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CASE REPORT

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A case report of chyle leakage after axillary node clearance in a patient with breast cancer

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Key Clinical Message

Chyle leakage is a rare postoperative complication of breast cancer, and conservative treatments should be prioritized, with careful monitoring of drainage volume and timely surgical intervention when conservative treatments are ineffective.

Abstract

Chyle leaks following surgery for breast cancer are seldom encountered. Management varies with no consensus in the literature. This paper reports a case of a chylous leak after axillary dissection in a patient with breast cancer eventually cured with conservative treatment and discusses management options varied with both conservative and surgical options available to clinicians.

KEYWORDS

axillary node clearance, breast cancer, case report, chyle leakage

1 | INTRODUCTION

Compared with the 0.47%–0.84% incidence rate of chyle leaks following breast cancer surgery,[1,2] the incidence of chylous fistula after cervical lymph node dissection is 1%–2%, of which 75% occurs on the left side.[3,4] Surgical traumatic chyle leakage can occur after thoracic, abdominal, and cervical lymph node dissection and axillary dissection. Both insufficient ligation of lymphatic vessels during surgery and anatomical variations of lymphatic vessels can lead to lymphatic reflux and develop into chyle leakage. Postoperative chyle leak, as an extremely rare complication following breast cancer surgery, has been infrequently reported. Furthermore, there has been no consensus on the treatment of chylous leakage after axillary lymph node dissection for breast cancer. We present a case of chylous leakage after left breast-modified radical mastectomy with level III axillary clearance in the First Affiliated Hospital of Guangzhou University of Traditional Chinese Medicine and discuss this rare complication.

2 | CASE HISTORY

A 58-year-old female with a past medical history of diabetes presented to the hospital with a left breast mass. The patient did not report pain or nipple discharge, but mentioned nipple retraction. Physical examination showed a 3.5 × 2 cm mass in the left breast palpable at 3 o'clock with hard consistency, unclear boundary, and poor mobility. Enlarged lymph nodes were palpated in the left subaxillary region, with the largest measuring approximately 3.2 × 1.5 cm. Breast ultrasound revealed a hypoechoic lesion measuring 33 × 17 mm at the 3 o'clock position in the left breast, with irregular morphology, unclear boundary, angulation, and burrs with BI-RADS classification: 4C category. Unusually enlarged lymph nodes were seen in the left axilla, with the largest measuring 21 × 15 mm. Mammography showed multiple punctate heterogeneous calcifications in the lateral quadrant of the left breast, inverted nipple, and BI-RADS classification: 4C category. Swollen lymph nodes were observed in the left armpit. This patient was diagnosed with a malignant tumor of the left breast and underwent a needle biopsy of the left breast mass on November 23, 2021. The frozen pathology suggested infiltrating ductal carcinoma of the left breast. The patient has no prior surgical history or family history of malignant tumors.

Left axillary lymph node biopsy was performed the next day, and pathological findings indicated grade III metastatic invasive ductal carcinoma of the breast with immunohistochemistry showing estrogen receptor-positive, progesterone receptor-negative, and human epidermal growth factor receptor-positive. In light of this, the patient received six cycles of neoadjuvant chemotherapy with docetaxel 95 m^2/kg, trastuzumab (loading dose: 440 mg, maintenance dose: 340 mg), and pertuzumab (loading dose: 840 mg, maintaining dose: 420 mg) from December 9, 2021, to March 30, 2022.

The left breast-modified radical mastectomy with level III axillary clearance was performed on May 11, 2022. The operative procedure was uneventful. The paraffin pathology of left breast puncture showed invasive ductal carcinoma of the left breast grade III, ER (++, about 50% of cells were weak to moderately positive), PR (−), Her-2 (+++, about 95% of cells were strongly positive), AR (+++), P53 (−), E-cad (+++), BRCA1 (++), Ki67 (mean index 30%, hot spot area 40%). Left axillary lymph node aspiration results confirmed invasive ductal carcinoma grade III metastasis of breast cancer in left axillary lymph nodes. Postoperative paraffin pathology showed that there were infiltrations of local breast ducts and perilobular chronic inflammatory cells, interstitial collagen fiber hyperplasia, calcifications, no residual cancer, intravascular cancer thrombus (−), and nerve invasion (−). The margins of the specimens were negative, no cancer metastasis was found in the lymph nodes and tissues at stations I, II, and II, lymph node fusion (−), and extranodal invasion of lymph nodes (−). Miller–Payne grade estimate of the response of primary cancer to neoadjuvant chemotherapy: grade 5. Miller–Payne grading assessment of response to neoadjuvant chemotherapy for lymph node metastases: grade 5.

3 | METHODS

On postoperative Day 1, a semifluid diet was given, and the subaxillary drainage was serosanguinous and 95 mL/24 h in volume. General diet on postoperative Day 2, the subaxillary drainage volume increased to 220 mL/24 h and became milk in color. Then, the low-fat diet and compression on the surgical area were prescribed. The milky drainage volume increased to 390 mL/24 h and even 550 mL/24 h on postoperative Days 3 and 4, respectively (Figure 1). Based on this, a strict low-fat diet, compression on axillary, and affected limb immobilization were implemented strictly. Drainage decreased to 390 mL/24 hrs and 90 mL/24 h, milky in color. The drainage tube was removed on postoperative day 9. Daily drainage variety is shown in Table 1. On postoperative Day 11, this patient's reexamination at the outpatient clinic showed that there was no subcutaneous effusion in the axilla and the patient was cured.

4 | CONCLUSION

Chyle leakage is a rare postoperative complication of surgery to the axillary lymph nodes in breast cancer patients, 80% of which can be cured with conservative treatment. Chylous leakage can lead to reduced immune function, sepsis, abdominal infection, and other complications. And infection, malnutrition, and other factors are not conducive to the healing of lymphatic vessels, thus aggravating leakage in patients, creating a vicious circle. Based on above, secondary surgical intervention should be promptly initiated when conservative treatment fails after 1 week or significant fluid loss affecting vital signs.

It is noteworthy that preoperative identification of high-risk groups of chylous leakage should be strengthened and personalized perioperative management programs should be formulated for those patients. Proper ligation of lymphatic vessels during operation is the key to prevent postoperative chylous leakage.

FIGURE 1 Chyle leak in a day collected in a bottle.

5 | DISCUSSION

Surgical traumatic chylous fistula is seen as a postoperative complication after thoracic, abdominal, or cervical lymph node dissection, or axillary dissection.[4–6]

Dr. Zhang Jian's research on lymphatic leakage after gastric cancer surgery has found that the occurrence of lymphatic leakage should meet the following two conditions: (1) The interruption of lymphatic circulation; (2) The pressure difference between the inside and outside of the lymphatic vessels. For example, lymphatic vessel rupture caused by surgery, lymph node metastasis leading to obstruction of lymphatic drainage, inadequate ligation of lymphatic vessels due to extensive use of electrocautery during surgery, combination with anemia and hypoproteinemia, which hinder the healing of lymphatic dissection wounds. Other studies on lymphatic leakage after pancreatic cancer surgery have found that factors such as female gender, chronic inflammation, extensive infiltration of malignant tumors, history of diabetes, neoadjuvant chemotherapy, prolonged surgical duration, and venous thrombosis in the surgical area can increase the risk of postoperative chyle leak.[7,8]

Anatomical variation of the lymphatic vessels is also one of the reasons for intraoperative damage to the lymphatic vessels and consequently the reflux of lymphatic fluid and the causing of chylous fistula. Microscopically, capillary lymphatic vessels have a special structure, which may increase the risk of developing chyle leakage. The tube wall constitutes a layer of transparent epithelial cells instead of a basement membrane, which is loosely packed. Furthermore, the absence of an elastic fiber layer leads to a higher risk of capillary lymphatic vessels being torn. The inadequate self-healing capability blocked recovery in due time once the injury occurs. The negative pressure inside the lymphatic vessel makes injuries indiscoverable.

Anatomically, the breast lymphatic network flows into the axillary lymphatic vessels through the interpectoral lymph nodes, and five groups of lymph nodes, including anterior axillary lymph nodes, posterior axillary lymph nodes, lateral lymph nodes, axillary lymph nodes, and central lymph nodes, flow from the left subclavian trunk into the thoracic duct (Figure 2). During the axillary lymph node dissection for breast cancer, inadequate ligation of the lymphatic vessels or damage of the left subclavian trunk lymphatic vessel can lead to lymphatic reflux in the thoracic duct, resulting in chyle leakage.

TABLE 1 Graph demonstrating the drainage for this patient postoperation.

Postoperative day	1	2	3	4	5	6	7	8	9
Drainage (mL)	95	220	390	550	390	90	0	5	Remove

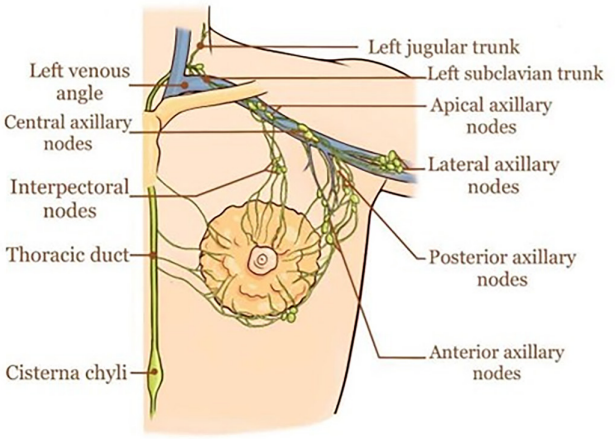

FIGURE 2 Breast lymph node anatomy.

Intraoperative prevention and postoperative treatment are equally important. Surgeons must be familiar with the axillary anatomy and pay more attention to anatomical variation. Aiming to avoid damage to the left subclavian trunk. careful and accurate operation is indispensable intraoperatively, and lymphatic vessels need to be ligated properly.

Comprehensive treatments of postoperative chylous fistula included as follows:

1. Adjust the diet structure: Long-chain triglycerides are hydrolyzed into long-chain fatty acids and monoacylglycerols by lipase, and form chylomicrons with apolipoproteins, which enter the lymphatic circulation through the thoracic duct. Patients suffering chyle leakage should reduce lipid intake and turn to a high-calorie, high-protein, low-fat, and low-sodium diet (foods only containing medium-chain triglyceride). If the drainage does not decrease, fasting and symptomatic treatment such as intravenous nutritional support, antibiotics, and correction of electrolyte disorders should be given. During fasting, the flow of chyle in the thoracic duct could be 14 mL/h, but up to 100 mL/h after a meal.[9,10] Chyle takes on a "milky" appearance after a fatty meal. Thus, a low-fat diet or fasting reduces the production and loss of lymphatic fluid and promotes the closure of lymphatic vessel fissures.[7]
2. Keep drainage unimpeded: Using a negative pressure drainage prevents infection, lymphatic cysts, and flap necrosis caused by chyle accumulation.
3. Compression bandage at the top of the axilla, subclavian the outer edge of the rectus abdominis muscle of the costal arch: Four case reports reveal that the lymph vessel leak point is located on the posterior to axillary vein through re-exploration or lymphangiography.[11–14] One case observes drainage coming from the lateral pectoral bundle branch on reoperation,[15] while another case detects along the superolateral of the operative region.[16] Precise compression site plays an important role in efficacy.
4. Inject meglumine diatrizoate: If the methods above fail to work, consider injecting meglumine diatrizoate through the drainage tube.[17–19] Meglumine diatrizoate's viscous characteristics make it possible to coalesce the leaking lymphatic vessels, by stimulating a traumatic adhesion.
5. Adopt Lymphangiography: Lymphangiography can accurately identify leaking points for follow-up pressure bandaging or surgical suturing.[12,16]
6. Perform secondary surgery: Fistulas that do not respond to conservative treatment in 1 week or persistent leaking over 500 mL/24 h indicate a re-exploration without delay.

AUTHOR CONTRIBUTIONS

XiaoRou Wang: Conceptualization; data curation; writing – review and editing. **YiJia Li:** Formal analysis; funding acquisition; investigation; methodology. **YuXi Miao:** Project administration; resources; software; supervision. **CaiLing Tong:** Visualization; writing – original draft; writing – review and editing. **WenJie Long:** Funding acquisition; supervision; writing – review and editing.

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DATA AVAILABILITY STATEMENT

The data supporting this case report are from previously reported studies, which have been cited. The processed data are available from the corresponding author upon request.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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