# CASE REPORTS

# Somatostatin treatment of a persistent chyloperitoneum following abdominal aortic surgery

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**Chyloperitoneum is an uncommon but serious complication of abdominal aortic surgery. There are no optimal guidelines for the management of chyloperitoneum. We present here our experiences regarding the treatment of chyloperitoneum with somatostatin for three patients who underwent surgery for abdominal aortic disease. Milky, odorless liquid was observed in the abdominal drain of these patients. The conservative treatment with total parenteral nutrition failed; therefore, in parallel, we initiated a somatostatin treatment as a continuous perfusion. Drain loss decreased in all up to the second day of treatment. The probable mechanisms of the somatostatin decrease the intestinal absorption of fats via the specific receptors, decrease triglyceride concentration in the thoracic duct, and attenuate lymph flow in the major lymphatic channels. The presented cases showed successful treatment using somatostatin and may be a new generation of effective treatments for chyloperitoneum. (J Vasc Surg 2012;56:1409-12.)**

Chyloperitoneum (chylous ascites) is a rare complication of abdominal and thoracic surgery.[1,2] It is defined as the accumulation of chylomicron-rich lymphatic milky effusions in the abdominal cavity. Chyloperitoneum after aortic surgery is the result of the disruption of the lymphatic system that occurs between the cistern chili (the cisterna chyli[3] is found on the posterolateral edge to the right of the aorta) and the adjacent major lymphatic trunks in the abdominal cavity because of traumatic injury or obstruction.[4] The previously reported mortality from chyloperitoneum after abdominal aortic surgery is 11% to 18%. The main reason for death is sepsis, pulmonary embolism, and malnutrition.[5] Rapid diagnosis of the effusion is the most important part of management. The consequence of delay induces critical losses of fluid, lymph, lymphocytes, proteins, coagulation factors, and immune deficiencies, which increase the prevalence of morbidity and mortality.[6,7]

Chyloperitoneum has been defined by mean white blood cell counts >5000/mL. Chyloperitoneum is significantly constituted by triglyceride (TG) concentration >1.24 mmol/L, high albumin (30 g/L), high numbers of immunoglobulin molecules, and high numbers of lymphocytes.[7] The TG level is an important diagnostic tool, and the concentration must be two to eight times higher in chyloperitoneum fluid than in plasma.[8]

There is no consensus regarding the optimal treatment of chyloperitoneum. Conservative treatments such as low-fat diets containing medium-chain TG molecules or total parenteral nutrition (TPN) have shown slow effects without assurance of cure.[9,10] This study focuses on three patients who postoperatively developed chyloperitoneum and who showed good responses to somatostatin therapy.

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**Case 1.** An 83-year-old female underwent surgery for an aneurysm in the abdominal aorta performed by midline transabdominal approach. An aorto-aortic bypass was undertaken with a Dacron graft, and an abdominal passive drain (Blake-type drains; Ethicon, San Angelo, Tex) was placed on the left retroperitoneal dissected space. A significant volume of milky effusion was observed through the abdominal drain over the following days (>400 mL/d) despite continued TPN, but without success. Microscopic and biochemical analyses of this drain fluid revealed TG >8.7 mmol/L; high levels of albumin and a predominance of lymphocytes (87%) established the diagnosis. In the presence of increasing drain losses under conservative treatment (TPN), we administered somatostatin as a continuous perfusion[11] up to 9 days after surgery, and thereafter followed the somatostatin protocol described below.

**Case 2.** A 68-year-old male underwent an aortobifemoral bypass performed by midline transabdominal approach. Abdominal passive drain (Blake Silicone; Ethicon) was placed on the left retroperitoneal dissected space. Postoperatively, the drainage (bloody/milky) increased over the few days to >250 mL/24 h. Analyses of this drain fluid revealed a TG >6.1 mmol/L, high

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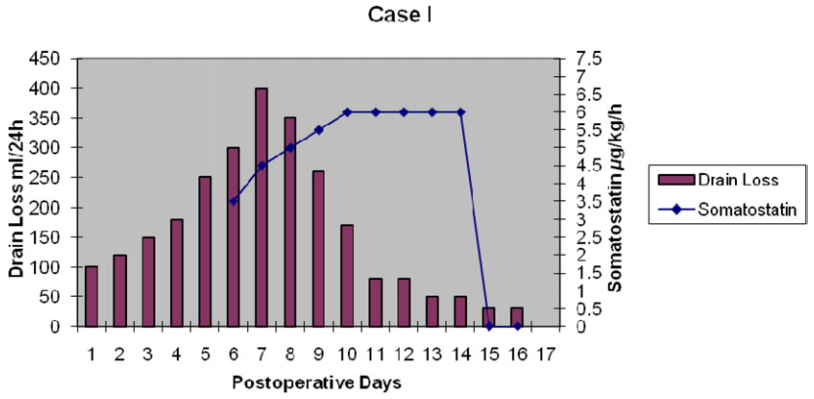


**Fig 1.** Volume of chylous effusion drained (mL/d) in relation to the somatostatin therapy (µg/kg/h) in case 1.

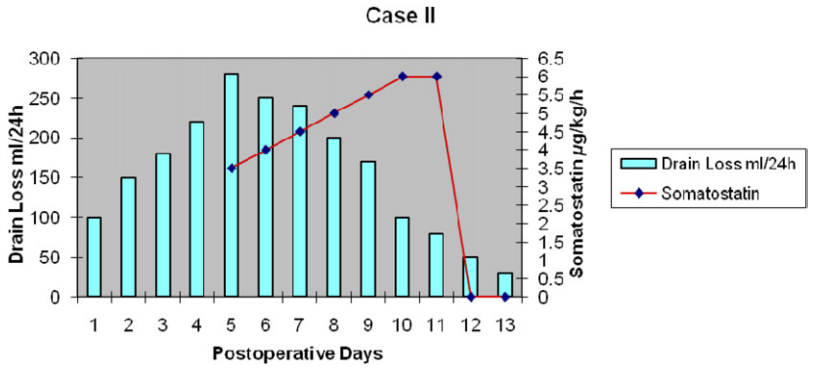


**Fig 2.** Volume of chylous effusion drained (mL/d) in relation to the somatostatin therapy (µg/kg/h) in case 2.

levels of albumin, and lymphocytes up to 60%; the diagnosis of chyloperitoneum was confirmed. The patient was under TPN, but without success, and drainage loss continued in significant quantities. We started somatostatin therapy as a continuous perfusion up to 5 days after surgery.[11]

**Case 3.** An 18-year-old male underwent surgery for coarctation of the thoracoabdominal area by lateral thoracotomy and midline transabdominal approach. Replacement of the thoracoabdomen was undertaken with a Dacron prosthesis. Passive drains were placed on the left pleura and left retroperitoneal dissected space (Blake Silicone). The pleural drain could be removed after 2 days, but the peritoneal drain showed a milky loss of >250 mL/d on the third postoperative day. Although the patient was under TPN, but without success, the drain loss decreased to 400 mL/24 h on the fifth postoperative day. Analyses of this drain fluid revealed a TG level >4.3 mmol/L, high levels of albumin, and a predominance of lymphocytes (68%), thereby establishing the diagnosis of chyloperitoneum. On the same day, somatostatin was administered as a continuous perfusion.[11]

**Protocol of somatostatin treatment.** Somatostatin (3.5 µg/kg/h) was administered as a continuous perfusion on the first day of treatment. The somatostatin dosage was increased to 0.5 µg/kg/h per day after 24 hours if no side effects were manifested, until the drain loss decreased to <100 mL/d. Somatostatin treatment was terminated for ≥24 hours before removing the peritoneal drain. During the somatostatin treatment, we continued in all cases the TPN. At the end of the somatostatin treatment, we decreased the TPN, and the patients started slowly with an oral fat-free diet for the long term (4 weeks).

## DISCUSSION

The mean number of days after surgery at which somatostatin therapy was started in our cases was 6.3 days (range, 5-9 days). The three patients were under TPN for a mean of 5.3 days (range, 5-6 days) without successful resolution of chyloperitoneum. The minimum dosage of somatostatin at treatment commencement was 3.5 µg/kg/h. The maximum dosage of somatostatin at treatment termination was 6.0 µg/kg/h (Figs 1-3). The mean duration of somatostatin treatment was 6.6 days (range, 6-7 days). The mean somatostatin dose was ±7.5 µg/kg/h. With increasing of somatostatin dosage, the drain loss decreased in all cases (150-200 mL/24 h) up to the second day of treatment (Figs 1-3). The retroperitoneal drain could be removed after a mean of 14 days postoperatively (range, 12-17 days) when the drain loss was <50 mL/24 h. The mean total stay in hospital was 19 days (range, 14-23 days). No side effects were observed during somatostatin treatment. At the 4-week, 3-month, and 6-month follow-

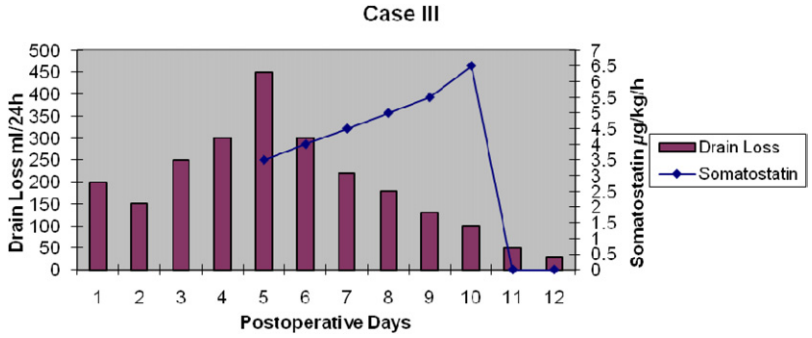


**Fig 3.** Volume of chylous effusion drained (mL/d) in relation to the somatostatin therapy (μg/kg/h) in case 3.

ups, the patients underwent computed tomography imaging of the abdomen, which showed no chyloperitoneum residue.

Chylous effusions must be differentiated from pus, ascites, and pseudochylous.[12] Pseudochylous is a milky effusion that mimics chyle, associated with decreased lipid-cholesterol or lecithin-globulin complexes, seen in tuberculosis, chronic pulmonary effusions, rheumatoid arthritis, or empyema.[13]

The first post-traumatic chyloperitoneum was described by Goldmann 1921.[14] Only 38 cases showing the development of chyloperitoneum after aortic abdominal surgery have been reported. Initial treatment with diuretics and TPN followed by low-fat diets containing medium-chain TG molecules is known.[15] In 1990, Ulibarri et al were the first to successfully treat chylothorax with somatostatin.[16] In 2009, Lumbreras et al reported that somatostatin showed a positive response in 73% of patients compared with 43% of patients with fat-free diets or diets rich in medium-chain TG molecules.[17-20] The mechanism by which somatostatin and its analog octreotide stop chylous effusions is not fully understood. The decrease of intestinal absorption of fats via specific receptors reduces triglyceride concentration in the thoracic duct and attenuates lymph flow in the major lymphatic channels.[21] It may be related to the inhibitory effects of somatostatin on lymphatic duct movement, and it also decreases the portal pressure and visceral blood flow.[22]

Side effects may include increased blood glucose, diarrhea, dizziness, gastrointestinal bleeding, hepatotoxicity, thrombocytopenia, respiratory failure, and disturbance of cardiac rhythm. Similarly, treatment with the somatostatin analog octreotide has been reported to show good results.[23-26]

If all conservative and pharmacologic treatments fail, the surgical procedure is to close lymphatic fistulae. The surgical application of a peritoneovenous shunt (LeVeen shunt)[27] was also reported; however, these types of interventions appear to have a high prevalence of complications, mortality, and morbidity.[27-30]

## CONCLUSIONS

There are no evidence-based guidelines for the management of chyloperitoneum. Somatostatin may be a new generation of effective treatments for chyloperitoneum to avoid long-term dietary restrictions, high-risk surgery, and prolonged hospitalization. Surgical ligation of the injured lymphatic channel should be performed only if conservative therapy with TPN, fat-free, medium-chain TG diets, and somatostatin treatment has failed in the first postoperative period.

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