for the treatment of refractory high-output chyle leakage. Further evaluations using different concentrations of glue are required.

References

1. Merrigan BA, Winter DC, O'Sullivan GC. Chylothorax. Br J Surg. 1997;84:15–20.
2. Jonhnstone F, Fenis RH. Chylothorax. Chest Surg Clin N Am. 1994;4:617–28.
3. Kos S, Haueisen H, Lachmund U, Roeren T. Lymphangiography: forgotten tool or rising star in the diagnosis and therapy of postoperative lymphatic vessel leakage. J Vasc Interv Radiol. 2007;30:968–73.
4. Matsumoto T, Yamagami T, Kato T, Hirota T, Yoshimatsu R, Masunami T, Nishimura T. The effectiveness of lymphangiography as a treatment method for various chyle leakages. Br J Radiol. 2009;82:286–90.
5. Alejandre LE, Krompiec C, Rau WS, Krombach GA. Effectiveness of therapeutic lymphography on lymphatic leakage. Acta Radiol. 2011;52:305–11.
6. Dugue L, Sauvanet A, Farges O, Goharin A, Le MJ, Belghiti J. Output of chyle as an indicator of treatment for chylothorax complicating oesophagectomy. Br J Surg. 1998;85:1147–9.
7. Cope C. Diagnosis and treatment of postoperative chyle leakage via percutaneous transabdominal catheterization of the cisterna chyli: a preliminary study. J Vasc Interv Radiol. 1988;9:727–34.
8. Cope C, Kaiser LR. Management of unremitting chylothorax by percutaneous embolization and blockage of retroperitoneal lymphatic vessels in 42 patients. J Vasc Interv Radiol. 2002;13:1139–48.
9. Binkert CA, Yucel EK, Davison BD, Sugarbaker DJ, Baum RA. Percutanous treatment of high-output chylothorax with embolization or needle disruption technique. J Vasc Interv Radiol. 2005;16:1257–62.
10. Blythe JN, Habib A, Gulati A, Brennan PA. Use of *N*-butyl-2-cyanoacrylate tissue glue in thoracic duct injury during neck dissection surgery. Br J Oral Maxillofac Surg. 2011;49:486–7.