

Axillar chylous fistula, a rare complication after axillary lymph node dissection

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Abstract

Background: Chylous fistulas following axillary surgery represent a rare, but significant complication, with a limited number of reported cases in the existing literature. Therefore, there is no consensus or a clinical guideline regarding the management of this condition [1].

Case description: A 67-year-old female, with no relevant medical history, after diagnosis of breast cancer (luminal B Her2-negative invasive ductal carcinoma, cT2N2M0) underwent surgical intervention involving left breast-conserving surgery and left axillary lymph node dissection. On the fifth day postoperative, a change in the drainage color and an increase in its volume were observed. Axillary chylous fistula was then clinically suspected, so a biochemical analysis of the drainage was request. The presence of triglycerides confirmed the diagnosis. A conservative approach was adopted, incorporating a low-fat diet and medical treatment with octreotide. Resolution ensued after 13 days of treatment, facilitating the patient's discharge on the 18th postoperative day.

Conclusion: Chylous fistula is a rare complication that should be suspected in the presence of changes in drainage volume and color. Confirmation is based on increased triglycerides in the axillary content. Management is typically conservative, involving dietary adjustments and medical treatment [2].

Keywords: Chyle leak; Chylous fistula; Axillary lymphadenectomy; Axillary clearance; Lymph node dissection; Sentinel lymph node biopsy.

Abbreviations: ALND: Axillary Lymph Dissection; SLNB: Sentinel Lymph Node Biopsy; POD: Post Operative Day; MRI: Magnetic Resonance Imaging; PTN: Parenteral Nutrition.

Introduction

Axillary lymph node dissection remains a crucial component in the surgical treatment of breast cancer. Common complications following this surgery include seroma, chronic lymphedema, or sensitive alterations in the inner arm [3]. Chylous fistula is a complication resulting from damage to the thoracic duct or one of its branches after neck or thoracic surgeries but is uncommon after axillary surgeries. This is because the thoracic duct is not anatomically related to the axilla [4]. However, anatomical variations in the thoracic duct or its branches had been described, being the damage of one of those branches the cause of axillary chylous fistula [5]. Diagnosis is usually made by observing a milky appearance in the drainage in the early postoperative days. Definitive diagnosis is confirmed through biochemical analysis of the drainage. Treatment is primarily conservative, with surgery rarely required [6].

Although uncommon, it is important for all surgeons involved in axillary procedures, including ALND or SLNB, to be aware of this rare complication and its potential treatment modalities [7].

Case Presentation

A 67-year-old female was referred to the Breast Pathology Unit at the University Hospital 12 de Octubre in Madrid after findings on screening mammography that were suspicious of malignancy. Imaging revealed an irregular spiculated nodule in the upper quadrants of the left breast and a core needle biopsy was performed. Histopathological examination confirmed a luminal B, Her2 negative invasive ductal carcinoma. Moreover, physical examination identified fixed nodal mass, further on MRI at least 5 highly suspicious axillary nodes were observed. A fine-needle aspiration of the most suspicious node confirmed its malignancy. Given the advanced axillary stage, neoadjuvant chemotherapy was conducted with a complete clinical and radiological response. Subsequently, breast-conserving surgery was performed, with left ALND due to the initial axillary involvement, cN2, at the initial TNM stage. The surgery proceeded without complications. An absorbable collagen pad (Hemopatch®) and drainage were placed in the axillary surgical site (as it is usually done in our hospital). On the fifth postoperative day, an increase in drainage volume, up to 120 ml in 24 hours, and a change in color were observed, raising suspicion of axillary chylous fistula. Triglyceride determination in the drainage yielded a value of 664 mg/dL, confirming lymphatic origin. A conservative approach was adopted, including administration of Octreotide, a somatostatin analog, and a low-fat diet. Following these measures, drainage quantity and appearance normalized, allowing its removal on the 13th day post-diagnosis. That is, the patient was discharged on the 18th postoperative day with no further complications or subsequent admissions. Current follow-up shows a favorable outcome with no lymphedema nor mobility or sensory sequelae.

Discussion

The lymphatic system is an extensive network of vessels that converge to form larger vessels, ultimately leading to two major trunks returning lymph to the venous circulation: the thoracic duct and the great lymphatic vein. The thoracic duct collects lymph from throughout the body, except for the right side of the head, neck, upper limb, and chest, which is handled by the great lymphatic vein. The thoracic

Table 1: Review of published cases of chylous fistula.

Author	Age	Surgery	Side	POD	24h drainage	1 st approach	2 nd approach	Recovery
Shinseki [11]	75	ALND	Left	3	500 ml	Diet Octeotride		19
Allegrini [12]	78	SLNB	Left	10		Surgery		
Yin [12]	67	ALND	Left	10	200 ml	Diet	Surgery	70
Ashoor [5]	39	ALND	Left	2	376 ml	Diet	PTN	15
	42	ALND	Left	3	150 ml	Diet		11
	44	ALND	Left	1	600 ml	Diet		29
	52	ALND	Left	2	140 ml	Diet		13
Sarawagi [13]	57	ALND	Left	1	100 ml	Diet		19
Kohno [14]	80	ALND	Left	11	670 ml	Diet	Surgery	29
Ibarra [15]	68	ALND	Left					
Wong [16]	71	ALND	Left	1	800 ml	Surgery		19
Pointer [17]	73	SLNB	Left	1	800 ml	Diet	Surgery	22
Al-Ishaq [18]	41	SLNB	Left	2	180 ml	Drenage		40
DiSumma [10]		ALND		3	-	Diet		-
Griffiths [19]	81	ALND	Left	2	400 ml	Diet		5
Oba [20]	69	ALND	Left	14	400 ml	Diet		10
Tan [21]	48	SLNB	Left	1	454 ml	Diet		6
Gonzalez [22]	72	ALND	Left	10	-	Octeotride		12
Thang [23]	78		Left	5		Surgery		1
Rico [24]	57	ALND	Left	7	400 ml	Diet Octeotride		13
Daggett [6]	41	ALND	Right	1	90 ml	Diet		2
Flores [3]	55	ALND	Left	5	250 ml	Diet		15
Chow [25]	47	ALND		5	250 ml	Drenage		30
Chan [7]	53	ALND	Left	4	300 ml	Diet		3
Malik [26]	79	SLNB	Left	9	2000 ml	Diet	Surgery	36
Singh [27]	56	ALND	Left	1	350 ml	Drenage		17
	47	ALND	Left	2	400 ml	Drenage		10
	33	ALND	Left	2	200 ml	Drenage		12
	59	ALND	Left	2	125 ml	Drenage		13
	56	ALND	Left	0	125 ml			12
	40	ALND	Left	0				0
Baek [4]	38	ALND	Left	4	700 ml	Diet	Surgery	12
Taylor [1]	82	ALND	Left	11	120 ml	Drenage		1
Zhou [28]	70	ALND	Left	4	5000 ml	Diet	Surgery	7-34
	44	ALND	Left	8	500 ml	Diet		7-34
	42	ALND	Left	3	500 ml	Diet		7-34
	37	ALND	Left	1	700 ml	Diet		17
Cong [29]	44	ALND	Left	2	170 ml	Diet + PNT		5
	38	ALND	Left	2	170 ml	Diet + PNT		5
	39	ALND	Left	2	170 ml	Diet + PNT		5
	42	ALND	Right	2	170 ml	Diet + PNT		5
	48	ALND	Left	2	170 ml	Diet + PNT		5
	65	ALND	Right	2	170 ml	Diet + PNT		5
Sakman [30]	65	ALND	Left	1	350 ml	Diet		4
Donkervoort [31]	53	ALND	Left	1	210	Drenage		6
Haraguchi [32]	71	ALND	Left	5	318 ml	Diet	Surgery	34
Abdelrazeq [33]	48	ALND	Left	7	700 ml	Diet		37
Purkayasta [34]	56	ALND	Left	1	1000 ml	Diet PNT	Surgery	17

Najakima [35]	74	SLNB ALND	Left	3	60 ml	Drenage	1
	30	ALND	Left	3	90 ml	Drenage	4
	57	ALND	Left	2	70 ml	Drenage	3
	48		Left	2	90 ml	Drenage	3
Caluwe [36]	53	ALND	Left	1	210 ml	Diet	26
Rijken [37]	46	ALND	Left	1	200 ml	Diet	8
	74	ALND	Left	4	360 ml	Diet	11
	43	ALND	Left	1	410 ml	Diet	8
	44	ALND	Left	2	260 ml	Diet	12
	47	ALND	Left	1	240 ml	Diet	13
Rice [38]	47	ALND	Left	1	275 ml	Diet	5
Fothiadaki [39]	55	ALND	Left	1	150 ml	Drenage	13

duct originates in the abdomen by the confluence of the lumbar trunks and the intestinal trunk (that is the reason why the lymph is a fluid rich in chylomicrons), ascending through the posterior and superior mediastinum until it drains into the left subclavian vein or its confluence with the jugular vein. Consequently, the thoracic duct is not anatomically related to the axilla [8]. However, typical anatomy is present in only 50% of individuals, with numerous anatomical variations of the thoracic duct and its subsidiary branches described. Therefore, the primary hypothesis is that damage to one of these aberrant branches draining the axilla could cause chylous fistula. Chyle leakage following axillary surgery is an uncommon event, with an incidence reported between 0.36-0.68% in case series [2]. Indeed, we have reviewed the literature and we have identified only 60 published cases of chylous fistula following ALND or SLNB in breast cancer (Table 1). Fistulas on the right side are even more exceptional, with only 3 cases reported to date. This rarity is attributed to even more infrequent anatomical variations, such as drainage from the thoracic duct on the right side or bilateral drainage [2].

Chylous fistula is typically detected in the early postoperative days when the patient resumes oral intake, and the drainage begins to appear milky. Specifically, after analyzing data from published cases, we can say this complication is diagnosed on average 3 days after surgery. This is because a collapse of the thoracic duct and its branches during surgery due to the fasting state [6]. The definitive diagnosis is confirmed by analyzing triglyceride levels in the drainage: triglyceride values above 110 mg/dL are diagnostic of chylous fistula, while values below 50 mg/dL almost exclude the diagnosis. Intermediate values between 50 and 110 mg/dL require determination of chylomicron content for confirmation. Other laboratory test, such as protein content, cholesterol, the presence of lymphocytes, or pH, may also be useful [9].

Lymphoscintigraphy, alone or in combination with SPECT (Single Photon Emission Computed Tomography), can be used to precisely locate the leakage. However, their use involves radiation and contrast, and the benefits of these tools are unclear, as they do not alter the management approach [2].

Regarding the proposed treatment, it is usually conservative: maintaining drainage, adopting a low-fat diet, or using medium-chain triglyceride diets (as medium-chain triglycerides do not enter the lymphatic system but pass directly into the portal venous system) [10]. The use of somatostatin analogs such as octreotide has also been suggested. It is assumed that this drug reduces splanchnic and hepatic blood flow, gastrointestinal secretions, and consequently lymphatic flow, thereby reducing flow towards

the damaged duct, facilitating repair. Another option is parenteral nutrition, which appears to promote faster closure than enteral nutrition by reducing lymphatic flow [9].

Surgical re-intervention with leakage repair using ligatures, clips, or topical agents is not recommended initially. A review conducted by Farkas et al. [2] in 2020 suggests that surgery should only be considered in cases with a drainage >500 ml/24 hours after a week of conservative treatment. This seems logical since, from the 60 published cases analyzed, 95% initially opted for conservative management and it was successful in 84% of cases. This implies that out of the 57 cases with initial conservative management, only 9 required secondary surgical intervention. Among them, 7 had a maximum drainage of 500 ml or more in 24 hours. In fact, only in 3 cases with drainage equal to or greater than 500, conservative management was successful. The average recovery time since the identification of the fistula was 14 days. Distinguishing between cases where conservative management was sufficient, recovery shortened to 11 days, while those requiring secondary surgery extended to 30 days.

Conclusion

Chylous fistula following axillary surgery is a rare but impactful complication. Therefore, early diagnosis and appropriate management are crucial. The most accepted etiology is the presence of aberrant anatomical variations in one of the branches of the thoracic duct draining the axilla. Thus, the vast majority occurs on the left side. Conservative management seems effective when the maximum drainage volume in 24 hours is less than 500 ml. Although, given the potential risks of a second surgery, even in those cases with drainage >500 ml, an initial conservative approach can be attempted, and surgery would only be indicated if the flow remains high for more than a week. However, due to the limited experience with this complication, management must be individualized, so publishing new cases as they arise helps to better understand this phenomenon and its treatment [2].

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