

# The Role of Somatostatin Treatment in the Management of Chylous Fistula after Neck Dissection

## Case Report

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## Abstract

Chylous fistula is a serious complication of neck dissection. The use of somatostatin after neck surgery, has been described in literature. Because of the absence of definitive guidelines, reporting of our experience in three cases may guide the surgeons to overcome this life threatening complication. We describe three cases who underwent neck dissection. While two of them had high output (>1000 mL/day), one had a low output (250 mL/day) chyle leakage, after neck dissection. After it was noticed in earlier days, conservative management was started immediately. While Somatostatin was started after the re-exploration in two, it was started due to the failure of conservative treatment for low output leakage

in one. All of the chyleous fistulas were healed within less than two weeks. We think that somatostatin may be considered as an effective treatment in low output chyle fistulas which the leakage continues after conservative treatment; however in high output chyle fistulas, somatostatin should be used in patients due to lack of control of leakage after ligation of thoracic ductus in revision. Somatostatin treatment was discussed in the light of the current literature.

**Anahtar Kelimeler:** Şilöz fistül, boyun diseksiyonu, somatostatin

## Introduction

Chylous fistula is a serious postoperative complication, the incidence is about 1-2.5% following head-and-neck dissections (1, 2). The potentially large losses of protein and electrolyte-rich fluid due to chylous leakage may cause metabolic imbalances. Locally, chyle leakage causes delayed wound healing, skin flap necrosis and sepsis because of high inflammatory reaction.

In the literature, the initial management of chylous fistula begins with dietary modifications such as low fat diet with medium chain triglycerides or total parental nutrition, repeated drainage and / or pressure dressings (3).

Somatostatin is an inhibitory hormone found throughout the body. In recent studies, somatostatin and its analogues have been described as highly effective drugs in the management of chylous fistula, with very few side effects. The mechanism for somatostatin effect in chylous fistula is not clear. By decreasing portal flow and gastrointestinal secretions, these drugs significantly reduce lymphatic flow through the thoracic duct and also decrease fistula volume (4, 5).

The role of somatostatin in the management of chylous fistula has not been well documented in the literature. Our experience in somatostatin use for three patients with chylous fistula after neck dissection who gave their informed consent for the procedure is presented in this article.

## Case Presentations

### Case 1

A 68 year- old female patient was referred to our clinic with a neck mass on the left side. Magnetic Resonance Imaging (MRI) showed a 4x5 cm neck mass in the lower neck, originating from left thyroid lobe, extending to the infraclavicular area and superior mediastinum. The mass was surrounding the subclavian artery in 270°. A fine needle aspiration biopsy was performed. The cytologic diagnosis was 'papillary thyroid carcinoma'. Computed Tomography of thorax demonstrated multiple metastases in the parancyma of both lungs. Total thyroidectomy and left modified radical neck dissection (Level I-VI) was performed. While the 11<sup>th</sup> cranial nevre and internal jugular vein was sacrificed, sternocleidomastoid muscle was conserved. During the surgery, it was observed that the mass was originating from the left thyroid lobe and infiltrating the deep fasia of neck and deep muscles, also the thoracic duct. The mass was dissected from the thoracic duct and it was ligated by non-absorbable sutures. The positive intraabdominal pressure was applied by the anesthesiologist and there was no leakage fom the oversewed region. A massive bleeding occured during the dissection of the mass through the subclavian artery. The artery was repaired by non-absorbable sutur materials. Then the dissection was carried out succesfully and specimen was removed en bloc. In the first operative day, the drainage from the neck was se-rohaemorrhagic and volume was 120 mL/day. The patient was continued to oral feeding. But in the

second postoperative day, the volume of drainage increased rapidly to 1200 mL/day and the characteristic changed to whitish, milky one. With the diagnosis of chylous fistula we immediately stopped oral feeding, applied pressure dressing on the left side of neck and instituted total parenteral nutrition. The third postoperative day, a re-exploration surgery was done. The thoracic duct and its channels were identified and ligated by non-absorbable sutures. Then there was seen no more leakage, after the intra-abdominal pressure applied. The drainage dramatically decreased to 150 mL/day in the first postoperative day after second surgery. The patient was followed up by non-oral feeding for two days. The volume kept stable and did not decrease by conservative treatment. Somatostatin injections were started on third postoperative day after second surgery with a dosage of 100 µg three times a day, subcutaneously. We noticed that there was an immediate decrease in drainage in the first day of somatostatin treatment. The drain was removed and started oral feeding at the seventh day. Somatostatin was continued two days more and the patient was discharged from hospital at the 9<sup>th</sup> day after the initiation of somatostatin treatment.

### Case 2

A 68 year-old male patient admitted to our clinic with hoarseness for several months. The Ear Nose Throat (ENT) examination revealed left vocal cord paralysis and ipsilateral neck mass in the lower cervical region. The thyroid ultrasonography and MRI showed a 4x4 cm neck mass originating from thyroid gland, surrounding the tracheoesophageal sulcus, invading the posterior tracheal wall and left recurrent laryngeal nerve. The fine needle aspiration biopsy revealed a diagnosis as 'papillary thyroid carcinoma'. Total thyroidectomy and bilateral posterolateral (Level II-VI) neck dissection was performed. The mass was removed en bloc with the neck dissection specimen and posterior tracheal wall was excised. During the dissection of lower cervical region (Level IV), the thoracic duct was identified and ligated. The intra-abdominal pressure was applied and we did not see any leakage from the ligated ductus. In the second day after the surgery, the drainage was increased (250 mL/day) and turned to whitish color. The oral feeding was interrupted immediately. The patient was followed up with non-oral feeding for three days and the drainage stopped. At the second day of initiation oral feeding, the chyle leakage repeated and increased to 250 mL/day. Somatostatin injections of 100 µg subcutaneous every 8 hours were started. After the initiation of somatostatin therapy, the chylous fistula healed within six days. And the patient was discharged from hospital.

### Case 3

A 52 year-old male patient was admitted to our clinic with a diagnosis of nasopharyngeal carcinoma. From the history, it was learned that he took concurrent chemoradiotherapy for T3N2aM0 nasopharyngeal carcinoma. The metastatic lymph node persisted after the treatment and neck dissection was planned. The metastatic lymphadenopathy was in 4 cm diameter and localized in middle and lower cervical region (Level III-IV). A radical neck dissec-

tion was performed. In the second postoperative day, chyle leakage was noticed. Interruption of oral feeding and pressure dressing was applied for four days. The re-exploration surgery was done in the 4<sup>th</sup> postoperative day, because of the increase in the volume of drainage (1500 mL/day). The thoracic duct was identified and over-sewed with non-absorbable sutures. After the second surgery, the volume of drainage decreased to 50 mL/day dramatically. But in the second day after re-exploration the patient had respiratory distress. Nasal oxygen (8 mL/minute) and corticosteroids (250 mg prednisolone intravenously) were started. Chest X-ray showed a left pleural effusion with minimally mediastinal shift. A chest tube was inserted by the cardiovascular surgeons. Somatostatin treatment (100 µg subcutaneous every 8 hours) was started immediately. The drainage from chest tube was 1000 mL/day in the first day, and decreased in the following days. The chest tube was removed in the 12<sup>th</sup> day and the patient was discharged from hospital in the 14<sup>th</sup> day after the initiation of somatostatin treatment.

### Discussion

The lymphatic fluid produced by the whole body particularly passes through two channels: the thoracic duct, draining into the left subclavian vein; the right lymphatic duct, draining into the right innominate vein at the junction of the right subclavian and right internal jugular veins. However, anatomical studies have demonstrated significant variations of thoracic duct within the neck, such as multiple channels, terminations and courses (3).

Lymphatic fluid (chyle) is composed of fats, proteins, chylomicrons, (esterified monoglycerides and fatty acids combined with cholesterol and proteins), electrolytes (sodium, potassium, chloride, calcium) and glucose. Lymphatic production can be between 2 and 4 liters per day. The lymphatic fluid volume is variable by diet, intestinal function, mobility of the patient, respiration and positive intra-abdominal pressure (3).

Injury to the thoracic duct is a rare but serious complication following neck dissections. In neck surgery, during the dissection of level IV, intra-operative damage may occur due to the variable anatomy of the thoracic duct and repair of the duct is always difficult because of its fragile composition. Chylous leakage may lead to prolong the hospital stay, due to primary hypoproteinaemia, hyponatremia, hypokalaemia and hypoproteinemia. Also chyle leak may disrupt the biochemical milieu that helps wound healing. This may cause delayed wound healing, wound infection, wound breakdown, fistula formation and generalised sepsis.

Chylous fistulas are separated into low and high output fistulas in the literature. Although there is no uniform consensus, high output fistulas are generally defined as having a drainage volume more than 500 mL/day (1, 6).

The initial treatment of chylous fistula is traditionally conservative (3). Conservative therapy currently includes the use of a low-fat diet with medium chain triglycerides, or stopping oral feeding. The aim of this management is to decrease the volume of chylous fluid. Also, repeated aspiration and pressure dressings are commonly used in the literature.

Most authors agree that high-output chyle fistulas are likely to fail conservative management (1, 7). The decision of the re-exploration operation is not usually easy, and it is generally recommended in the situation of failure of conservative treatment after 1-2 weeks (8). The amount of drainage is also important. Some authors recommend re-exploration as soon as possible if there is an initially high output leakage (>600 mL/ day) (9). At the second surgery, identifying the leak from thoracic duct is usually not easy. If it is detected, it may be treated with ligation and oversewing of the bed of the thoracic duct with non-absorbable sutures. Care must be taken to avoid damage to the thin-walled duct. Other adjunctive treatments, including pectoralis or sternocleidomastoid muscle coverage, fibrin glue or cyanoacrylate have been described as being successful in literature (3).

Somatostatin is an inhibitory hormone. In hypothalamus, it inhibits the pituitary's secretion of thyroid stimulating hormone and growth hormone. In the gastrointestinal tract, it inhibits vasoactive intestinal peptide, gastrin, and motilin. Secretion of insulin, glucagon, and somatostatin from the pancreas is also decreased by somatostatin. By decreasing portal flow and gastrointestinal secretions, somatostatin significantly reduces lymphatic flow through the thoracic duct and also decrease fistula volume (4, 5). Somatostatin is usually given as a continuous intravenous infusion due to its short half-life (3-6 min). But the longer acting somatostatin analogs (such as octreotide and lanreotide) can be given in subcutaneous injections splitted into three doses over the day. Side effects of somatostatin treatment includes flatulence, loose stools, nausea, and malabsorption (10). Also octreotide may lead to hypoglycemic reactions because of its affect in blood glucose regulatory systems. Checking the blood glucose level every 6 hours has been recommended (11).

In literature, there are only a few case reports about the use of somatostatin in chylous fistula. In these reports, somatostatin has been introduced as a highly effective drug for decreasing the chyle volume with very few side effects (12, 13). In our report, in two of the patients, high output leakage were decreased but not stopped after the re-exploration surgery. The decreased volume of drainage was then followed by total parenteral nutrition for a few days. Then somatostatin was started and we noticed that the volume was decreased significantly within 48 hours and stopped within two weeks. In the third patient, the low output chyle leakage was controlled by somatostatin treatment within six days after the failure of conservative treatment. We did not see any side-effects of the treatment.

## Conclusion

We propose that when there is a high output leakage, a re-exploration surgery is needed. In the situation that the chyle leakage continues after over-sewing the thoracic duct in the second surgery, somatostatin is an effective treatment to overcome the chylous fistula.

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