TECHNICAL NOTE

Prevention and cure of lymphorrhea and lymphocele after cervical lymph-node surgery

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Introduction

Cervical lymphorrhea is defined as lymph fluid leakage from the neck, whereas lymphocele consists in a lymph collection in a neo-cavity without cellular membrane [1]. Onset of either following cervical lymph-node surgery (adenectomy, lymph-node dissection) results from a breach, usually in the thoracic canal or sometimes in the great lymphatic vein. Pathogenesis and management of this complication are analyzed, based on one case report and a PubMed literature review.

Case report

A 31-year-old woman with morbid obesity (weight, 125 kg; height, 1.67 m) presented with a swelling of the left lower-neck following total thyroideectomy for papillary carcinoma, including left-side dissection of levels IV and VI, performed 27 days previously in another center. Immediate postoperative course had included onset of lymphorrhea in the aspiration drainage liquid at day 3, then swelling of the left lower-neck following drain removal at day 5. The swelling had been punctured daily for 1 week and then every 48 hours for the following week, but continued to increase in volume. The patient lost confidence in her care team and came to our clinic with a CT scan (Fig. 1) performed 48 hours earlier.

On clinical examination a sensitive, tightly stretched swelling extending from the clavicle to the mandible, restricting the rotational motion of a neck that was short and wide was noted. The cervicotomy scar and facing skin in the inferior cervical fold were inflammatory. The patient had no fever. Analysis of the CT scan (Fig. 1) suggested localized level IV lymphocele without associated chylorhithorax. Puncture confirmed this diagnosis, withdrawing 150 cc of creamy liquid and thereby lessening the swelling. A low-fat medium-chain triglyceride (MCT) parenteral diet failed to prevent return of swelling, and revision cervicotomy was therefore advised. The procedure, re-utilizing the primary incision, found a cavity filled with milky liquid, with walls showing a very friable whitish fibrinous coating over inflammatory tissue. No vascular or nervous structures (internal jugular vein, internal carotid artery, transverse cervical pedicle, phrenic or pneumogastric nerve or brachial plexus) were clearly identifiable, but a thoracic canal wound in the lowest part of the cavity under the clavicle could be seen after gentle, painstaking removal of the fibrinous coating. The wound was repaired using two Vicryl 3/0 cross sutures, biologic glue and an ipsilateral inferior-based sternocleidomastoid flap. A Blake drain was positioned away from the repaired wound.

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prior to closure. Under parenteral feeding with MCT and antibiotics (*per os* Bristopen), postoperative course was free of complications. The suction drain was removed by 4 and the patient was discharged on day 6. At more than 2 years’ follow-up, there was no recurrence of lymphocele.

**Discussion**

Cervical lymphocele and lymphorrhea result from a wound in the anatomic structures that drain (depending on the individual subject [2]) 2 to 4 liters of lymph per day from the lower-neck venous system: the thoracic canal on the left, and the great lymphatic vein on the right.

Diagnosis is founded on the aspect of the liquid, which is creamy or milky depending on its lipid content (0.4% to 4%) [1,2], either leaking from the neck (lymphorrhea) or retrieved on puncture (lymphocele). Biochemical analysis, when performed, enables seroma to be ruled out with certainty when triglyceride and cholesterol levels are found to be at higher levels in the liquid than in the blood. Complementary examinations, and notably CT, are not contributive to diagnosis and serve only to determine the anatomic level involved (IV and/or VI), to search for a possible associated asymptomatic chylothorax and, above all, to help explain to the patient the nature of the complication and the benefits and risks inherent to the various treatment options available.
Optimal management of lymphorrhea and lymphocele after cervical lymph-node surgery incontestably consists in preventing any breach in the thoracic canal or the great lymphatic vein perforation during surgery. The walls of these structures, contained within the lower-neck fat with no reliable anatomic landmarks to identify them, are extremely thin and friable. Moreover, their junctions onto the cervical venous system vary from individual to individual: the cervical end of the thoracic canal may join either the lower cervical part of the left internal jugular vein or the left subclavicular, left external jugular or right internal jugular vein [3,4]. Furthermore, in 10 to 40.6% of cases [4], the junction consists of numerous fragile connections to the drainage vein. All this combines to make thoracic canal or great lymphatic vein lesion a risk that the head-and-neck surgeon needs to have constantly in mind when performing level IV or VI lymph-node dissection. Dissection thus needs to be anatomic, painstaking, cautious and gentle, avoiding any mechanical detachment or undue traction. Also, the surgical site should be systematically examined for the slightest leakage at end of procedure, and postoperative surveillance should include systematic examination of the aspect of the drainage liquid (especially at resumption of oral feeding, and of the lower-neck region for any signs (red or sensitive skin, or else hardened by intense inflammatory reaction to lymph) suggestive of leakage, even before onset of tume-faction clearly indicates lymphocele [5,6]. It is noteworthy that no studies have demonstrated a reduction in the risk of these complications associated with use of modern tools (harmonic scalpel, thermofusion vessel sealing) rather than classical cold instruments and/or electric Bowie knife at the time of dissection.

Peroperatively, breach closure by resorbable or non-resorbable suture is theoretically the optimal solution, but may in some cases be hindered by the thinness and fragility of the structures, proximity to critical anatomic structures such as the phrenic or pneumogastric nerve or brachial plexus, or anatomic difficulty (short, wide neck). In some cases, insisting on suturing the wound at all costs may worsen the lymph leakage. Over the years, various materials (gelatin, cellulose, fibrinogen, tetracycline powder, biologic glue) have been marketed for closure, used either alone or, more often, in association with a local muscle flap (infrahyoid, sternocleidomastoid) and/or autologous fat graft [2,5–8]. Analyzing the literature, no single product stands out, although biologic glue associated to local muscle flap, as in the present case, seems currently to be the most widespread attitude. Finally, it should be borne in mind that the drain must be carefully positioned away from the operated area, to reduce risk of recurrence of lymph leakage due to direct aspiration of the wound site.

The management of diagnosed lymphorrhea and lymphocele has yet to be codified, and two options are worth discussing. One, non-surgical, attitude comprises bed-rest with the head raised, continued aspiration drainage, external compression of the lower-neck and parenteral feeding with MCT, which are directly absorbed by the portal system, shunting the thoracic canal and thereby reducing local lymph flow [2,6]. Such treatment performed for a few weeks (1 month) may be efficient for low-level lymph leakage (< 100 cc/day) but such is not the case when leakage is more severe. Crumley and Smith [2], for instance, recommended surgical revision in case of leakage exceeding 500 cc/day for 4 days. Likewise, Spiro et al. [6] advocated surgical revision in case of leakage exceeding 600 cc/day. Furthermore, revision should be undertaken before signs of cutaneous involvement appear in the neck region and/or possibly fatal deterioration in general health status sets in due to loss of electrolytes, liquids and proteins. No exact time limit can be determined, but revision surgery should not be too late to prevent granulation tissue and fibrinous coatings making the leakage site and local vascular-nervous structures hard to locate. Locating the leak is made easier by preoperative ingestion of milk or cream [2]. Sealing the leak is not always straightforward: like in peroperatively identified rupture, suturing (which is always difficult in friable tissue) is associated to use of various biomaterials and/or a local fat or muscle flap. In persistent lymphorrhea or recurrent lymphocele, an interval of several months between primary surgery and revision entails elevated risk for adjacent vascular-nervous structures, and certain authors [1,9,10], seeking to avoid the pitfalls and risks associated with transthoracic ligature of the thoracic canal, reported success with a variety of pro-sclerotic agents, either injected transcutaneously (povidone-iodine, picibanil) or applied peroperatively (talc) in the bed of the cavity after removal of the fibrinous coating and argon-laser photocoagulation. Thoracic canal ligature should nevertheless be considered in case of diffuse lymph leakage in the lower-neck region or failure of the above-mentioned local control maneuvers, when leakage is equal to or greater than 1000 mL/day and/or in case of associated chylorthorax [11]. In such cases, thoracic canal ligature via thoracotomy is associated with non-negligible morbidity and mortality, and less traumatic video-endoscopic approaches are now to be considered [11].

Conclusion

Lymphorrhea and lymphocele are rare but potentially very serious complications of cervical lymph-node surgery. Incidence can be reduced by knowledge of lower-neck anatomy, gentle and painstaking dissection of levels IV and VI, and identification and peroperative management of parietal breeches in the thoracic canal or great lymphatic vein. Management, depending primarily on the degree of lymph leakage, may be either medical or surgical.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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References