Introduction

Orthotopic heart transplantation (OHT) is an accepted method of end stage heart failure treatment. Among the main OHT indications are cardiomyopathies and ischemic heart disease (ischemic cardiomyopathy). While pericardial bleeding and/or effusion is fairly common in cardiac surgery, the isolated chylopericardium is an extreme rarity, but still a potential cause of postoperative cardiac tamponade. In the vast majority of cases, the cause of chylopericardium remains undiscovered. The surgical dissection in cardiac surgery is remote from the thoracic duct and the risk of its direct injury is relatively low. Riquet et al. reported in a study of 90 cadaver hearts, that the lymphatic drainage from the heart is variable, and lymphatic vessels originating from the heart connect with the thoracic duct in 8.9%. Chylus is collected from the heart by the right and left efferent lymphatic trunks, and it is postulated that their damage may be causative for some chylopericardium cases after cardiac surgery. Also, small lymphatic vessel injury, high venous pressure, venous thrombosis and increased lymphatic vessels permeability were mentioned as arguable chylopericardium culprits.

To the best of our knowledge there are only three reports of chylopericardium complicating the postoperative course after OHT. Here we present a case of a 59-year-old man who underwent OHT and suffered from chylopericardium resulting in cardiac tamponade in the postoperative course. We discuss the successful invasive therapeutic approach with use of absorbable fibrin sealant patch.

Case Report

A 59-year-old male patient with ischemic cardiomyopathy and end stage heart failure, a non-smoker with a history of implantable cardioverter-defibrillator (ICD) implantation...
underwent urgent OHT in our Institution in February 2015. The donor was a 49-year-old women, who died after a major stroke. The bariatral approach was employed (total ischemic time: 160 min; local donor). Concomitantly, the ICD with electrodes were explanted. The pericardial and substernal chest-tubes were placed, and the early postoperative course was uneventful. Decreasing blood drainage was observed, and the drains were removed on postoperative day (POD) 5. The immunosuppression (with tacrolimus, mycophenolate mofetil, steroids and thymoglobulin) was initiated, and until POD 10 the daily routine echocardiographic examinations revealed recovering ventricular function and a fluid-free pericardium. On POD 10, routine endomyocardial biopsy was performed, and acute allograft rejection was excluded. On POD 14, the patient experienced increasing dyspnea, and the clinical signs of cardiac tamponade were observed. The tamponade was confirmed echocardiographically, and a pericardial drain was placed surgically through a 3 cm subxiphoid incision (500 ml of milky fluid was obtained). The diagnosis of chylopericardium was based on macroscopic fluid appearance and high triglyceride content (3.30 mmol/l; the neoplastic markers were negative).

Conservative treatment was initiated – total chylopericardium drainage time was 35 days, and the maximal chylus volume was observed on POD 18 (800 ml/d). On POD 18, total parenteral nutrition was initiated, which resulted in drainage volume decrease to 200–300 ml/d. On POD 40, a repeat endomyocardial biopsy was performed, excluding acute allograft rejection. On the following days, the drainage volume decreased gradually and echocardiography revealed fluid collection in the pericardium. On POD 46 the signs of cardiac tamponade were observed again, and a redo-sternotomy was necessary (500 ml of chylus obtained). The site of chylorrhea origin could not be directly identified. The anterior superior mediastinum was patched with absorbable fibrin sealant patch (TachoSil, Baxter Healthcare, Deerfield, IL) and the chest was closed. No chylorrhea was observed subsequently, and the pericardial drain could be removed after 2 days. Enteral nutrition was re-initiated, and the patient was discharged on POD 61. Follow-up echocardiography on POD 75 revealed minimal pericardial effusion and left ventricular ejection fraction of 65%. Subsequent follow-up visits were uneventful.

**Discussion**

We report for the first time the successful implementation of absorbable fibrin sealant patch in the treatment of chylopericardium complicating OHT. The chylopericardium is a rare complication in cardiac surgery, and very few cases after OHT were reported. In our Institution the reported case is the first among 554 OHTs to date, giving the incidence of 0.18% among OHT recipients, which is comparable to that reported in literature (0.12%–0.22% for all cardiosurgical operations); however, if all types of cardiac operations were considered, the incidence would be extremely low, as the reported case is the first ever to occur in our Institution – a high volume cardiac center performing over 2000 operations in cardiopulmonary by-pass a year since 1979).

Chylopericardium can develop into a life-threatening cardiac tamponade. The therapeutic approach must be judicious, particularly in the OHT recipients cohort, as they are extremely vulnerable to infectious complications. Generally, in chylopericardium complicating cardiosurgical procedures, the conservative strategy is the treatment of the first choice, which is successful in most cases. The chylopericardium treatment strategies in OHT patients reported in literature comprised pericardiocentesis, medical and nutritional (medium-chain triglycerides rich diet) management, pericardial window and thoracoscopic right-sided duct ligation with partial pericardiectomy. Of other medical interventions, somatostatin or octreotide (somatostatin analogue, an agent decreasing portal vein system pressure and chyle flow) administration were put forward in the literature, both in the treatment of chylothorax and chylopericardium after cardiac procedures, however, this strategy was never used in an OHT recipient. In patients with pericardial effusions secondary to malignancy, topical use of minocycline to induce adhesions was proposed as a treatment option. This therapy (also never used in an OHT recipient) was shown to be highly effective, however, it is frequently associated with severe chest pain, and can potentially cause constrictive pericarditis. It must also be highlighted that OHT recipients receive high doses of steroids, and the efficiency of adhesion generation would probably be decreased.

Because of the early postoperative period after OHT and reservations regarding possible complications, the conservative treatment was initially preferred (pericardial drainage and parenteral nutrition). After the prolonged drainage failure and the second episode of cardiac compromise, a full re-do sternotomy was performed with intention to identify the origin of chylorrhea. It is generally accepted that the injury to thoracic duct would result in chylothorax, rather than chylopericardium, and because the OHT is a purely intrapericardial procedure...
(excluding pacemaker removal), damage to the thoracic duct, which is located near the descending aorta, was anatomically rather unlikely. Rose et al. and reported small lymphatic leaks in the thymic tissues or periaortic fat as a source of chylorrhea, identified during reoperation in a patient with chylopericardium. In our patient, the site could not be found (Sudan III dye could be given orally to facilitate the visual identification). The intuitive placement of TachoSil in the superior anterior mediastinum proved sufficient and definitively resolved the chylopericardium. The anterior superior mediastinum is frequently involved in chylopericardium development, especially in pediatric patients, in whom the thymus is rich in lymphatic tissue. Furthermore, the right and left efferent lymphatic trunks, draining chylus from the heart, ascend in the proximity of the ascending aorta and pulmonary trunk, and their transsection might be inevitable during OHT.

The employment of the fibrin sealant patch in the most suspicious area allowed to avoid the classical invasive methods of chylorrhea management, including thoracic duct ligation or anastomosis to innominate vein, or thoracic duct obliteration, along with their potential consequences. It must however be acknowledged that repeated sternotomy was necessary, which is a major limitation, of the method used.

Conclusions

In conclusion, chylopericardium resulting in tamponade, as a complication of OHT, can be successfully and definitely treated with absorbable fibrin sealant patch during re-do sternotomy.

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Disclosure Statement

None declared.

References

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