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Natural History of Giant Cell Tumour of the Bone

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ABSTRACT

The clinical presentation and behaviour of giant cell tumours of bone vary. The progression of the disease and metastases are unpredictable, but the overall prognosis is good. We describe the natural history and different clinical presentations of two cases of giant cell tumour of bone where the patients had refused the initial treatment and presented several years later with the disease.

Keywords: Giant cell tumour, natural history

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INTRODUCTION

The clinical presentation and behaviour of giant cell tumours of bone vary[1,2]. Some tumours may remain latent only to be discovered incidentally, while others may grow rapidly destroying the cortex and often invading the overlying soft tissues. They may remain dormant and regress. However, spontaneous reactivation and aggressive behaviour leading to dissemination can occur. Published reports in the English literature of untreated cases of giant cell tumour of bone or cases who present very late after the initial biopsy diagnosis are scanty. This report highlights the biological behaviour of giant cell tumour that appears to fall between the conventional benign and malignant tumours.

CASE REPORTS

Case 1

A 52-year-old man was first seen in another institution in May 1993 with pain in the right knee for five months. A radiographic evaluation revealed a large well-delineated lucent tumour of the distal femur. Subsequent biopsy confirmed the diagnosis of giant cell tumour of bone. He was advised ablative surgery but was reluctant and finally defaulted treatment. The patient was seen again in February 2000, after more than six years, with the complaint of pain around the right knee which was relieved by analgesics and a gradually enlarging swelling of the lower right femur. On examination, the right knee had a flexion deformity. Diffuse painless bony swelling at the distal femur extending 10 cm from knee joint. Painful crepitus elicited throughout knee motion.

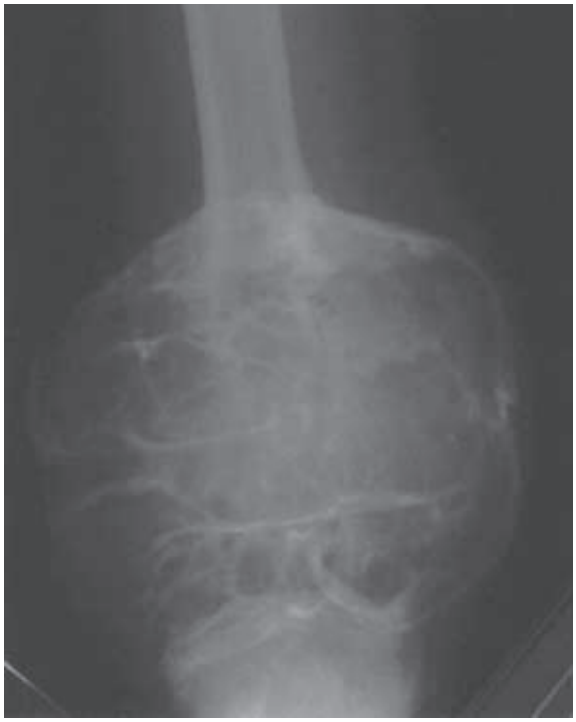

Fig. 1 Radiograph shows expansile lytic lesion with sclerotic rim margin.

The radiograph showed an expansile septated lytic lesion in the distal femur with a sclerotic margin (Fig. 1). There were arthritic changes in the patellofemoral and tibiofemoral joints. Magnetic resonance imaging revealed a well circumscribed lesion located mainly in the bone with soft tissue or joint involvement (Figs. 2a, b). There was no evidence of distant metastases on computed tomography scan of the chest and bone scantigraphy.

The patient underwent a wide surgical resection of the tumour with oncologic endoprosthetic reconstruction. The final histopathological examination revealed a richly vascular and cellular tumour composed of plump spindle cells with oval vesicular nuclei and moderate amount of eosinophilic cytoplasm mixed with numerous evenly dispersed giant cells of the osteoclast type. One mitotic figure

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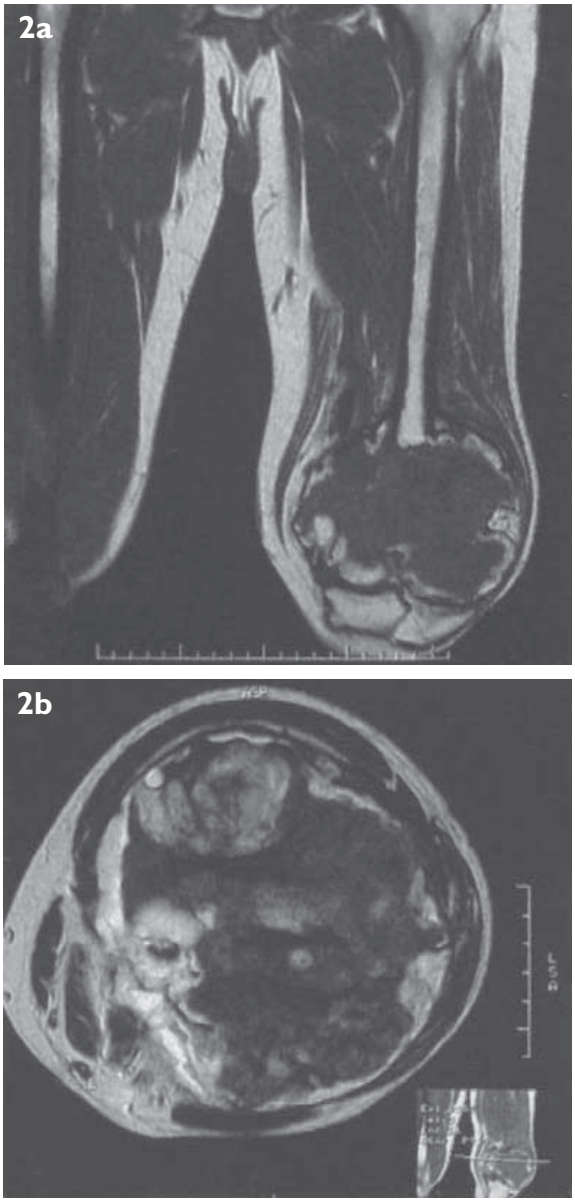

Fig. 2a, b MRI images revealed soft tissue involvement.

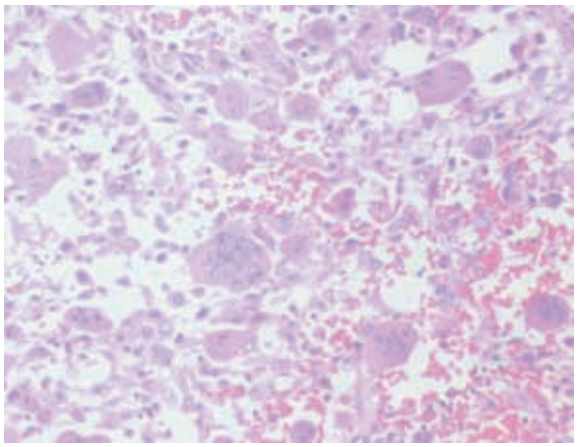

Fig. 3 Photomicrograph shows giant cells with multiple monomorphic centrally placed vesicular nuclei having moderately prominent nucleolus and abundant pink cytoplasm are evenly dispersed in the stroma. The stromal cells have single oval or reniform vesicular nucleus, insignificant nucleolus and moderate pinkish cytoplasm. Rich vascularity and mild lymphocytic sprinkling are also seen in the stroma. (Haematoxylin and eosin x 100).

was present per ten high power fields. Small foci of collagenisation and mild lymphoplasma cell infiltration were seen in the stroma. There was no evidence of malignancy or vascular invasion (Fig. 3).

At present, after 22 months of surgery he is free of disease without any complication.

Case 2

A 53-year-old man was first seen in January 1989 with a fracture of the right femur following a motor-vehicle accident. A skeletal survey revealed an expansile septated lytic lesion over the right proximal tibia. He was managed with internal fixation. Simultaneous biopsy of the lesion confirmed a giant cell tumour with uniformly distributed prominent osteoclast type giant cells in a mild to moderately cellular and vascular stroma. The stroma cells varied from oval to spindle cells with vesicular nuclei. The stroma also displayed foci of haemorrhage, macrophages with foamy cytoplasm and mild lymphocytic infiltrates. Cellular pleomorphism, mitotic figures, vascular invasion and other features of malignancy were not seen (Fig. 4). He refused to undergo an ablative surgery and finally defaulted treatment a year later. Despite the problem he resumed his daily work as a motor mechanic apparently without much disability.

He presented again in July 2000 with increasing pain and swelling of the right leg for three months. Physical examination revealed a large warm swelling over the right proximal tibia with significant oedema distal to the lesion. Radiograph showed an expansile lytic lesion with multiple septated and marked soft tissue swelling in the proximal tibia (Fig. 5). A computed tomography scan revealed a proximal right tibial mass, which had infiltrated the entire soft tissue compartments around the tumour and encased the posterior neurovascular structures (Figs. 5, 6a, 6b). Furthermore, multiple metastatic deposts in both lungs fields were detected by computed tomography scan of the chest. With the view to perform salvage surgery, an angiographic embolisation was performed to reduce the vascularity of the tumour. Intraoperatively, it was noted all major vessels were encased by the tumour. An above knee amputation was unavoidable and was done. A final histopathological study showed extensive necrotic areas secondary to the embolisation with small foci of viable tumour tissue composed of osteoclastic giant cells in a highly vascularised stroma, not different from the earlier biopsy finding. The lung lesions were not histologically verified.

The patient presented again three months later with massive haemoptysis and subsequently succumbed to the disease.

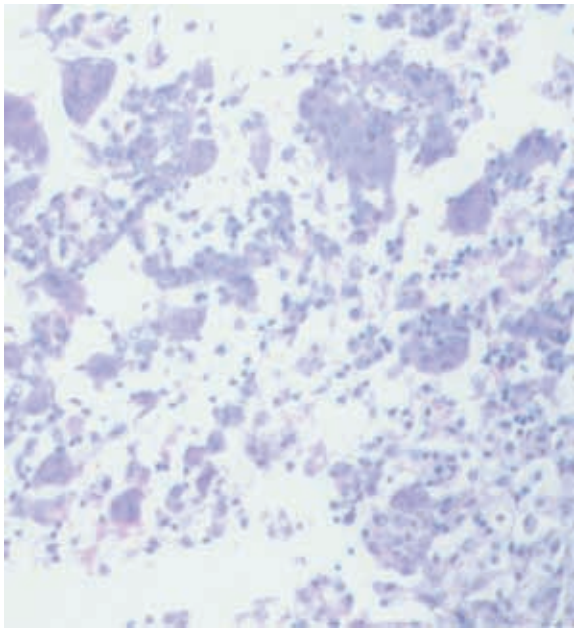

Fig. 4 Photomicrograph shows multinucleated giant cells seen in a background of loose oedematous stroma with low concentration of stromal cells, many foamy macrophages, thin-walled blood vessels and a few scattered lymphocytes. (Haematoxylin and eosin x 100).

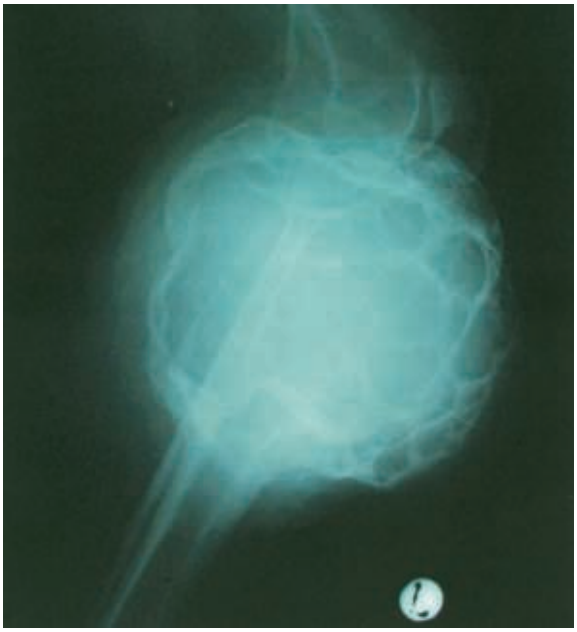

Fig. 5 Radiograph shows an expansile lytic lesion in the proximal tibia with multiple septation and marked soft tissue swelling.

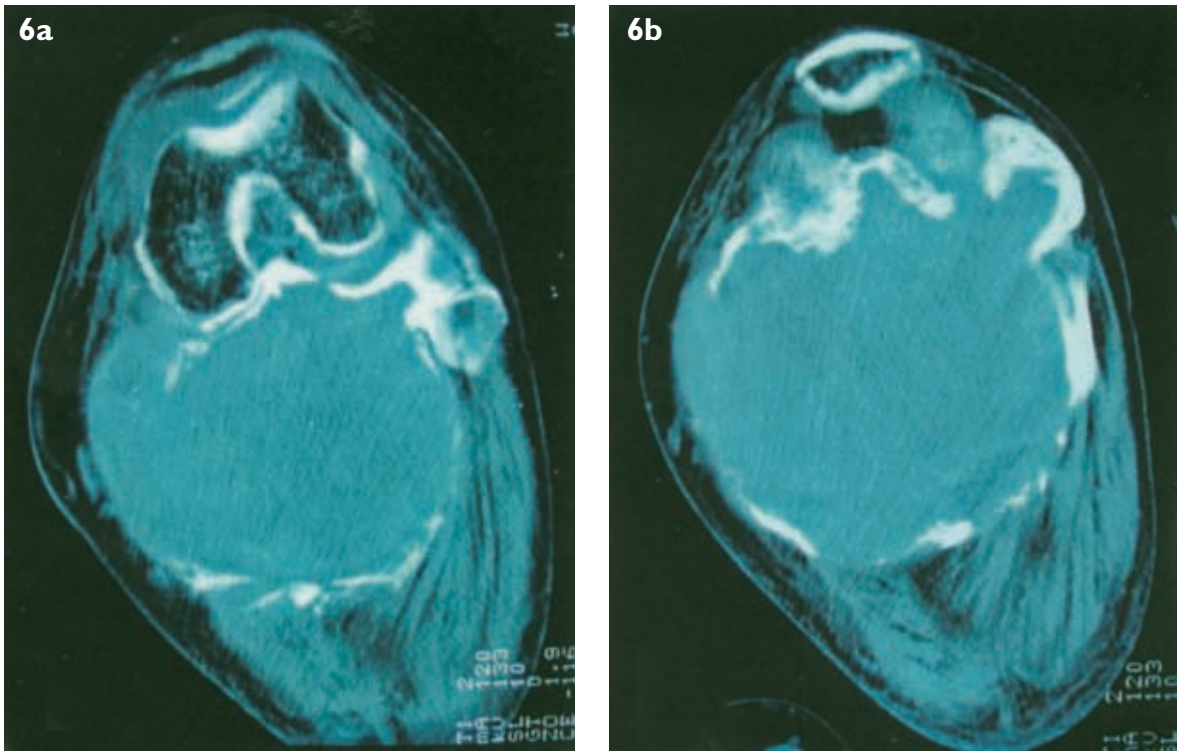

Fig. 6a, b Computed tomography scans showed marked soft tissue involvement.

DISCUSSION

Giant cell tumour of bone is well known to have a wide spectrum of clinical and radiological presentations[1-3]. Some will grow very slowly and undergo necrosis, apoptosis and spontaneous growth arrest. On the other hand, others grow rapidly with invasion of the surrounding soft tissue or even metastasize[1-3]. Both of our cases initially presented as slow growing tumour that remained dormant for a period of more than six years and ten years respectively. Spontaneous aggressive reactivation and systemic dissemination as seen in the second case is a well-recognised feature of malignant transformation, which carries a guarded prognosis. However, histopathological evaluation did not reveal any evidence of malignant change. This provides additional information about the natural unpredictable behaviour of this disease.

The histological grading initially described by Jaffe et al[4] was believed to be related to the aggressiveness of the tumour, but it had never been confirmed by subsequent investigators[1,3]. Despite the different clinical behaviour as seen in the two cases, histopathological findings were almost identical in both and no evidence of malignant changes was noted.

Overall, pulmonary metastases occur in approximately 1-2% of cases[5,6]. Metastases are postulated to be the result of iatrogenic seeding of tumour cells into the blood stream at the time of surgery for the primary lesion. However, pulmonary metastases have been described simultaneously along with the primary lesion[5]. The disseminated metastases occurred after a spontaneous activation of a dormant tumour, prior to any surgical manipulation in our second case.

It must be very rare that patients of giant cell tumour are treated several years after the biopsy diagnosis. The default of the two patients to early treatment has, however, provided a rare opportunity to observe the natural history of the tumour.

CONCLUSION

An aggressive soft tissue infiltration and systemic dissemination in a seemingly dormant tumour could raise the question mark on the actual behaviour of giant cell tumours. As seen in both the cases, giant cell tumour of bone could remain dormant for a long period of time. Spontaneous reactivation with aggressive clinical behaviour and subsequent metastases could occur and could not be predicted.

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