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Review

Pneumomediastinum in patients with AIDS: a case report and literature review

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SUMMARY

Objective: Pneumomediastinum is a rare complication of opportunistic infections in HIV-infected patients. However, the relationship between the causative pathogens and the prognosis is unclear. We report the case of a patient with AIDS presenting with community-acquired pneumonia complicated by pneumomediastinum. The cases of a further 10 HIV-infected patients with pneumomediastinum reported in the English language literature are reviewed.
Methods: PubMed was searched for cases of HIV-infected patients with pneumomediastinum published in the English language literature.
Results: Pneumocystis jirovecii is the most common pathogen causing pneumonia and concurrent pneumomediastinum in HIV-infected patients. Only one of the identified cases was caused by cytomegalovirus. Excluding the two cases with incomplete information, the overall mortality rate in the remaining nine cases was 55.5%.
Conclusion: In HIV-infected patients, *Pneumocystis jirovecii* pneumonia can occasionally present as pneumomediastinum. In such cases, adequate appropriate antimicrobial therapy is needed due to the high mortality rate.

1. Introduction

Pneumomediastinum, the presence of interstitial air in the mediastinum, can be caused by trauma, hollow organ perforation, iatrogenic injuries, or infectious diseases, or may even occur spontaneously. In HIV-infected patients, it is an unusual complication of respiratory infections. However, the relationship between pneumothorax, the causative pathogen, and the prognosis is not clear. We report the case of a patient with AIDS, bilateral community-acquired pneumonia, and pneumomediastinum. Further, we summarize the clinical features, pathogens, treatments, and outcomes of a total of 11 cases of pneumomediastinum related to infectious diseases in HIV-infected patients.

2. Case report

A 31-year-old woman presented with fever, productive cough, and progressive shortness of breath of 3 weeks duration. She was a previous intravenous drug user, but was not using drugs at this time. A chest radiograph showed bilateral reticulointerstitial infiltrations and focal consolidation over the right upper lung lobe (Figure 1A). She was treated initially for community-acquired pneumonia with cefotaxime and doxycycline. Urine antigen tests for Legionella and pneumococcal infections were both positive (Alere BinaxNOW *Streptococcus pneumoniae* Antigen Card and Legionella Urinary Antigen Card; Alere Scarborough, Inc., Scarborough, ME, USA). However, progressive dyspnea with respiratory distress developed. A chest computed tomography (CT) scan showed pneumomediastinum, bilateral ground glass infiltrations, and consolidation over the right upper lobe (Figure 1B). Trimethoprim/sulfamethoxazole (TMP/SMX; 15 mg/kg/day of TMP) and methylprednisolone (20 mg twice daily) were prescribed for a suspicion of *Pneumocystis jirovecii* pneumonia (PJP); *P. jirovecii* DNA was later detected in her sputum by PCR. Intubation and mechanical ventilation were later applied for poor oxygenation. Gram stain of endotracheal fluid revealed

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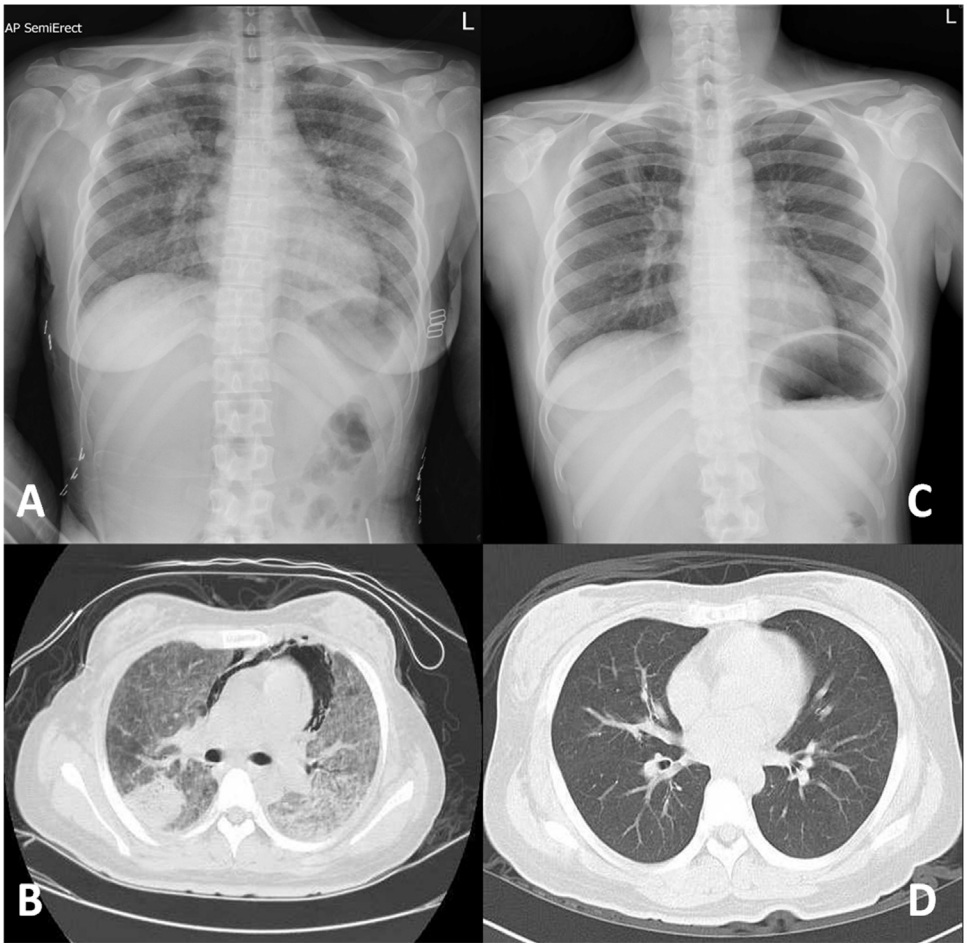

Figure 1. Radiological findings in a 31-year-old woman with HIV infection and community-acquired pneumonia. A chest radiograph at admission revealed bilateral reticulointerstitial infiltrations with focal consolidation over the right upper lung (A), and computed tomography showed ground glass opacities over the bilateral lungs, consolidation over the right lobe, and pneumomediastinum (B). Resolution of the pneumomediastinum and infiltrations over the bilateral lungs on chest radiograph (C) and computed tomography (D) 7 months later.

Gram-positive bacilli, which were further identified as *Nocardia asteroides* complex. She was diagnosed as having AIDS due to the presence of serum HIV-1 antibody, a plasma HIV-1 viral load of 12 700 RNA copies/ml, and a low CD4 count of 13 cells/μl during the hospitalization. She was extubated successfully 2 days later, and highly active antiretroviral therapy (HAART) of efavirenz, lamivudine, and zidovudine was initiated on the 10th day. She completed a total 14 days treatment with azithromycin and cefuroxime for the Legionella and pneumococcal infections. TMP/SMX was given for *P. jirovecii* and Nocardia pneumonia for 20 weeks. A follow-up CT scan 7 months later showed resolution of the pneumomediastinum and bilateral ground glass infiltration (Figure 1C and 1D).

3. Literature review

To identify the reported cases, we searched the PubMed database using several keywords, including pneumomediastinum, pneumothorax, and HIV. Furthermore, in order to identify the prevalence of pneumomediastinum in *P. jirovecii* pneumonia, we used the keywords '*Pneumocystis jirovecii* pneumonia' and 'human immunodeficiency virus', and searched for cases complicated by pneumomediastinum.

4. Results

A retrospective analysis of 11 published cases, including our case, was conducted (Table 1).[1–8] The mean age of patients was 33 years, and 82% were males. According to the available data, the mean CD4 count was 22.8 cells/μl. All enrolled cases had concurrent bilateral pulmonary infiltrations and were treated for pneumonia clinically. *P. jirovecii* was the predominant pathogen, accounting for 10 cases, and only one case was infected by cytomegalovirus. Two cases, including our case, had another pathogen. The clinical diagnosis of *P. jirovecii* infection was based on various methods, including pathological findings of lung biopsy or bronchial examination (eight cases), clinical and radiological characteristics (one case), and PCR (our case). In the cases of PJP, pneumomediastinum was noted as the initial presentation in four cases, during medication treatment in four cases, and as an iatrogenic complication (as a result of ventilator use or lung biopsy) in two cases. Four (31%) cases were complicated by subsequent pneumothorax and received a tube thoracostomy. Three cases had received steroid therapy for PJP and four cases were intubated due to respiratory failure. There was no correlation between intubation and steroid use. Of note, three cases evolved into tension pneumomediastinum and the patients died of this complication. Excluding the incomplete information of two cases, the overall mortality rate was 55.5% among the remaining nine cases.

5. Discussion

Pulmonary complications remain the leading cause of morbidity and mortality in patients with AIDS. According to a prospective