Pneumococcus "die hard"

A previously healthy 18-month-boy was admitted via the emergency department with a 2-week history of fever, chills and rigors, cough and coryzal symptoms in 2011. His immunisations were up-to-date, and included three doses of the 10-valent pneumococcal vaccine and a recent booster. His father also reported coryzal symptoms. He was initially treated symptomatically by his general practitioner as an upper respiratory tract infection. The family went on a short trip overseas. The infant became increasingly lethargic with 'shortness-of-breath' and was taken to the emergency department on returning to Hong Kong. The boy had a temperature of 37.3°C, pulse rate of 175 beats/min, and respiratory rate of 36 breaths/min. He had an arterial oxygen percent saturation of 95% on room air, and diminished air entry to left lung; chest radiography showed a left pleural effusion with mediastinal shift to the right (Fig 1). Because of respiratory distress, he was immediately admitted to the paediatric intensive care unit (PICU) and treated with intravenous vancomycin, cefotaxime, and oral azithromycin. Urgent ultrasound-guided placement of a 6-Fr pigtail catheter relieved his symptoms after yielding 25 mL of turbid exudate. Initial investigations showed a normal C-reactive protein (CRP) level (ie <0.6 mg/L) and a white cell count of 10.2 $x10^9$ /L, with 54% neutrophils and 5% reactive lymphocytes.

Nasopharyngeal aspirate revealed no pathogens, including influenza, parainfluenza, respiratory syncytial virus, metapneumovirus, and adenovirus. Repeated chest radiography showed persistent left lower zone consolidation (Fig 2). Blood culture yielded no growth. Despite a full immunisation history, normal serial CRP and white cell differentials, pneumococcal disease was strongly suspected in this young child with acute unilateral pneumonia and pleural effusion. The pleural exudative fluid yielded a total white cell count of 2400/mL, with 88% polymorphs; the smear was negative for acid-fast bacilli but *Streptococcus pneumoniae* serotype 6C was subsequently cultured. The latter organism was sensitive to penicillin (minimal inhibitory concentration [MIC], 0.5 μg/mL) and cefotaxime (MIC, 0.25 μg/mL), but resistant to cotrimoxazole and erythromycin. The boy was discharged from the PICU to the general ward 5 days later to complete his course of antibiotics.

Pneumococcus is an important childhood pathogen.[1-5] Invasive pneumococcal disease gives rise to unlocalised bacteraemia, pneumonia, or meningitis. Despite the availability of effective vaccines, new serotypes continue to evolve.[1-4] The Hong Kong SAR Government introduced the 7-valent polysaccharide vaccine in September 2009. In 2010, the vaccine was changed to the 10-valent vaccine, and in 2011 a recommendation was made to switch to a 13-valent vaccine. In local children, the cover involving the 7-valent or 10-valent, and the 13-valent vaccines was 65% and 90%, respectively.[4] Obviously, pneumococcal immunisation does not guarantee prevention of pneumococcal infection. Antibiotic resistance of pneumococci has also developed in Hong Kong.[4] Among isolates from young children aged <5 years, dual penicillin/erythromycin resistance

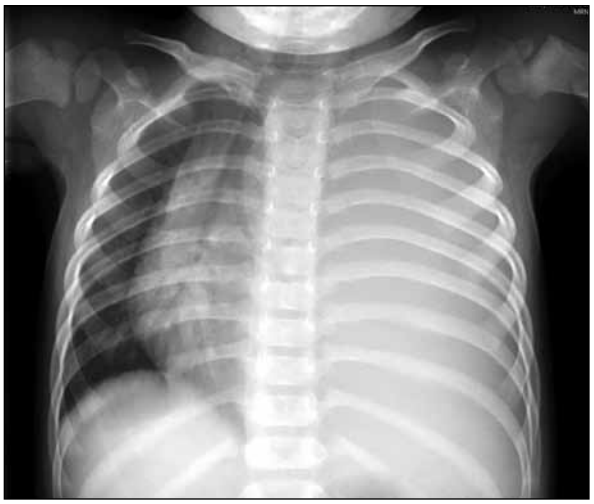

FIG 1. A young child with left pleural effusion and mediastinal shift

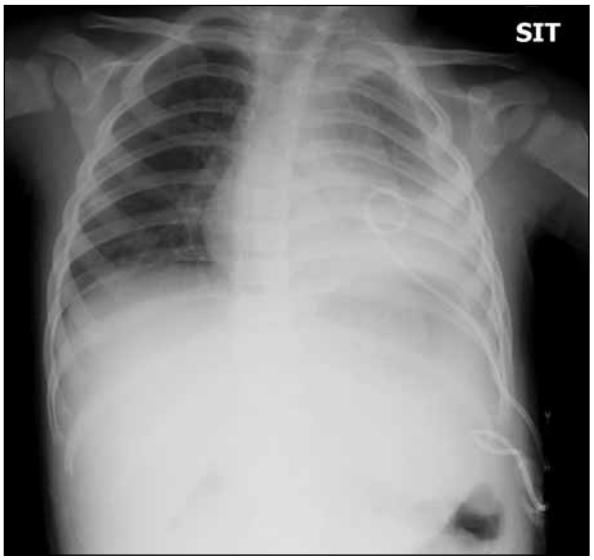

FIG 2. Resolving left pleural effusion following percutaneous placement of pigtail catheter

has increased from 44 to 64% (P=0.01) between 1995 and 2009.[4] The types more likely to have dual penicillin/erythromycin resistance were 6B, 14, 19F, 23F, 6A and 19A.

Serotype 6C associated with severe lobar pneumonia, pleural effusion, and PICU admission has not been previously reported locally. Pneumococcal vaccines protect against serotype 6B, with some cross-protection to all serogroup 6 strains as a whole. However, an increasing frequency of 6C and 6D serotypes has been observed, while that of 6B has decreased.[2-4] The pathogen is difficult to isolate, especially in patients who have already started on antibiotics. It is recommended that intravenous vancomycin and cefotaxime be used initially after cultures are taken to guard against resistant pneumococcus until the pathogen's sensitivity is known. Penicillin can be used against sensitive pneumococci.[1,4] If the pneumonia does not respond satisfactorily, more invasive investigative/therapeutic management becomes necessary, including recourse to a pleural drain for biological speciation and to guide management. Antimicrobial sensitivity patterns in local PICU patients have been reported.[1,4] In this case, the pathogen was susceptible to penicillin and cefotaxime. In patients who do not respond satisfactorily to initial antibiotics despite known sensitivity to penicillin, a higher dose of penicillin should be tried.

Declaration

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