Thoracoscopic creation of a pericardial window for recurrent pericardial effusion after heart transplantation

M. Brandt
M. Brückner
S. W. Hirt
J. Cremer
D. Schröder
A. Haverich

Abstract A 56-year-old man underwent orthotopic heart transplantation (Htx) for dilative cardiomyopathy. The postoperative course was uneventful despite the appearance of pericardial effusions during the first 6 months, which required repeated drainage therapy. Six months postoperatively a pericardial window was created using a thoracoscopic approach via the right pleural cavity. The course after this intervention was uncomplicated and there was no recurrence of the pericardial effusion during 18 months of follow-up.

Key words Heart transplantation · Pericardial effusion · Pericardial window · Thoracoscopic technique

Introduction

Dilative as well as ischemic cardiomyopathy are the most common indications for heart transplantation (Htx) [1]. Due to the pathologic dilatation of the recipient’s original heart, an enormous pericardial space remains after implantation of the normal-sized donor organ in most cases. Pericardial reduction plasty seems to be an excellent way to reconstruct a quite normal anatomic situation and to prevent tricuspid regurgitation [2]. Postoperatively, however, small pericardial effusions are often observed after Htx, which usually resolve spontaneously with diuretic therapy. However, large pericardial effusions may compromise right ventricular filling, with resulting elevation of the central venous pressure and its consequences. If treatment with diuretics and repeated puncture is not satisfactory, pericardial fenestration may be the method of choice [3].

Case report

A 56-year-old man suffered from dilatave cardiomyopathy for several years. A rapid decrease in cardiac function within a few months required the daily intravenous application of diuretics. The preoperative chest X-ray showed severe enlargement of the diseased heart.

In December, 1992, orthotopic heart transplantation was performed. The postoperative course was complicated by bradycardia, requiring pacemaker implantation, and cytomegalic virus infection. One rejection episode was treated by pulsed steroids on postoperative day 27. No impairment of renal function was observed. A minor pericardial effusion occurred during the first 3 months postoperatively, as seen on repeated echocardiographic studies. Thereafter enlargement of the effusion appeared, resulting in compromised right ventricular filling, elevation of the central venous pressure and liver congestion. During the next 3 months puncture and drainage of this effusion was required on five occasions. Each time between 1000 and 1500 ml were drained. Six months after transplantation, a huge pericardial effusion was detected again by echocardiography, and surgical treatment was deemed necessary (Fig. 1). In order to reduce the surgical trauma, a thoracoscopic approach was chosen to create a pericardial window.

Under general anesthesia, the patient was intubated with a double-lumen endotracheal tube while in the supine position. He was then turned to a left lateral position and two 5 mm trocars (Surgiport) were introduced into the second right intercostal space in the midclavicular line and into the third intercostal space in the para-axillary line. The camera was placed through a 10 mm trocar in the fourth intercostal space in the anterior axillary line. The smaller trocars were used to open the pericardial space with scissors (Endo-shears) and grasper (Endograsp). A total of 1200 ml serous fluid

1 Auto-Suture, Norwalk, Conn, USA
Fig. 1 Posteroanterior chest X-ray shows the large pericardial effusion 6 months after transplantation

Fig. 2 Posteroanterior chest X-ray shows the normal-sized heart and no signs of pericardial or pleural effusion 12 months after pericardial fenestration

could be suctioned from the pericardial space. No viral or bacterial contamination of the effusion could be found on subsequent microbiological examination of the fluid. A 4 x 4 cm large pericardial flap was resected followed by coagulation of the pericardial margin using electrocautery. A chest tube was directed into the pericardial space (16 French) and a second one (20 French) into the pleural space. The postoperative course was uneventful. The chest tubes were kept in place for 2 and 3 days, respectively. Four days after the operation the patient was discharged from the hospital.

During the eighteen months follow-up no recurrent pericardial or pleural effusions could be detected on echocardiography and chest X-ray (Fig. 2).

Discussion

In patients with symptomatic recurrent pericardial effusion, fenestration of the pericardium is a therapeutic option, if diuretic therapy and repeated puncture fail to control the effusion permanently. A pericardial window provides a persistent communication between the pleural and pericardial spaces, the fluid can be absorbed by the pleural surface and continuous decompression is possible allowing for fusion of epicardium and pericardium to obliterate the pericardial space [3, 4]. A lot of different techniques of creating a pericardial window have been reported in the literature [3–9]. The transthoracic approach is the most invasive method with the greatest potential for mortality [7]. The subxiphoid approach is the simplest technique but the exposure of the pericardium is limited in obese patients or patients with narrow costal margins and high recurrence rates have been reported using this method [4, 6, 7]. Creation of a pericardial window using balloon catheters avoids the risk of anesthesia and surgery, but it is not possible to visualize the pericardium and to take biopsies with this method [5].

Thoracoscopy has established itself as an alternative to open thoracotomy for resection of pulmonary lesions and the management of spontaneous pneumothorax and other pleural or pulmonary disorders. In recent years thoroscopic techniques, as a minimally invasive method, have also been applied in patients with recurrent pericardial effusions caused by pericarditis, malignoms or other disorders. This technique provides optimal visualization of the pericardium combined with minimal operative trauma [3, 8, 10]. So far, it has not been described for patients with recurring pericardial effusion following Htx.

This case report shows that this is a safe and effective technique which can be recommended especially in cardiac transplant recipients. Due to its minimally invasive character, an early extubation is possible, preventing the risk of infection caused by prolonged mechanical ventilation in these immunosuppressed patients. Less attendant pain makes respiratory recovery easier and reduces the risk of atelectasis and pneumonia. Especially in transplant recipients with psychological problems caused by long hospitalization periods before and after transplantation, the short hospital stay is an additional benefit of this method. The use of this method would only be limited by excessive pleural adhesions and the necessity of general anesthesia.

In conclusion, thoracoscopy is a safe and effective method for the creation of a pericardial window in cardiac transplant recipients. The advantages are the minimal operative trauma, less attendant pain and the short hospital stay.
References


