Tumour or Infection?—Misleading Spinal Radiographs

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Summary

Radiological appearances alone are often insufficient to make a precise diagnosis of spinal pathology, and should be supplemented by appropriate investigations, which ideally should include histological and bacteriological examination of the diseased tissues.

Key words: *Spinal radiology; Spinal infection; Metastatic carcinoma; Spinal cord compression.*

Plain x-ray films are a very useful routine screening test for spinal disease (Waddell 1982). Pathological processes manifest themselves in radiographs by destruction and devitalisation of bone, new bone formation and by associated soft tissue swelling, these common features appearing in different combinations in varying circumstances (Aegerter *et al.*, 1975, Murray and Jacobson 1971, Salter 1970). Classically, infection produces destruction of adjacent vertebrae, reactive new bone formation, loss of the intervening disc space, and rarely cause obstruction on myelography. A metastatic tumour, on the other hand, can produce a lytic or sclerotic appearance, which is centred in the vertebral body, often with more than one body affected, the diseased regions being separated by a normal segment of the vertebral column. Malignant encroachment into the spinal canal is not unusual.

Although these radiological patterns can help in making the diagnosis, they are not by themselves reliable enough to allow conclusions to be drawn as to the nature of the underlying pathological process. Forty orthopaedic surgeons and radiologists, when presented with 28 plain radiographs and the relevant clinical history, could only attain 33–50% accuracy in differentiating between tumour and infection (Waddell 1982). These limitations are clearly illustrated by the following two clinical examples.

Case reports

Patient 1

A 64-year-old man developed acute, progressively severe low back pain, associated with an acute confusional state, swinging pyrexia and rigors. There was localised tenderness in the upper lumbar spine, and investigations included an ESR of 99, a neutrophilia with total white cell count of 12.7, and blood cultures on three separate occasions grew *Staphylococcus Aureus*. X-rays of the lumbar spine showed narrowing of the L2/3 disc space with irregularity of the adjacent vertebral bodies. A diagnosis of disc space infection and septicaemia was made, and treatment was commenced with intravenous Flucloxacillin. The subsequent clinical picture was one of continuing improvement, the ESR and white cell count progressively fell to normal levels and the patient was allowed home in a plaster jacket. His antibiotic treatment was continued for a total of 3 months.

Five months after the initial presentation, there was a recurrence of worsening lumbar backache, associated with anorexia and tiredness. Repeated investigations showed the ESR to be 22 with a slightly elevated white cell count of 11.9, and the patient was noted to be afebrile. Repeat x-rays of the lumbar spine (Fig. 1), and a bone scan suggested recurrence of infection, and treatment with Flucloxacillin was reinstituted, but failed to produce any improvement. Needle biopsy of the affected disc space and adjacent vertebral bodies was then carried

Figure 1 Radiograph of the spine of Patient 1.

out, with a presumptive diagnosis of infection due to a resistant organism. Subsequent microscopy and culture of the removed tissue showed no evidence of infection, but histology revealed a well differentiated squamous cell carcinoma. The patient subsequently developed bilateral leg weakness despite local radiotherapy, and died of disseminated metastatic carcinoma 6 months later.

Patient 2

A 52-year-old man with a history of several years of mechanical type lumbar back pain, presented with a spontaneous onset of thoracic girdle pain for a few days, hospital admission being precipitated by sudden bilateral leg weakness, which was associated with numbness in both legs and with urinary incontinence. The weakness rapidly progressed to total flaccid paralysis, with a sensory level at T7. The patient was noted to have slight localised tenderness over the mid-thoracic spine and was afebrile. Investigations of note were an ESR of 121, a normal white cell count, alkaline phosphatase of 179 U/l (21–92 U/l) and x-ray of thoraco-lumbar spine showing compression of the bodies of T6, T9 and L2 (Fig. 2). A Technetium 99 isotope bone scan produced 'hot spots' in T6, L2

Figure 2 Radiograph of the spine of Patient 2.

and L4, and a myelogram demonstrated an incomplete extradural obstruction at T6. A chest x-ray indicated an increase in size and density of the left hilar shadow, and a presumptive diagnosis of bronchial neoplasm with multiple spinal metastases was made. Needle biopsy of the T6 vertebral body was performed, histology and microscopy revealed acute inflammatory changes, with pus cells and gram positive cocci present, but subsequent cultures failed to reveal any growth. In view of the 'typical' x-ray appearances of malignancy in conjunction with spinal cord compression, deep x-ray therapy had been commenced before the results of the biopsy were available, but in view of the findings, x-ray therapy was withdrawn and Flucloxacillin and Ampicillin commenced, with a progressive improvement in the patient's general state, and a return of the ESR to normal levels. There was unfortunately no recovery of neurological function, though the bony spinal lesion has healed and the patient remains systemically well.

Discussion

The inability of spinal x-rays to reliably distinguish tumour from infection can lead to errors in diagnosis. Occasionally the associated clinical features may compound an error, which is particularly likely when there is pre-existing disease in the spinal column or a special need for rapid diagnosis and early effective treatment. Percutaneous trephine biopsy of the spinal column gives access to lesions from the mid-thoracic region distally, and is safely performed under local anaesthetic using image intensifier control (McCulloch and Waddell 1978). This direct approach enables full histological and bacteriological examination of the diseased tissues to be carried out, and avoids more protracted indirect investigations, which are undesirable when dealing with an ill patient.

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