Case report

Balloon angioplasty for pulmonary artery stenosis after lung transplantation

Tsuyoshi Shoji, Nobuharu Hanaoka, Hiromi Wada, Toru Bando*

Department of Thoracic Surgery, Kyoto University, 54 Shogoin-Kawahara-cho, Sakyo-ku, Kyoto 606-8507, Japan

Received 24 February 2008; received in revised form 27 May 2008; accepted 2 June 2008; Available online 18 July 2008

Abstract

We report here a successful case of balloon angioplasty for a stenosis of the pulmonary artery after lung transplantation. A 49-year-old patient with end stage diffuse bronchiectasis with sinusitis underwent bilateral living donor lobar lung transplantation. After treatment of postoperative right pneumothorax, a perfusion lung scan revealed deficient perfusion in the left lung. Pulmonary angiography showed a severe stenosis in the left pulmonary artery just distal to the anastomosis. Percutaneous balloon angioplasty improved both pulmonary perfusion and respiratory function.

#2008 European Association for Cardio-Thoracic Surgery. Published by Elsevier B.V. All rights reserved.

Keywords: Transplantation; Lung; Anastomosis; Surgery; Complications

1. Introduction

Pulmonary arterial stenosis after lung transplantation is rarely reported [1—3] compared with common complications such as rejection, infection, and failure of bronchial anastomosis. However, this stenosis usually required surgical correction and it often causes poor prognosis even after surgical correction [1]. We report a case of stenosis of pulmonary artery following lung transplantation, which was successfully treated by percutaneous transluminal balloon angioplasty without deployment of vascular endoprosthesis.

2. Case report

A 49-year-old female with end stage diffuse bronchiectasis with sinusitis received bilateral living donor lobar lung transplantation in April, 2002. On postoperative day (POD) 39, the patient developed right pneumothorax, which required chest tube drainage for 3 days. A scintigraphic perfusion scan on POD 44 showed severe hypoperfusion of the left lung, which was only 18% of the total pulmonary flow. Pulmonary angiography and multidetector-row computed tomography (MD-CT) (Fig. 1) revealed a stenosis just distal to the anastomosis of left pulmonary artery. It was decided to treat this stenosis percutaneously. On POD 52, balloon angioplasty was performed using 6, 8, and 10 mm balloon (Cordis Endovascular, Warren, New Jersey, USA) and 12 mm balloon (Cook, Bloomington, Indiana, USA) and the stenosis of the pulmonary artery was successfully corrected. The subsequent perfusion of the left lung is shown in the Table 1. The scintigraphic perfusion scans confirmed gradual improvement in perfusion of the left lung. The patient was discharged on POD 235, 183 days after balloon angioplasty from the hospital without recurrence of the stenosis. The patient died one year and a half after transplantation due to the recurrence of sinusitis and bilateral diffuse bronchiectasis with pseudomonas aeruginosa infection. No autopsy was performed.

3. Discussion

Vascular anastomotic stenoses are an infrequent complication of lung transplantation that have high mortality and morbidity. Pulmonary arterial anastomotic stenosis is a rare, but serious, complication defined as a minimal anastomotic diameter of less than 75% of that of neighboring vessels [2]. Pulmonary angiography is the preferred method of diagnosis to examine the pulmonary morphology.

Treatment options for pulmonary arterial anastomotic stenosis include conservative management, reoperation, or angioplasty and stent insertion [4—6]. Clark et al. [1] suggested that reoperation is advisable unless the patient has other problems to which the stenosis is not contributing, and dilatation and stenting should be considered when the risks of reoperation are substantial. Waurick et al. [6]
described that percutaneous balloon stenting alone is insufficient for high-grade pulmonary artery stenosis because of elastic recoil.

In the present case, the immediate postoperative condition had been uneventful. However, on POD 39 after transplantation, the patient developed right pneumothorax which was treated by chest tube drainage, and 5 days after the development of pneumothorax and chest tube drainage, the perfusion scan revealed severe hypoperfusion of the left lung and MD-CT revealed a stenosis of the left pulmonary artery. We speculated that the cause of the stenosis might be due to the contralateral right pneumothorax. The collapsed right lung resulted in the mediastinal shift, and then the resultant shift and overinflation of left lung graft may have bent the left pulmonary artery. It is also possible that the length of donor pulmonary artery has been too long for anastomosis. In our case, balloon angioplasty for the stenosis of the pulmonary artery was successful. The reason for successful treatment only with balloon plasty without stent insertion is because it is suspected that the stenosis may have had early onset when it was diagnosed by perfusion scan. The scintigraphic perfusion of left lung had increased by 9% on day 6 after balloon angioplasty, and improved a further 10% on 174 days after angioplasty. This gradual improvement suggests the angioplasty may not have been the sole factor responsible for the improvement. It should be also considered that angioplasty could potentially be hazardous depending on exactly what the technical problem is, the surrounding postoperative adhesion status, and the pulmonary artery pressure.

In our opinion, balloon angioplasty should be considered for selected case with early onset of pulmonary artery stenosis and if angioplasty does not work then it does not preclude a surgical intervention.

References


Table 1

| POD after transplant | 44 | 52 | 58 | 87 | 128 | 177 | 226 |
| Days after angioplasty | 0 | 6 | 35 | 76 | 125 | 174 |     |
| Perfusion (%) | 18 | 27 | 25 | 32 | 39 | 37 |     |

* Perfusion of left lung on perfusion scan. Results are given in percentage of perfusion of both lungs.