Octreotide infusion for the treatment of chylothorax in pediatric cardiac intensive care unit

Pediyatrik kardiyak yoğun bakım ünitesinde octreotid infuzyonu ile tedavi edilen şilotoraks olguları

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Chylothorax is a serious complication of congenital heart surgery that increases morbidity and prolongs hospitalization time. The most common cause is intraoperative disruption of lymphatic channels. The reported incidence rates of chylothorax after cardiac surgery range from 0.56-1.9% (1-4). The primary treatment options are conservative management with medium-chain triglycerides (MCT) and/or total parenteral nutrition (TPN), and surgery when these modes fail; however, all these approaches are associated with high morbidity risk due to longer hospital duration (1,2,5). Octreotide, a synthetic somatostatin analogue, has recently been introduced as a new treatment for chylothorax, but the literature contains little information about this approach.

Five hundred and eighty pediatric patients underwent cardiac surgery at our center between May 2001 and December 2002. In five children (0.86%), chylotorax was developed. Chylothorax was related to the heart surgery in four of the patients, and in one patient, chylothorax occurred after a central venous access procedure. Four of these patients underwent surgery to manage this problem. Breakdown of pleurodesis was performed in one case, and the thoracic duct was ligated in three cases. The latter procedure failed in one patient, and we administered octreotide infusion in this case and one other case.

Chylothorax is defined as accumulation of chylomicron-rich lymphatic fluid within the pleural cavity. Development of this complication after congenital cardiac surgery is a serious problem that increases morbidity and extends hospital stays. In most cases, chylothorax results from disruption of lymphatic channels during surgery (1-5).

Case 1: A 14-day-old girl who had transposition of the great arteries underwent an arterial switch procedure. On the third postoperative day, there was excessive drainage of chylous fluid. The patient was placed on a medium chain triglyceride (MCT) diet, but the drainage continued. On the sixth day of chylous drainage, a second surgery was performed to ligate the thoracic duct, but the problem persisted. In the following five days after operation, volumes of 165 ml, 115 ml, 150 ml, 100 ml and 120 ml, respectively, were collected. On the fifth day, we started an octreotide infusion at 2 mg/kg/hour. Two days later, the dose was increased to 4 mg/kg/hour. The chylous drainage gradually diminished from day 2 to day 5 of octreotide infusion. On the sixth day, there was no further drainage. Chest tube was removed on the 8th day and octreotide was stopped. The patient was discharged.

Case 2: A 3-month-old boy with Taussig-Bing anomaly (pulmonary committed ventricular septal defect, coarctation of the aorta) and pulmonary hypertension underwent an initial surgery for repair of coarctation of the aorta and pulmonary banding. Five days later, an arterial switch operation was performed, and the chest tubes were removed seven days after this procedure. Eleven days after the arterial switch operation, a right subclavian venous line was placed. Two days later, chest X-ray showed a moderate pleural fluid collection on the right. On the third day after venous line placement, a thoracocentesis was performed. One hundred milliliters of chylous fluid was drained. Octreotide infusion (2 mg/kg/h) was started immediately, and a chest tube was placed. The patient continued to be breast-fed. One hundred and sixty-five milliliters of chylous fluid was drained on the first day of octreotide infusion, and this amount dropped to 25 ml on the second day. There was no drainage over the next 2 days. The chest tube was removed on the fifth day of octreotide administration and octreotide infusion was stopped. But the patient died 25 days after the initial surgery due to severe infection.

There are conservative and surgical treatment options for chylothorax, but none is effective in all cases (1-4, 6, 7). Surgery is usually performed if conservative treatments fail; however, there is no agreement on exactly when the operative approach should be taken. Most authors feel that surgery is indicated when chylous drainage lasts longer than 2 or 3 weeks despite MCT diet and/or total parenteral nutrition (1-7). In a large series of 39 patients with chylothorax due to different causes, after 45 days of conservative therapy the effusion had resolved in 77% of the cases (5).

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We performed surgery in four of our five cases. All four patients had experienced significant chylous drainage for longer than 7 days despite MCT diet and total parenteral nutrition. The operation included pleurodesis in one patient, ligation of lymphatic ducts in two patients, and dissection of a lymph node in one patient. Surgery for chylothorax was effective and drainage ended immediately in all but one of the patients. In that case, since chylous drainage persisted after the surgery, we initiated octreotide infusion. This was successful, and the drainage ceased on the sixth day of octreotide treatment.

Infusion of octreotide is a new approach for managing chylothorax or chylous drainage after any type of surgery. The literature contains only a few reports on experience with this mode of therapy. Octreotide is a somatostatin analogue that inhibits several pituitary and gastrointestinal hormones. It increases splanchnic arteriolar resistance and decreases gastrointestinal blood flow, thus reducing lymphatic flow (1,8). Cheung et al. (1) also reported favorable results with octreotide therapy in two patients with chylothorax. Their dose (maximum 40 mg/kg/day) was somewhat lower than ours. Shapiro et al. reported rapid resolution in a pediatric case of chylothorax after liver transplantation that was treated with octreotide and total parenteral nutrition. Their patient responded in 2 days and there was no recurrence (4). In another report, octreotide was effective for treating chylothorax after cardiac surgery in four pediatric patients (2). These authors used octreotide infusion rates similar to ours (1-4 mg/kg/h), and the duration of treatment was 5-9 days.

Concerning the use of octreotide in our two cases, it is especially noteworthy that this drug was effective for treating chylothorax in a case where surgery had failed. We did not observe any complications associated with octreotide, such as hypo/hyperglycemia. The results with this agent are promising, but more experience and further studies are needed for octreotide to become routine therapy for chylothorax.

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