

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: [www.elsevier.com/locate/radcr](http://www.elsevier.com/locate/radcr)

## Case Report

# Lipiodol embolization for chylous leak complication post robotic-assisted para-aortic lymph node resection ☆,☆☆

Rajeev Shamsuddin Perisamy<sup>a</sup>, Rusli Zaim Rusli<sup>b,\*</sup>, Mohd Fandi Kamis<sup>c</sup>, Anas Tharek<sup>c</sup>, Tze Hui Soo<sup>d</sup>

<sup>a</sup> Department of Radiology, Kulliyah of Medicine, International Islamic University Malaysia, Kuantan, Pahang, Malaysia

<sup>b</sup> Department of Medical Imaging, Hospital Pengajar Universiti Sultan Zainal Abidin, Terengganu, Malaysia

<sup>c</sup> Department of Radiology, Faculty of Medicine and Health Sciences, Hospital Pengajar Universiti Putra Malaysia, Serdang, Malaysia

<sup>d</sup> Department of Urology, Faculty of Medicine and Health Sciences, Hospital Pengajar Universiti Putra Malaysia, Serdang, Malaysia

## ARTICLE INFO

## Article history:

Received 10 April 2023

Revised 6 November 2023

Accepted 28 November 2023

## Keywords:

Lipiodol embolization

Lymphangiogram

Testicular carcinoma

Lymph node metastasis

Robotic-assisted lymph node resection

Chylous leak complication

## ABSTRACT

Thoracic or abdominal chylous leakage, a rare complication of lymph node removal procedures, can lead to the accumulation of lymph fluid within the abdominal cavity, resulting in chylous ascites, abdominal distension, discomfort, and an increased risk of infection. Lipiodol lymphangiography, a diagnostic procedure utilizing a unique contrast agent, serves to identify the site and cause of chylous leaks. Furthermore, it functions as a therapeutic tool by injecting Lipiodol into the affected lymphatic vessel. By employing this diagnostic procedure, successful closure of the leak can be achieved. We present a case where a chylous leak was effectively treated with Lipiodol injection following the robotic-assisted removal of metastatic lymph nodes surgery.

© 2023 The Authors. Published by Elsevier Inc. on behalf of University of Washington.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

☆ Acknowledgments: This article did not receive specific funding.

☆☆ Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

\* Corresponding author.

E-mail address: [zaimrusli@unisza.edu.my](mailto:zaimrusli@unisza.edu.my) (R.Z. Rusli).

<https://doi.org/10.1016/j.radcr.2023.11.074>

1930-0433/© 2023 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

## Introduction

The paraaortic region is a common site for nodal metastases in testicular malignancy. Surgical excision of paraaortic nodes with curative intent typically involves maximal lymph node removal while preserving the functionality of adjacent organs and tissues. This approach is motivated by the unfavorable prognosis linked to distant metastasis from the primary site. Consequently, debulking surgery is often followed by adjuvant radiotherapy and chemotherapy to achieve remission. Unfortunately, this aggressive strategy can lead to complications such as bleeding, organ damage, and lymphatic injuries [1].

In this context, lymphatic fluid leakage can complicate lymphatic injuries, resulting in intraabdominal cavity distension due to fluid accumulation and subsequent breathing difficulties. Identifying the leaking sites is pivotal in addressing this complication, even though it can present significant clinical challenges. This report details the diagnostic and therapeutic utilization of the lipiodol lymphangiography contrast agent (Guerbet LLC, France) to resolve this situation.

## Case Report

A 28-year-old gentleman diagnosed with right testicular carcinoma underwent scrotal exploration followed by right orchiectomy. After surgery, both Beta-HCG and LDA levels returned to the normal range. However, the alpha-fetoprotein level remained persistently elevated at 35  $\mu$ g/l. Subsequently, the patient received and completed 3 cycles of Bleomycin, Etoposide, and Platinum (BEP) adjuvant chemotherapy. After completing treatments, a follow-up Computed Tomography (CT) scan was conducted for staging purposes. The CT scan revealed an enlarging aortocaval lymph node with a necrotic center measuring approximately 2 cm. This node compressed the adjacent inferior vena cava and abutted the abdominal aorta (Fig. 1A). Additionally, a small lung nodule was identified, displaying similar characteristics compared to the initial CT staging and subsequent serial CTs.

Following these findings, the patient underwent robotic-assisted lymph node dissection to remove the paraaortic nodal metastasis. Initial recovery was uneventful. However,

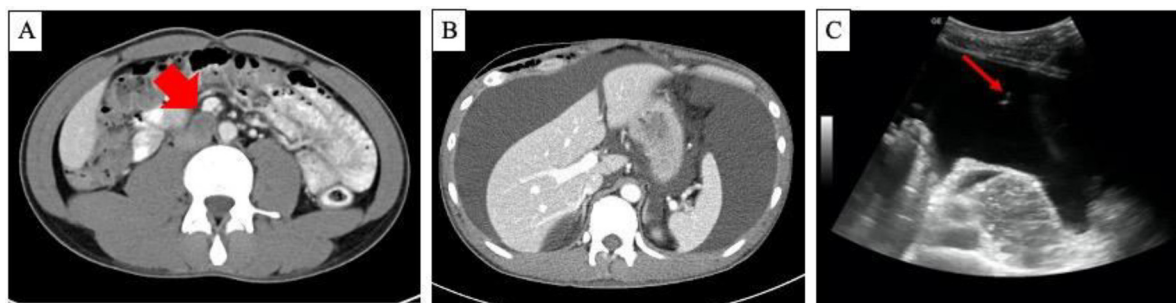
a few days postsurgery, he developed abdominal distension, pain, and shortness of breath. An urgent contrast-enhanced CT abdomen was performed to investigate the cause of postoperative abdominal discomfort. The scan revealed substantial ascites (Fig. 1b), requiring an ultrasound-guided percutaneous ascitic fluid pigtail drainage. Analysis of the drainage sample indicated milky fluid aspirate, indicative of a postsurgical chyle leak complication (Fig. 1C). Unfortunately, despite several days of conservative management, drainage persisted at a rate of approximately 100 to 200 mL daily, necessitating active intervention.

The patient was scheduled for a lipiodol lymphangiography procedure. An interventional radiologist conducted the procedure under local anesthesia. Using ultrasound guidance, a 22-G spinal needle was directed to lymphatic vessels through an enlarged node in the right femoral region (Fig. 2A). Employing fluoroscopy, Lipiodol was slowly injected via the spinal needle (Fig. 2B), with a total of 10 mL of Lipiodol administered over 15 minutes. Subsequently, the needle was removed. Infusion of Lipiodol within the lymphatic channel was verified using plain cone-beam angiography, illustrating the 3-dimensional anatomical location of the contrast within the lymphatic system (Fig. 2C). A postprocedure plain CT abdomen was performed to assess Lipiodol distribution. The scan distinctly indicated the leak's demarcation at the cisterna chyli region (Fig. 3A and B).

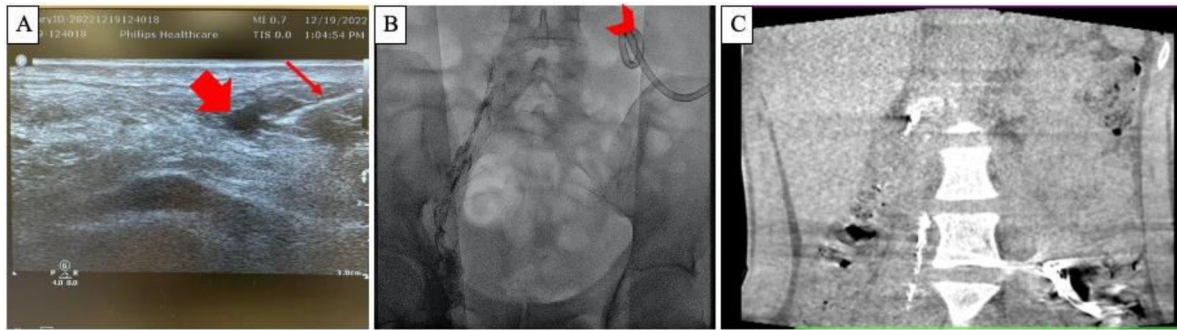
Following the procedure, the volume of chylous ascitic fluid drainage gradually decreased until the collection bag was empty 1 week later. The patient became free of abdominal symptoms and was discharged home. Over several months of postprocedure follow-up, no evidence of chylous leak recurrence or abdominal symptoms emerged. Further imaging was not deemed necessary.

## Discussion

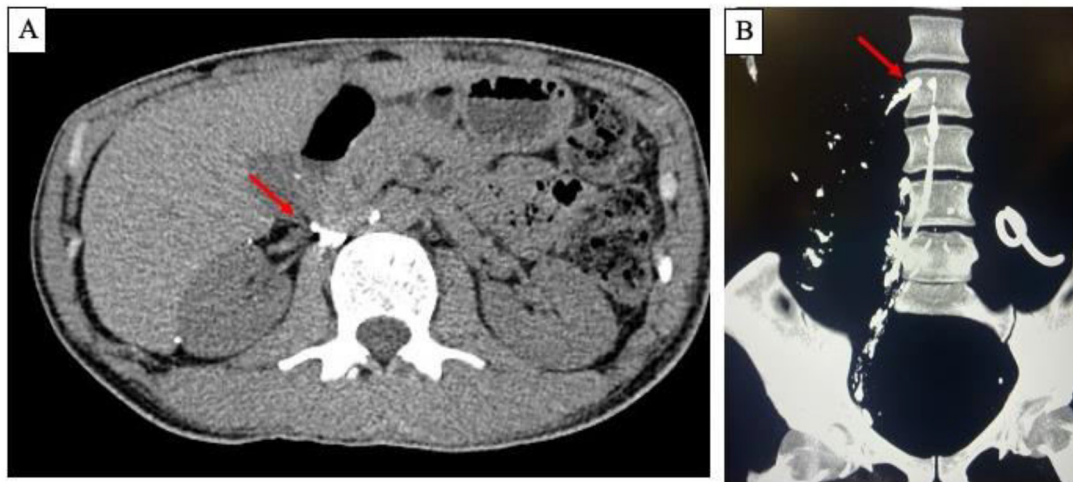
Our experience in managing this case highlights Lipiodol's dual roles as both a diagnostic and therapeutic agent. Lipiodol embolization is a technique that employs Lipiodol to seal leaking lymphatic vessels by effectively plugging the leak and preventing further lymphatic fluid seepage. This procedure leverages Lipiodol's ability in lymphangiography to validate



**Fig. 1 – Initial preprocedure CT Abdomen in portovenous (PV) phase demonstrates an enlarged and lobulated metastatic aortocaval node (A-red arrow). Subsequent postoperative GECT Abdomen reveals substantial ascites (B). Ultrasound-guided percutaneous drainage of the ascites yielded milky fluid, indicative of chylous ascites. The needle tip within the ascitic fluid is discernible (C-thin arrow).**



**Fig. 2** – The lymphatic channel was accessed by puncturing an enlarged right inguinal lymph node (A-solid arrow) using a 22-G spinal needle under ultrasound guidance. The position of the needle tip is shown (A-thin arrow). Slow injection of Lipiodol into the right inguinal node was undertaken, with the flow observed in the lymphatic channel intermittently monitored through fluoroscopy. Notably, the presence of a pigtail drainage catheter is marked by the arrowhead (B-arrowhead). Confirmation of the distribution of Lipiodol within the lymphatic channel was achieved through a 3-dimensional cone beam angiography (C).



**Fig. 3** – An axial plain CT Abdomen obtained 2 hours after lipiodol injection reveals a distinct demarcation of the leakage point at the cisterna chyli (A-thin arrow). A 3-dimensional volumetric reconstruction of the CT scan illustrates the leakage point situated adjacent to the cisterna chyli (B-thin arrow).

the leakage location, accomplishing diagnostic and treatment objectives concurrently and effectively.

Lipiodol embolization demonstrates a high success rate for treating chylous leakage, ranging from 80% to 90% [1]. These statistics are supported by another documented case involving a direct percutaneous injection of Lipiodol over a suspected leak at the surgical site, resulting in spontaneous embolization of the chyle leak [2]. In most cases, Lipiodol embolization halts leakage within 24 hours postprocedure, often leading to prompt patient improvement. In instances where embolization is unsuccessful, attempting percutaneous direct injection of alternative embolic material is advisable [3].

Furthermore, a recent multicenter study by S. Hur et al. demonstrates that when applied in combination, lymphangiography and glue embolization boast excellent technical and clinical success rates of 89% and 94% respectively, compared to a 50% clinical success rate of lymphangiography alone [4]. Interestingly, the study introduces the term 'lym-

phopseudoaneurysm' for a chyle leak forming a sac-like structure adjacent to the site of lymphatic leakage. Thus, Lipiodol embolization presents a potentially effective and efficient alternative to surgical procedures or sclerotherapy in cases with inadequate responses to lymphangiography for managing lymphatic leakage.

Healthcare personnel should exercise caution when considering this approach, as it comes with several associated limitations. Foremost, there is a risk that Lipiodol could become permanently retained within the lymphatic system, leading to diagnostic challenges that have been documented in numerous reports [5] where Lipiodol may mimic pathology. Additionally, it is important to consider potential rare complications arising from Lipiodol lymphangiography, including infection, bleeding, and allergic reactions to the agent. Therefore, these limitations need to be carefully considered in the clinical decision-making process before opting for Lipiodol embolization as a solution for addressing lymphatic leakage.

---

## Conclusion

Lipiodol embolization has demonstrated itself as a secure and efficient approach for effectively addressing chylous leakage complications that arise after the surgical resection of lymph nodes. As with any medical procedure, inherent limitations accompany this technique. However, our first-hand experience aligns harmoniously with the mounting evidence, firmly establishing Lipiodol embolization as a comparably safe and minimally invasive procedure, executed promptly with minimal patient discomfort. Significantly, this approach also presents a cost-effective alternative, alleviating the need for more expensive and invasive interventions, such as surgery or prolonged hospital stays.

---

## Patient consent

The informed and written consent obtained from the patient prior to submission of this case for publication.

---

## Statement of ethics

Written and informed consent for data publication was obtained from the patient and family.

---

## Author contributions

All authors have reviewed and approved the final manuscript.

---

## Declaration of generative AI and AI-assisted technologies in the writing process

In the creation of this work, the author(s) employed chat AI for syntax and grammatical error checks. Following the use of this tool/service, the author(s) meticulously reviewed and edited the content as necessary and assume full responsibility for the publication's content.

---

## REFERENCES

- [1] Singh A, Chatterjee S, Bansal P, Bansal A, Rawal S. Robot-assisted retroperitoneal lymph node dissection: feasibility and outcome in postchemotherapy residual mass in testicular cancer. *Ind J Urol* 2017;33(4):304–9.
- [2] Lipiodol lymphangiogram in chylous leakage successful embolisation post mastectomy: a case report. *Malaysian J Med Health Sci* 2022;18(4):221–3.
- [3] Mohd Naim MY, Ezamin AR, Md Noh MSF, Al Khafiz Kamis MF, Shukri MHAS, Percutaneous Healey A, et al. Successful percutaneous embolization of refractory chylous ascites following peritoneal lymph node dissection. *Radiol Case Rep* 2019;14(6):708–10. doi:10.1016/j.radcr.2019.03.001.
- [4] Hur S, Shin JH, Lee IJ, Min SK, Min S II, Ahn S, et al. Early experience in the management of postoperative lymphatic leakage using lipiodol lymphangiography and adjunctive glue embolization. *J Vasc Interv Radiol* 2016;27(8):1177–1186.e1. doi:10.1016/j.jvir.2016.05.011.
- [5] Soo TH, Tharek A, Ibrahim I, Zakaria MH, Mohd Yaakob MN, Kamis MFAK. Lipiodol retention masquerading as talcum powder in Mammography. *Interv J* 2022;2(1):23–5.