

Chylopericardium following Atrial Septal Defect Repair: Case Report

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ABSTRACT

Chylopericardium after intrapericardial cardiac operations is extremely rare. We present an unusual case of postoperative chylopericardium with cardiac tamponade following atrial septal defect repair, and we comment on the clinical course and treatment.

INTRODUCTION

Isolated chylopericardium after a cardiac operation is a rare clinical entity. A few cases have been reported that occurred following median sternotomy for treatment of congenital heart disorders, acquired valvular disease, myocardial revascularization with internal mammary graft, and cardiac transplantation [Kansu 1977, Papaioannou 1984, Schiessler 1984, Hamilton 1985, Lee 1987, Bar-el 1989, Mailander 1992]. This report documents a case of postoperative chylopericardium following atrial septal defect (ASD) repair. The clinical course, management strategy, and description of the anatomy that makes this disorder possible are presented.

CASE REPORT

An 8-year-old girl was admitted for surgical repair of an ostium secundum-type ASD. Through a median sternotomy, cardiopulmonary bypass was commenced after aorticaval cannulation. The heart arrested well after cold antegrade crystalloid cardioplegia. Under normothermic cardiopulmonary bypass, the patient underwent double-velour dacron patch closure of the 2 × 3-cm defect. She was extubated 4 hours after surgery, and the mediastinal drains were removed

the following morning. The patient's immediate postoperative recovery was uneventful. On the third postoperative day, while recuperating in the ward, she started vomiting and became short of breath. On examination, she was found to have cold peripheries, nonpalpable peripheral pulses, and an enlarged liver. Transthoracic echocardiogram (TTE) revealed massive pericardial effusion with diastolic collapse of the right atrium and right ventricle. She was taken to surgery for urgent exploration. After the chest was opened through the subxiphoid incision, 400 mL of turbid milky fluid in the pericardial sac was drained, and the chest was closed with single mediastinal drains. The drained fluid was tested biochemically and was found to contain chylomicrons and triglycerides. The patient was extubated and later on sent to the ward. She had persistent drainage through a mediastinal drain of approximately 300 to 450 mL of chylous fluid every day. She was given a low-fat, high-protein diet with medium-chain triglycerides for approximately 2 weeks. This conservative management failed, and she continued to have drainage of more than 350 mL of chyle every day. On the 15th postoperative day we decided to perform reexploratory surgery.

During this operation, through the previous incision, the pericardial cavity was drained and washed. There was a lymphatic leak from the left thymic lobe, which was oversewn with 4-0 prolene suture. The chest was closed with 2 mediastinal drains. The patient was extubated and transferred to the ward. The drains were removed the following morning because the drainage had ceased and the TTE showed no pericardial collection. She made an uneventful recovery and was discharged home after 4 days. There was no recurrence of the chylopericardium in this patient up to 12 months after surgery.

COMMENTS

Chylothorax as a complication of cardiovascular surgery has a reported incidence of 0.25% to 0.5% and is extremely rare following intrapericardial procedures [Tchervenkov 1985]. Chylopericardium in particular has a reported incidence even lower than that of chylothorax. We are aware of only a few odd reported cases that occurred following various intrapericardial procedures [Kansu 1977, Pollard 1981, Papaioannou 1984, Schiessler 1984, Hamilton 1985, Tcher-

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venkov 1985, Lee 1987, Bar-el 1989, Mailander 1992, Campbell 2001].

Chylopericardium is a debilitating and potentially life-threatening postoperative complication resulting in impairment of the immune system and the nutritional state. This report describes a rare case of chylopericardium following ASD closure through a median sternotomy. This rare complication is important because of high morbidity due to prolonged tube drainage and the fact that nearly half of the reported patients underwent reoperation [Pollard 1981, Campbell 2001]. The majority of the reported cases involved a fistula in the anterior mediastinum lymphatics in the region of the thymic tissue. The branches of the thoracic duct infiltrate thymic tissue to cross the midline, forming a plexus that may be transected during exposure of the ascending aorta [Tchervenkov 1985]. The other described etiology appears to be related to obstruction of thoracic duct drainage due to a combination of intraoperative lymphatic injury and catheter-related thrombosis at the junction of the left jugular and subclavian veins. In this situation pressure within the thoracic duct may become elevated, resulting in an accumulation of chyle within the pericardial space [Pollard 1981, Campbell 2001]. A direct injury to the thoracic duct during intrapericardial procedures is not possible. The complication is recognized postoperatively by persistent, milky chest tube drainage that contains fat globules, chylomicrons, triglyceride concentrations greater than 110 mg/dL, and a high lymphocyte cell count. This problem can be prevented by surgical ligation rather than the use of electrocautery on the thymic vascular structures at the time of dissection. The awareness of the significance of lymph encountered during cardiac operations, particularly during reoperation, in thymic lobes and near the origin of the internal mammary artery may alert the surgeon that the stage is set for this disabling complication [Pollard 1981, Campbell 2001]. The control of potential chylous leaks at the time of original operation is vital. The initial management of this condition is dietary. The recommended treatment is a 2-week trial of conservative therapy with a diet of high-protein, low-fat medium-chain triglycerides supplemented by intravenous feedings and closed-chest suction. The majority of leaks close without surgery. If this treatment fails, surgical ligation of the fistula is recommended [Tchervenkov 1985, Campbell 2001]. Should surgery be necessary, injection of heavy cream into a nasogastric tube may facilitate location of the leaks. The dilated lymphatics exuding chyle have been found during operations undertaken to control lymph fistulas and were located in anterior thymic tissue previously divided by electrocautery. Electrocautery may be an unreliable means of control because the thin lymphatic wall contains little coagulable material; suture is recommended instead. Alternatively, ligaclips are as effective as sutures and can be applied more quickly and in multiple areas. The experience derived from reported cases demonstrates that initial treatment of chylothorax with thoracos-

tomy drainage and dietary modification is successful in the majority of patients and is not associated with high morbidity or mortality rates [Pollard 1981, Tchervenkov 1985, Campbell 2001]. Only a minority of patients require surgical intervention for chylopericardium occurrences that fail to respond to initial conservative measures. These patients in general are best served by quick and decisive reoperation to directly control the site of the leak. Surgeons should be prepared to use alternative surgical measures in case direct control fails. These alternative operative management strategies in the form of low ligation of the thoracic duct through thoracotomy or video-assisted thoracoscopic surgery should be considered for situations in which reoperation fails to identify or fails to control a persistent leak [Campbell 2001]. In cases in which reoperations fail, pericardial-peritoneal shunting with Denver shunts provides a simple and effective alternative to prolonged pericardial drainage and prevents the loss of chylous fluid [Pollard 1981, Campbell 2001].

We conclude that chylopericardium is rare following ASD repair and can be prevented by careful ligation of thymic tissue during the operation. The treatment initially is conservative, consisting of adequate pericardial drainage and a low-fat, medium-chain triglyceride diet. If this strategy fails, the appropriate operative procedure is carried out.

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