Partial resolution of acute interstitial pneumonia in native lung after single lung transplantation

D S Robinson, D M Geddes, D M Hansell, C D Shee, C Corbishley, A Murday, B P Madden

Abstract
The case of a 49 year old man presenting with rapidly progressive interstitial lung disease is described. Radiological findings and the lung biopsy specimen were compatible with an acute interstitial pneumonia, as was the relentless clinical course culminating in hypoxic respiratory failure. After right single lung transplantation there was considerable improvement in lung function and radiographic clearing of disease in the native left lung. (Thorax 1996;51:1158-1159)

Keywords: acute interstitial pneumonia, transplantation.

The label of Hamman-Rich syndrome has been applied to several interstitial lung diseases including idiopathic pulmonary fibrosis. However, recent reviews have clarified that the acute syndrome as originally described is distinct from idiopathic pulmonary fibrosis and represents an organising form of diffuse alveolar damage termed acute interstitial pneumonia. We present a case of acute interstitial pneumonia which failed to respond to high dose oral corticosteroids or cyclophosphamide, but showed unequivocal improvement in the remaining native lung following single lung transplantation for fulminant respiratory failure.

Table 1 Lung function before and after lung transplantation was performed on 1 July 1994

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV (ml)</td>
<td>3030</td>
<td>2020</td>
<td>2140</td>
<td>3050</td>
</tr>
<tr>
<td>FVC (ml)</td>
<td>3900</td>
<td>2110</td>
<td>2380</td>
<td>3610</td>
</tr>
<tr>
<td>TLC (ml)</td>
<td>5750</td>
<td>3180</td>
<td>4010</td>
<td>5060</td>
</tr>
<tr>
<td>RV (ml)</td>
<td>1850</td>
<td>1060</td>
<td>1610</td>
<td>1140</td>
</tr>
<tr>
<td>TLCO (mmol/min/kPa)</td>
<td>8.65</td>
<td>3.50</td>
<td>4.56</td>
<td>5.69</td>
</tr>
<tr>
<td>V̅A (ml)</td>
<td>5650</td>
<td>2440</td>
<td>4400</td>
<td>5100</td>
</tr>
<tr>
<td>KCO (mmol/min/kPa/l)</td>
<td>1.53</td>
<td>1.43</td>
<td>1.03</td>
<td>1.11</td>
</tr>
</tbody>
</table>

FEV = forced expiratory volume in one second; FVC = forced vital capacity; TLC = total lung capacity; RV = residual volume; TLCO = carbon monoxide transfer factor; V̅A = alveolar volume; KCO = carbon monoxide transfer coefficient.
influenza A and B, coxiella, chlamydiae, Epstein-Barr virus and cytomegalovirus were negative, as was the autoimmune profile (rheumatoid factor, antinuclear factor, dsDNA antibodies, immune complexes, pANCA and cANCA). The results of electrocardiography and echocardiography were normal. Arterial blood gas tensions were Pao₂ 7.69 kPa and Paco₂ 4.65 kPa breathing air.

Because he had shown symptomatic progression on high dose steroids these were reduced to allow an open lung biopsy specimen to be taken which showed moderate interstitial inflammation, together with loose myxoid interstitial fibrosis with little well polymereised collagen. The alveolar walls were thickened and there was intra-alveolar organisation.

He continued to deteriorate and in April 1994 he was started on cyclophosphamide 150 mg daily and prednisolone 10 mg daily. However, by June he was short of breath on minimal exertion. His Pao₂ was 5.6 kPa and Paco₂ was 4.5 kPa on air. His lymphocyte count was 0.1 × 10⁹/L compatible with the immunosuppressive treatment, but there was no culture or serological evidence of infection. The chest radiograph suggested progressive disease. His condition worsened rapidly to a point where his Pao₂ on 95% inspired oxygen was 6.5 kPa with Paco₂ 4.51 kPa, and he therefore underwent right single lung transplantation. He made good postoperative progress. His immunosuppressive regimen was cyclosporin A 200 mg twice daily, azathioprine 125 mg daily, and prednisolone 15 mg daily. He was discharged from hospital on the 29th postoperative day and continued well at home six months later.

Histological examination of the explanted right lung showed florid, diffuse interstitial and intra-alveolar fibrosis. In some areas there was evidence of hyaline membrane formation. There was marked associated type II pneumocyte hyperplasia. Intra-alveolar macrophages were prominent, but there was little inflammatory infiltrate. No evidence of infection was seen and no granulomas were present. These appearances were consistent with an acute interstitial pneumonia.

Follow up showed a marked improvement in his lung function (table 1) and this was reflected in the chest radiograph (fig 1B) and computed tomographic (CT) scan which showed considerable resolution of the abnormalities previously seen in the native left lung.

**Discussion**

Pathologically, acute interstitial pneumonia is characterised by extensive alveolar damage with hyaline membrane formation in most cases, relatively uniform thickening of alveolar walls with oedema, fibroblast and type II pneumocyte proliferation, but relatively little fibrosis or inflammatory infiltrate. These findings are similar to those in diffuse alveolar damage seen in adult respiratory distress syndrome.

The appearances on the CT scan have been reviewed and include diffuse ground-glass attenuation and air space shadowing in a pattern similar to that seen in the adult respiratory distress syndrome. The pathology and radiology are thus distinct from chronic idiopathic pulmonary fibrosis. Olson et al reviewed the features of 29 cases of acute interstitial pneumonia. The mean age at presentation was 50 years, with both sexes affected equally. All had a prodromal illness with features of viral upper respiratory tract infection (in this case), which had been present for a mean of 18 days. All developed respiratory failure requiring mechanical ventilation. Twelve (41%) survived after a mean hospital stay of 48 days.

The pathology showed diffuse oedema and interstitial fibroblast and type II pneumocyte proliferation. This is similar to changes seen during the organising phase of diffuse alveolar damage which may result from a number of causes including oxygen therapy. As in the case described here, all patients reviewed had received oxygen before a biopsy specimen was taken so that oxygen toxicity could not be entirely excluded. However, similar changes were seen in the original Hamman and Rich cases described before the advent of oxygen therapy.

The patient described here showed a rather slower progression of his disease than the cases reviewed by Olson et al, although the deterioration over a period of 4–6 months is similar to the cases described by Hamman and Rich.

We cannot distinguish between a “bridging effect” allowing spontaneous improvement of the left lung and a potential beneficial effect from the immunosuppression used following transplantation. However, before transplantation there had been no response to cyclophosphamide and prednisolone in doses sufficient to reduce the lymphocyte count to 0.1 × 10⁹/L. There are no data on the effects of azathioprine and cyclosporin in acute interstitial pneumonia, and trials in interstitial pulmonary fibrosis do not show a conclusive benefit.

In conclusion, we believe that this case demonstrates the first report of improvement in acute interstitial pneumonia in a native lung following single lung transplantation. It is important that this condition is recognised since the potential recovery rate is different from that of idiopathic pulmonary fibrosis and more aggressive supportive therapy may be beneficial in acute interstitial pneumonia.

Partial resolution of acute interstitial pneumonia in native lung after single lung transplantation.

D S Robinson, D M Geddes, D M Hansell, C D Shee, C Corbishley, A Murday and B P Madden

Thorax 1996 51: 1158-1169
doi: 10.1136/thx.51.11.1158

Updated information and services can be found at:
http://thorax.bmj.com/content/51/11/1158

These include:

**Email alerting service**
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

**Notes**