CASE REPORT

CT-Guided Intranodal Lymphangiography for Postoperative Chylous Ascites

Masanori Hirata1 · Atsuo Shimizu1 · Shoko Abe1 · Azusa Ichinose1 · Akira Sugiyama1 · Yusuke Tanino2 · Suguru Watanabe2 · Ryota Nakano2 · Yoshihiko Kato2 · Toshiyuki Miyahara2 · Yasuhiro Sumi2 · Hiroshi Nakano2

Received: 27 January 2017 / Accepted: 29 March 2017 / Published online: 5 April 2017
© Springer Science+Business Media New York and the Cardiovascular and Interventional Radiological Society of Europe (CIRSE) 2017

Abstract The utility and minimal invasiveness of ultrasound-guided intranodal lymphangiography have already been reported by several researchers. Although ultrasound-guided intranodal lymphangiography is known to be not technically difficult in general, a patient’s edematous groin due to hypoalbuminemia resulting from chylous ascites made it too challenging to detect and prick the lymph nodes precisely. This report describes a 71-year-old female with refractory chylous ascites due to an operation for an extrahepatic bile duct cancer, who was successfully treated by computed tomography (CT)-guided intranodal lymphangiography. After switching from ultrasound- to CT-guided lymphangiography, the procedure was successfully performed, and the refractory chylous ascites was treated.

Keywords Intranodal lymphangiography · Chylous ascites · Pylorus-preserving pancreatoduodenectomy · Chylothorax · Lipiodol

Introduction

Chylous ascites may occur after abdominal surgery as a result of damage to the intraabdominal lymphatic vessels. Lymphangiography is known to be both diagnostic and therapeutic for chylous leakage. Ultrasound (US)-guided intranodal or inguinal lymphangiography is easier and more practical than pedal lymphangiography [1]. Nevertheless, thick edematous skin and massive ascites may hamper the precise detection of inguinal lymph nodes. We herein report a case of a postoperative chylous ascites treated by computed tomography (CT)-guided intranodal...
lymphangiography, instead of US guided. To our knowledge, this is the first report of CT-guided intranodal lymphangiography with a groin puncture.

**Case Report**

A 71-year-old woman with jaundice was admitted to our hospital. She was diagnosed with extrahepatic bile duct cancer. The stage of the cancer was T2N1M0. After percutaneous transhepatic biliary drainage, pylorus-preserving pancreaticoduodenectomy was performed. On postoperative day (POD) 10, her belly was swollen and strained due to ascites. On POD 15, both legs became edematous. Since the ascites kept increasing and the levels of serum albumin decreased, diagnostic abdominal paracentesis was performed on POD 20. A biochemical examination for ascites revealed chylous ascites. On the same day, we started to treat her with diuretics by administering a medium-chain triglyceride through a central venous catheter. Although conservative treatment was continued, the chylous ascites worsened (Fig. 1), the level of serum albumin kept decreasing, and her urine output dropped to <1000 ml per day.

On POD 33, intranodal lymphangiography was performed. US-guided puncture in the bilateral groins was attempted but unsuccessful, as the patient’s thick edematous skin prevented the precise detection and tapping of the inguinal lymph nodes. We therefore switched to a CT-guided puncture methods. An initial CT scan of the abdomen was performed to identify the bilateral inguinal lymph nodes, and the size of the targeted lymph nodes was about 10 mm in width and 13 mm in depth on right and 9 mm in width and 10 mm in depth on left in transverse CT images. A 23-gauge butterfly needle with a tube connected to a 2.5-ml syringe, which seemed to be reasonable to prevent forceful injection by hand and not to give too much pain when pricked, was then inserted above the node, and CT was performed again to verify that the needle was placed right above the lymph node. After confirming that the head of the needle was positioned correctly, approximately 1 ml of water-soluble contrast agent (300 mg iodine/ml Iopamidol, Oypalomin 300; Fuji Pharma, Tokyo, Japan) was injected as a tester, and CT was performed to see whether the agent had been injected into the lymph node. After confirming that the agent had indeed been successfully injected into the lymph nodes, the oily contrast media—lipiodol (Lipiodol 480; Guerbet Japan, Tokyo, Japan)—was slowly injected into the lymph node. For the right inguinal lymph node, 2 ml of lipiodol was injected into the center of the lymph node and 1 ml into the caudal part of the lymph node, and for the left inguinal lymph node, 2 ml of lipiodol was injected.

Immediately after the injections, CT was performed again to check whether or not the lymph nodes were...
enhanced. Although the inguinal lymph nodes and upstream lymph ducts were enhanced, a small amount of lipiodol had leaked into the subcutaneous tissues on the right side, and most of the lipiodol had leaked on the left side (Fig. 2A, B). It seemed that neither side of the lymph node nor the upstream lymph ducts had been injected with a sufficient amount of lipiodol to determine where the lymph duct was damaged. On the same day, abdominal tap was performed, and 1500 ml of ascites was drained.

The day following lymphangiography, the patient’s urine output was >2000 ml a day. We examined chest and abdominal radiographs to determine how far the contrast agent had traveled from the inguinal lymph node and found that it had risen to around the level of L3 (Fig. 3A). A few days later, the patient began to take meals, her general condition improved, and her swollen belly subsided (Fig. 3B). At 16 days after intranodal lymphangiography (-POD 49), she was discharged from the hospital. She remained asymptomatic without ascites 6 month after lymphangiography.

Discussion

The causes of chylous ascites include filariasis, tuberculosis, trauma, hepatic cirrhosis, and complications of surgical operation. Patients with chylous ascites may feel discomfort and have a poor appetite due to abdominal fullness, even suffering from malnutrition because of the leakage of lymph fluid.

The methods of conservative managements for chylous ascites are abdominal paracentesis and drainage, a trial of low-fat diet with the restriction of long-chain triglycerides for three to four weeks, and fasting with total parenteral nutrition. Octreotide treatment is also performed on occasion. However, if these conservative treatments fail, patients must undergo a surgical ligation of lymphatic vessels to the thoracic duct while identifying the site of the lymph leak [2].

Conventional lymphangiography initially required great precision, as the operator had to inject contrast agents such as indocyanine green (ICG) into thin, undistinguishable lymph nodes on the foot [1]. US-guided lymphangiography requires far less technically proficiency and is less invasive than the conventional method. In addition, quite a few reports have described the use of US-guided intranodal lymphangiography to treat refractory chylothorax or chylous ascites after traumas or surgery [1, 3–6]. We abandoned US-guided puncture in the groin due to the lack of clarity with US images in the present case.

For CT-guided lymphangiography, the patient had to be exposed to radiation each time CT was performed. In general, US-guided intranodal lymphangiography should be considered first, as it does not require radiation exposure. In addition, serious complications of lymphangiography using lipiodol, such as cerebral infarction and pulmonary embolism, have been reported. These complications seem to be preventable if we carefully consider the amount of lipiodol to be administered. In the previous studies, the volume of lipiodol injection needs to be more than 3 ml in order to detect the chylous leaks but not to exceed 20 ml to avoid serious complications [7, 8]. Without the benefit of fluoroscopic guidance in the present case, we used water-soluble contrast agent as a tester so that we could avert the smallest chance of severe complications due to the excess amount of lipiodol in the course of the CT-guided identification of inguinal lymph nodes. In the present case, total amount of lipiodol injection was 5 ml, which was almost 1 ml/10 kg, and its rate was approximately 0.3 ml/min. Both were decided upon referring to the literature [6, 7]. Complications of lymphangiography include infection, pain, and lipiodol extravasation into the soft tissue [9]. In the present case, although the lipiodol remained under the skin in the groins for several days after
intranodal lymphangiography, the patient did not suffer any other complications. Subsequently to lymphangiography, edematous legs improved most likely because hypoalbuminemia that had been caused by chylous ascites was compensated. It has been suggested that lipiodol embolizes and then induces inflammatory reactions at the point of lymphatic leakage and thus leads to the closure of the lymphatic leaks [10, 11]. Having considered the relatively small amount of the lipiodol injection on both sides of the lymph nodes and the favorable clinical outcome in this case, some of the lipiodol that leaked on the left side could have been absorbed in the lymph node to rise afterward. As reported by several studies, lymphangiography itself seemed to have played a therapeutic role in chylous ascites and also in leg edema in succession [7, 8, 10, 11].

We herein reported a case of a postoperative chylous ascites treated by CT-guided intranodal lymphangiography. To our knowledge, this is the first report of CT-guided intranodal lymphangiography with a groin puncture. CT-guided intranodal lymphangiography may be a good alternative and a second choice when US-guided intranodal lymphangiography cannot be performed.

Acknowledgements Masanori Hirata wish to thank the senior doctors of the Department of Radiology for encouraging me to publish this case report.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent Informed consent was provided by the patient.

References
