

Editorial

## Traumatic Chyle Leak In Neck: An Uncommon and Serious Complication

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The lymph from the entire left side of body and right side of body below the diaphragm flows through the thoracic duct. The lymph from rest of the body flows through the right thoracic duct. It also carries chyle from intestines, partially digested long chain fatty acids and chylomicrons. The thoracic duct develops from the fusion of the 2 lymphatic ducts present from the 8<sup>th</sup> week of intrauterine life and fuse before birth. There can be connections between remnants of the 2 lymphatic ducts or branching from the thoracic duct. The thoracic duct originates from cisterna chyli situated at the level of 2<sup>nd</sup> lumbar vertebra, runs between the Aorta and Azygous vein and passes behind the Aortic arch and is situated lateral to the esophagus. At the root of the neck it lies between the common carotid and internal jugular vein anteriorly, inferior belly of omohyoid laterally, scalenius anterior branchial plexus and phrenic nerve posteriorly and esophagus medially. It terminates in the venous system by draining into internal jugular vein or confluence of internal jugular vein and subclavian vein or in few cases into the subclavian vein. Variations are common in anatomy of the thoracic duct.<sup>[1]</sup>

In surgeries of the lower neck, or sharp or penetrating trauma to the lower neck, the thoracic duct or its tributaries or branches are susceptible to injury and the thin wall of the thoracic duct can tear resulting in chyle leak in the neck. In our country about 30% of all malignancies involve the head and neck. Among them the most common malignancy is squamous cell carcinoma. Thyroid malignancies are also relatively common. 80% of the patients with the above mentioned malignancies present with loco-regionally advanced disease requiring neck dissection and adjuvant treatment.<sup>[2]</sup> These patients are particularly susceptible to thoracic duct injury. In literature, 0.5 to 1% of all neck surgeries and 2 to 8% of neck dissections for malignancies can result in chyle leak.<sup>[2]</sup> Patients who have had Neoadjuvant Chemotherapy prior to the neck dissection and patient undergoing salvage neck dissection following radiation failure or recurrence, are more susceptible to chyle leak.

Chyle leak following neck surgery can adversely affect the nutritional status of the patient and wound healing. It results in significant loss of proteins and fats, induces severe inflammatory reaction due to inflammatory cytokines, can macerate

the surrounding structures resulting in flap necrosis and damage to blood vessels. The increased pressure due to accumulation of chyle can cause wound dehiscence, damage to pleura and flap necrosis.<sup>[3]</sup> In addition to delay in healing, it can also delay adjuvant radiotherapy predisposing to recurrence of malignancy in neck.

It is mandatory to identify chyle leak intra-operatively and immediately ligate it. However, minor leaks may be difficult to identify during surgery due to branching of the thoracic duct in neck before draining into the venous system, collapse of the thoracic duct due to overnight fasting before surgery, absence of respiratory effort and movement when patient is under anaesthesia, position of the patient etc. Increasing the intra-thoracic pressure during surgery by surgical Valsalva (positive pressure in ventilation by the anaesthesiologist), Trendelenburg position for the patient or pressure over the abdomen are various manoeuvres which can help identify the chyle leak intra-operatively.<sup>[4]</sup> Majority of the chyle leaks are identified in the post operative period when the patient starts oral or nasogastric tube feeds, due to raising thoracic pressure caused by respiratory movements, fatty diet and build up of hydrostatic pressure in the neck which can macerate the wall of the thoracic duct and pleura.

Post operative chyle leak is seen as whitish or fatty fluid in the drains, collection of chyle under the skin flap causing swelling and inflammation or may present as chylothorax. The diagnosis involves biochemical examination of the drain fluid for chylomicrons, cholesterol or fatty acids and ultrasound or imaging of the neck.

Management of chyle leak depends on various factors like severity and volume of leak, nutritional status and hydration of the patient, local inflammation, immunological status of the patient, the local expertise, duration of the leak and response to initial conservative treatment. Low output leaks (less than 500ml) can usually be treated conservatively. High output leaks (more than 500ml) often require surgical intervention.<sup>[5]</sup>

Conservative management includes bed rest, elevation of head end, stool softeners, no fat diet, low fat diet, diet containing only medium and short chain fatty acids, suction

drain positioned away from the thoracic duct, replacement of fluids, proteins and electrolytes and regular dressing. Most of the above management aims at decreasing the chyle production by avoiding long chain fatty acids and bypassing the intestinal lymph production induced by feeding. They also aim at reducing the intrathoracic pressure. Placement of pressure dressing is controversial as it has the benefit of pressure but the disadvantage of reducing the vascularity of skin flap.

Somatostatin or its longer acting analogue octreotide have been found to be beneficial in controlling chyle leaks. Octreotide administered in a dose of 100 microgram subcutaneous every 8 hours controls chyle leak in 3-5 days by decreasing the gastric intestinal and pancreatic secretions. Pancreatic lipase inhibitors are also beneficial. Sclerosing agents like OK-432, Doxycycline and Tetracycline have been tried locally and can reduce the quantity of leak.<sup>[5]</sup> However, their use is controversial as they can induce severe local inflammation and damage the surrounding neurological structures.

The surgical intervention involves re-exploration and identification of the leak and ligation by under-running a non absorbable suture or liga clips. This is undertaken for high output leaks, failure of 3-5days of conservative management, patient co-morbidities like dehydration, hypovolemia, electrolyte imbalance and risk to adjoining major blood vessels. Placement of a polygalactin mesh (vicryl) at the site of leak, adhesive like fibrin glue or cyano-acrylate may also help sealing the leak. Flaps like rotation of sternal head of sternomastoid or scaleneus anterior or pectoralis major muscle also help in sealing the leak and protecting the neurovascular structures. <sup>[6]</sup>Microvascular free tissue transfer to cover the site of the leak also helps.

Percutaneous transabdominal embolization of the thoracic duct can avoid surgery and control chyle leaks. However, this requires expert interventional radiologist and is not available in all institutions. It may also require repeated attempts. Chyle leaks which cannot be localized on re-exploration of neck may require thoracotomy to localize and ligate the leak.

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