

Two cases of postoperative chylothorax treated with parenteral octreotide and conservative therapy

Department of Pediatrics, Thoracic and Cardiovascular Surgery*
Catholic University of Daegu School of Medicine, Daegu, Korea

Eun Jin Choi, M.D., Sub Lee, M.D.*

Chylothorax is a rare complication following cardiac surgery for congenital heart diseases. Although conservative management is successful in the majority of cases, surgical intervention is required in a refractory one. Recently, subcutaneous or intravenous infusion of octreotide has been used as a safe treatment that helps avoiding surgical intervention. Herein, we report two cases of postoperative chylothorax treated with parenteral octreotide and conservative therapy. (*Korean J Pediatr* 2007; 50:298-301)

Key Words: Chylothorax, Postoperative Complications, Octreotide, Parenteral

Introduction

Chylothorax is a rare complication following cardiac surgery for congenital heart disease. It leads to fluid and electrolyte disturbances, protein-calorie malnutrition, coagulopathy, and increased susceptibility to infection¹⁾. Although conservative management is successful in the majority of cases, surgical intervention is required in a refractory one. Recently, several acceptable, foreign case reports revealed that subcutaneous or intravenous infusion of octreotide, along with conventional therapy, is advantageous²⁻⁹⁾. Herein, we report two cases of postoperative chylothorax treated with parenteral octreotide and conservative therapy.

Case Report

Case 1

An 11-month-old girl with a secundum atrial septal defect and valvular pulmonary stenosis underwent cardiac surgery for patch closure of the atrial septal defect and a pulmonary valve commissurotomy. The patient's general and hemodynamic condition was stable after surgery. On postoperative day 1, enteral feeding with normal milk for-

mula was permitted. On postoperative day 2, immediately after removal of the chest tube, chest x-ray showed pneumothorax on the left lung field. The chest tube was inserted and milk colored fluid was drained. The formula for feeding was changed to medium chain triglyceride (MCT) enriched milk and the drained output was decreased in 3 days. However, one day after the second trial of normal formula milk feeding, chyle was again drained from the chest tube. On biochemical analysis of the pleural fluid, triglyceride concentration was 361 mg/dL and the cells were mostly lymphocytes (>90%). Chylothorax was diagnosed. MCT enriched milk feeding was restarted and

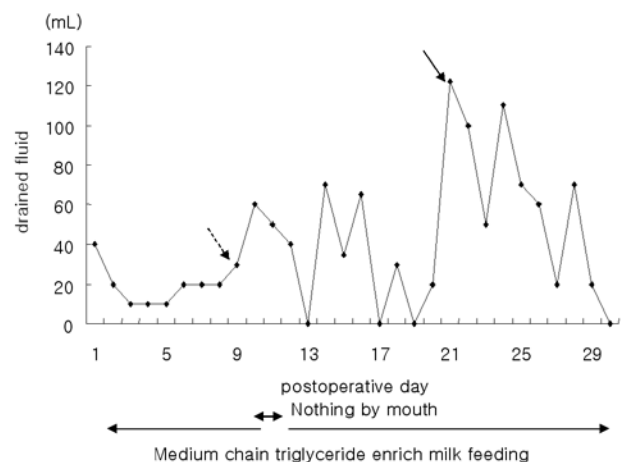


Fig. 1. Subcutaneous octreotide was administered at a dose of 10 μ g/kg/day in 3 divided doses since postoperative day 9 (dotted arrow). After postoperative day 21, continuous infusion of octreotide was administered (arrow).

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책임저자 : 최은진, 대구가톨릭대학교 의과대학 소아과학교실

Correspondence : Eun Jin Choi, M.D.

Tel : (053)650-4248 Fax : (053)622-4240

E-mail : ejchoi2@cu.ac.kr

subcutaneous octreotide (Sandostatin, Novartis, Stein, Switzerland) was administrated at a dose of 10 $\mu\text{g}/\text{kg}/\text{day}$ in 3 divided doses. Despite treatment with octreotide and MCT enriched milk feeding, chest tube output increased. Enteral feeding was replaced by total parenteral nutrition. Two days of nothing by mouth caused the tube output to decrease and MCT enriched milk feeding was restarted. Since chyle output gradually increased, we increased the dosage of subcutaneous octreotide and then changed to a continuous intravenous infusion at a dose of 1 $\mu\text{g}/\text{kg}/\text{hr}$. Total suppression was achieved with a dose of 3.5 $\mu\text{g}/\text{kg}/\text{hr}$. During the infusion of octreotide, the level of triglycerides in the drained fluid dramatically decreased compared to serum levels (Fig. 2). Weaning of continuous octreotide infusion commenced 4 days after insignificant chyle output (<10 mL/day). Octreotide was withdrawn over 2 days without recurrence of chylothorax with normal formula milk feeding. There were two episodes of fever during the treatment of the chylothorax. One was associated with pneumonia from postoperative day 7 to 12 and the other with coagulase negative staphylococcal sepsis from postoperative day 35 to 38. Both episodes resolved with appropriate antibiotic therapy and left no significant complications. The patient was discharged on normal milk formula feeding at 7 weeks after surgery. When the patient was followed up in the outpatient department, 10 days after discharge, she was symptom-free and her parents reported no history of dyspnea or fever.

Case 2

A 7-month-old boy underwent cardiac surgery for patch closure of a secundum atrial septal defect. The baby's general condition was stable after the operation. On postoperative day 1, enteral feeding with normal milk formula was permitted. Milky fluid was drained via the left-sided chest tube on postoperative day 2. The fluid was determined to be chyle by biochemical analysis and high levels of triglycerides (860 mg/dL) and lymphocytes (>80% of cells) were found. Restricting oral intake, total parenteral nutrition was started with the use of subcutaneous octreotide at a dose of 20 $\mu\text{g}/\text{kg}/\text{day}$ in 2 divided doses. On the second day of treatment, chyle output was increased. Therefore, we changed to a continuous infusion of octreotide at a dose of 1 $\mu\text{g}/\text{kg}/\text{hr}$. The dosage of infusion was increased gradually as the chyle drainage continued. Total suppression was achieved with a dose of 3 $\mu\text{g}/\text{kg}/\text{hr}$. Enteral feeding with MCT enriched milk was started when the drainage decreased to less than 20 mL/day. The continuous infusion was given for 16 days. Three days after cessation of the continuous infusion of octreotide, normal milk formula feeding was started and we watched carefully for signs of effusion on chest radiograph (Fig. 3). No clinical or laboratory abnormalities were noted. The patient was discharged on normal milk formula feeding at 26 days after surgery. The patient was followed in the outpatient department 1 week after discharge with no evidence of

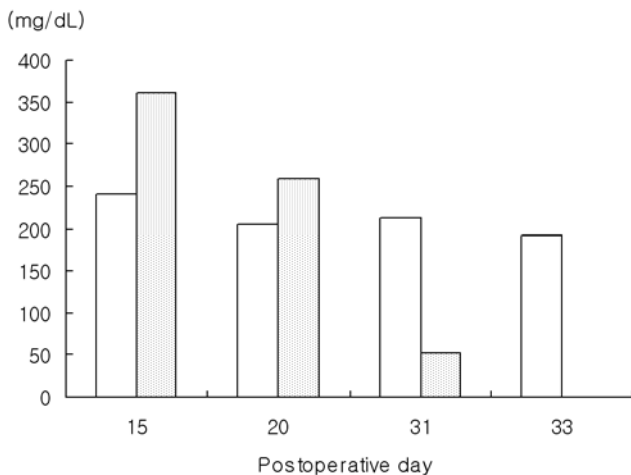


Fig. 2. The level of triglyceride (TG) in drained fluid dramatically decreased as compared to serum TG level.
 □ Serum TG, ■ Fluid TG



Fig. 3. Three days after cessation of the continuous infusion of octreotide, normal milk formula feeding was started and the patient was watched carefully for signs of effusion on chest radiograph.

recurrence of the chylothorax.

Discussion

A chylothorax is the accumulation of lymph fluid or chyle in the pleural space. In pediatric patients, chylothoraces may be either acquired or congenital, the latter of which is probably a result of in utero thoracic duct obstruction. Postoperative chylothorax occurs in 0.9% to 3.8 % of pediatric patients following cardiac surgery^{1, 10, 11}. The etiology of chylothorax in children following surgery for a congenital heart defect is considered to be direct injury to the main thoracic duct, injury to the variable lymphatic pathways and accessory lymphatic channels during operative approaches, or disruption of microscopic lymphatic channels concomitant with some degree of lymphatic hypertension or significant right heart dysfunction¹.

In case 1, the patient had two episodes of infection with chylothorax without any finding of other immunological abnormalities in laboratory analysis. Appropriate antibiotic therapy was administered as an important conservative treatment for the febrile episode in both patients.

Conservative treatment of a chylothorax includes chest tube drainage, use of medium chain triglyceride (MCT) oil, a low-fat enteral diets, parenteral nutrition, and somatostatin¹⁻⁹. In our cases, MCT enriched milk feeding and chest tube drainage were tried first. Since there was no decrease of chylous drainage, enteral feeding was replaced by total parenteral nutrition and octreotide, a long-acting synthetic analogue of somatostatin. Somatostatin may act directly on vascular somatostatin receptors to reduce lymph fluid excretion. Lymph flow in the thoracic duct mainly depends on the state of splanchnic circulation and gastrointestinal motility¹². Somatostatin has been shown to reduce splanchnic, hepatic, and portal blood flow and to inhibit intestinal motility¹³. Indirect effects on the hemodynamics of splanchnic circulation and intestinal motility may thus have a role in reducing lymph flow. Apart from reducing chyle output, octreotide reduced the ratio of triglyceride concentration in the lymph to that in the serum. We observed that the serum concentration of triglycerides remained relatively stable in case 1 throughout the study period and that the reduction was related mainly to a decrease in triglyceride content in the chyle. Cheung et al.⁵ have also reported similar findings. In our cases, octreotide was administered subcutaneously in 2 to 3 divided doses

or infused continuously after 1 or 2 days of failed conservative treatment. One of the advantages of using octreotide is a decrease in the period of nothing by mouth. Nothing by mouth is a quite effective regimen for patients with chylothorax, but practically, it is hard to endure for pediatric patients, especially infants. We could not explain why the continuous infusion showed more effective, but assumed that the continuous action of octreotide to the splanchnic circulation and intestinal motility contributed to the effectiveness when oral feedings were permitted. Rosti et al.⁹ studied 8 cases of the octreotide in the management of chylothorax, they also treated with the continuous infusion and octreotide infusion was gradually tapered and stopped after 12.8±5.1 days (range, 5-22). During treatment, oral feedings were not stopped either. Peitersen and Jakobsen¹⁴ have demonstrated a substantial increase in triglyceride and chylomicron content of the pleural fluid after MCT oil has been given for the treatment of spontaneous neonatal chylothorax. We experienced an effective reduction of the triglyceride concentration in the lymph by octreotide infusion despite continuation of an MCT diet. Adverse effects of octreotide are hypotension, hypoglycemia, hyperglycemia, hypothyroidism, liver dysfunction, and abdominal distension^{2, 8, 9}. In our cases, there were no significant side effects but there were mild increases in loose stool frequency in both cases.

In conclusion, octreotide infusion combined with conventional conservative therapy to treat postoperative chylothorax seems to be safe and helpful to avoid surgical intervention and may potentially reduce the expense incurred and morbidity associated with a prolonged hospital stay.

한글 요약

보존요법과 함께 octreotide 주입을 이용한 수술후 유미흉 치험 2례

대구가톨릭대학교 의과대학 소아과학교실, 흉부외과학교실*

최은진 · 이 섭*

선천성 심장병의 수술후 발생하는 유미흉은 드문 합병증이다. 이는 수분, 전해질 및 영양의 불균형을 초래할 뿐만 아니라 감염에 취약함을 보이기도 한다. 지금까지의 보존요법에 대해 비교적 치료성적이 좋으나 치료에 반응하지 않는 경우에는 수술적 중재가 불가피하다. 저자들은 보존요법과 octreotide 주입을 병행하여 수술적 중재를 피하고 효과적으로 치료한 수술후 발생한 유미흉 2례를 보고하는 바이다.

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