Vertebral osteomyelitis due to *Pseudomonas aeruginosa*

M. J. DENHAM
M.D., M.R.C.P.

C. S. GOODWIN
M.D., M.R.C.Path.

Northwick Park Hospital and Clinical Research Centre, Watford Road, Harrow, Middlesex

Summary

A case of vertebral osteomyelitis due to *Pseudomonas aeruginosa* is described and the problems of diagnosis and treatment discussed.

Introduction

Vertebral osteomyelitis, although said to occur most frequently in adolescents or in those over the age of 50 years (Waldvogel, Medoff and Swartz, 1970), is not a common disease of geriatric practice. *Staphylococcus aureus* is the causative organism in about 66% of cases (Winters and Cahen, 1960; Stone and Bonfiglio, 1963; Waldvogel *et al.*, 1970), but infection with *Pseudomonas aeruginosa* as the primary organism appears uncommon. The following is an example.

Case history

A 76-year-old man presented with a 2-week history of severe low back pain, which was worse on movement but did not radiate. Two weeks earlier he had had a transient untreated febrile illness. The only abnormalities on admission were a mid-systolic apical murmur and tenderness on percussion over the upper lumbar vertebrae. Investigations showed a polymorphonuclear leucocytosis and a raised alkaline phosphatase of 14.1 KA.U. Blood cultures were negative, but there was a urinary tract infection with *P. aeruginosa*, sensitive to gentamicin and carbenicillin. Initial X-rays of the lumbar spine showed no definite abnormality, but repeat films taken 1 week later showed osteomyelitis at L1/2. Bone scan showed a 'hot' area at the same level. Intravenous pyelogram was normal.

Pseudomonas aeruginosa was considered the probable cause of the osteomyelitis in view of the urinary tract infection and gentamicin was therefore given. The initial response to treatment was excellent, but later the blood urea and plasma creatinine increased sharply despite a reduction in the frequency of the gentamicin dose. The backache reappeared and signs of spinal cord compression developed. Gentamicin was therefore replaced by sodium fusidate and flucloxacillin. During this phase of the illness the

blood levels of gentamicin did not reach toxic values and vestibular function was not disturbed.

The spinal cord was decompressed at operation, diseased bone removed and a bone graft inserted. A swab taken from L1 later grew *P. aeruginosa* and gentamicin was re-started. The patient made excellent postoperative progress, although a marked rise in plasma creatinine and a development of toxic blood levels of gentamicin required the drug to be stopped again. Blood plasma urea values, however, were only slightly elevated during this period.

Discussion

The non-specific presentation of disease in the elderly makes the diagnosis difficult. The onset of vertebral osteomyelitis is often insidious, leading to general ill health and backache, which may be dismissed as old age. Laboratory results give limited diagnostic help. The ESR is raised, but nearly 25% of elderly at home have an elevated ESR for no obvious reason (Milne and Williamson, 1972). X-rays do not detect osteomyelitis until 6-8 weeks after onset (Stone and Bonfiglio, 1963; Waldvogel *et al.*, 1970), while bone scans merely indicate non-specific 'hot spots'. Bacterial diagnosis is very important, but blood cultures are usually negative in sub-acute and chronic cases and for this reason needle aspiration of the bone has been advocated (Valls, Ottolenghi and Schajowioz, 1948).

Vertebral osteomyelitis due to *P. aeruginosa* is uncommon. None is described in the series of Winters and Cahen (1960), Stone and Bonfiglio (1963) and Waldvogel *et al.* (1970), although Forkner (1960) in his review found six cases, and there is a further report of one case in *Medical World News* (Anonymous, 1973). Bone infection with *Pseudomonas* appears most likely to occur after instrumentation of the urinary tract or following a urinary tract infection, as probably happened in this patient. The reason for predilection of haematogenous osteomyelitis in the vertebral column is not known, but the increasing vascularity of the vertebrae with age may be a factor (Wiley and Trueta, 1959).

Gentamicin may cause renal or vestibular dysfunction and its use in osteomyelitis is potentially hazardous, since it may need to be given for long periods. It is recommended by the manufacturers

Correspondence: Dr M. J. Denham, Department of Geriatric Medicine, Northwick Park Hospital, Watford Road, Harrow HA1 3UJ.

(Nicholas Laboratories) that dose and frequency of administration is titrated against the plasma urea or creatinine clearance. In this particular patient, however, gentamicin blood levels correlated better with plasma creatinine than with plasma urea. Consequently, plasma creatinine may be a better measure of renal function in this context and might be used in preference to plasma urea when judging the frequency of gentamicin administration, thus dividing serum creatinine in $\mu\text{mol/l}$ by 15 gives the number of hours between doses.

References

- ANONYMOUS (1973) Guess what causes low back pain now. *Medical World News*, **14**, 90.
- FORKNER, C.R. (1960) In: *Pseudomonas aeruginosa Infections*, pp. 50–59. Grune and Stratton, New York.
- MILNE, J.S. & WILLIAMSON, J. (1972) The ESR in older people. *Gerontologia clinica*, **14**, 36.
- STONE, D.B. & BONFIGLIO, M. (1963) Pyogenic vertebral osteomyelitis. *Archives of Internal Medicine*, **112**, 491.
- VALLS J., OTTOLENGHI, C.E. & SCHAJOWIOZ, F. (1948) Aspiration biopsy in the diagnosis of lesions of the vertebral bodies. *Journal of the American Medical Association*, **136**, 376.
- WALDVOGEL, F.A., MEDOFF, G & SWARTZ, M.N. (1970) Osteomyelitis: a review of the clinical features, therapeutic considerations and unusual aspects. *New England Journal of Medicine*, **282**, 198.
- WILEY, A.M. & TRUETA, J., (1959) The vascular anatomy of the spine and its relationship to pyogenic vertebral osteomyelitis. *Journal of Bone and Joint Surgery*, **41B**, 796.
- WINTERS, J.L. & CAHEN, I. (1960) Acute hematogenous osteomyelitis. *Journal of Bone and Joint Surgery*, **42A**, 691.