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CASE REPORT
Reconstructive

Treatment of Refractory Ascites with Lymphaticovenous Anastomosis Considering Lymphatic Territories

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Summary: Lymphatic ascites is an infrequent complication observed in patients who have undergone lymphadenectomy as part of their surgical treatment for gynecological cancer. Previous research has suggested that intranodal lymphangiography can effectively manage lymphatic leakage. However, its efficacy diminishes for ascites with substantial fluid accumulation. This case report presents a patient who underwent lymphaticovenous anastomosis (LVA) for ascites that was unresponsive to lymphangiography and sclerotherapy. A 70-year-old woman required weekly ascites punctures after surgical treatment of ovarian cancer. Lymphoscintigraphy revealed lymphatic leakage originating from the right pelvic lymphatic vessel. Intranodal lymphangiography was performed from the inferior lateral inguinal region, followed by embolization with 33% NBCA. Despite these measures, recurrence of ascites and lower limb lymphedema were observed. LVA was conducted at 149 days after the primary operation. Before the LVA, indocyanine green was injected into the lateral and medial ankles, first and fourth toe web spaces, and lower abdomen. The indocyanine green lymphography revealed several linear patterns extending from the dorsum of the foot and the lower abdomen to the inguinal lymph node. Among these, the lymphatic vessels leading to the inferior lateral inguinal lymph node were chosen for the LVA. Eight anastomoses were executed at the right thigh, right lower leg, and right lower abdomen. The patient was discharged at 1 day postoperatively. A computed tomography examination conducted at 20 days post-LVA revealed no accumulation of ascites. To improve the success rate of LVA for ascites, a treatment strategy based on lymphatic territories is required. *(Plast Reconstr Surg Glob Open 2024; 12:e6134; doi: 10.1097/GOX.0000000000006134; Published online 6 September 2024.)*

Lymphatic ascites is an uncommon complication observed in patients who have undergone lymphadenectomy as part of their surgical treatment for gynecological cancer.[1] Conservative treatments, such as dietary changes and paracentesis, are typically effective for alleviating symptoms. However, treatment of lymphatic ascites that is unresponsive to conservative treatments can be challenging.

Intranodal lymphangiography is an effective option for not only detecting lymphatic leakage but also blocking the lymphatic ducts.[2] However, cases that cannot be controlled by this procedure become highly refractory.

Lymphaticovenular anastomosis (LVA) has been reported for the treatment of lymphatic leakage. However, LVA is not effective in all patients with lymphatic ascites. Recent research on lymphatic anatomy has clarified the territories of the lymphatic vessels and nodes. Thus, LVA targeting the territories of damaged lymphatic vessels is expected to be effective in the treatment of ascites.

This report presents a patient with refractory postoperative ascites who underwent multisite LVA after

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Received for publication May 27, 2024; accepted July 17, 2024.

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DOI: 10.1097/GOX.0000000000006134

Disclosure statements are at the end of this article, following the correspondence information.

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identification of the responsible lymphatic vessels using lymphoscintigraphy and indocyanine green (ICG) lymphangiography.

CASE REPORT

A 70-year-old woman was referred by her gynecologist with a diagnosis of refractory ascites after laparoscopic total abdominal hysterectomy with bilateral salpingo-oophorectomy, partial resection of the omentum, and pelvic and para-aortic lymphadenectomies for treatment of stage IA ovarian cancer. On postoperative day 48, the patient complained of abdominal distension, and a computed tomography (CT) examination revealed a large amount of ascites (Fig. 1A). Abdominal paracentesis allowed drainage of 3–5 L of ascites every 10–12 days. Laboratory examinations ruled out bacterial infection, peritoneal ascites, chylous ascites, and peritoneal ascites. Indigo carmine testing further ruled out urethral injury. The patient subsequently required weekly abdominal paracentesis procedures. Lymphoscintigraphy images taken after tracer injection into the dorsum of the foot revealed lymphatic leakage from the right pelvic lymphatic vessel. On postoperative day 70, intranodal lymphangiography with lipiodol from the bilateral inferior lateral inguinal region was performed. Although lymphatic leakage from the right external iliac lymphatic region was identified, sclerotherapy with lipiodol was not effective [**See figure, Supplemental Digital Content 1,** which displays intranodal lymphangiography revealing lymphatic leakage from the right external iliac lymphatic region (black circle) and accumulation of sclerosing agent in the abdominal cavity (black arrow), **http://links.lww.com/PRSGO/D480**.]

Thus, embolization of the lymphatic vessels with 33% NBCA (n-butyl-2-cyanoacrylate) was performed, and elimination of the lymphatic leakage was confirmed. However, recurrence of ascites was observed. A second embolization was performed after 2 weeks, but no reduction in ascites was achieved, and lymphedema of the bilateral lower extremities appeared.

For the bilateral lower limb lymphedema and refractory ascites, LVA was conducted under general anesthesia at 149 days after the primary operation. before anesthesia induction, abdominal paracentesis was performed to reduce the effect of ascites on breathing. ICG was injected into the lateral and medial ankles, first and fourth toe web spaces, and lower abdomen. The ICG lymphography revealed several linear patterns from the dorsum of the foot and the lower abdomen to the inguinal lymph node. In the right lower leg, the lymphatic vessels leading to the inferior lateral inguinal lymph node were selected for the LVA. Eight anastomoses were performed at the bilateral thigh, lower leg, and lower abdomen (Fig. 2A). The patient was discharged at 1 day postoperatively.

An ultrasound examination conducted at 1 week postoperatively revealed no accumulation of ascites (**See figure, Supplemental Digital Content 2,** which displays graph showing the volume of paracentesis drainage. LG: lymphangiography, **http://links.lww.com/PRSGO/D481**). A CT examination performed at 20 days postoperatively showed no accumulation of ascites (Fig. 1B). At 3 months after the LVA, no recurrence of ascites has been observed (Fig. 2B).

DISCUSSION

Postoperative lymphatic leakage, including lymphatic ascites, chylous ascites, lymphocele, lymphorrhea, and lymphatic fistula, is a known complication after abdominal surgery. Extent of surgery, tumor grade, and number of resected lymph nodes were identified as risk factors for lymphatic leakage.[3] The incidence of postoperative lymphatic ascites in patients who underwent lymph node dissection for gynecological malignancies was reported to be 4.0%.[1] Although most cases improve within 1–3 months with conservative treatments such as dietary modifications, further treatment strategies need to be developed for persistent ascites.

Lymphangiography, involving injection of a contrast agent from a lymph node, is an effective technique to detect lymphatic leakage. Moreover, the contrast agent lipiodol remains in the lymphatic vessels and induces

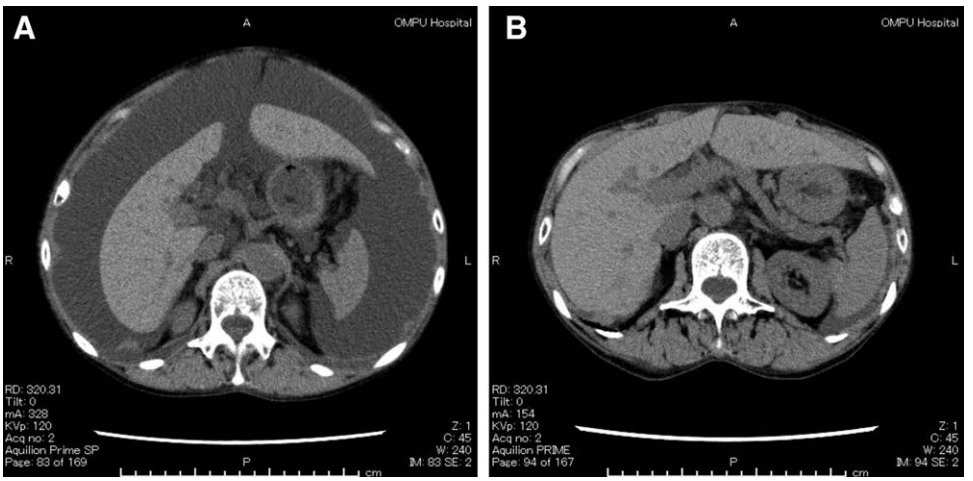

Fig. 1. Pre- and postoperative CT images. A, Preoperative CT image showing massive ascites. B, Postoperative CT image showing no accumulation of ascites.

Fig. 2. Pre- and postoperative lower extremity photographs. A, Results of ICG lymphangiography (green line) and the location of the anastomosis (red arrows). In the right lower limb, several linear patterns from the dorsum of the foot and the lower abdomen to the inguinal lymph node were observed. Among them, the lymphatic vessels leading to the inferior lateral inguinal lymph node (red dotted circle) were selected for the LVA. In the left leg, linear patterns were observed in the lower leg and dermal backflow was observed in the thigh. The LVA was performed upstream of the dermal backflow. B, Picture showing the lower leg 3 months after the LVA.

inflammation, which has a therapeutic effect for blocking any leakage. The therapeutic success rates for lymphangiography were reported to be 86% for chylous ascites[4] and 77%–94% for lymphocele.[5–7] However, patients with large lymphatic accumulation volumes may not benefit from the therapeutic effects of lymphangiography and sclerotherapy. Mahrer et al.[5] used sclerotherapy to treat 43 patients with lymphatic leakage and reported a success rate of 77%. They further reported that the mean lymphatic accumulation volume was 206 ± 213 mL in cases that responded to treatment and 1708 ± 1521 mL in cases that did not respond to treatment, with a significant difference between the two groups. In our patient, 5–6 L of ascites was drained every 10 days, suggesting that the sclerotherapy was not effective. Furthermore, additional embolization was performed, which was ineffective and may have caused the lower extremity lymphedema. These results suggest that treatment strategies should be considered according to the amount of lymphatic effusion.

Lymphatic flow in the lower extremities and the abdomen below the umbilicus runs through the inguinal lymph nodes to the pelvic region. In 2019, Shinaoka et al[8] examined the relationship between lower limb lymphatic drainage pathways and lymph nodes. They divided the lower limb lymphatic vessels and inguinal lymph nodes into four groups, respectively. Their findings revealed that most of the lymph vessels reached the inferior lateral or inferior medial inguinal lymph nodes. In our case, lymphatic leakage from the inferior lateral inguinal lymph node was confirmed by intranodal lymphangiography. The postoperative findings suggested that directing the lymph to the venous system by multiple LVAs upstream of this lymph node was able to reduce the lymphatic leakage downstream of the lymph node. Among them, we believe that LVA on right lower limb contributed most to the reduction of ascites.

CONCLUSIONS

LVA may be considered depending on the amount of lymphatic accumulation. To improve the success rate of LVA for ascites, a treatment strategy based on lymphatic territories is required.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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