LESSON OF THE MONTH

Vertebral osteoporosis—the importance of serum and urine electrophoresis

R A Hughes, C Costello, A C S Keat

Case report

In 1990 a 66 year old female ex-civil servant was admitted to hospital with back pain and vertebral wedge fractures of T8, T10 and L2. Except for restricted painful movements of the back, examination was unremarkable with no organomegaly nor palpable lymphadenopathy. Radiographs of the chest and shoulders were normal, erythrocyte sedimentation rate (ESR) was 10 mm/hour and serum calcium, phosphate and alkaline phosphatase levels were normal. Haemoglobin was 12.5 g/dl and total plasma protein, albumin and immunoglobulin levels were within normal limits. Serum protein electrophoresis revealed no paraprotein bands. Total urine protein concentration was 0.34 g/l with electrophoresis showing two faint bands of kappa Bence Jones protein (BJP). Bone densitometry by DEXA scanning confirmed osteopenia, interpreted as generalised osteoporosis. The decision was taken to monitor sequentially serum and urine electrophoresis rather than to perform biopsy of the bone marrow. Symptomatic recovery was rapid and follow up was arranged with instructions for the patients to start a cyclical sodium etidronate regime to minimise further osteoporotic vertebral crush fractures. The patient did not attend a further outpatient appointment as arranged and was lost to follow up.

In March 1992 she was referred to the rheumatology outpatient clinic by her general practitioner with an enlarging "lump over her left shoulder". This suddenly appeared after she levered herself out of the bath with her arms and her GP had initially diagnosed an osteoporotic fracture of the left clavicle. No x rays were performed at that time and subsequently she had noticed a palpable mass in the region of her shoulder. Three weeks before her appointment she had developed considerable purpuric discolouration of the skin over the mass (fig 1). X rays performed from the outpatient clinic showed lytic destruction of most of the left clavicle and a portion of the left scapula associated with an overlying soft tissue mass (fig 2). There were also lytic lesions of the third, fourth and fifth ribs on the left with destruction of part of the right clavicle and scapula. Vertebral x rays were unchanged from 1990. Biopsy of the soft tissue mass overlying the left shoulder showed pleomorphic poorly differentiated plasma cells. Multiple myeloma was confirmed by bone marrow aspirate and trephine. ESR was not elevated on repeated testing and serum

immunoglobulin levels were within normal limits with no detectable serum paraprotein. Urine total protein was elevated at a concentration of 0.64 g/l of which 80% was kappa BJP. Treatment with melphelan was started but she rapidly became neutropenic with a total white cell count of $2.4 \times 10^9/l$ and a neutrophil count of $0.54 \times 10^9/l$. She developed a urinary tract infection and septicaemia which proved refractory to antibiotics and she died.

Discussion

Acute onset of back pain in the elderly, with or without vertebral fracture, should raise the possibility of malignant disease. The detection of multiple myeloma is particularly important as this is a potentially treatable disease. Investigation of all patients with an 'osteoporotic' vertebral fracture should therefore, at the very least, include measurement of ESR, a full blood count (FBC) and levels of calcium, phosphate and alkaline phosphatase, together with electrophoresis of serum and urine protein, before the fracture is attributed to senile or postmenopausal osteoporosis.

It is important to appreciate that the absence of serum paraprotein does not exclude the diagnosis of multiple myeloma. Twenty per cent of patients with myeloma have no serum paraprotein though the vast majority have detectable urine BJP.¹ Rarely multiple myeloma is 'non-secretory' with neither serum paraprotein nor quantifiable amounts of BJP. Traces of urine BJP in isolation can prove to be benign; close follow up of such cases is essential, with clinical examination and regular serum and urine protein electrophoresis to exclude the development of myeloma. Regular serum and urine protein electrophoresis were planned in this case but the patient did not attend a follow up appointment. A system which ensures recall of non-attenders such as this patient is important.

Subsequent to initial testing this patient developed an unusually destructive myeloma with associated soft tissue tumour. This case draws attention to the occurrence of multiple myeloma in the absence of detectable serum paraprotein or immune paresis. Bony destruction occurs in 60% of cases of myeloma; lesions are typically punched-out lytic areas with no surrounding sclerosis. The extent of radiological lysis has some correlation with the total mass of myeloma cells.² Soft tissue masses associated with extensive bony

Department of
Rheumatology, St
Peter's Hospital Trust,
Chertsey, Surrey,
United Kingdom
R A Hughes

Department of
Rheumatology,
Charing Cross
Hospital,
London W6 8RF,
United Kingdom
A C S Keat

Department of
Haematology, Chelsea
and Westminster
Hospital, London
SW10, United
Kingdom
C Costello

Correspondence to:
Dr R A Hughes,
Charing Cross Hospital,
Fulham Palace Road,
London W6 8RF, United
Kingdom.

Accepted for publication
18 October 1993

Figure 1 Myeloma presenting as a palpable mass over the left shoulder with associated neo-vascularity.

destruction have been estimated to occur in 10% of cases of myeloma and they indicate poor prognosis as extramedullary spread of myeloma is often accompanied by a change in the nature of the tumour growth pattern to a more malignant phase.³ The destructive capacity of the tumour in this patient was remarkable. Earlier therapeutic intervention might have been possible with regular screening of urine BJP.

The lesson

Screening the serum and the urine for para-protein bands in all patients with vertebral crush fractures is necessary to exclude a diagnosis of multiple myeloma. An adequate system for evaluating the results of this screening and a follow up of patients with any abnormalities must be devised.

- 1 Kyte R A. Multiple myeloma. Review of 869 cases. *Mayo Clin Proc* 1975; 50: 29-40.
- 2 Salmon S G. Immunoglobulin synthesis and tumour cell number and the natural history of multiple myeloma. *BMJ* 1971; ii: 321.
- 3 Foucar K, Raber M, Foucar E, Barlogie B, Sandler C M, Alexanian R. Anaplastic myeloma with massive extramedullary involvement. *Cancer* 1983; 51: 166-74.

Figure 2 Lytic lesions of the left scapula and clavicle.