

A Case of Severe Lower Extremity Lymphedema Caused by Postoperative Intraperitoneal Lymphatic Leakage Treatment

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Summary: In the present study, we encountered a patient who developed intraabdominal lymphatic leakage after surgery for gastric cancer, underwent lymphangiography and lymphatic mass embolization, and developed severe lymphedema. The patient was a 55-year-old woman with gastric cancer with pancreatic invasion. Total gastrectomy and lymph node dissection were performed as conversion procedures. Six liters of ascites was detected postoperatively. Lymphangiography with Lipiodol injections into the bilateral inguinal lymph nodes was done three times, and Histoacryl embolization of the lymphatic leak was performed. However, edema of the lower extremities rapidly worsened. Lymphatic venous anastomosis was performed under general anesthesia. Anastomosis was performed at seven sites on the right and eight sites on the left. Postoperatively, the patient underwent compression therapy using the multilayer bandage method. The edema continued to improve further, and at 2 weeks postoperatively, the patient's weight had decreased by 21.4 kg from the preoperative weight, which was the same as that before the onset of edema. In this case, the patient's general condition was unstable due to cardiac insufficiency and other factors. Therefore, we aimed for an operation time of less than 3 hours. In addition, two surgeons performed the surgery to ensure an immediate therapeutic effect, and more anastomoses were performed than usual. After lymphatic venous anastomosis, not only the edema of both lower extremities but also the edema of the entire body improved promptly. One of the reasons for the improvement in general edema was thought to be due to increased intravascular protein and enhanced intravascular return of interstitial fluid. (*Plast Reconstr Surg Glob Open* 2024; 12:e5648; doi: 10.1097/GOX.0000000000005648; Published online 4 March 2024.)

Lymphatic venous anastomosis (LVA) is a bypass technique that allows lymphatic fluid to flow from the lymphatic vessels to the veins and has been reported to reduce edema and prevent cellulitis.^{1,2} LVA is performed for various lymphatic conditions, including preventive LVA,³ primary lymphedema,⁴ pubic lymphedema⁵ and facial lymphedema.⁶ In the present study, we encountered a patient who developed intraabdominal lymphatic leakage after surgery for gastric cancer, underwent multiple lymphangiography and lymphatic mass embolization procedures, and developed severe lymphedema of both

lower extremities owing to these intralymphatic treatments. We report the details of the surgery and discuss the postoperative course of this patient.

CASE REPORT

The patient was a 55-year-old woman with stage IVA advanced gastric cancer with pancreatic invasion. Total gastrectomy and D2 lymph node dissection were performed as conversion procedures. On the 10th postoperative day, 6L of ascites was detected per day. Lymphoscintigraphy revealed lymph leakage in the left abdomen. Lipiodol injections into the bilateral inguinal lymph nodes were done three times, and Histoacryl embolization of the lymphatic leak was performed. After these intralymphatic treatments, the intraabdominal lymphatic leakage improved; however,

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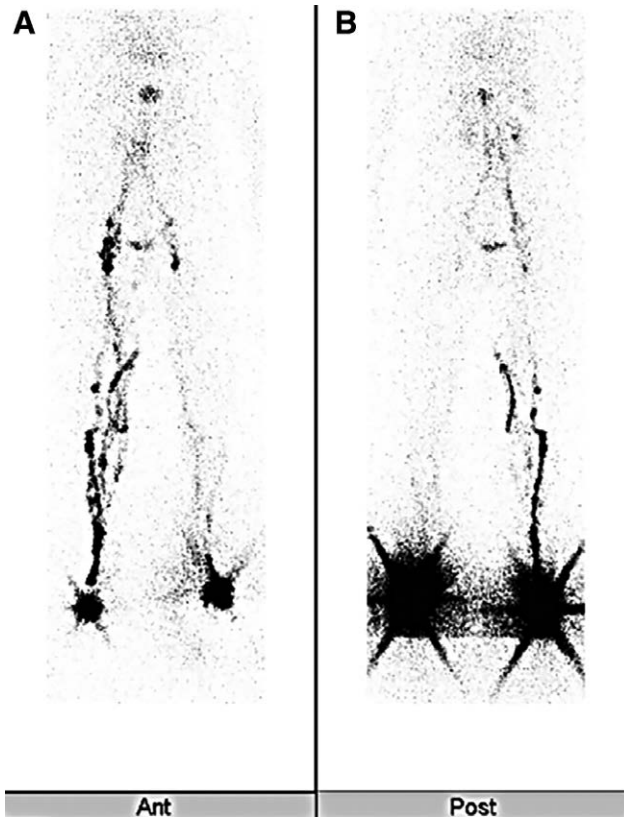


Fig. 1. Lymphoscintigraphy of both lower extremities (A, Anterior view; B, Posterior view). The right and left lower extremities showed formation of collateral tracts. The left lower extremity also showed poor delineation of lymphatic vessels. Poor delineation was observed in the inguinal region.

edema of the lower extremities rapidly worsened. The patient weighed 20 kg more than before the gastric cancer surgery, and both lower extremities showed severe edema with a feeling of fullness, accompanied by lymphatic leakage in the right thigh. She also had systemic edema due to hypoalbuminemia, with an albumin level of 1.8 g per dL. She required respiratory management in the intensive care unit owing to severe pleural effusion and cardiac insufficiency. Lymphoscintigraphy showed the formation of collateral tracts in the right lower extremity and the formation of collateral tracts as well as poor visualization in the left lower extremity; in addition, the inguinal region was poorly visualized (Fig. 1). Based on the examination findings, a diagnosis of lymphedema in both lower extremities was made, and LVA was scheduled under general anesthesia. The patient underwent elevation of the lower extremities and weak compression therapy until the surgery, but there was no obvious improvement in edema. Normal therapeutic pressure compression was not performed because of the risk of intraabdominal lymphatic leakage worsening. Indocyanine green examination was performed preoperatively, and dermal backflow was observed in the bilateral medial lower and medial thighs. The anastomosis was determined by looking for a vein under echo around the running of the confirmed lymphatic vessels. Anastomosis



Fig. 2. Lower extremities at the time of LVA. After preoperative indocyanine green examination to confirm the lymphatic vessels and echocardiography to determine the location of the skin incision, LVA was performed in seven locations in the right lower extremity and eight locations in the left lower extremity.

was performed at seven sites on the right and eight sites on the left using two microscope units (Fig. 2), with an operative time of 2 hours and 58 minutes. Intraoperative findings included no gross fibrosis of the skin or subcutaneous fat, and no visible degeneration of the lymphatic vessel walls; most of the fluid flow in the lymphatic vessels was high. [See Video (online), which shows lymphatic vessels in this case.] Postoperatively, the patient underwent compression therapy using the multilayer bandage method. On the third postoperative day, the patient lost 6 kg of body weight because of improvements in general edema as well as in edema of both lower extremities and hypoalbuminemia (Table 1). On the sixth postoperative day, the patient's body weight decreased by 14.8 kg from the preoperative level, and the circumference of both lower extremities markedly improved by 3–7 cm in each area. The edema continued to improve further, and at 2 weeks postoperatively, the patient's weight had decreased by 21.4 kg from the preoperative weight, which was the same as that before the onset of edema. Hypoalbuminemia also improved, with an albumin level of 2.9 g per dL. Although no compression therapy was administered after the sixth postoperative day, the improvement in edema in both lower extremities was remarkable 2 weeks after surgery (Fig. 3). Two months

Table.1. Patient’s Lower Extremity Circumference, Weight, and Albumin Level

		Diameter (cm)					Body Weight (kg)	Albumin (g/dL)
		Dorsalis Pedis	Ankle	10 cm Below the Knee Joint	Knee Joint	10 cm Above the Knee Joint		
One day preoperative	Right	27.2	27.2	37.6	40.2	48.8	85.8	1.8
	Left	27.4	28.3	38.2	39.3	46.0		
		-6.0 kg*						
Three days postoperative	Right	23.8	22.0	35.6	39.5	49.8	79.8	2.4
	Left	22.4	22.8	34.0	37.2	44.2		
		-14.8kg*						
Six days postoperative	Right	20.8	21.8	32.7	36.4	41.8	71.0	2.3
	Left	20.9	22.3	32.2	36.3	39.9		
		-21.4kg*						
Two weeks postoperative	Right	22.1	21.9	32.8	34.3	37.7	64.4	2.9
	Left	22.1	22.3	31.9	35.5	37.8		

*Weight change since the initial visit.



Fig. 3. Lower extremities at 2 weeks postoperatively. Two weeks after surgery, edema in both lower extremities markedly improved.

postoperatively, the patient had progressed without worsening edema or ascites. Thereafter, the patient is being followed up at another hospital. [See Video (online).]

DISCUSSION

The causes of secondary lymphedema include tumor resection with lymph node dissection, radiation therapy, chemotherapy, and trauma. Although this case differs from usual lymphedema in the onset of edema and the

acute onset of edema, the pathophysiology is similar to that of usual secondary lymphedema in that edema occurs in the obliterating zone rather than in the area of lymphatic vascular pathway obstruction. We expected that the edema, in this case, would be improved by reconstruction of the lymphatic drainage pathway with LVA.⁷

In patients with lymphedema, the lymphatic vessel wall is disturbed by increased intralymphatic pressure, resulting in wall degeneration. As edema progresses and degeneration becomes more severe, the lumen of the lymphatic vessels is narrowed or obstructed, and the ability of lymphatic fluid to be transported is reduced.⁸ Therefore, when performing LVA, it is important to anastomose the lymphatic vessels with veins that are mildly degenerated and retain their lymphatic transport capacity.⁹ Surgical intervention before edema progresses can be expected to have a higher therapeutic effect. In this case, the patient had acute-onset lymphedema, and lymphatic vascular degeneration was expected to be relatively mild. We planned to intervene as early as possible to improve the patient’s condition before the edema became irreversible and lymphatic degeneration progressed owing to the persistent edema. In addition, the patient’s general condition was unstable due to cardiac insufficiency and other factors, and we considered a lengthy operation to be too invasive. Therefore, we aimed for an operation time of less than 3 hours. In addition, two surgeons performed the surgery to ensure an immediate therapeutic effect, and more anastomoses were performed than usual. Although the surgery was performed approximately 2 weeks after the rapid worsening of edema in both lower extremities, little gross degeneration occurred in either lymphatic vessel, and lymphatic flow was abundant, suggesting that the surgery was performed before irreversible damage to the lymphatic vessels occurred. There was marked improvement in edema on the day after surgery, suggesting that a highly effective drainage pathway had been reconstructed. After LVA, not only the edema of both lower extremities but also the edema of the entire body improved promptly. One of the reasons for the improvement in general edema was thought to be due to

increased intravascular protein and enhanced intravascular return of interstitial fluid as a result of the surgical return of lymphatic fluid into the vessels.¹⁰

CONCLUSIONS

In the present case, the patient experienced lower extremity lymphedema caused by postoperative intraperitoneal lymphatic leakage treatment, and multiple LVAs were remarkably effective in treating the edema. This finding suggests that LVA is effective in treating acute-onset lymphedema.

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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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