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Saqib A Gowani  
*Aga Khan University*

Ameer A Khowaja  
*Aga Khan University*

Asmatullah Khan  
*Aga Khan University*

Saulat H Fatimi  
*Aga Khan University*

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## **Chylopericardium - a rare complication after ventricular septal defect repair**

Saqib A. Gowani<sup>1</sup>, Ameer A. Khowaja<sup>2</sup>, Asmatullah Khan<sup>3</sup>, Saulat H. Fatimi<sup>4</sup>

Medical Students<sup>1,3,4</sup>, Department of Surgery<sup>2</sup>, Aga Khan University, Karachi.

### **Abstract**

Chylopericardium is a rare complication of cardiac surgery. It may be caused by a lesion in the thoracic duct or its tributaries or by thrombosis in the confluence of the jugular and left subclavian veins, obstructing the drainage of the thoracic duct. The treatment may be conservative or surgical, depending on the duration and on the volume of the effusion. We report the case of a 1 ½ year-old male, who, in the late postoperative period of VSD repair, was hospitalized with low-grade fever and breathlessness for one week due to the presence of chylopericardium. The clinical findings and treatment performed are discussed.

### **Introduction**

Chylopericardium is a debilitating postoperative complication due to the high morbidity associated with uncontrolled chyle leaks causing hypoproteinemia, malnutrition and immuno-incompetence. Effused chyle may be present in the pericardium after the repair of complex congenital anomalies, valve replacement, and myocardial revascularization.<sup>1-3</sup> Although first described in 1966<sup>4</sup>, the incidence in a large cohort of surgical patients is unknown. Therefore, we present our case of 18 months old child with a rare complication of chylopericardium after the repair surgery of VSD.

### **Case report**

A 1½ yr old child presented with low-grade fever and breathlessness for one week. He had a history of perimembranous ventricular septal defect that was repaired with a patch under cardiopulmonary bypass one month back. Chest X-ray revealed a massive cardiomegaly. Echocardiography showed pericardial effusion (15-20 mm) on posterior and posterolateral side. The heart chambers were of normal size but atypical septal motion was detected. Mildly thickened mitral valve and mild mitral regurgitation along with moderate tricuspid regurgitation was also noted. There was no flow across the VSD patch. A pericardial drain was placed which aspirated 100cc of whitish fluid. Provisional diagnosis of Post peri-cardiotomy syndrome or Antigen-antibody reaction was made and fluid was sent for culture and detailed report revealed moderate pus cells but no organism was isolated. Echocardiogram after drainage

revealed a circumferential 10-14 mm effusion.

Two days later the child was found to be in respiratory distress, irritable with profuse sweating and dysphagia. Chest X-ray revealed cardiomegaly. Echocardiogram showed circumferential loculated effusion of 10-14 mm and the child was diagnosed to have recurrent pericardial effusion. Pericardiocentesis was performed.

An approach through sixth intercoastal space was made at the anterior axillary line and 375 ml of frank purulent fluid was aspirated. The fluid was sent for analysis and patient was put on vancomycin. Culture revealed MRSA and vancomycin was continued.

After 4-5 days the child was again found in a sweating and irritable state. Echocardiogram follow-up showed pericardial effusion, which was 6-8mm around left ventricle and 8-10mm around right atrium and right ventricle. Echocardiogram after 3 days revealed 30 mm effusion around left ventricle and right atrium and 12mm effusion around right ventricle. There was no evidence of cardiac tamponade. 100cc of chylous fluid was drained. Aspirated fluid was found to be MRSA positive. Conservative management was employed for two weeks including low-fat and MCT oil in diet. Follow up of echocardiogram revealed 3-7 mm of pericardial effusion around left ventricle and behind right and left atrium.

Echocardiogram follow-up revealed recurrent pericardial effusion of 15mm around right atrium and 18mm around left ventricle. Proper pericardial drainage with stuffer catheter was planned. Pig-tail was passed which drained around 50-60cc of fluid. Another 230cc of fluid was drained which dislodged a small red clot. Chest X-ray follow-up was normal. 100-150 cc of fluid was drained episodically.

Post-operative course was unremarkable except throat infection by streptococcus viridans and non-aureus staphylococcus that was managed by ceftazidime and cloxacillin. Another echocardiogram follow-up revealed circumferential chylopericardial effusion of 10-11mm.

The child was discharged on regular activity and fat-free diet.

### **Discussion**

Most reports concerning lymph or chyle within the

pericardial space concern isolated patients because this condition is rare.<sup>5</sup> Chylopericardium, i.e., milky effusion, most commonly results from obstruction or injury of the thoracic duct. At other times, its cause is not discernible but, nevertheless, hemipericardiectomy and ligation of pericardial lymphatics may result in disappearance of the chylous effusion.<sup>5</sup> Lymphangiomas hamartoma (cystichyroma) of the mediastinum associated with a communication between the thoracic duct and pericardial space<sup>6</sup> also has caused chylopericardium. Chylous fluid may accumulate rapidly and even lead to tamponade.<sup>5,7</sup>

Chylopericardium following cardiovascular surgery occurs with an incidence of 0.2 to 0.5% and can cause catastrophic consequences if left untreated.<sup>8</sup> Chylopericardium is caused by the inevitable transection of the very small lymphatic channels in the pericardial reflections or by operative injury to tributaries of the thoracic duct. The fistula in most instances occurs in the anterior mediastinum in the region of the thymic tissue. Lymphatic capillaries lack a basal lamina which makes the endothelium much more permeable to large molecules, cell debris and microorganisms.

In our case, the child had a VSD repair surgery which was complicated by recurrent chylopericardium.

Chylopericardium can be managed successfully by percutaneous pericardiocentesis or a low-fat or medium chain triglyceride diet in most cases. However, treatment of patients with prolonged drainage by pericardial-peritoneal shunting has been described.<sup>9</sup> Alternative treatment regimens include discontinuing enteral feeds and instituting total parental nutrition. Prolonged drainage has been associated with persistently elevated pulmonary venous or upper limb systemic venous pressure. As others have noted, thrombus in the upper body great veins may be responsible for persistent drainage by either direct obstruction of the thoracic duct.<sup>10</sup>

The etiology of the chylous collection in the pericardial space after operations to correct congenital heart disease is controversial especially when it complicates extrapericardial operation.<sup>8</sup>

Chylopericardial effusions can be life threatening post-surgical complications occurring after even minimal dissection in the pericardium in the absence of other

exacerbating factors. The control of potential chylous leaks at the time of the original operation is vital. Electrocautery may be an unreliable means of control as the thin lymphatic walls contains little coagulable material. This problem can be prevented by surgical ligation of the thymic vascular structures at the time of dissection rather than the use of electrocautery. The diagnosis demands a high degree of suspicion and prompt surgical intervention is warranted if conservation therapy fails.

## Conclusion

Chylopericardium is treated by pericardiocentesis and diet depending upon severity and etiology. After initial drainage the disorder may be resolved through dietary management (medium chain triglycerides) alone. If further production of chylous effusion continues, surgical treatment is mandatory. Pericardio-peritoneal shunting and ligation and resection of the thoracic duct just above the diaphragm have proved to be the most effective treatment.

However, if the pericardial effusion enlarges, fails to clear or presents late after hospital discharge; diagnostic pericardial tap is indicated to avoid confusion with the postpericardiotomy syndrome.

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