Chylous pericardial effusion as a rare complication after pulmonary endarterectomy

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Abstract

Chylous pericardial effusion is a rare complication of cardiac surgery. We report a case of a patient who underwent pulmonary endarterectomy for chronic thromboembolic pulmonary hypertension and was diagnosed with chylopericardium after the procedure. We present the surgical management of this condition, which included bilateral pedal lymphangiography followed by ligation of injured lymph vessel.

Keywords: Pulmonary endarterectomy • Chylopericardium • Lymphangiography • Chronic thromboembolic pulmonary hypertension

INTRODUCTION

Pulmonary endarterectomy is a treatment of choice for patients with chronic thromboembolic pulmonary hypertension (CTEPH) [1]. Chylopericardium is a rare complication of cardiac surgery, first reported by Thomas and McGoon in 1971 [2]. We have found no reports of this complication after pulmonary endarterectomy. The methods of treatment can be conservative or surgical. Surgical treatment commonly requires thoracic duct ligation and is considered to be curative [3]. However, thoracic duct ligation can be associated with the risk of malnutrition, immunological deficits and metabolic complications. We report thoracic duct-saving surgical treatment, which included bilateral pedal lymphangiography followed by ligation of the injured lymph vessel.

CASE REPORT

We report a case of a 48-year old female patient with progressive dyspnoea (NYHA III) after two episodes of pulmonary embolism. She was diagnosed with severe CTEPH (PAMP 57 mmHg, PVR 14 Wood units, Cardiac index 1.7 l/min/m², multiple occlusions bilaterally on pulmonary angiography and multiple perfusion defects in both lungs on V/P scan) and was indicated for pulmonary endarterectomy.

After median sternotomy, we established cardiopulmonary bypass and the patient was cooled down to 16.9°C. We cross-clamped aorta and achieved cardiac arrest using crystalloid cardioplegia. We performed bilateral pulmonary endarterectomy from the right and left pulmonary incisions during three circulatory arrests (22 + 15 + 21 min) with ~10 min reperfusion periods between individual circulatory arrests. The perioperative findings were in accordance with Jamieson class III (Fig. 1A). Weaning from the bypass was uneventful.

The patient was extubated on Day 1 and was haemodynamically stable with sufficient cardiac output. On Day 3, milky pericardial effusion in mediastinal drain (50 ml/h) appeared. The fluid analysis demonstrated triglycerides of 420 mg/dl, white blood cell count of 880/ul (95.6% lymphocytes), and total proteins of 4.5 g/dl.

On Day 5, we started conservative treatment. We inserted peripherally inserted central catheter line and began total parenteral nutrition to reduce fat input. The milky effusion turned to serous effusion; however, the amount of fluid production remained high (500–1000 ml/day). The chest X-ray was in accordance with normal postoperative image. On Day 15, the drain got obstructed and the patient started to show signs of cardiac tamponade. We inserted a pigtail catheter which immediately drained 40 ml of serous liquid and the patient’s vital functions improved rapidly. Within 2 weeks after operation, the patient lost almost 12 kg of weight.

We indicated surgical treatment. We first performed pedal lymphangiography which showed normal thoracic duct, no aberrant lymph vessels and collection of contrast liquid in the superior mediastinum (Fig. 2). However, we did not identify the exact leakage point. On Day 20, we performed operation to treat the leaking lymph vessels. Three hours before the procedure, we applied lipids containing vitamin A via jejunal tube to increase the effusion. After median sternotomy, we found collection of cloudy fluid in the pericardium. We inspected surrounding tissues and in the left lobe of thymus we found the injured lymph vessel (2 mm in diameter), with the lymph leaking (Fig. 1B). We ligated the
vessel and we also sutured and ligated the whole left lobe of thymus and sealed it with tissue glue (Fig. 1C). There were no signs of lymphatic effusion. The patient was transported in a haemodynamically stable condition to the ICU.

After the procedure, there was minimal pericardial effusion. The drain was extracted on the first postoperative day and we started enteral nutrition. The patient was stable and was discharged from hospital 12 days after the lymph vessel ligation, 32 days after the pulmonary endarterectomy.

CONCLUSION

Chylous pericardial effusion can occur as a primary condition; however, most often it is secondary to heart surgery, radiation therapy, trauma, malignancy, infection or pancreatitis [4]. Chylopericardium after cardiac surgery is rare, because the thoracic duct and its main tributaries are not typically in the operative field during median sternotomy procedures [3].

In order to avoid effusion from lymph vessels in the anterior mediastinum, we recommend ligation or suture of thymic tissue, if preparation is being done in this area. Coagulation may not be sufficient to avoid postoperative lymphatic effusion. Tissue glue may be applied in case small lymph vessel damage is suspected.

Patients with chylopericardium are at risk of cardiac tamponade if the fluid is not drained properly—either by drainage tubes or by pericardial window. If the fluid is drained properly, there is yet another complication, especially if the effusion is prolonged. The loss of substances normally transported in chyle results in malnutrition, immunological deficits and metabolic complications.

Conservative treatment, based on fat input reduction and total parenteral nutrition, is meant to decrease the chyle production, reduce chyle flow via the thoracic duct and therefore decrease the chylous effusion.

When it fails, surgical treatment is indicated. The most common technique is thoracic duct ligation. We, however, were aware of possible complications after this procedure. In case, there is no lymph vessel substituting the function of thoracic duct, its ligation may lead to malnutrition, immunological deficits or metabolic complications.

We performed lymphangiography before the operation. Lymphangiography is not a standard procedure to treat chylopericardium [4] because it rarely helps to identify the leaking vessel, and the resolution is not high enough. However, it can show the anatomy of thoracic duct and its tributaries and reveal an atypical position of the duct or presence of any aberrant vessels.

Because chylopericardium truly is not common in cardiac surgery, there are not many described cases and therefore not enough evidence for individual treatment methods. Our strategy was curative, it did not require thoracic duct ligation and led to successful treatment of our patient’s condition.
Conflict of interest: none declared.

REFERENCES


