

# Administration of Octreotide for Management of Postoperative High-Flow Chylothorax

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Chylothorax is a rare complication of adult cardiothoracic surgery that can affect the postoperative course as it can lead to respiratory insufficiency, protein loss, fluid imbalance, and immunodeficiency. We report the case of a 51-year-old man who developed a persistent high-flow chylothorax after replacement of the descending thoracic aorta for an aneurysm. After a week of complete oral intake cessation and total parenteral nutrition, we started administration of octreotide, a somatostatin analog. It led to rapid cessation of chyle production, and the patient was discharged without further complications and chylothorax relapses.

Chylothorax is a rare complication of adult cardiothoracic surgery, occurring in 0.5-2.5% of patients.<sup>1,2</sup> Although not frequent, it can affect the postoperative course as it can lead to respiratory insufficiency, protein loss, fluid imbalance, and immunodeficiency.<sup>3</sup>

The therapy of chylothorax includes pleural drainage, fat-free enteral nutrition, total parenteral nutrition (TPN), and, if pleural effusion persists, pleurodesis or surgery as last steps. Timing of surgery is controversial and depends on several factors, including etiology of chylothorax and patient's overall condition. Chaiyaroj et al.<sup>4</sup> recommended surgery by 1 or 2 weeks if output remains >1,000 mL/day, while other authors indicate immediate reoperation if chest tube drainage is >500 mL during the first 24 hr after complete oral intake cessation and TPN.<sup>5</sup>

We report the case of a patient with high-flow chylothorax treated by conservative means with octreotide, a somatostatin analog.

## CASE REPORT

In January 2005, a 51-year-old white man was admitted to our hospital with the diagnosis of descending thoracic aorta aneurysm (diameter 7.4 mm). Associated diseases included hypertension, mild diabetes mellitus, and severe chronic obstructive pulmonary disease (COPD). He underwent replacement of the descending thoracic aorta with the "quick simple clamping technique" through a left posterolateral thoracotomy.<sup>6</sup> The operation was uncomplicated. No paraplegia was observed. The patient was discharged from the intensive care unit 3 days after surgery. The left pleural chest tubes were removed on postoperative day 4, and the patient resumed a diabetic diet. The hospital stay was uneventful until postoperative day 7, when the patient demonstrated weakness and dyspnea. The vesicular murmur was decreased significantly in the left hemithorax, and a chest X-ray revealed a large pleural effusion. A left thoracentesis was performed, and 1,200 mL of milky fluid were removed. The clinical diagnosis of chyle was then confirmed by pleural fluid analysis for triglyceride content, which was 623 mg/dL.

The patient was initially treated with complete oral intake cessation and TPN. The chest tube drainage decreased to 600-700 mL in 3 days but afterward stabilized at this level for 4 days (mean  $862.9 \pm 214.6$  mL/day in the first week). We delayed surgery in consideration of high operative risks linked to progressive worsening of general conditions and severe COPD. Infusion of 100  $\mu$ g octreotide

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three times per day was started. The chest drainage significantly decreased after 1 day and stopped by the fifth day. The octreotide dose was decreased to 100 µg twice per day, and a diabetic diet was resumed. The treatment was continued for another 5 days and then stopped as no more chyle was drained. No complications related to octreotide were observed. The patient was discharged on postoperative day 26. No complications or chylothorax relapses were observed at 3- and 6-month follow-up.

## DISCUSSION

Postoperative chylothorax is generally secondary to injuries on the thoracic duct or its collateral channels. The thoracic duct lies posterior to the aorta, coursing to the right of the spine. It usually crosses to the left at the fifth thoracic vertebra, ascends into the neck posterior to the aortic arch, and empties into the left jugulosubclavian junction.<sup>1</sup> It has a highly variable course. Variations in the normal anatomy include a right lymph duct and a persistent left lymph duct. Surgery of the esophagus, pulmonary resection, and replacement of descending thoracic aorta can cause damage on the thoracic duct or collateral channels.

The management of secondary chylothorax is still a challenge for physicians, and the choice of therapy is still debated. The first step is generally conservative management by fat-free enteral nutrition or TPN, associated to chest drainage. It entails a reduction of the production of chyle, but it is claimed to be associated with a high rate of failure and to require a long hospitalization with subsequent increasing costs and worsening of the patient's condition. For these reasons, some authors advocate early surgical treatment to repair the damage of the thoracic duct or its branches, in particular in case of high-flow leaks.<sup>7,8</sup> Recently, the use of video-assisted thoracoscopic surgery (VATS) has gained popularity in the treatment of chylothorax because of its manageability and low comorbidities.<sup>9</sup> Fahimi et al.<sup>7</sup> consider the use of VATS for postoperative chylothorax when daily leakage exceeds 200 mL after 2 weeks of conservative therapy and an earlier intervention in case of high-flow leaks. However, VATS needs a learning curve. Moreover, it can be difficult and entail risk after surgery of the descending aorta with thoracotomy access as it could be hard to identify damage to the lymphatic system. Embolization with coils and the glue and needle disruption technique showed good results.<sup>10</sup> Even these percutaneous techniques require a learning curve and can lead to complications. The choice between medical and surgical approaches is controversial and depends on several factors, not only on the amount of chylous drainage. In our case, the patient's comorbidities and

general condition led us to delay surgery and to start continuous infusion of octreotide, an analog of somatostatin. The native peptide somatostatin is widely distributed in the central nervous system and peripheral tissues.<sup>11</sup> It has diverse physiological actions, including a role as a central nervous system neurotransmitter and neuromodulator, a regulatory hormone in the gastrointestinal tract and pancreas, and an inhibitor of growth hormone and thyroid-stimulating hormone release in the pituitary gland. Somatostatin and its analog octreotide act by both endocrine and paracrine pathways to affect their targets. They reduce chyle production, inhibiting pancreatic secretion and gastrointestinal secretion, decreasing hepatic venous pressure, and reducing splanchnic blood flow.<sup>12</sup> They can enhance the effect of the cessation of oral intake. It is presumed that they work even through vasoconstriction of the lymphatic vessels, but the mechanisms of action are not fully understood.<sup>3</sup>

The use of somatostatin and octreotide for the management of chylothorax was first described by Ulibarri et al.<sup>13</sup> In the last decade, their role in the treatment of chylothorax has been growing in children and newborns as primary and postsurgical chylothorax increases mortality and morbidity.<sup>3,14-17</sup> Results are encouraging in all reports, and somatostatin is claimed to be a valuable therapy for chylothorax in children with only few, easily treatable side effects.<sup>3</sup> Few reports exist in the literature about the treatment of postoperative chylothorax in adults with somatostatin, and in all cases, somatostatin is indicated for small chylous drainages that did not stop with the cessation of oral intake and TPN. In our case, somatostatin was effective at treating high-flow chylothorax without complications, confirming data on children.<sup>3</sup> Our case demonstrates that it can be used even with abundant chylothorax in adults (chest tube drainage >800 mL daily), permitting avoidance of surgery in patients with high operative risks or a poor general condition. Although larger studies are necessary, the rapid response and the absence of complications in all the reports should indicate the use of somatostatin in the conservative management of chylothorax after TPN failure and before considering surgery.

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