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Chyle Leakage Site Identification is Required for its Treatment in Breast Cancer

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Abstract

Chyle leakage is very rare in breast cancer. Knowledge of this complication and the management methods when it happens are quite restricted. Consensus has yet to be formed for its treatment. Three chyle leakage patients are reported in this paper. The first patient underwent two times surgical explorations without locating the chyle leakage sit ahead of time, a typical example of treatment failure. The second patient received simple suture of skin and subcutaneous tissue. We saw a remarkable effect. For the third patient, we fixed the chyle leakage site with the help of lymphoscintigraphy. She recovered quickly when we gave a firm compression to the leakage site. We realized that accurate localization of chyle leakage is necessary for various local procedures, including surgical exploration. We summarized the treatment process and hoped that other doctors will give proper treatment to the complication.

Introduction

Chyle leakage or fistula is a very rare complication after breast cancer, with a reported incidence of <0.5% [1,2]. Injury to an aberrant branch of the thoracic duct during breast surgery and retrograde lymphatic stream are the reasons. Inappropriate treatment will lead to impair nutrition and immunity; compromise and delay wound healing, prolong hospitalization, and delay adjuvant therapy [3]. Although many methods have been reported, such as low fat diet, compression bandage, negative drainage and exploratory operation. The treatment experience was limited, especially the failure experience. Reasonable comprehensive treatment process has not yet formed. We report three chyle leakage cases (Table 1) in this paper and find leakage site identification is necessary for many local treatment methods, including reoperation. We summarized the treatment process of chyle leakage, and hoped it will be useful for other doctors.

Table 1: Patients characteristics, one was right breast cancer, the other were left. They all received modified radical mastectomy.

	Patient 1	Patient 2	Patient 3
Age	46	49	67
Tumor size(cm)	2.4 × 2.2	4.5 × 2.6	3.5 × 1.6
Axillary lymph node (cm)	Neg	0.8 × 0.5	3.6 × 1.8
Operation	left modified radical mastectomy	right modified radical mastectomy	left modified radical mastectomy
Metastatic lymph node	0/17	0/17	16/20
ER	-	-	+
PR	-	-	+
Her2 (IHC)	-	3+	+
Ki67 (%)	60	70	30
P53	+	3+	2+
	axilla	parasternal	axilla
Maximum drainage (ml)	600	100	400
Continued time (Week)	30	10	4
Management	conservative, two times ligation operation	conservative, simple suture	conservative, SPECT Lymphoscintigraphy

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Case Presentation

Case 1

A 46-year-old woman was diagnosed as breast cancer. The tumor was 24 mm \times 22 mm in left breast. She underwent left modified radical mastectomy (05/10/2005). At the end of the operation two drains were placed, the first to drain the axilla, and the second to drain the anterior skin flap. Pathology result: invasive ductal carcinoma, grade 2, lymph node 0/17, ER-, PR-, CerbB2 -, ki67 60%, P53+. On the first postoperative day, 120 ml milk-like liquids were observed in the suction drain. She was diagnosed as chylous leakage and was treated with conservative methods, include low-fat diet, drainage and compression bandage. The drainage fluid increased day by day, and up to 400 ml per day on the 26th postoperative day.

Two times surgical explorations were performed to close the chyle leakage site. In first operation (11/01/2005), we ligated the lymphvessel above axillary vein and rotated the latissimus dorsi to cover axillary fossa according to previously described method [4]. It is a pity this operation does not work. In the second day after operation, chyle leak appeared again, and volume increased to 600 ml on postoperative day 8. The patient developed hypoproteinemia (Total Protein, 59.1g/L; Albumin, 34.1g/L). She received Total Parenteral Nutrition (TPN) for two weeks. The drainage volume decreased gradually. Drainage tube was removed after nearly 100 day (13/02/2006). But recurrent subcutaneous chyle appeared even repeated aspiration with syringe. Finally, we carried out the second surgical exploration (18/05/2006). A figure-of-eight suture was used to close leakage site on lateral chest wall. We sprayed fibrin glue around the suture. The operation was successful. The chyle did not appear again.

Case 2

A 49-year-old woman was diagnosed as breast cancer. Ultrasound found the tumor ($45 \text{ mm} \times 26 \text{ mm}$) in right breast with a large axillary lymph node ($8 \text{ mm} \times 5 \text{ mm}$). She underwent right modified radical mastectomy (06/07/2016). Pathology result: invasive ductal carcinoma, grade 3, lymph node 0/17, ER-, PR-, CerbB2 3+, ki67 70%, P53 3+. Chylous leakage appeared on postoperative day 2 in the parasternal drainage tube, and the volume was 100 ml per 24 h. Although conservative methods (low-fat diet and compression bandage) were carried out, there was no sign of drainage reduction on the postoperative one and half month.

We removed the drainage tube (20/09/2016). The chyle discharged from the tissue channel previously occupied by drainage tube. Local effusion appeared in leakage site. We sutured the full layer of skin and subcutaneous tissue. Chylous leakage disappeared immediately. Suture was removed after two weeks. Chylous leakage did not relapse.

Case 3

A 67-year-old woman was diagnosed as breast cancer. Ultrasound found the tumor (35 mm \times 16 mm) in left breast with a large axillary lymph node (36 mm \times 18 mm). She underwent left modified radical mastectomy (29/03/2017). Pathology result: invasive ductal carcinoma, grade 2, lymph node 16/20, ER+ 90%, PR+ 50%, CerbB2 1+, ki67 30%, P53 2+. On the first postoperative day, 60 ml pink-white colored liquids were observed in the suction drain. In the next few days, drainage fluid became milk-like. She was diagnosed as chylous leakage. She was treated with conservative methods; include low-fat diet and compression bandage. The drainage fluid increased to 400ml per day on the 14th postoperative day. The patient developed



Figure 1: Identification of the chyle leakage sits through SPECT/CT Lymphoscintigraphy. 2 mCi Tc-99m was administered sub-dermally in the second web space of the both feet. Three sites were founded (b, left: anteroposterior, right: posteroanterior) by SPECT/CT examination (1.5 h after injection, a). Using regulus lead block, one chyle leakage sit was identified in axilla (b and c, arrow mark). Left two sits were considered to be venous angle and internal mammary lymph nodes. Chyle disappeared after one week compression bandage on the leakage sit (d).



hypoproteinemiaalso (Total Protein, 60.0 g/L; Albumin, 31.6 g/L). But she refused TPN. There was no sign of drainage reduction on the 21^{st} postoperative day.

We carried out SPECT/CT lymphoscintigraphy to identify the chyle leakage sit. We have tried 1.5 mCi Tc-99m injection subdermally in the second webspace of left foot. The dynamic images did not show any focal tracer uptake on left chest. At the second time, 2 mCi Tc-99m was administered for the both feet. Three sites were founded (b) through lymphoscintigraphy (1.5 h after injection, a). Using regulus lead block, one chyle leakage sit was identified in axilla (b and c, arrow mark). Chyle disappeared after one week compression bandage on the leakage site (d).

Discussion

Chyle leakage is a rare complication after breast surgery. Several researches have reported the aberrant branch of the thoracic duct [5,6]. Injury to the lateral terminating branches or lymphatic trunk, leading to retrograde chyle flow, is more likely than direct injury to the thoracic duct. Most chyle leak cases appeared after modified radical mastectomy [7,8], also have reports appeared after breast conserving surgery 5 orsentinel lymph node biopsy [9,10]. Our three cases were all received modified radical mastectomy. Conservative treatment should initially be considered, which includes dietary control, pressure dressings, and negative pressure drainage. It is generally advised that in case of persistent high output (daily volume

greater than 500 ml) or continuation of leakage for more than 2 weeks, surgical repair should be considered [9,11-13]. Chyle leakage usually last for several weeks (6-8 weeks), but in case 1, lasted for 30 weeks. And this patient was the only person, who received two times surgical explorations. At the first time, latissimus dorsi rotation flap was applied, but it did not work. To our knowledge, this phenomenon has never been described in literature before. After injury, the thoracic duct and its branches collapse quickly and it could not be determined in the operation room. We did not find the major injured lymph duct contribute to chyle leakage was the reason of failure.

Several methods can be used for chyle leakage site identification. X-ray lymphography with contrast agent is the main method used for confirming and localizing thoracic duct injuries [14]. Lin has reported ultrasound-guided bilateral groin lymph node puncture for lymphangiography with lipiodol delivery [15]. However, X-ray lymphography is an invasive procedure, with the drawbacks of contrast agent administration, radiation exposure, patient discomfort, and long examination time. Lymphoscintigraphy has been found to be useful for the detection of such chyle leakage [3,13]. SPECT imaging improves localization, as compared with planar scintigraphy, by allowing a three-dimensional view of the lesion of interest [13]. We located chyle leakage site with lymphoscintigraphy in case 3 (Figure 1). It is easy to use. Leakage site identification according local effusion emergence is our innovative method, and first reported here in case 2. Patients should be chosen carefully. Case 2 have tissue channel already. When we sutured the full layer of skin and subcutaneous tissue, chyle can discharge from the channel. So, we have the chance to observe the result, and the result is very well.

Surgery with re-exploration of the axilla and oversewing of the chyle duct can be used as the last reserve for persistent chyle leaks. If we could not find the major injured lymph in surgery, the risk of surgical failure is still very high, even using muscle flap rotation. Case 1 is a typical example of treatment failure in first exploration surgery. Long time chyle leakage will result in hypoproteinemia, emotional anxiety, and even delay adjuvant therapy. Locating chyle leakage site is necessary for many kinds of local treatment, including exploratory surgery. When conservative therapy failure, we can timely take approaches, such as local compression bandage, local Bleomycin injection or exploratory surgery. The localization of chylous leakage greatly reduces the duration of the complication, and case 3 is a typical case. According to our experience and literature review, we summarized the clinical processing flow of chyle leakage in Figure 2. We hope other doctors will give proper treatment to the complication in the future, and alleviate the pain of the patient.

Additional Contributions

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