

Case Report

A Crucial Instrument in the Treatment of a Patient with Chylous Ascites: Lympho-SPECT/CT.

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Abstract

Chylous ascites is an uncommon type of ascites that is typically linked to infections, operations, cirrhosis, and abdominal cancers. We reported a case of chylous ascites following robotic laparoscopic prostatectomy (PLDN-RALP), in which SPECT/CT lymphoscintigraphy provided the accurate diagnosis. Following surgery, a 72-year-old man developed chylous ascites and had Using radiolabeled albumin nanocolloids in lymphoscintigraphy to identify a potential leaking point and do additional lymph flow analysis. The left iliac region's lymph stasis and abdominal effusion were visible on the scintigraphic imaging. The evaluation of chylous illnesses can be resolved by combining planar imaging with SPECT/CT.

Keywords : SPECT/CT, robotic laparoscopic prostatectomy, lymphoscintigraphy, lymph stasis, and chylous ascites.

INTRODUCTION

A rare type of ascites known as chylous ascites (CA) is characterized by the accumulation of lipid-rich, milk-like peritoneal fluid and the leakage of lymph that is high in triglycerides into the abdominal cavity. CA may arise from any cause of lymph channel blockage or leaking. The accumulation of lymph in the abdominal cavity and the inability to recycle the collected lymph are the results of these illnesses' causes [1–4]. CA has a low incidence rate and is frequently linked to underlying conditions like cancer and cirrhosis. Furthermore, non-portal etiologies, which can be either acquired or congenital, might result in the exudation of lymph material. Adults' lymphatic Infections, surgery, and trauma can all cause harm [2].

Although CA is rarely seen following laparoscopic procedures like robotic laparoscopic radical prostatectomy (PLDN-RALP), which have lymphocele formation as the primary complication (in nearly 50% of patients), it has been documented following surgical procedures such as retroperitoneal lymphadenectomy and genitourinary surgery.

The most common cause of CA after surgery is disruption of the lymphatic vessels, which can happen early (about

a week); adhesions or extrinsic constriction of lymphatic vessels can cause CA to develop late (weeks to months). CA is a serious clinical circumstance with mechanical, dietary, and immunological effects on the entire body, linked to high rates of morbidity and mortality (40–70%) [2,5–8]. Although radiographic evaluation and early diagnosis are critical for CA, neither computed tomography (CT) nor magnetic resonance imaging (MR) are specifically designed for CA. Because of its adaptability, lymphoscintigraphy stands out among all lymphatic channel examinations. given the extensive range of data available for analysis [5,9,10].

We describe a patient who underwent laparoscopic surgery and developed chylous ascites; in this case, lympho-SPECT/CT was essential in determining the best course of treatment.

CASE PRESENTATION

In order to eradicate prostate cancer, a 72-year-old man had a pelvic lymphadenectomy during robotic-assisted laparoscopic radical prostatectomy (PLDN-RALP) (Gleason score 7 = 4 + 3). Due to the procedure's positive outcome and lack of adverse effects, the patient was released on day six following surgery. Regretfully, he had dyspnea and abdominal distension,

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leading to his readmission seven days later. An abdominal and thoracic contrast-enhanced CT scan was done while the patient was in the hospital. It described the existence of a left pleural effusion without the presence of liver disorders and confirmed large ascites. He underwent 1500 mL of paracentesis to alleviate the symptoms caused by the abundance of ascitic fluid, and the fluid's biochemical examination verified the chylous ascites. The respiratory symptoms, abdominal distension, and paracentesis appeared four days later, onset once more.

After undergoing lymphoscintigraphy, the patient was examined for the cause of the recurrent chylous ascites. To reduce the risk of a false-negative result, the patient ate a diet high in fat the day before the scan.

The dorsum of each foot was subcutaneously treated with 99mTc-labeled human serum albumin nanocolloids (185 MBq) concurrently, approximately 1-2 cm proximally to the first interdigital space, as part of superficial lymphoscintigraphy.

Low energy high-resolution parallel hole (LEHR) collimators were used to capture images using a dual-head gamma camera (Optima NM/CT 640, GE, Waukesha, WI, USA) with a 20% window centered on the 140 KeV photopeak.

A dynamic anterior image of the pelvic region was obtained while the patient was supine, at a rate of one frame per minute for 20 minutes. This image only displayed the left inguinal lymph node, indicating asymmetric and delayed lymphatic drainage from the lower extremities.

Following a high-fat meal at two and three hours after administration, anterior whole-body pictures were taken at thirty and sixty minutes. Images taken at 30 and 60 minutes verified the right inguinal lymph node's delayed visibility and asymmetric lymphatic drainage.

Following a high-fat meal, delayed acquisitions revealed a diffuse pathological accumulation of 99mTc-labeled human serum albumin nanocolloids in the abdomen; additionally, a radioactivity spot was observed in the left iliac region, where surgery should have removed all internal iliac lymph nodes (Figure 3c,d). Three hours after delivery, single photon emission tomography/computed tomography (SPECT/CT) pictures of the abdomen and thorax (128 × 128 matrix, scan step 3, reduced exposure period of 20 s, and each detector rotation angle of 180 degrees) were obtained. The 110 kV, 75 mAs, and pitch 1.3 were used to create an integrated CT scan, which enables anatomical localization and image corrective attenuation.

The radioactive spot in the left iliac area and the diffuse aberrant accumulation of radiotracer in the peritoneum, which was more pronounced in the left iliac fossa, were verified by abdominal SPECT/CT images; the CT co-registration pictures revealed the absence of an internal iliac lymph node there, but the lymphatic channel at the surgical site is enlarged, and the ascitic effusion has a higher level

of radioactivity surrounding it. Chyle exudation into the peritoneal cavity via lymphatic dilatation was subsequently determined to be the etiology of chylous ascites.

DISCUSSION

The ascitic effusion, which manifests as a turbid yellow fluid upon chemical, cytological, and microbiological investigation, is the primary basis for the diagnosis of chylous ascites [2,11]. Abdominal soreness is a sign of CA, which is an uncommon event (81% of instances) typically occurs 1–14 days following laparoscopic surgery; our patient also had dyspnea and abdominal distension 13 days later. Distension of the mesenteric and retroperitoneal serosa, as well as any type of ascites, including neoplastic ones, can cause the following pain [2,11,12].

Chronic liver disease is the primary cause of CA, however even though recent robotic technologies have been introduced and complication rates are even lower, the risk of injury must be taken into account while undergoing surgery [5]. When assessing intraperitoneal fluid accumulations, CT is the preferred imaging modality. It can also be very useful in identifying the amount and location of potential injuries in the context of postoperative causes of CA [2,11].

Both the thoracic and abdominal CT scans that were done on our patient showed a pleural effusion in addition to a considerable amount of CA dispersed throughout the peritoneal cavity. Since the CT density of chylous is similar to that of water and cannot be distinguished from simple effusion, its etiology was impossible to describe. Additionally, no changes linked to post-operative harm were found. MR is a type of abdominal radiological imaging that is not unique to CA but can be helpful in evaluating the liver, detecting intra-abdominal tumors, and detecting changes in lymph nodes [6]. Imaging tests revealed no signs of CA-causing liver, spleen, or renal disease in our patient. Modalities that can investigate the lymphatic system and identify vessel damage, such as fistulas or lymphatic channel leakage, include lymphoscintigraphy and lymphangiography. According to studies, patients with CA have a 64–86% lymphangiography detection rate for leaking locations. Due to the inflammatory and granulomatous reaction on extravasation brought on by contrast chemicals during the treatment, some investigations have also suggested a therapeutic potential in situations of lymphatic leakage.

Otherwise, it is an intrusive treatment that can lead to problems such as intra-alveolar bleeding, discomfort, infection, lung contrast emboli, lipiodol extravasation into soft tissue, and allergic responses [2,13]. Lymphoscintigraphy is a non-invasive nuclear medicine technique that can be used repeatedly and has no side effects or contraindications. It enables a functional assessment of the lymphatic system

and has shown promise in the study of limb lymphatic drainage in pre- and post-operative evaluations as well as in the identification of the sentinel lymph nodes in radioguided surgery. By displaying a map of the active veins draining the injection site, lymphoscintigraphy makes it possible to investigate both superficial and deep lymphatic vessels and identify any changes in radiocolloid drainage. The presence of bypass, stenosis, short circuits, or cutaneous reflux [9, 10]. is helpful for assessing any potential lymphatic changes that may be the cause of CA in patients [14].

Following the operation that comprised the lymphadenectomy of the iliac lymph nodes, lymphoscintigraphy was utilized to evaluate the presence of lymphatic alterations in our patient. There was delayed lymphatic outflow in the right lower limb; further scans revealed radioactivity in the abdomen region, corroborating the CA is present, and there is a spot in the left iliac region that may be an iliac lymph node in the two-dimensional planar imaging. This already-valid procedure's diagnostic accuracy was greatly improved by recent technologies. The ability to get tomographic and CT co-registration pictures with modern gamma cameras has enhanced everyone's diagnostic performance. Exams using scintigraphy.

Because lympho-SPECT/CT is so accurate at identifying even small lesions and can be used to correlate them physically, it has evolved from an accessory to a basic tool for studying lymphatic channels. Our patient is a prime example since in order to identify the spot in the iliac region as not being a lymph, lympho-SPECT/CT was essential. Node, but also in characterizing the proximal larger peritoneal deposition of radioactivity and as a lymphatic dilatation.

The lymphatic dilatation found in the lympho-SPECT/CT images subsequently enabled us to determine the CA aetiology in the chyle exudation, which is one of the three potential causes of postsurgical CA [1]. The lack of radioactivity at the location of the pleural effusion is another important piece of information that thorax lympho-SPECT/CT revealed. This allowed us to determine the reactive nature of the effusion, ruling out the possibility of damage to the connective vessels of lymph [15]. Correcting the underlying cause and using conservative approaches to enhance patient comfort, lower recurrence, and maximize results are the cornerstones of CA therapy. To decrease the production and movement of lymph, CA conservative treatment focuses on the use of diuretics and nutritional optimization with a low-sodium, low-fat, high-protein diet that contains medium-chain triglycerides. Individualized treatment is necessary and modified for the degree of chylous ascites, although recalcitrant CA cases would need surgery, peritoneovenous shunting, TIPS, or embolization [2,6].

All of the lympho-SPECT/CT results made it feasible to select conservative treatment, which eliminates the necessity

for surgery, depending on the right dietary regimen and medication. In conclusion, even though CA following surgery is a relatively uncommon complication, the increased risk of morbidity and fatality necessitates an immediate evaluation. Because lympho-SPECT/CT using ^{99m}Tc-nanocolloids may evaluate lymphatic channels throughout the body in all three spatial planes, it should be taken into account when managing CA. This non-invasive method makes it possible to determine the kind and location of lymphatic drainage so that the appropriate treatment can be started right away.

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Institutional Review Board Statement: Since this study is a case report rather than an experimental investigation, ethical review and approval were not required.

Informed Consent Statement

The patient has given their written informed consent.

Data Availability Statement

Not applicable.

Conflicts of Interest

No conflicts of interest are disclosed by the writers.

REFERENCES

1. Lv, S.; Wang, Q.; Zhao, W.; Han, L.; Wang, Q.; Batchu, N.; Ulain, Q.; Zou, J.; Sun, C.; Du, J.; et al. A review of the postoperative lymphatic leakage. *Oncotarget* 2017, 20, 69062–69075. [CrossRef] [PubMed].
2. Bhardwaj, R.; Vaziri, H.; Gautam, A.; Ballesteros, E.; Karimeddini, D.; Wu, G.Y. Chylous Ascites: A Review of Pathogenesis, Diagnosis and Treatment. *J. Clin. Transl. Hepatol.* 2018, 28, 105–113. [CrossRef] [PubMed].
3. Pan, W.; Yang, C.; Cai, S.Y.; Chen, Z.M.; Cheng, N.S.; Li, F.Y.; Xiong, X.Z. Incidence and risk factors of chylous ascites after pancreatic resection. *Intern. J. Clin. Exp. Med.* 2015, 8, 4494–4500.
4. Leibovitch, I.; Mor, Y.; Golomb, J.; Ramon, J. The diagnosis and management of postoperative chylous ascites. *J. Urol.* 2002, 167, 449–457. [CrossRef] [PubMed].
5. Carbonara, U.; Srinath, M.; Crocero, F.; Ferro, M.; Cantiello, F.; Lucarelli, G.; Porpiglia, F.; Battaglia, M.; Ditunno, P.; Autorino, R. Robot-assisted radical prostatectomy versus standard laparoscopic radical prostatectomy: An evidence-based analysis of comparative outcomes. *World J. Urol.* 2021, 39, 3721–3732. [CrossRef] [PubMed].
6. Lizaola, B.; Bonder, A.; Trivedi, H.D.; Tapper, E.B.;

- Cardenas, A. Review article: The diagnostic approach and current management of chylous ascites. *Aliment Pharmacol. Ther.* 2017, 46, 816–824. [CrossRef] [PubMed].
7. Eden, C.G.; Zacharakis, E.; Dundee, P.E.; Hutton, A.C. Incidence of lymphoceles after robot-assisted pelvic lymph node dissection. *BJU Int.* 2012, 109, E14. [CrossRef] [PubMed].
8. Liss, M.A.; Palazzi, K.; Stroup, S.P.; Jabaji, R.; Raheem, O.A.; Kane, C.J. Outcomes and complications of pelvic lymph node dissection during robotic-assisted radical prostatectomy. *World J. Urol.* 2013, 31, 481–488. [CrossRef] [PubMed].
9. Rubini, G.; Altini, C.; Iuele, F.; Ferrari, C. Lymphoscintigraphy and lymphedema. In *Encyclopedia of Nuclear Medicine and Molecular Imaging*; Signore, A., Ed.; Elsevier: Oxford, UK, 2022; Volume 2, pp. 546–554.
10. Lavelli, V.; Ferrari, C.; Santo, G.; Altini, C.; Ballini, A.; Sardaro, A.; Fanelli, M.; Rosario Pisari, A.; Nappi, A.G.; Guidice, G.; et al. The lymphoscintigraphic study of unpredictable head and neck cutaneous melanoma lymphatic drainage. *Biomedicines* 2020, 8, 70. [CrossRef] [PubMed].
11. Cheng, X.; Huang, J.; Yang, A.; Wang, Q. Refractory ascites after laparoscopic cholecystectomy: A case report. *BMC Surg.* 2022, 22, 317. [CrossRef] [PubMed].
12. Altini, C.; Asabella, A.N.; Lavelli, V.; Bianco, G.; Ungaro, A.; Pisani, A.; Merenda, N.; Ferrari, C.; Rubini, G. Role of 18F-FDG PET/CT in comparison with CECT for whole-body assessment of patients with esophageal cancer. *Recent. Progress. Med.* 2019, 110, 144–150. [CrossRef].
13. Lee, E.W.; Shin, J.H.; Ko, H.K.; Park, J.; Kim, S.H.; Sung, K.B. Lymphangiography to treat postoperative lymphatic leakage: A technical review. *Korean J. Radiol.* 2014, 15, 724–732. [CrossRef] [PubMed].
14. Al-Busafi, S.A.; Ghali, P.; Deschênes, M.; Wong, P. Chylous Ascites: Evaluation and Management. *ISRN Hepatol.* 2014, 3, 240473. [CrossRef] [PubMed].
15. Weiss, M.; Schwarz, F.; Wallmichrath, J.; Baumeister, R.; Frick, A.; Bartenstein, P.; Rominger, A. Chylothorax and chylous ascites. Clinical utility of planar scintigraphy and tomographic imaging with SPECT/CT. *Nuklearmedizin* 2015, 54, 231–240. [PubMed]