Bilateral Lung Transplant for Bronchioloalveolar Carcinoma: First Case in China

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Abstract

Because of the potential risk of recurrence and dissemination, lung carcinoma is rarely considered an indication for lung transplant, but as the technique has improved, novel end-stage pulmonary diseases can be treated successfully. Experience in lung transplant for patients with lung carcinoma has shown that select patients may benefit from this therapy. In this report, we examine the case of a bilateral lung transplant in a young man with bilateral bronchioloalveolar carcinoma. This report suggests that bilateral lung transplant might be an efficient therapeutic option for select patients with lung carcinoma.

Key words: *Lung transplant, Lung neoplasms, Adenocarcinoma, Bronchioloalveolar*

Case Report

In 2008, a 40-year-old man with lung carcinoma underwent surgical removal of his right, middle, and lower lobes, and bronchioloalveolar carcinoma was identified by pathological examination (PT4N0M0, stage IIIb). After surgery, chemotherapeutics (gemcitabine and cisplatin) were administered 4 times; however, 1 year later, he complained of cough and expectoration. Positron emission tomography - computed tomography showed multiple, bilateral pulmonary nodules without any extrapulmonary metastases (Figure 1A), and treatments of gefitinib, erlotinib, and pemetrexed were performed subsequently from September 2009 to October 2010. Regrettably, symptoms and radiologic findings had not changed at all (Figure 1B). As no effective surgical or medical treatment options were available, he was considered a bilateral lung transplant candidate. Another positron emission tomography - computed tomography was performed to rule out extrapulmonary disease.

A preoperative echocardiogram showed left ventricular ejection fraction of 62% without tricuspid regurgitation. Pulmonary function tests showed a moderate restriction, forced vital capacity of 1.93 liters and FEV_1 of 1.1 liters (36.5% and 32% of predicted), with severe diminishing of diffusion capacity; he was considered type II respiratory failure (PaO_2 52 mm Hg, $PaCO_2$ 56 mm Hg).

All protocols were approved by the ethics committee of the institution before the study began, and the protocols conformed with the ethical guidelines of the 1975 Helsinki Declaration. Written, informed consent was obtained from the patient for a double-lung transplant. Eight days after his admission, a 28-year-old, 75 kg, 170-cm local male donor became available.

The patient underwent a bilateral lung transplant on October 21, 2010, and no extracorporeal circulatory assistance was used. Access to the patient was gained via a bilateral anterolateral thoracotomy in the fifth intercostal space without a transsternal incision.

The right lung was removed first. Because the patient had a history of lobectomy, the right thoracic cavity was somewhat smaller than normal. At surgery, we placed the lung partially outside the cavity during implantation of the second organ because of the disproportion of the right cavity and the implanted lung. The whole left lung was used.

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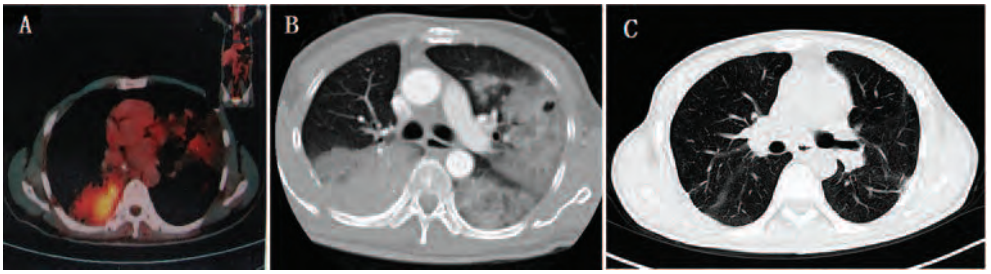
Experimental and Clinical Transplantation (2012) 5: 519-521

DOI: 10.6002/ect.2011.0186

Figure 1. Clinical Radiologic Features of the Patient



(A) Preoperative PET-CT scan showing bilateral multiple nodules and mass without positive lymph nodes or extrapulmonary metastases. (B) Preoperative CT chest scan showing diffuse bilateral ground-glass opacities and nodules. (C) CT scan of the chest obtained 12 months after surgery showing satisfactory re-expansion of double lungs with no evidence of recurrence.

At the end of the procedure, a right lower lobectomy was performed to adjust the rest of the lobe to the smaller pleural cavity.

The same histopathology findings were observed. Routine therapies were performed perioperatively, and the patient was discharged 66 days after surgery. During the hospital stay, the patient experienced a left-side pneumothorax, which was treated surgically. There was no clinical or radiologic evidence for recurrence of lung carcinoma at his latest follow-up 12 months after surgery (Figure 1C); nevertheless, long-term follow-up is required.

Discussion

In 1963, Hardy and associates performed the first human lung transplant for 1 patient with stage IIIb lung carcinoma. Because of a lack in lung transplant techniques, this patient died of renal failure 18 days after surgery.[1] Until 1983, the first successful human lung transplant was reported,[2] and since then, lung transplant has become an efficient therapeutic option for end-stage pulmonary diseases. Nevertheless, malignancy has been considered a relative contraindication for lung transplant (the role of lung transplant for localized bronchioalveolar carcinoma remains controversial).[3]

The first successful treatment for bronchioloalveolar carcinoma (BAC) by lung transplant was reported by Etienne and associates,[4] and their patient had been free of relapse 5.5 years after the transplant in 1997. Paloyan and associates[5] shared that the tendency of BAC not to spread as rapidly outside the lungs made it a suitable disease for lung transplant.

One article in 2004 retrospectively analyzed 26 cases of BAC treated by lung transplant and drew the following conclusions[6]: First, survival rates for the 26 patients were similar to the overall survival reported by the International Society for Heart and Lung Transplantation registry in 2003, with a 5-year survival of 45% and a 10-year survival of 23%. The rates for BAC patients were 39% and 31%, and the 5-year recurrence-free survival was 35%. Four patients died postoperatively (primary graft dysfunction, n=2; right ventricular failure, n=1; and cardiogenic shock, n=1). Among the 22 patients who survived the operation, 13 developed recurrence between 5 and 49 months (median, 12 mo) after transplant, and 9 of them died between 11 and 82 months (median, 22 mo) after transplant. Second, survival rates for patients with stage I approached overall survival reported by the International Society for Heart and Lung Transplantation registry and were even better than the overall survival reported by the International Society for Heart and Lung Transplantation registry. Few of them developed recurrences, while most patients with stage II and III bronchogenic carcinoma developed recurrences and died within 1 year of transplant.

This is the first case of lung transplant for lung carcinoma in China. Bronchioloalveolar carcinoma was identified, and the patient had recurrence and dissemination leading to respiratory failure. As a result, a lung transplant was performed with the permission of the local ethics committee. Our patient was discharged from hospital 66 days after surgery; he was followed-up 12 months and showed no evidence of cancer relapse. Further research is required to focus on the mechanisms of recurrence and long-term survival rate. Nevertheless, lung transplant can be performed in select cases of bronchioloalveolar carcinoma.

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