Case Report

Management of delayed chyle leak after thyroid cancer surgery

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Abstract

Chyle leak from thoracic duct injury after head-and-neck surgery is a rare but serious complication that occurs in 0.5%–1.3% of thyroidectomies and 2%–8% of neck dissections. The variable anatomy and fragile composition of the thoracic duct render it prone to injury. The majority of chyle leak occurs with surgery of the left neck; however, up to 25% of chyle leak occur with right neck surgery. Early identification and appropriate management of chyle leak are imperative for optimal surgical outcome. In this case report, we explain a case of carcinoma thyroid for which total thyroidectomy with left lateral neck dissection was done. Postoperatively, there is continuous drainage of chyle from wound site which was managed by re-exploration and repair of injured thoracic duct.

Keywords: Chyle leak, neck dissection, thoracic duct injury, thyroidectomy

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INTRODUCTION

Chyle fistula is defined as a leakage of lymphatic fluid from the lymphatic vessels. These can be accumulating in the thoracic or abdominal cavities but may also be manifesting as an external fistula. It is a rare but potentially devastating and morbid condition.[1] Chylous fistula was first described in the 17th century as complications of trauma. Chyle fistulas most commonly occur secondary to lymphatic disease or malignancy or following abdominal, neck, or thoracic operations. Chyle fistulas also can from a result of venous hypertension, and they have been described in patients with superior vena cava syndrome or thrombosis of the vena cava.[2] Patients with this condition usually give history of some comorbid conditions like history of any malignancy or prior operations of the chest, neck, or abdomen. In postoperative patients, symptoms become evident after the start of oral feeding and depend on the site of obstruction.[3] Chyle fistulas can cause severe injury to patient in the form of loss of fluids, electrolytes, and other nutrients. In addition, chyle fistulas can result in loss of lymphocytes and immune dysfunction. Finally, chyle fistulas are space-filling and exert pressure on surrounding tissues, creating symptoms that can range from minimal discomfort to life-threatening situations.

Anatomy

The cisterna chyli and thoracic duct drain lymph from the entire body except the head, neck, arms, and right thorax

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which instead use the right bronchomediastinal, jugular, and subclavian lymph trunks to form the right lymph duct. Anatomy of drainage is highly variable. Approximately half of people do not have an identifiable cisterna chyli. In addition, half of the 4 L of lymph draining through the cisterna chyli and thoracic duct originates from the intestinal and hepatic lymphatics. At approximately L1, the cisterna chyli ascends, becoming the thoracic duct. The duct then enters the posterior mediastinum, crosses at T4 into the left retro pleural space, and continues in a cephalad direction. The thoracic duct then enters the venous system at the junction of the left subclavian and internal jugular veins (IJVs).

Pathophysiology

Lymph vessel damage and lymphatic leakage are common after surgery or trauma. However, damaged lymphatics most often heal spontaneously without any significant morbidity. Chyle flow varies dramatically depending on the quantity and quality of oral intake. During times of starvation, chyle flow is minimal. After meals, especially those with high contents of long-chain fatty acids, chyle flow increases dramatically. This basic knowledge provides the rationale for controlling dietary intake as part of the treatment of this disease.[4]

Conservative therapy

Conservative treatment with nutritional intervention remains the mainstay of treatment. It includes the following:

- Use of enteral diets with fat restriction or the use of medium-chain triglycerides; medium-chain triglycerides are absorbed directly from the gut into the portal venous circulation.[5]
- Total parenteral nutrition affords full caloric and nitrogenous support while allowing bowel rest; bowel rest achieves a decrease in chyle flow, allowing healing to occur.
- Transjugular intrahepatic portosystemic shunts have been reported to successfully treat chylous ascites due to cirrhosis.[6]

Surgical therapy

Surgery is reserved for the patients who are not in benefit from conservative treatment. Surgical approaches vary significantly, depending on the site and etiology of the leak. A thoracoscopic surgical approach to the thorax may be tried, provided that adequate expertise is available. Surgical ligation can be successfully achieved when the site of the leak is identified, and the primary pathology causing the leak has not caused disruption or blockage of other lymphatic vessels. If exact location of the disrupted lymphatic vessel is not identified, surgeons may use flaps like muscle flap to cover the area where the leak is occurring. Other forms of therapy to plug the leak have included fibrin glue and the use of chemical irritants such as tetracycline.

CASE REPORT

A 55-year-old male admitted in surgery department with a complaint of left lateral neck swelling in the past 1 month. There was no other lateral or medial neck swelling on presentation. There is no associated pain or any other complaint. There is also no any significant past and family history.

On examination, he has 3 cm × 3 cm swelling in left lateral neck region, nonmobile, firm in consistency not moved on deglutition or protrusion of tongue [Figure 1].

On blood investigation, thyroid function and other blood investigations are within normal range.

On fine-needle aspiration cytology (FNAC), lateral neck swelling was diagnosed as metastatic lymph node with colloid material in it suggestive of lateral aberrant thyroid. On further investigation, primary was found in the left lobe of thyroid which on FNAC diagnosed as papillary carcinoma of thyroid.

On positron emission tomography scan, increased fluorodeoxyglucose uptake was found in thyroid left lobe, central and left II, III, IV, VI level lymph nodes. Right neck lymph node was free from tumor. Diagnosis of papillary carcinoma thyroid with left lateral neck lymph node metastasis was made on the basis of these findings.

Hence, total thyroidectomy and left lateral and central neck dissection were performed. Bilateral recurrent laryngeal

Figure 1: Left lateral neck swelling

nerve and external laryngeal nerve were preserved. Drain was placed *in situ*.

From postoperative day 3, there is continuous drainage of chyle which was gradually increased to around 1–1.5 L per day from 7th postoperative day. Collected fluid was aspirated and sent for biochemical analysis. It shows high amount of triglycerides (1828 mg/dl). Diagnosis of chyle leak was made from these observations [Figure 2].

Hence, re-exploration was done. On re-exploration, injury was found in one high arched tributary of left thoracic duct. Injured tributary was successfully ligated, and leak was stopped. Furthermore, fibrin sealant was spread. Postoperatively, the patient was discharged without any further complication [Figures 3 and 4].

Figure 2: Aspiration of collection which shows milky fluid

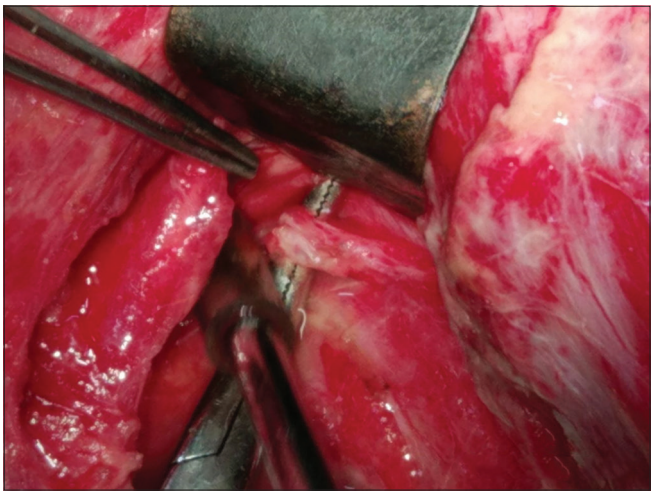

Figure 3: Injured high arched tributary of left thoracic duct

Figure 4: After successfully ligation of injured tributary

DISCUSSION

Thoracic duct is the largest lymphatic vessel that drains up to 75% of the body's lymph from the entire left body and the right side of the body below the diaphragm. Thoracic duct is particularly susceptible to accidental injury during dissection low in the neck. Due to variable course and collapsibility of the thoracic duct and patient fasting in preparation for surgery, identification of the thoracic duct may be difficult and injury can be undiagnosed during surgery.[7] Because of the presence of multiple terminations, the thoracic duct may be identified and ligated at the time of surgery; unidentified terminal branches can still result in a chyle leak.[8] A chyle leak can be diagnosed clinically; however, blood investigation may be helpful for doubtful cases, drain fluid with triglyceride level >100 mg/dL or serum triglyceride or with the presence of chylomicrons confirmatory for the diagnosis of a chyle leak.[9] Suggested criteria for re-exploration range from outputs of >500 mL/day to >1000 mL/day output for 5 days.[9] When identified, the leaking thoracic duct can be ligated, covered with a muscle flap, or treated with any number of sclerosing agents, adhesive agents, or mesh.[10] It is imperative that a suction drain is placed at the conclusion of the case.

CONCLUSION

- The variable course and fragile composition of the thoracic duct make it vulnerable to iatrogenic injury during head-and-neck procedures that involve dissection low in the neck. In certain instances, inadvertent injury to the thoracic duct is unavoidable, particularly with the extirpation of malignancy
- The surgical care team should be vigilant for a chyle leak if the surgery involved dissection in the vicinity of the confluence of the IJV and subclavian vein, on either side of the neck
- There is much debate about the exact criteria for and timing of surgical re-exploration. Muscle flaps,

sclerosing agents, and adhesives can be applied at the time of surgery as an adjunct to thoracic duct ligation.

Declaration of patient consent

I declare that consent has been obtained from patient or subject after full explanation of the purpose and nature of all procedures used. I also declare that approval is not required in our study as patient is not harmed during all procedure.

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Conflicts of interest

There are no conflicts of interest.

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