

CASE REPORT

A novel way of controlling cervical chyle leak post neck dissection by lipiodol lymphangiography, a rare case report with review of literature

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INTRODUCTION

The thoracic duct is the largest lymphatic channel in the body which runs from the superior aspect of the cisterna chyli to the lower cervical spine draining lymph from all left side of the body and the right lower half of the body inferior to the diaphragm into the venous system¹ The thoracic duct typically starts at the second lumbar vertebra from the superior aspect of cisterna chyli, on the right side then crossing to the left side (at T4), ending at the junction of left subclavian and left internal jugular vein with considerable variation in its termination in the neck². The duct is about 45 cm long with a diameter of approximately 2 - 5 mm. Chyle is the fluid transported by the thoracic duct from the cisterna chyli into the venous system. Chyle is rich in chylomicrons, triglycerides, cholesterol, vitamins and albumin in high concentrations (12-14 g/L). Besides, the chyle is rich in lymphocytes, which account for 95% of the cell content, and this keeps the chyle mostly sterile. Electrolytes like sodium, potassium, chloride glucose and other enzyme levels in chyle are similar to that of the plasma^{3,4}. Approximately 2 - 4 litres of chyle is transported through the thoracic duct each day, the production however varies with dietary intake, activity level, respiratory movements, intestinal motility, and intra-abdominal pressure variations.

Due to the unique composition and high daily turnover of chyle, chyle leaks produce significant metabolic and life-threatening complications. Chyle leaks are well-recognized

iatrogenic thoracic duct injuries with serious complications after surgery affecting 1-2.5% of head and neck surgery⁵. It is potentially a life-threatening condition and management may be problematic and prolonged. Due to the paucity of available literature on the management of chyle leaks, no clear guidelines are available regarding the management of this morbid complication. The available treatment strategies like medical management, thoracic duct ligation, thoracic duct embolisation, bypass etc are evidenced by isolated case reports and case series⁶. We report a rare case of high-output chyle fistula following neck dissection for papillary carcinoma thyroid managed by lymphangiography.

Case Report

A 27-year-old non-diabetic, normotensive, euthyroid unmarried female noticed a swelling in her neck which on evaluation proved to be papillary carcinoma thyroid with cervical nodal metastasis. The patient was taken for total thyroidectomy with type III Modified radical neck dissection on the left side and type II modified radical neck dissection on the right side. Post-operatively given the high drain output of more than 1 litre, the patient was referred on 3rd post-operative day to the endocrine surgery division of our department. Chyle leak was confirmed by the nature of

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the drain fluid and markedly raised triglyceride levels in the drain fluid (> 250 mg/dl) and hypocalcemia (6.2 g/dl and 6.8 g/dl). The Patient was stabilised, dyselectrolytemia was corrected, and the patient was put on conservative management with bed rest, modified low fat and fat-free diet, Inj. Oclerotide 100 ug subcutaneously 12 hourly, total parental nutrition (TPN) and monitoring the drain output. The course of the drain output during the hospital stay is shown in Figure 1. The daily drain output did not change much with the conservative strategy and fluctuated between 1.5 and 2.0 litres. So it was decided to take the patient for lymphangiography on the 26th postoperative day using lipiodol. The dye was injected into the inguinal nodes and the lymphatic flow was traced by serial computed tomography scans (CT scans). The scan revealed extravasation of dye in the upper thoracic duct in the lower neck within a localised cervical collection of $30 \times 64 \times 19$ mm anterior to the trachea Figures 2 and 3. Post lipoidal scan lymphangiography, the drain output decreased remarkably over one week to less than 50 mL on the 7th post-scan day/ 33rd postoperatively day. The patient was discharged on the 34th postoperative day in a stable condition with the drain in situ. An ultrasound neck was suggestive of a small 3.7×2.3 cm collection in the neck. On the first follow-up after one week, the patient was stable with minimal drain output (< 10 cc). The drain was removed and the patient had no functional compromise. Later the patient was referred for radioactive Iodine therapy for metastatic papillary carcinoma thyroid.

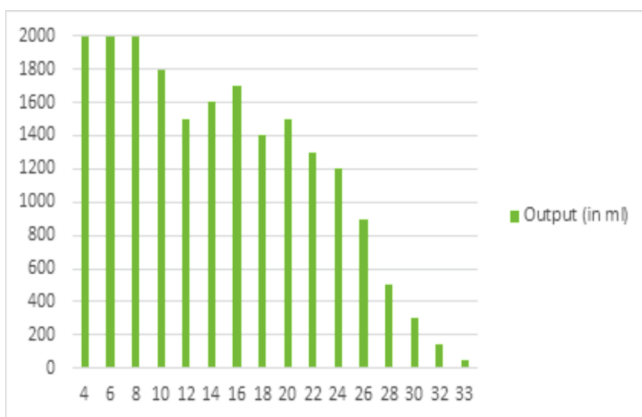


Fig 1: Daily Drain output during hospital admission.



Fig. 2: Opacification of Abdominal Lymphatics on lipiodol scan.

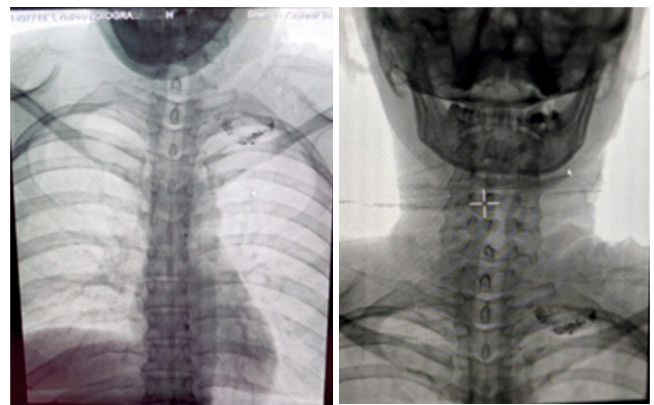


Fig 3: Opacification of Thoracic duct in thoracic cavity (Right) and extravasation of dye in upper thoracic duct in cervical region (Left).

DISCUSSION

The possibility of iatrogenic cervical thoracic duct injuries should be kept in mind in all kinds of neck explorations given the morbidity and protracted healing associated with the possibility of cervical chyle leaks and their adverse impact on the patient's psychological and financial conditions^{7,8}. If identified intraoperatively during the index surgery, simple ligation of the thoracic duct averts all the morbidity without any significant functional compromise⁹ but the chyle leaks identified postoperatively put the surgeon in a dilemma in deciding the ideal treatment

strategy with the best outcome. Literature reveals many reviews and case reports demonstrating variable success rates of different treatment strategies in post-operative chyle leak following neck dissection. Nandy K and colleagues¹⁰ in their experience of managing 52 cervical chyle leaks reported conservative management as a mainstay treatment strategy but regular monitoring of output and patient response and assessment in terms of immunosuppression, nutritional debilitation and impaired wound healing is essential to identify the failure of conservative management at the earliest and initiate surgical ligation to prevent grave complications. Deshmukh R¹¹ in his case report on cervical chyle leak reported the success of the PMMC flap in controlling chyle leak after the failure of all conservative strategies. De Felice, Francesca et al¹² attempted to demonstrate the role of ionizing radiotherapy in controlling cervical leaks. Sean W Delaney and colleagues⁶ in their review of contemporary treatment strategies for cervical chyle leak reported variable success rates of different treatment strategies like nonfat diet, reduced fat diet, or medium-chain fatty acid (MCFA) diet^{13,14}; use of pressure dressings to expedite the closure of chyle leak (CL)^{15,16}; Octreotide as a cost-effective strategy for iatrogenic CL¹⁷; use of sclerosing agents like OK-432 or tetracycline during surgery or postoperatively through drainage tubing or percutaneous injection to seal a CL¹⁸; distal embolization of thoracic duct with coils or tissue adhesive as an effective and less invasive technique for the treatment of CL with a documented 45–70%^{13,19} of success rate and thoracoscopic ligation of thoracic duct proximally near supradiaphragmatic hiatus between aorta and azygous vein²⁰. The search for an effective and safe strategy with the best possible outcome continues in the literature. In our case, we started with a conservative management plan including bed rest, a fat-free diet and somatostatin therapy. Many case reports and case series published in the literature report a nearly 100% success rate with this regimen²¹, though there is much debate regarding the duration of the conservative approach before taking the patient for surgery. While some suggest that an initial conservative approach for at least 5 days fails to reduce the chyle leak, the patient can be considered for surgical exploration²²; others have demonstrated a mean duration of 3.4 to 29 days until the resolution of the chyle leak with conservative management²³. However, because of the poor performance status of our

patient, we did not consider early surgical exploration in our patient as the patient was not fit for general anaesthesia. So, we continued with conservative management for more than 3 weeks but in our case, the conservative regime could not control the chyle leak. We had put the patient on octreotide 100 ug 12 hourly subcutaneous injections. There is also a debate in literature regarding the dosage of octreotide in chyle leaks, most of the dosages used are anecdotal and vary among institutions²³. Due to the failed conservative management and poor performance status of the patient being at high risk for surgery, we decided to take the patient for thoracic duct embolisation with the intervention radiology department of our institute. The literature review supports thoracic duct embolisation as an effective method for controlling chyle leaks with minimal morbidity in cases of failed conservative regimes^{24,25}. However, thoracic duct embolisation was not possible in our patient due to unsuccessful cannulation of the cisterna chyli or thoracic duct. Based on our previous unpublished experience of controlling a low-output cervical chyle leak with a lipiodol lymphatic scan, we decided to go for a similar lipiodol lymphangiography in the reported case to see the response and also locate the site of the leak in the duct. The scan was done by injecting the dye into the inguinal lymph nodes and taking serial CT scans. The leak was traced in the inferior cervical region and also a significant gradual reduction in drain output was noted from 1.2 litres before the scan to < 100 ml on the 6th post-scan day. The patient was later discharged with stable general condition having no functional compromise requiring no further intervention.

CONCLUSION

Based on this report, we think that the possibility of a chyle leak has to be considered in all patients with a high serious drain output after any neck surgery. Besides putting the patient on conservative strategy including dietary modification, TPN, and octreotide therapy. All such patients irrespective of high or low output leaks should be taken for early lymphangiography scans while on conservative management. However, may need further reports to validate the reproducibility of the benefits of early lipoidal lymphangiography scans in reducing chyle leaks.

Conflict of Interest

There is no conflict of interest to present.

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