Pneumococcal endocarditis and disseminated infection

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Abstract

A 61 year old woman presented with back pain and clinical signs of meningitis. Pleocytosis in the cerebrospinal fluid was found, but although *Streptococcus pneumoniae* was cultured from her blood it failed to grow from the cerebrospinal fluid. An echocardiogram detected vegetations on the mitral valve and a lesion at S1/S2 was demonstrated on a bone scan. Treatment for one month with benzylpenicillin (1200 mg four hourly) was successful for both the cardiac and neurological components of her infection, but her back pain only resolved after treatment was changed to clindamycin.

The clinical presentation and metastatic spread of the *S pneumoniae* infection is much more commonly seen in the context of *S aureus* endocarditis. It is rare for the pneumococcus to be associated with endocarditis and when it is mortality is usually high. This case shows the metastatic potential of the organism and the requirement for appropriate antibiotics with regard not only to the sensitivity of the organism, but also for the site of infection.

(J Clin Pathol 1992;45:1034-1035)

Case report

A 61 year old Ghanaian woman attended the casualty department giving a four day history of general malaise with pain in the right groin and right buttock radiating down the right thigh. She had been resident in the United Kingdom for eight years. She had no previous history of cardiac problems or of clinically relevant illness. She neither smoked cigarettes nor drank alcohol. At presentation she had a temperature of 37.7°C and blood and protein in the urine on dipstick testing. She was sent home with analgesics, but re-presented to her general practitioner two days later. A urinary tract infection was diagnosed and trimethoprim was prescribed.

Five days later she was admitted to hospital complaining of recent onset of a frontal headache and low back pain. On examination she had a pyrexia of 40°C, was drowsy with pronounced neck stiffness and photophobia, and a positive Kernig's sign. She was confused and abusive. Her heart rate was 120/minute, and her blood pressure was 120/70. She was noted to have a grade 2/6 mitral regurgitant murmur. Bacterial meningitis was diagnosed.

Blood cultures, a full blood count, an ESR and a chest x-ray picture were taken and the patient was given benzylpenicillin, 1.2 g two hourly. The white cell count was $23 \times 10^9/l$ with 89% neutrophils, her ESR was 116 mm/first hour, and the lung fields were clear on chest x-ray picture. A sample of cerebrospinal fluid was obtained which showed 30 white blood cells $\times 10^6/l$ (90% neutrophils), 1280 red blood cells $\times 10^6/l$, a protein concentration of 3.49 g/dl and a glucose concentration of less than 0.5 mmol/l (blood glucose was 7.7 mmol/l). No organisms were seen in the cerebrospinal fluid and pneumococcal and meningococcal antigen latex tests (Wellcome) were negative (neat). There was insufficient cerebrospinal fluid to titre to exclude a prozone effect. Lumbar puncture was repeated 24 hours later showing 350 white cells $\times 10^6/l$ (80% neutrophils), 500 red blood cells/mm³, a protein concentration of 1.86 g/dl and a glucose concentration of 0.1 mmol/l with a blood glucose of 7.7 mmol/l. The pneumococcal latex test was, on this occasion, positive in the cerebrospinal fluid. Three sets of blood cultures also grew a mucoid *Streptococcus pneumoniae* (type 3), which was sensitive to benzylpenicillin, trimethoprim, and clindamycin. The organism was not, however, subsequently grown from either sample of cerebrospinal fluid. In view of the cardiac murmur, echocardiography was performed and showed a large vegetation on the mitral valve. A computed tomogram of the brain was normal. After the first 24 hours treatment was continued with benzylpenicillin at 1200 mg four hourly for one month. Her cardiac function remained stable, but with improvement of her neurological condition she complained again of right sided low back pain. Examination of the right hip was normal. A plain x-ray picture showed some loss of definition of the margins of the L5-S1 disc space, of uncertain relevance. After one month's treatment with benzylpenicillin her ESR had fallen to 75 mm/hour.

Forty eight hours after discontinuing antibiotics she became feverish, with a temperature of 39°C and had a rigor. Repeat echocardiography showed the vegetation to be unchanged. A Technetium-99 bone scan showed high uptake in the region of S1 and S2, but Technetium HMPOA white cell scanning showed reduced uptake in this area. Sampling of the L5-S1 disc space obtained by fluoroscopically controlled needle biopsy showed no pus cells or organisms on Gram staining, and no growth was subsequently obtained. Her sustained ESR at 75 mm/h, her increasingly

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Accepted for publication
30 April 1992

severe back pain, and the bone scan results, in the presence of her recent episode of endocarditis, strongly suggested a presumptive clinical diagnosis of pneumococcal osteomyelitis. Oral clindamycin (300 mg three times a day) replaced the benzylpenicillin. Her fever rapidly settled and the ESR fell to 19 mm/hour over the next month. Her back pain completely resolved within two months of receiving clindamycin. She received a total of 3 months' treatment with clindamycin without any side effects. At follow up, three months after treatment had stopped, her ESR was 13 mm/hour and there was no evidence of vegetations on her mitral valve. One year after her initial presentation she was clinically well, with only occasional backache, and a stable cardiac murmur consistent with mitral regurgitation.

Discussion

The largest prospective study of pneumococcal bacteraemia was published by Gransden, Eykyn, and Phillips from St Thomas's Hospital in 1985.⁴ Seventy eight per cent of the 325 patients studied presented with a bacteraemia and pneumonia alone, as the source of infection. Three patients had pulmonary infection in association with meningitis and endocarditis and one patient also had empyema. All but two of the St Thomas's patients had an underlying predisposing condition in association with their sepsis and only one of the seven patients with endocarditis was not alcoholic or cirrhotic. Of the seven patients with endocarditis, six died and in five the diagnosis was only made at necropsy.

This case thus has several distinctive features. There was no apparent predisposing factor to account for either the initial infection or for its subsequent dissemination. Three major focal sites—the heart, the brain, and the bone—were involved in this infective process but the lungs appeared normal with no evidence of a pneumonia, either clinically or radiologically. Moreover, the initial findings in the cerebrospinal fluid of this patient were not entirely typical. The oral trimethoprim given to the patient for a urinary tract infection probably suppressed the growth of the organism, but the primary event may not have been meningitis but may have been related to the endocarditis, with a clinical presentation of meningism. Such a clinical picture is well described for *S aureus* endocarditis which often presents in this way,⁵ but has not been recorded with the pneumococcus.

Indeed, endocarditis with this organism is rare but mortality is usually high. The association of pneumonia, endocarditis, and meningitis was first described in 1862 by Heschl after necropsy of five patients. Netter then described this association with respect to pneumococcal endocarditis in 1886 in a review of 82 patients

and noted its particular predilection for the aortic valve. Until the introduction of penicillin the disease seems to have been uniformly fatal. Austrian reported eight cases in 1957, six of whom died.⁶ He noted that rupture of the aortic valve was a common and often fatal sequelae of the infection. The aortic valve has been the site of most cardiac infections, but three of the St Thomas's patients did not have infection at this site and our patient had mitral valve endocarditis.

Pneumococcal osteomyelitis is also only rarely reported. Jacobs has recently reviewed 11 cases of paediatric pneumococcal osteomyelitis presenting over a 20 year period.⁷ Coleman reported 14 cases in his study in 1983² and none was reported from the St Thomas's study. Although in the present case the organism was not cultured from the aspirate of L5-S1 obtained after four weeks of high dose benzylpenicillin, the patient's initial presentation involved back pain, and the bone scan was consistent with an inflammatory process. Her ESR and back pain failed to resolve after a long course of high dose (1200 mg two hourly) benzylpenicillin but both rapidly settled when clindamycin was substituted. Clindamycin, an agent now infrequently used in this country, especially in the elderly because of earlier association with pseudomembranous colitis,⁸ is a particularly useful agent in this setting because of its good oral absorption and excellent penetration into bone.

We have presented an unusual case of *S pneumoniae* endocarditis which mimicked, in several salient features, the more familiar presentation of *S aureus* endocarditis. Mortality from *S pneumoniae* septicaemia is high and has increased over the past 14 years. As this case shows, it may present unusually with multi-organ involvement. Aggressive treatment with appropriate antibiotics is required but appropriate consideration to the site of infection with the possibility of metastatic spread of the organism to sites such as heart or bone may need to be considered.

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