**Pneumocystis carinii** pneumonia presenting with pneumomediastinum in an HIV-positive patient

Sheila Moss, Peter B Carey, Charles RK Hind

**Summary**

A 19-year-old man presented with community-acquired pneumonia, complicated by pneumomediastinum. Subsequently he was found to be HIV-positive, and to have *Pneumocystis carinii* pneumonia.

**Keywords:** *Pneumocystis carinii*, Pneumomediastinum, HIV disease

**Introduction**

Pneumomediastinum without pneumothorax is an unusual, though well-documented, complication of a variety of medical and surgical conditions. We report the case of a patient with pneumomediastinum without pneumothorax, who presented with *Pneumocystis carinii* pneumonia as a complication of previously undiagnosed HIV infection.

**Case report**

A 19-year-old male drama student presented to a local hospital’s casualty department on Boxing Day with a four-week history of a dry cough, increasing shortness of breath, fever and nausea. In the preceding week he had developed watery diarrhoea for which his general practitioner had prescribed metronidazole. There was no past medical history of note and in particular no history of asthma, smoking, foreign travel or inhaled or intravenous drug misuse. He was otherwise well, but had lost nearly 40 kg in weight over the last 12 months.

On examination he looked unwell and was febrile. He had labial herpes simplex infection and gingivitis, with marked cervical lymphadenopathy. His pulse rate was 110 beats/min; there were no heart murmurs and his blood pressure was 110/60 mmHg. Auscultation of his lung fields revealed fine bilateral basal crepitations. There were no abnormal abdominal or neurological signs.

Emergency investigations revealed the following: haemoglobin 12.0 g/dl with normal indices; white cell count 3.1 × 10^9/l with marked lymphopaenia; platelet count 220 × 10^9/l. Renal and liver function tests were normal. Arterial blood gas measurements were not performed. His chest X-ray showed increased shadowing throughout both lung fields. Sputum culture revealed normal flora only, and staining for acid- and alcohol-fast bacilli was negative. Blood cultures were also negative. A provisional diagnosis of atypical pneumonia was made, and treatment with intravenous erythromycin 500 mg 6-hourly was commenced. After 24 hours he was apyrexial. A subsequent glandular fever slide test was positive and tuberculin skin test negative. The antibiotics were stopped, and he was allowed home after 12 days.

Within four days he returned to hospital with pleuritic chest pain, breathlessness, fevers and neck swelling. On examination there was central cyanosis, and subcutaneous emphysema was noted in his neck. His chest X-ray showed evidence of a pneumomediastinum, without pneumothorax (figure). Arterial blood gas analysis revealed pO_2_ 3.6 kPa, pCO_2_ 5.0 kPa and pH 7.42 (breathing air).

Despite intravenous amoxycillin and clavulanic acid (1 g 6-hourly) and supplementary oxygen (60%), his condition continued to deteriorate. Following an opinion from a respiratory specialist he was counselled for HIV antibody testing, though denied any risk factors. The HIV test was positive.

A clinical diagnosis of *Pneumocystis carinii* pneumonia (PCP) was made and high dose intravenous cotrimoxazole (120 mg/kg) therapy was started, and therapy with 60% oxygen continued. He was transferred to a specialist centre for AIDS care. Within 24 hours his condition had further deteriorated, and he was observed, though not initially ventilated, on an Intensive Care Unit. Neither

**Figure** Chest X-ray showing subcutaneous emphysema, pneumomediastinum and a ground-glass appearance of both lung fields
Pneumonia complicated by pneumomediastinum

Steroid treatment or nasal continuous positive airway pressure therapy were given, for fear of increasing the presumed alveolar leak into the mediastinum. After three days, however, he developed acute pleuritic pain and worsening breathlessness. A chest X-ray showed a large pneumothorax. He was therefore sedated, paralysed and ventilated via an endotracheal tube. An intercostal chest drain was inserted. A subsequent fibreoptic bronchoscopy and bronchoalveolar lavage revealed cysts of *Pneumocystis carinii*.

Despite anti-pneumocystis treatment he remained on a ventilator for four weeks, until his death from multi-organ failure secondary to staphylococcal septicaemia. No post-mortem examination was held.

**Discussion**

Pneumomediastinum without pneumothorax may arise for a variety of reasons (see box) including cavitating pneumonia caused by *Klebsiella* spp and *Mycobacterium tuberculosis*.1 Hitherto, pneumomediastinum has not been described as a presenting feature of PCP, as occurred in the case reported here. This complication has, however, been described in cases of PCP following fibreoptic bronchoscopy with lavage, transbronchial biopsy, and mechanical ventilation.2-4 In addition, cases of PCP presenting with a pneumothorax are increasingly recognised, particularly in second or third episodes of this infection.5-6

<table>
<thead>
<tr>
<th>Causes of pneumomediastinum without pneumothorax</th>
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<tbody>
<tr>
<td>Raised intrathoracic pressure:</td>
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<tr>
<td>- asthma</td>
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<td>- barotrauma</td>
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<td>Ruptured oesophagus:</td>
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<td>- spontaneous following instrumentation</td>
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<td>Cavitating pneumonia:</td>
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<tr>
<td>- <em>Aspergillus</em> spp</td>
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<tr>
<td>- <em>Klebsiella</em> spp</td>
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<tr>
<td>- <em>Mycobacterium tuberculosis</em></td>
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<td>Inhaled drugs:</td>
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<td>- ecstasy</td>
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<td>- cocaine</td>
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<tr>
<td>Miscellaneous:</td>
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<tr>
<td>- dental extraction arthroscopy</td>
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</table>

The air leak is thought to arise from cystic lesions (pneumatoceles) caused by proteases released by activated macrophages, and ischaemic necrosis of vessels caused by *Pneumocystis carinii*. Air may escape from a pneumatocele and track along the vascular sheath to the hilum, and then to the mediastinum.1 The presence of air in the mediastinum prevented optimal treatment of this patient’s severe PCP. Neither steroid therapy or continuous positive airway pressure were used because of the fear that these therapies might cause further leak of air into the mediastinum.7,8

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8 Miller RF, Semple SJG. Continuous positive airways pressure ventilation as an alternative to mechanical ventilation for respiratory failure associated with *Pneumocystis carinii* pneumonia. *Thorax* 1990; 45: 304P.
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S. Moss, P. B. Carey and C. R. Hind

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