



# Efficacy of octreotide against chylothorax following lateral neck dissection for thyroid cancer: A case report



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## ABSTRACT

**INTRODUCTION:** Postsurgical chylothorax is a rare complication of cervical dissection for thyroid cancer. We report that octreotide, a synthetic analog of somatostatin, is effective in treating chylothorax after thyroid carcinoma surgery.

**PRESENTATION OF CASE:** The patient was a 48-year-old woman who presented to our institution complaining of a left anterior cervical mass. We diagnosed this as thyroid papillary carcinoma and performed a subtotal excision of the thyroid gland with left cervical lymph node dissection. The patient developed dyspnea, and a chest X-ray revealed bilateral chylothorax on Day 4 post-surgery. Octreotide was administered since bilateral chylothorax was noted. A marked decrease in chyle effusion was noted just 3 days after starting octreotide, and after a total of 9 days of treatment, there were no further signs of chylous effusion.

**DISCUSSION:** Octreotide is effective against postsurgical chylothorax; however, if there are no signs of improvement, we believe surgical treatment should be considered.

**CONCLUSION:** Octreotide should be administered first to treat postsurgical chylothorax before surgical treatment is considered.

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## 1. Introduction

Postsurgical chylous leakage is a rare complication of cervical dissection for thyroid cancer, but even rarer are cases where the chyle effusion accumulates in the thoracic cavity and leads to chylothorax. When this condition persists, the patient can develop electrolyte disorders, malnutrition, and even become immunocompromised. Respiratory complications such as dyspnea can occur, and appropriate treatment should be instituted at an early stage. Chylothorax treatment can involve both conservative and surgical methods. However, the synthetic somatostatin analog, octreotide, is reportedly effective against postsurgical chylothorax and has now become standard treatment. We would like to report our experience with a case where octreotide administration was effective against bilateral chylothorax that occurred after cervical dissection for thyroid carcinoma.

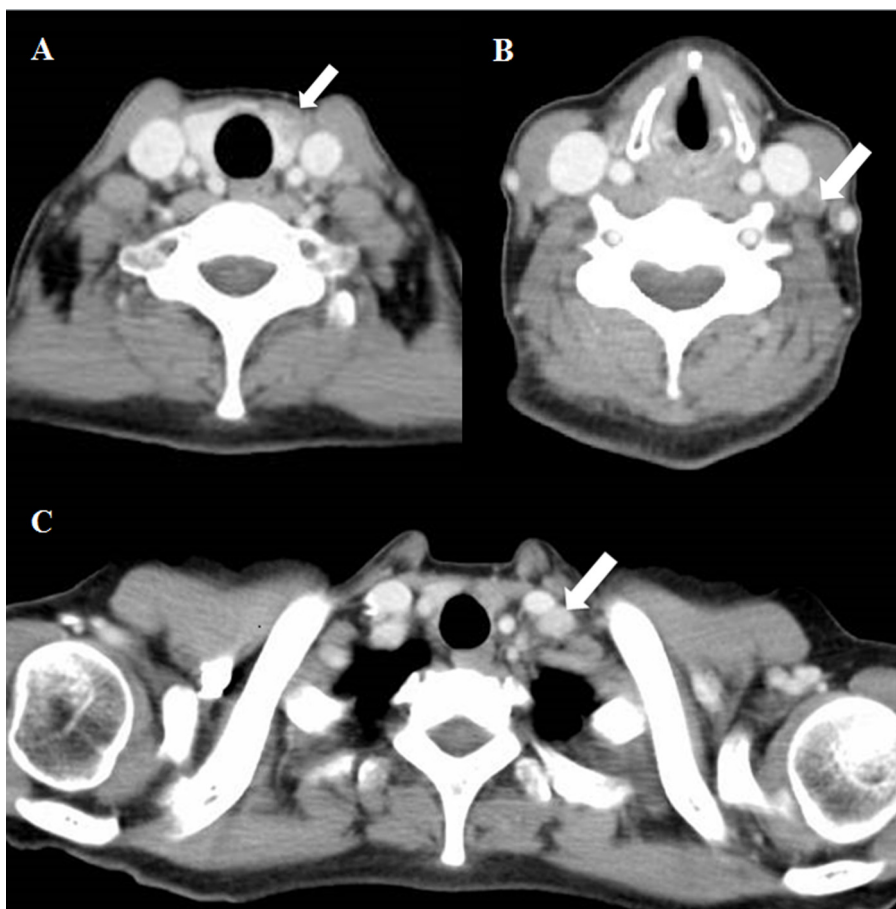
## 2. Presentation of case

The patient was a 48-year-old woman. Past medical history and family medical history were unremarkable. She also had no history of smoking. A hard, immobile 3 cm × 3 cm-sized nodule could be

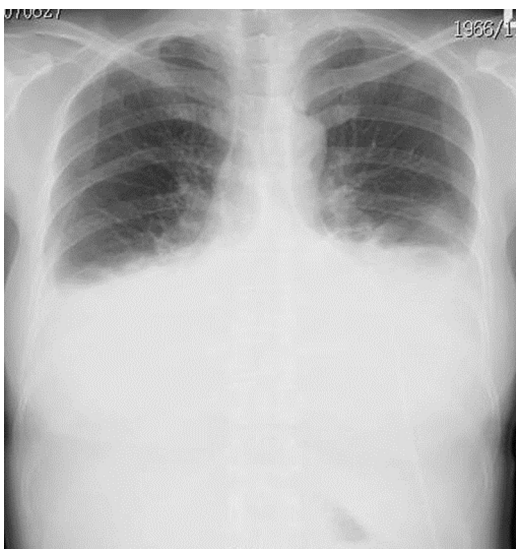
palpated in the left anterior cervical area. The CT showed a 3-cm-sized poorly contrasted region in the left lobe of the thyroid gland with lymphadenopathy of the left supraclavicular lymph nodes (Fig. 1A–C). Needle aspiration cytology diagnosed the mass as a papillary carcinoma. From the above, the patient was diagnosed with papillary thyroid carcinoma where the primary lesion was found in the left lobe of the thyroid, and a subtotal thyroidectomy with central and lateral neck dissection was performed by thyroid cancer specialists. Surgical findings included a 3-cm-diameter mass in the left lobe of the thyroid gland with infiltration into the sternothyroid muscle. Some left deep cervical lymph nodes were swollen with adhesion to the subclavian vein but were not infiltrating into the internal carotid artery, internal jugular vein, or recurrent laryngeal nerve. We performed a subtotal thyroidectomy according to the Japanese guideline [1]. We did not obviously encounter or injure the thoracic duct during the procedure. Histopathologic findings showed a tumor with a 2.8 cm diameter. It was a thyroid papillary carcinoma that infiltrated into the sternothyroid muscle and thymus. We found 4 involved lymph nodes in 22 dissected neck nodes. Metastases to lymph nodes level IV, level Vb, and level VI were noted. On Day 1 post-surgery, drainage from the tube inserted in front of the trachea was 80 mL. There was no drainage effusion and the patient was allowed to start oral alimentation on Day 2. However, she developed dyspnea on Day 4 post-surgery. A chest X-ray revealed bilateral pleural effusions, and when the thoracic cavity was drained bilaterally, a total of 1400 mL of chylous drainage was

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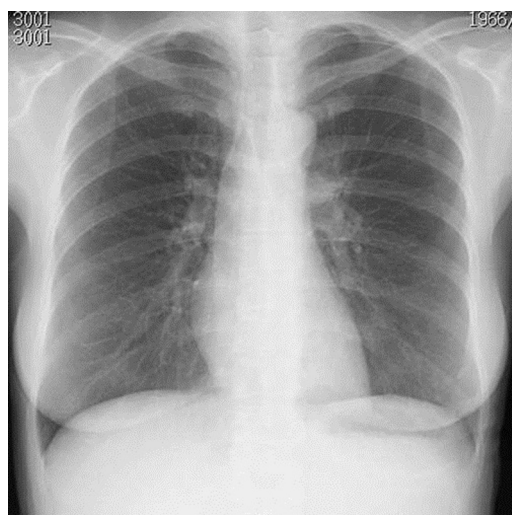
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**Fig 1.** A: Neck CT: a poorly contrasted 3 cm-diameter mass was noted in the left lobe of the thyroid. B: Neck CT: left deep cervical lymphadenopathy was noted. C: Neck CT: left supraclavicular lymphadenopathy was noted.



**Fig. 2.** Chest X-ray: an image from Day 4 post-surgery revealed bilateral chylothorax.



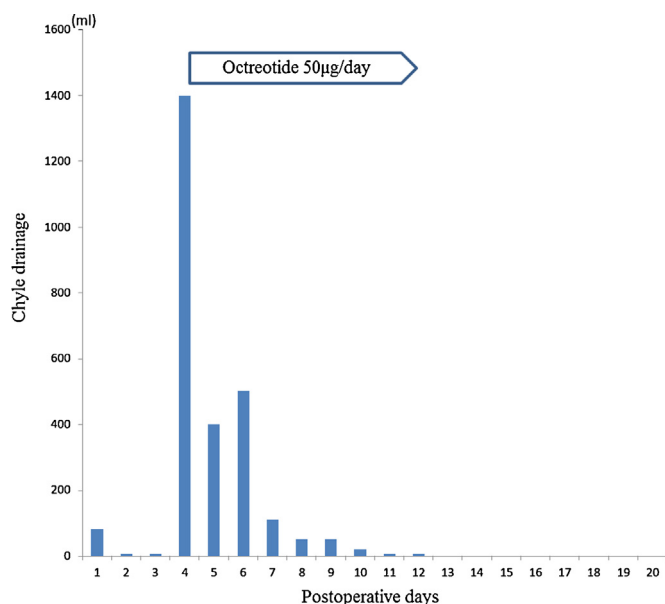
**Fig. 3.** Chest X-ray: an image from Day 15 post-surgery showed no signs of chylothorax.

suctioned off (Fig. 2). The patient was diagnosed with postsurgical chylothorax and placed on a fat-restricted diet and administration of 50 µg/day of octreotide. The day after the drug was started, drainage volume decreased to 110 mL/day on Day 3 of administration, and no effusion was collected at all by Day 9 (Fig. 3). Even

after restarting oral alimentation, chylothorax did not recur, and the patient was discharged on Day 20 post-surgery (Fig. 4).

### 3. Discussion

Chylous leakage is a relatively uncommon complication and is said to occur in about 1–2% of cases after cervical dissection [2].



**Fig. 4.** Changes in daily chyle drainage over time. After administration of octreotide, chylous drainage decreased markedly.

Since only some of the patients suffering chylous leakage will go on to develop chylothorax, the incidence of chylothorax is believed to be even lower than 1–2%.

Patients who present with respiratory symptoms due to a buildup of chylous effusion must first have their thoracic cavity drained. Once the thoracic fluid is drained, the following will occur: the lungs will be able to re-inflate; the respiratory symptoms will be alleviated; the intrathoracic cavity will shrink; and the chylous leakage can be expected to improve as well [3].

There are 2 ways to treat chylothorax: conservative therapy or surgery. Chylous effusion volume is an important criterion when deciding whether to attempt conservative treatment. At drainage volumes of 500 mL/day or less, 50–83% of chylothorax cases have reportedly been cured with conservative treatment [4,5]. On the other hand, in cases where the chyle drainage exceeds 1 L per day, it is highly unlikely that the thoracic duct wound will close with just conservative therapy, and surgery would be indicated in such cases [6,7]. If there is no improvement after continuing conservative therapy for 1–2 weeks or more, surgery should be performed in order to avoid serious malnutrition and sepsis [8,9].

Conservative treatment of chylothorax includes the following: (I) implementing fat-restricted diets or fasting with central venous nutrition, limiting the intake of long-chain triglycerides and implementing dietary treatment to inhibit the production of chyle [3]; (II) instituting pharmacotherapy and administering octreotide, a synthetic somatostatin analog, or etilefrine which stimulates the sympathetic nervous system to inhibit chyle production and limit lymph flow in the thoracic duct by constricting thoracic duct smooth muscle [10]; or (III) performing pleurodesis using tetracycline, minomycin, or OK-432 [11,12].

Surgical treatment consists of: (I) wound retraction or thoracic duct ligation by video-assisted thoracic surgery (VATS) [13,14]; (II) percutaneous thoracic duct cannulation and insertion of an indwelling metal coil for thoracic duct embolization [15]; and (III) in cases where all of these treatments are ineffective, establishing a thoraco-peritoneal shunt [16].

Octreotide is a synthetic somatostatin analog comprising 8 amino acids. It inhibits secretion of various digestive hormones such as glucagon and insulin, and digestive juices such as gastric acid, pancreatic fluid, and bile, and thereby decreases blood flow to

the internal organs which decreases the lymph flow [17]. This drug also constricts smooth muscle via the somatostatin receptors in the lymph duct endothelium and smooth muscles [18]. Octreotide is believed to decrease the thoracic duct flow rate through these mechanisms of action.

Recent papers reported that octreotide is effective against postsurgical chylothorax [19,20]. These reports suggest that chylothorax improvement can be seen as early as 2–3 days after starting octreotide. If there are no signs of improvement after 3 days of treatment, it is highly likely that the drug will not be effective. However, there is no consensus on how to administer this drug for chylothorax. Some reports have suggested a dose of 600 µg/day while others report that chylothorax improved on a 150 µg/day dose regimen [21]; thus, an optimized dosage and administration method should be established in the future. In our case, the patient presented with dyspnea on Day 4 after surgery, and 1400 mL of chylothorax effusion was drained through a thoracic tube. Since there were no signs of chylous drainage from the cervical drain, all of the chyle that leaked from the thoracic duct was believed to have come from chyle contained in the thoracic cavity. A total of 1400 mL of chyle collected in the thoracic cavity during the 4 days from immediately after surgery up to the thoracic cavity drainage. Therefore, the mean daily chyle drainage was 350 mL/day, a level at which conservative treatment is indicated. The patient was therefore placed on a fat-restricted diet and octreotide was administered subcutaneously at a dose of 50 µg/day. The chylothorax improved after 3 days of drug administration, and conservative treatment was continued. By Day 7 after starting octreotide, the drainage had decreased markedly to only 20 mL/day. We were thus able to achieve a cure after only 9 days of octreotide administration. In our case, the dose was 50 µg/day of octreotide. This means we were successful in alleviating the chylothorax with a very low dose compared to the standard dose of octreotide, which ranges from 150 µg/day to 600 µg/day.

#### 4. Conclusion

To treat chylothorax that develops after thyroid papillary carcinoma surgery, the clinician should first attempt to continue conservative treatment, including pharmacotherapy with octreotide. In cases where there is no sign of improvement, it would be reasonable to consider another operation.

#### Conflict of interest

All authors declare that there is no conflict of interest.

#### Sources of funding

No funding is received.

#### Ethical approval

Ethical approval is not needed because this manuscript is not a research study.

#### Consent

Written informed consent was obtained from the patient.

#### Author contributions

Noriaki Hayashibara conceived the design and wrote the paper. Toshihisa Ogawa, Eiichi Tsuji and Kazuo Ishizuna performed the surgery.

**Guarantor**

Noriaki Hayashibara.

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**References**

- [1] H. Takami, Y. Ito, T. Okamoto, A. Yoshida, Therapeutic strategy for differentiated thyroid carcinoma in Japan based on a newly established guideline managed by Japanese Society of Thyroid Surgeons and Japanese Association of Endocrine Surgeons, *World J. Surg.* 35 (2011) 111–121.
- [2] H.H. De Gier, A.J. Balm, P.F. Bruning, Systematic approach to the treatment of chylous leakage after neck dissection, *Head Neck* 18 (1996) 347–351.
- [3] A. Wasmuth-Pietzuch, M. Hansmann, P. Bartmann, A. Heep, Congenital chylothorax: lymphopenia and high risk of neonatal infections, *Acta Paediatr.* 93 (2004) 220–224.
- [4] M.L. Paes, H. Powell, Chylothorax: an update, *Br. J. Hosp. Med.* 51 (1994) 482–490.
- [5] C. Bolger, T.N. Walsh, W.A. Tanner, P. Keeling, T.P. Hennessy, Chylothorax after oesophagectomy, *Br. J. Surg.* 78 (1991) 587–588.
- [6] S. Paul, N.K. Altorki, J.L. Port, B.M. Stiles, P.C. Lee, Surgical management of chylothorax, *Thorac. Cardiovasc. Surg.* 57 (2009) 226–268.
- [7] H. Zabeck, T. Muley, H. Dienemann, H. Hoffmann, Management of chylothorax in adults: when is surgery indicated, *Thorac. Cardiovasc. Surg.* 59 (2011) 243–246.
- [8] K. Shimizu, J. Yoshida, M. Nishimura, K. Takamochi, R. Nakahara, K. Nagai, Treatment strategy for chylothorax after pulmonary resection and lymph node dissection for lung cancer, *J. Thorac. Cardiovasc. Surg.* 124 (2002) 499.
- [9] J.G. Selle, W.H. Snyder 3rd, J.T. Schreiber, Chylothorax: indications for surgery, *Ann. Surg.* 177 (1973) 245–249.
- [10] P. Guillem, I. Papachristos, C. Peillon, J.P. Triboulet, Etilefrine use in the management of postoperative chyle leaks in thoracic surgery, *Interact Cardiovasc. Thorac. Surg.* 3 (2004) 156–160.
- [11] L. Dugue, A. Sauvanet, O. Farges, A. Goharin, J. Le Mee, J. Belghiti, Output of chyle as an indicator of treatment for chylothorax complicating oesophagectomy, *Br. J. Surg.* 85 (1998) 1147–1149.
- [12] F. Maldonado, R. Cartin-Ceba, F.J. Hawkins, J.H. Ryu, Medical and surgical management of chylothorax and associated outcomes, *Am. J. Med. Sci.* 339 (2010) 314–318.
- [13] D.C. Mares, P.N. Mathur, Medical thoracoscopic talc pleurodesis for chylothorax due to lymphoma: a case series, *Chest* 114 (1998) 731–735.
- [14] K.J. Scott, E. Simko, Thoracoscopic management of cervical thoracic duct in-juries: an alternative approach, *Otolaryngol. Head Neck Surg.* 128 (2003) 755–757.
- [15] D.J. Boffa, M.J. Sands, T.W. Rice, S.C. Murthy, D.P. Mason, M.A. Geisinger, et al., A critical evaluation of a percutaneous diagnostic and treatment strategy for chylothorax after thoracic surgery, *Eur. J. Cardiothorac. Surg.* 33 (2008) 435–439.
- [16] A.G. Little, M.H. Kadowaki, M.K. Ferguson, V.M. Staszek, D.B. Skinner, Pleuro-peritoneal shunting: alternative therapy for pleural effusions, *Ann. Surg.* 208 (1988) 443–450.
- [17] C.C. Roehr, A. Jung, H. Proquitté, O. Blankenstein, H. Hammer, K. Lakhoo, Somatostatin or octreotide as treatment options for chylothorax in young children: a systematic review, *Intensive Care Med.* 32 (2006) 650–657.
- [18] G. Torrecillas, J. Medina, M.L. Diez-Marques, Mechanisms involved in the somatostatin-induced contraction of vascular smooth muscle cells, *Peptides* 20 (1999) 929–935.
- [19] T. Fujita, H. Daiko, Efficacy and predictor of octreotide treatment for post-operative chylothorax after thoracic esophagectomy, *World J. Surg.* 38 (2014) 2039–2045.
- [20] A.S. Bryant, D.J. Minnich, B. Wei, R.J. Cerfolio, The incidence and management of postoperative chylothorax after pulmonary resection and thoracic mediastinal lymph node dissection, *Ann. Thorac. Surg.* 98 (2014) 232–237.
- [21] H. Okumura, Y. Uchikado, T. Owaki, M. Matsumoto, T. Setoyama, Y. Kita, et al., Post-esophagectomy chylothorax successfully treated with combination of thoracic duct clipping and octreotide administration, *Esophagus* 9 (2012) 29–32.

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