Pneumonia with synpneumonic effusion and bacteraemia: *Streptococcus pluranimalium* infection in a healthy adult

Introduction

Streptococcus pluranimalium was discovered as a new species of Streptococcus in 1999. It is a viridans streptococci that causes diseases in cows such as mastitis (Devriese et al, 1999) and reproductive problems such as abortion, stillbirth and vaginitis (Foster et al, 2010; Twomey et al, 2012).· Only a few cases of disease in humans have been reported. This organism has been isolated from subgingival plaque samples (Dhotre et al, 2016), humans with subdural empyema (Aryasinghe et al, 2014), infective endocarditis (Fotoglidis

Case report

A 34-year-old man who worked as a manual labourer, with no significant past medical comorbidity, presented to the authors' hospital complaining of fever, cough and runny nose of 3 days' duration, right-sided chest pain of 1 day duration and mild breathlessness. On examination, he was febrile (101 °F) and his pulse was 100/minute and regular. Blood pressure was 100/60 mmHg, and his respiratory rate was 22 breaths/minute. Oxygen saturation was 92% on room air. Respiratory examination revealed bilateral basal end-inspiratory crepitations. Cardiovascular examination was normal. His abdomen was soft and there was no organomegaly.

His investigation results were as follows: haemoglobin = 14.5 g/dl, total white blood count = 20 300/ul (neutrophils 86%, lymphocytes 4%, monocytes 1%, meta myelocytes 2%, band forms 7%), platelet count = 283 000/ul, erythrocyte sedimentation rate = 7 mm/hr and C-reactive protein = 65 mg/litre. His sodium level was 140 mEq/litre and his potassium was 3.4 mEq/litre. His creatinine level was 1.03 mg/dl, liver function tests were within normal limits, H1N1 polymerase chain reaction was negative. Troponin I <0.01 mg/litre, international normalized ratio was 1.0 and activated partial thromboplastin time was 31 seconds. Echocardiogram was normal. Ultrasound of the abdomen was normal with minimal right-sided pleural effusion and chest X-ray was normal (**Figure 1a**). After taking three blood cultures, the patient was empirically started on intravenous ceftriaxone, and azithromycin and oseltamivir tablets.

A chest X-ray taken on day 2 (**Figure 1b**) showed bilateral lower zone haziness suggestive of pneumonia.

His blood cultures grew *S. pluranimalium*, so the antibiotics were changed to piperacillin-tazobactam from day 2 of admission. Physical examination on day 3 showed decreased air entry in the right infrascapular region. Ultrasound of the chest showed minimal right pleural effusion with right lower zone consolidative changes. He was continued on piperacillin-tazobactam and azithromycin. The patient reported improvement in chest pain but continued to have febrile spikes. On day 8, chest examination revealed decreased breath sounds in the right infrascapular region and so a repeat chest X-ray was done, which showed loculated pleural effusion on the right side (**Figure 1c**).

As ultrasound of the chest showed septated effusion in the right infra-axillary and infrascapular regions, a diagnostic pleural tap was performed. Pleural fluid examination revealed a total white blood cell count of 400 cells/mm^3, neutrophil 90%, lymphocyte 10% and red blood cell count of 1800 cells/mm^3. Lactate dehydrogenase level was 2206 u/litre, pH 7.5 and pleural fluid protein was 6.2 g/dl. Gram stain of the pleural fluid showed inflammatory cells but no organisms. Culture and sensitivity revealed no growth. He was continued on piperacillin-tazobactam. His pain decreased, fever subsided and he was discharged on day 10. He was sent home on oral amoxicillin-clavulanic acid for 2 weeks and advised to return for outpatient review. Two weeks after discharge, he was afebrile and had no chest pain. A repeat chest X-ray showed mild patchy opacity in the right lower zone (**Figure 1d**).

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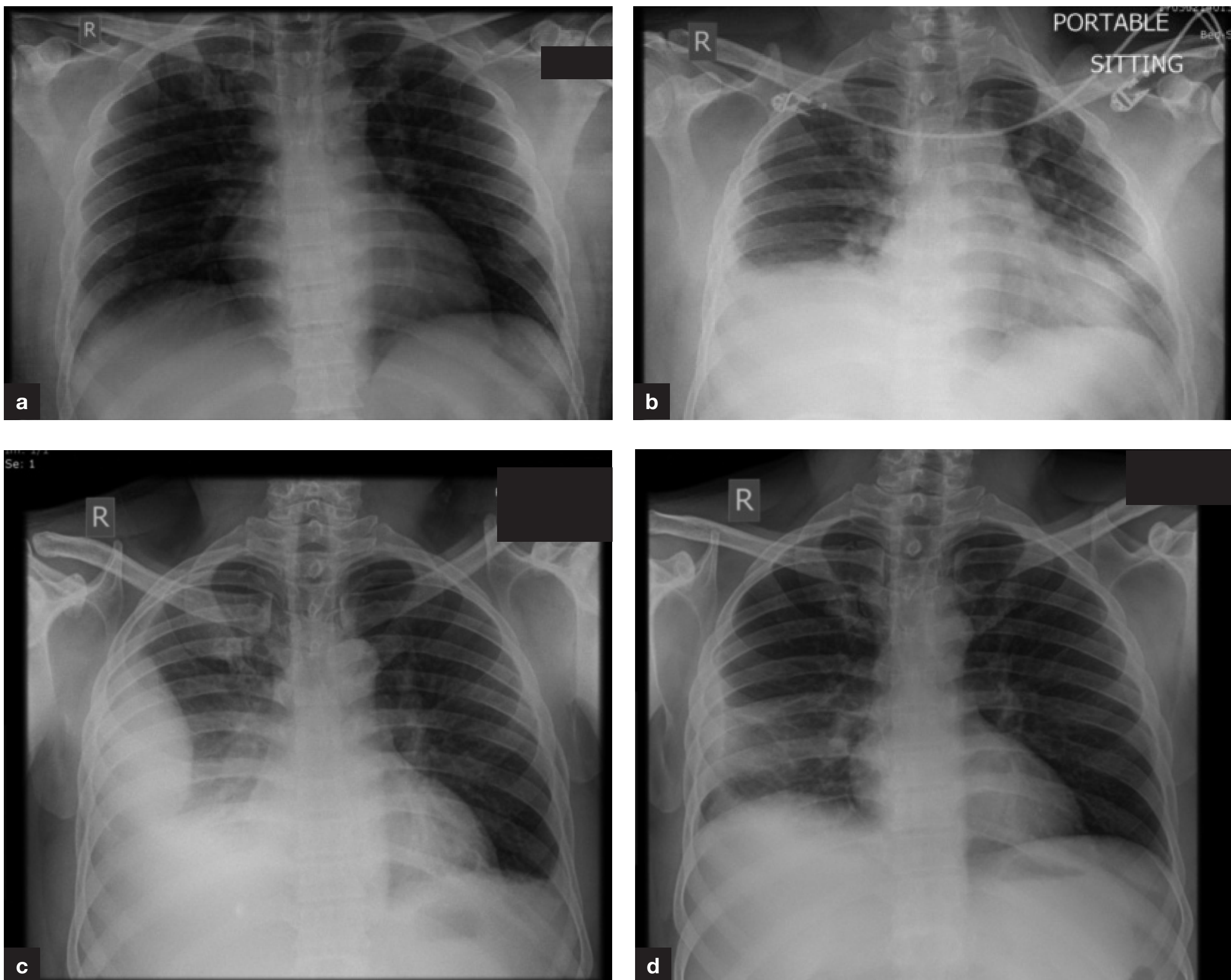

Figure 1. a Day 1 – relatively normal lung parenchyma. b. Day 2 – mild blunting of the right costophrenic angle. c. Day 8 – well-defined loculated pleural effusion on the right side. d. Day 29 – significant interval reduction of right-sided loculated pleural effusion.

et al, 2015), brain abscess (Jayavardhana and Mohanraj, 2015), aortic ring abscess (Kindo et al, 2015), blood cultures of a febrile neutropenic patient (Paolucci et al, 2013), and in a patient with septic arthritis and septic shock (Jacob et al, 2014).

Discussion

Pneumonia is an infection of the pulmonary parenchyma. To the best of the authors' knowledge *S. pluranimalium* has not been found to cause pneumonia, although it has been isolated in humans with brain abscess, infective endocarditis, aortic ring abscess and septic arthritis. As this patient did not report any contact with farm or domestic animals the authors assume that he acquired this infection from the oral cavity.

Conclusions

The mode of acquisition of this disease remains uncertain. The choice of antibiotics and duration of treatment were empirical as there were very few case reports to guide the authors. Further exploration is needed into the mode of transmission of this pathogen and its treatment.

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Learning points

- In humans, only a very few case reports of infections caused by *Streptococcus pluranimalium* have been published.
- This article reports the first ever case of *S. pluranimalium* causing bronchopneumonia in a healthy adult.
- This condition was successfully treated with a combination of antibiotics.

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