Use of Octreotide in the Treatment of Chylothorax and Chyloperitoneum

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Report of three cases of chylothorax and one case of chylous ascites in children who had undergone cardiac surgery with no response to routine clinical treatment, based on fasting and long-term parenteral nutrition. Treatment with octreotide at an initial dose of 1.0 mcg/kg/h was chosen, with a gradual increase of 1.0 mcg/kg/hr/day until a maximum dose of 4.0 mcg/kg/h. All cases had a favorable response, with gradual reduction of drainage output until prognosis improvement with no significant side effects.

Introduction

Chylothorax is the accumulation of chylomicron-rich lymph fluid in the pleural cavity due to obstruction and difficulty in the lymph flow, as occurs in lymphatic malformations, increased pressure or laceration of the thoracic duct, in which cancer, trauma, infection and venous thrombosis are the most common causes.

This type of injury has been described mainly in surgical procedures performed in the narrow upper left chest and in diagnostic procedures such as translumbar angiography and central venous catheterization in jugular veins or left subclavian veins[1].

It consists of a rare complication in the postoperative period of cardiac surgery, with an incidence of around 0.5% to 2%[2-4], which increases morbidity and mortality of the procedure, extending the length of hospitalization.

There are also controversies in the treatment of chylothorax. Conservative treatment consists of pleural drainage and lipid-free diet with medium chain triglycerides, or fasting and long-term parenteral nutrition. The surgical approach is usually reserved for failure of conservative treatment for two weeks. Similarly, chyloperitoneum or chylous ascites is the accumulation of lymph nodes produced in the small intestine by absorption of products of fat digestion in the peritoneal cavity. Most cases have congenital or idiopathic causes, and 10% are of traumatic cause.

Recently, octreotide (a synthetic analogue of somatostatin) has been used in the conservative treatment of chylothorax, even with little experience in world literature.

We report three cases of use of octreotide in the treatment of chylothorax and chylous ascites, all in post-cardiac surgery.

keywords

Chylothorax / therapy; octreotide; chilous Ascites / therapy; thoracic surgery / complications; child.

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Case Report

Case 1

S.N., one day old, male, brown, with a diagnosis of transposition of great arteries, atrial septal defect and patent ductus arteriosus. On the second day of life, he underwent an atrial septostomy with a balloon catheter and, at 11 days of life, the Jatene procedure. On the 9th day after the operation, the patient presented chyloperitoneum with triglycerides in the peritoneal fluid of 428.0 mg/dl, conservative treatment was initiated by fasting and parenteral nutrition, with no improvement after 12 days. Then, it was decided to start octreotide at a dose of 1.0 mcg/kg/h with a gradual increase up to 4.0 mcg/kg/h, with success in five days. He was discharged from hospital in two months due to infectious complications.

Case 2

E.M.C.J., two-year-old, male, white patient with Down Syndrome, diagnosed with pulmonary atresia with ventricular septal defect and patent ductus arteriosus. Admitted in our hospital to perform Rastelli surgery, with expansion of the left pulmonary artery. On the 21st day after the procedure, he presented chylothorax with triglycerides in the pleural fluid of 2196.0 mg/dl. Fasting and parenteral nutrition were started without improvement after 10 days. Use of octreotide was started (1 to 4 mcg/kg/h), with increase of liver enzymes with spontaneous regression, even after maintenance of the drugs. There was good response to treatment and prognosis improvement in eight days, evolving to chest tube removal in 15 days and discharge after 18 days of starting treatment with octreotide.

Case 3

J.M.U.S., 4 months, male, black, suffering from Down Syndrome and protein energy malnutrition grade III. He was diagnosed with coarctation of the aorta, patent ductus arteriosus and pulmonary artery fistula to left ventricle. He underwent aortic isthmusplasty and ductus arteriosus section and suturing. On the 2nd day after the procedure, he presented chylothorax with triglycerides of 594 mg/dl. Prognosis improved after four days of parenteral nutrition and fasting. Then, a slow progression of the supply of dietary lipids was started. After 10 days, the child again presented respiratory distress, chylothorax was diagnosed on the right (Figure 1a) with triglycerides in the pleural fluid of 4954 mg/dl. We decided to perform thoracic duct ligation and parenteral nutrition associated with oral fasting, without success after 15 days. After introducing octreotide (1 to 4 mcg/kg/h), there was an increase in urine output (10 ml/kg/h), normalized with discontinuation of octreotide. Chylothorax was resolved in 7 days. Chest tube was removed after 20 days of the onset of drug use (Figure 1b). The patient was discharged in 26 days.

Case 4

ACGCD, 6 months, female, white, with chronic protein energy malnutrition grade II, diagnosis with double inlet right ventricle, ventricular inversion, double outlet right ventricle and patent ductus arteriosus. She underwent Glenn bidirectional surgery, expansion of the right pulmonary artery and left pulmonary trunk banding, atrioseptectomy, ductus arteriosus section and suturing. She was discharged on 9th postoperative day. On the 15th postoperative day, she returned to hospital due to progressive respiratory distress for three days and was diagnosed with chylothorax, improving after 7 days of total parenteral nutrition, and recurrence after introduction of general diet. Fasting and parenteral nutrition was resumed with a new recurrence after 23 days, on a diet free of triglycerides. Treatment with octreotide was started (1 to 4.0 mcg/kg/h) with increased urine output (8.0 ml/kg/h) and liver enzyme, normalized through adjustments in parenteral nutrition. The patient made use of octreotide for 12 days, with an improved prognosis by day 13. Drainage was removed after 3 days and she was discharged after seven days of starting medication.

Findings

No child had serious side effect requiring reduction or discontinuation. The dose was based on the literature, starting at 1.0 mcg/kg/h, progressively increasing to 4mcg/kg/h in a continuous infusion pump, and then regressed, and the volume of pleural drainage presented progressive reduction in all cases, as drug infusion increased (Figure 2).

Discussion

The main cause of chyloperitoneum in children is congenital. Its causes also include obstructive causes due to bad rotation, intussusception, incarcerated hernia, lymphangioma, abdominal trauma, liver diseases and tuberculosis[2]. Its evolution has a mortality rate of 11.1% to 17%[3]. The loss of lymphatic fluid causes hypoalbuminemia, hydroelectrolyte alterations, coagulation and immunodeficiency[4] with important involvement of clinical condition of the child and increased morbidity and mortality.

Both for the chylothorax and for the chyloperitoneum, there are conservative and surgical treatments, and the latter is usually indicated after failure of conservative treatment after two to three weeks[5]. A study involving 39 patients with chylothorax due to different causes, after 45 days of conservative treatment, revealed that the prognosis improved in 77% of patients[6]. Pego et al[7] reported four cases of surgical ligation of the thoracic duct, in which all patients had substantial improvement of chylothorax after thoracic duct ligation. It was concluded that its early performance could rule out potential failures of conservative treatments, reducing aggressions and patients' time of suffering. However, such procedure is limited by anatomic variations of the duct location, as well as difficulty to identify the drainage site.

Octreotide is a somatostatin analogue that inhibits the secretion of some pituitary and gastrointestinal hormones increasing

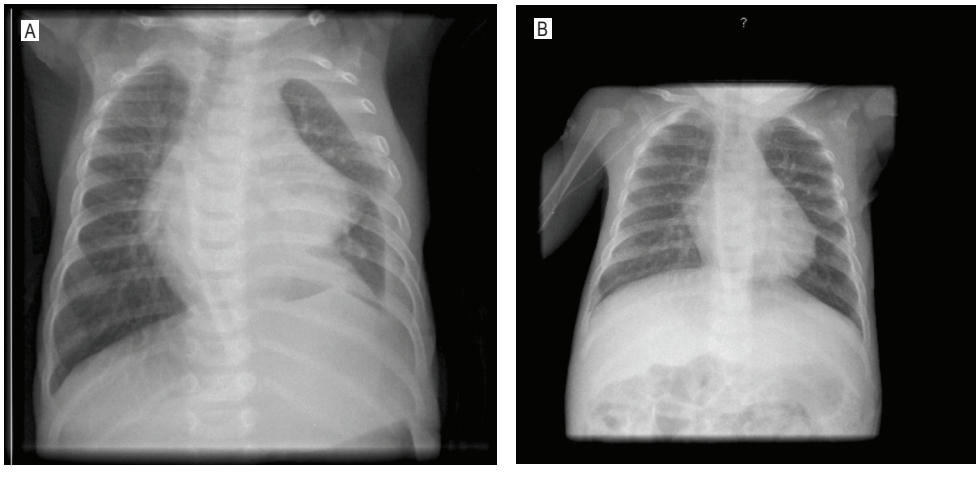

Figure 1 - A: Chest X-ray of J.M.U.S. on July 12, 2008. B: Chest X-ray of J.M.U.S. on August 25, 2008.

splanchnic arteriolar resistance, reducing gastrointestinal flow and, consequently, the lymph flow[8]. This has been frequently reported in the world literature both in the treatment of chylothorax and chyloperitoneum, with encouraging results, reducing treatment time and the need for surgical intervention[5].

Side effects of octreotide relate to reduced sperm motility and intestinal secretion: hypertension, malabsorption, nausea, flatulence, hepatic dysfunction and hyperglycemia[9]. Although there are typically few side effects observed in the follow-up of patients using octreotide, such practice has been associated with serious complications such as necrotizing enterocolitis, and its use is contraindicated in patients with a history of significant vascular disease. During its use, we recommend the periodic control of liver function, blood glucose and thyroid function[10].

Conclusion

The results found in the 4 cases are encouraging with respect to drug safety, ease of handling and favorable outcome in the treatment of chylothorax and chylous ascites in cases of failure of usual treatments or inability to surgery for poor clinical condition of the child.

For a prospective randomized study evaluating a larger group of patients, it is necessary to confirm the findings of this small group of patients.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Sources of Funding

There were no external funding sources for this study.

Study Association

This study is not associated with any post-graduation program.

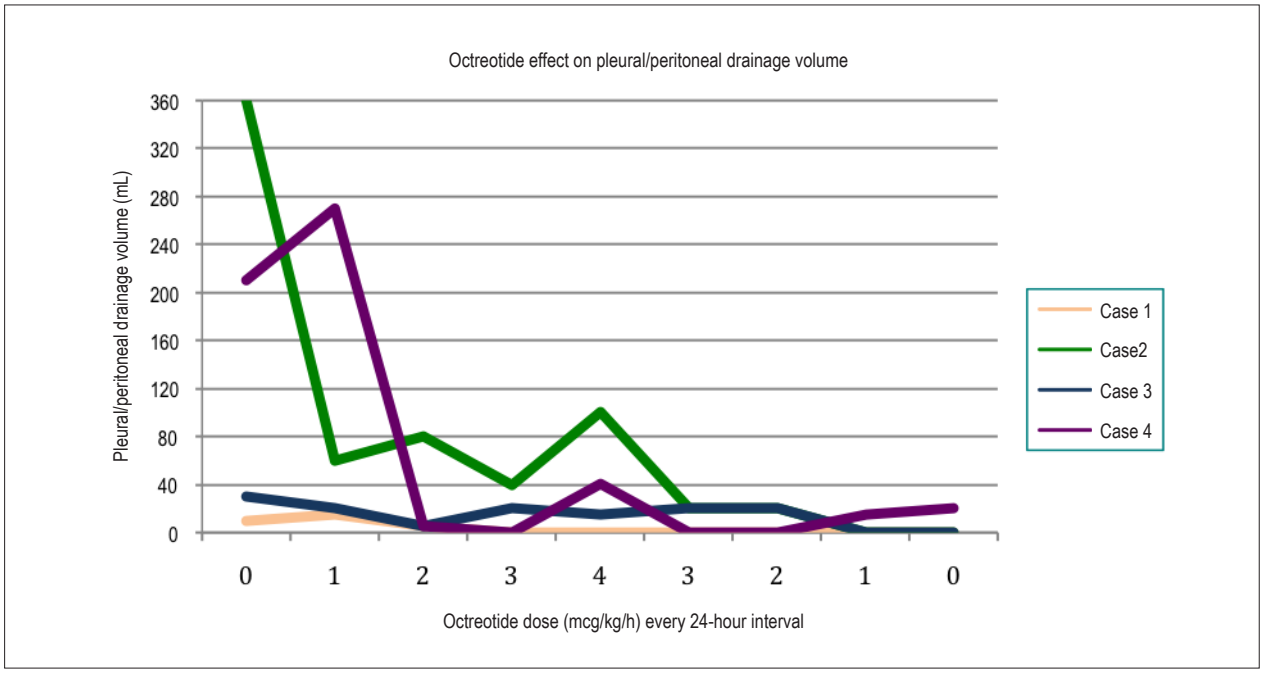

Figure 2 - Effect of octreotide on pleural/peritoneal drainage volume according to the rate of drug infusion..

Reference

1. Vaz MAC, Pêgo-Fernandes PM. Quilotórax. J Bras Pneumol. 2006; 32 (supl. 4): S197-S203.
2. Unger SW, Chandler JG. Chylous ascites in infants and children. Surgery. 1983; 93 (3): 455-61.
3. Pabst TS, McIntyre KE Jr, Schilling JD, Hunter GC, Bernhard VM. Management of chyloperitoneum after abdominal aortic surgery. Am J Surg. 1993; 166 (2): 194-9.
4. Sahin Y, Aydin D. Congenital chylothorax treated with octreotide. Indian J Pediatr. 2005; 72 (10): 885-8.
5. Yildirim SV, Kervancioglu M, Saritas B, Varan B, Mercan S, Tokel K. Octretide infusion for the treatment of chylothorax in pediatric cardiac intensive care unit. Anadolu Kardiyol Derg. 2005; 5 (4): 317-8.
6. Buettikker V, Fanconi S, Burguer R. Chylothorax in children. Chest. 1999; 116: 682-7.
7. Pêgo-Fernandes PM, Jatene FB, Tokunaga CC, Simão DT, Beirutty R, Iwahashi ER, et al. Ligadura do ducto torácico para o tratamento de quilotórax em cardiopatas. Arq Bras Cardiol. 2003; 81 (3): 309-13.
8. Cheung Y, Leung MP, Yip M. Octreotide for treatment of postoperative chylothorax. J Pediatric. 2001; 139 (1): 157-9.
9. Lim KA, Kim SH, Hub J, Kang IS, Lee HJ, Jun TJ, et al. Somatostatin for postoperative chylothorax after surgery for children with congenital heart disease. J Korean Med Sci. 2005; 20 (6): 947-51.
10. Panthongviriyakul C, Bines JE. Post-operative chylothorax in children: an evidence-based management algorithm. J Paediatr Child Health. 2008; 44 (12): 716-21.