Peer reviewed article

The puzzling coexistence of different histological changes in the same transplanted lung

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Summary

Large fragments of a transplanted lung from living lung recipients are rarely available. The case presented is that of a patient who underwent lingulectomy after a gunshot trauma. We describe the patchy panel of histological findings encountered in the resected specimen, ranging from normal lung to zones of acute and chronic rejection. Such contrasting findings have already been described, but should prompt us to exercise caution when interpreting histological results of routine transbronchial biopsies.

Key words: lung; transplantation; pathology

Case report

Introduction

Concomitant diagnoses in lung transplant recipients have only occasionally been reported. We report here on a patient presenting with a wide array of simultaneous diagnoses.

Clinical history

This 45-year old male patient underwent double lung transplantation for primary pulmonary hypertension in February 2000. Transplantation was carried out under extracorporeal cardiopulmonary bypass, with ischaemic times of 3h 45min and 5h 30min for the right and the left lungs respectively. Maintenance immunosuppression consisted of mycophenolate mofetil (2x1 g/d), tacrolimus (target blood level: 10 µg/L), and prednisone (7.5 mg/d).

Best postoperative FEV_1 (3.58 L; 99% of predicted) was reached within 3 months of transplantation. Bronchiolitis obliterans syndrome (BOS) stage 0-p was diagnosed in August 2000 and progressed rapidly to stage 3 over the next 18 months. While no acute rejection (AR) episodes occurred in the first three years and despite a BOS-driven decision to increase immunosuppression, four episodes of AR (grade A2) occurred between May 2003 and December 2004. All were successfully treated (histology-proven resolution) with a standard 3-day course of high-dose methylprednisolone (15 mg/kg).

During a bout of depression in March 2005 the patient fired a 5.6 mm bullet into his left chest; the point of entry was on the midclavicular line in the 3rd intercostal space, and the exit wound was close to the tip of the left scapula. He was intubated and two chest tubes drew 350 cc of blood over 24 hours. Despite large-spectrum prophylactic antibiotic therapy, sepsis occurred on the 11th day of the ICU stay. Thoracic CT scan showed a cavity in the left lower lobe which was interpreted as a possibly infected haematoma.

Material and methods

Left exploratory thoracotomy revealed a totally hepatised lingula which was resected and a 5-cm hollow cavity, created by the entry of the bullet, in the apical segment of the left lower lobe, which was simply cleaned (lower lobectomy in addition to lingulectomy was felt unrealistic). Intraoperative cultures were all negative. Nevertheless the postoperative course was slowed down by lung cavity infection with *Klebsiella pneumoniae*, *methicillin-resistant Staphylococcus aureus*, and *Enterococcus faecalis* which was treated conservatively. The patient left hospital 2.5 months after admission and follow-up has been uneventful for nearly four years to date.

Results

Histology of the resected specimen showed a vast array of findings ranging from normal lung to AR (A3), chronic rejection, organising pneumonia, and contusion (fig. 1–4).

The authors have no conflicts of interest to disclose.

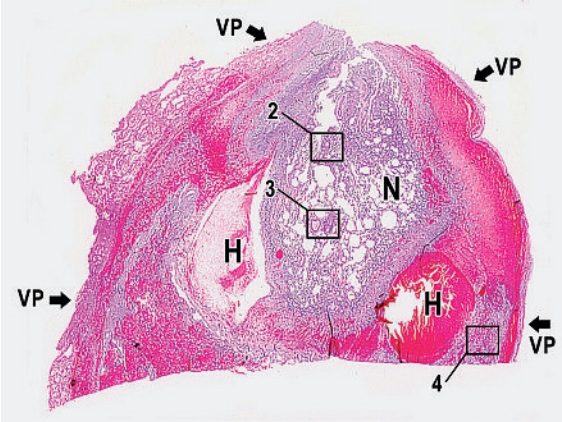

Figure 1

Macroscopic view of the tip of the resected lingula (no magnification) showing in its centre a triangular pulmonary lobule limited by two areas of haematoma (H) caused by the bullet. The visceral pleura (VP) is thickened due to acute fibrinous pleuritis. Areas in boxes are magnified in the next three figures (haematoxylin-eosin). N = zone of normal lung.

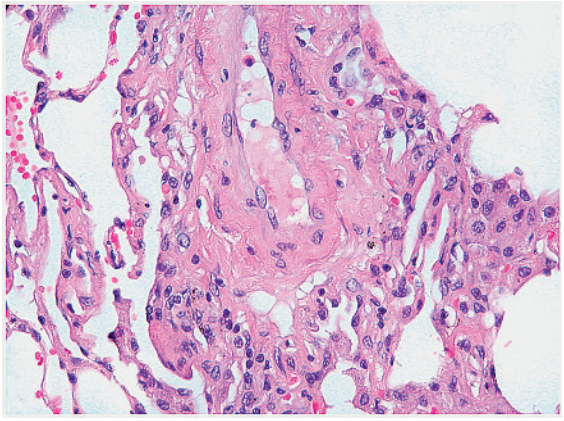

Figure 2

Minimal AR (A1) with lymphocytic perivascular infiltrates (haematoxylin-eosin, magnification 200x).

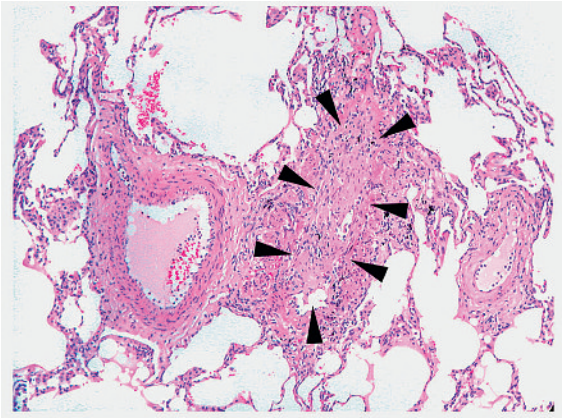

Figure 3

Chronic rejection (obliterative bronchiolitis). The terminal bronchiole is delineated by arrows and filled with dense fibrous material (haematoxylin-eosin, magnification 25x).

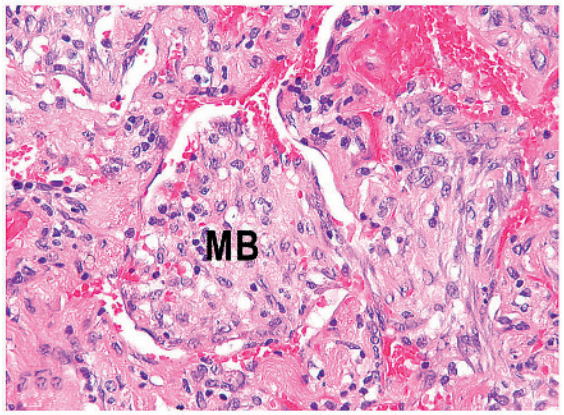

Figure 4

Focal organising pneumonia composed of Masson bodies (MB) (haematoxylin-eosin, magnification 200x).

Discussion

This report describes three different but simultaneous parenchymal lesions in a lung transplant recipient who underwent bisegmentectomy for a self-inflicted thoracic gunshot wound. The unusually large size of the resected lung parenchyma offered a rare opportunity to illustrate patchy distribution of both acute and chronic lung rejection, which is constantly described but rarely shown [1].

Bronchoscopy with transbronchial biopsy (TBBx) is usually helpful in diagnosing acute rejection (AR) in lung recipients. The overall performance of TBBx remains however suboptimal, with sensivities ranging from 51% up to 94%, depending on the number of specimens and sites that are biopsied. When compared to surgical lung biopsy (SLBx) procedures, TBBx have been shown to underestimate overall histopathological diagnoses by 33% and to have a tendency to understimate the histological grade of rejection, especially for grades ≥A2 [2].

With regard to chronic rejection, obliterative bronchiolitis (OB) is unlikely to be diagnosed with TBBx. In a prospective analysis of over 1200 TBBx, OB averaged only 0.9% [3]. Reported sensitivities of TBBx and SLBx in the diagnosis of chronic rejection are 0 and 85% respectively, highlighting the importance of sample size for this diagnosis [2].

The third concurrent diagnosis found in the case presented is organising pneumonia. As in the case of OB, this diagnosis usually requires SLBx [5]. TBBx sensitivity for organising pneumonia ranges from 0 to 1.4%, but rises to 9% when a surgical biopsy is performed. In its analysis of 1235 TBBx the Australian study found only 18 cases of organising pneumonia (1.4%) [3]. Similarly, a report from Alabama found, in a series of 42 cases, four instances of organising pneumonia established at SLBx after an unsuccessful attempt with TBBx. Organising pneumonia in transplant recipients is a secondary process, a non-specific reac-

tion to an injury occurring in 1–10% of patients and most often described in association with infection, rejection (in the majority of cases acute), acute lung injury and aspiration. All of these factors (except aspiration) were present in our patient.

Concomitant diagnoses in lung transplant recipients have only occasionally been reported. The Pittsburgh report documented one case of diffuse alveolar damage with OB [2], and the study from Alabama one case of organising pneumonia with OB [5]. Finally, in the mid-nineties, a large retrospective review from Toronto with 887 TBBx, 42 SLBx and 49 autopsies identified 11 cases of organising pneumonia with simultaneous AR.

To the best of our knowledge this is the first report to illustrate the coexistence of three different pathologies in the same transplanted lung and to emphasise the usefulness of surgical lung biopsies. While TBBx should remain the "gold standard" for diagnosis of lung AR, SLBx should be considered in lung transplant recipients whose functions deteriorate despite apparently appropriate therapy. Such an attitude is the closest possible approximation to a correct diagnosis and should help avoid potentially toxic drugs, especially when the latter are administered blindly.

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