Musculoskeletal case 19. Diagnosis

Giant cell tumour of the tibia

The anteroposterior and lateral plain radiographs (Figs. 1 and 2, see presentation page 410) demonstrated a well-defined eccentric, expansile, lytic lesion, involving the metaphysis and subarticular regions of the medial tibial plateau. On sagittal T_2-weighted gradient echo magnetic resonance imaging (MRI) (Fig. 3, page 411), a multicystic mass was seen with multiple fluid–fluid levels. Note the absence of soft-tissue involvement. The axial T_2-weighted image (Fig. 4, page 411) again demonstrated the multicystic nature of the mass with multiple fluid–fluid levels within the various locules of the lesion. Computed tomography (CT) was also done immediately before CT-guided biopsy. On the axial (transverse) images (Fig. 5), the mass was seen to be lytic and expansile, with marked thinning of the medial tibial cortex. No intralesional calcified matrix was present. Coronal CT reformats (Fig. 6) nicely depicted the proximal extent of the lesion, extending to the immediate subarticular surface of the medial tibial palteau. Radiologically, the lesion was thought to represent either a giant cell tumour or an aneurysmal bone cyst, with the former being favoured. Histologic examination of the CT-guided biopsy specimen confirmed that the lesion was a giant cell tumour.

Giant cell tumours (osteoclastomas) consist of multinucleated giant cells within a mononuclear fibroid stroma that lie within the bone marrow. Typically, they are highly vascular tumours. They account for 5% to 8% of all primary bone tumours. Although the tumour was initially described in 1818, it was not until 1940 that giant cell tumours were distinguished from other tumours that contain giant cells, such as brown tumours of hyperparathryoidism, aneurysmal bone cyst, chondro- or osteoblastoma and fibrous dysplasia.[1]

In most giant cell tumours the zone of transition from tumour to normal bone is sharp and abrupt and characteristically does not have sclerotic margins. In addition, periosteal reaction is unusual except in the presence of a fracture. Cortical breakthrough may be seen in 24% of cases. In such cases, a soft-tissue mass is usually present.[2] CT or MRI may be required to show the extent of the tumour and its relationship to the adjacent joint. A fluid–fluid level, as detected in our case is the result of either internal septation and separation of serum above degraded blood products. Giant cell tumours typically appear as areas of intense isotope uptake on bone scanning and

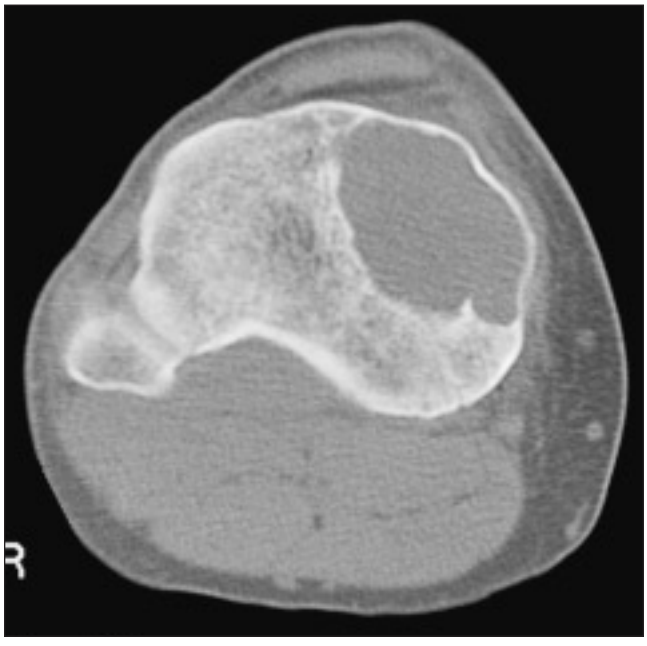

FIG. 5.

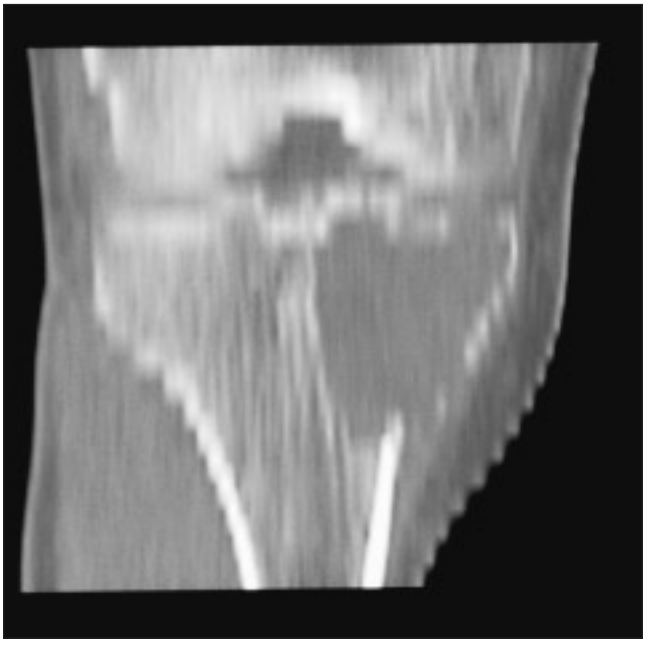

FIG. 6.

often demonstrate a "doughnut" appearance, with greater activity at the margins of the lesion.

Giant cell tumours nearly always occur after epiphyseal fusion. Most tumours (70%) occur in people between the ages of 20 and 40 years. The tumour is usually localized to the end of the bone, originating eccentrically in the metaphysis and growing to the subchondral region.

About 50% of tumours are found about the knee, but other long bones including the spine and the sacrum may be involved. In the spine, the vertebral body tends to be involved; the posterior elements are rarely involved. Overall, the spine is affected in approximately 7% of cases.[3] Giant cell tumours are generally single lesions, but may be multicentric, particularly in the skull and facial bones. This is particularly so when Paget's disease is present.

Most giant cell tumours are benign. However, they often exhibit locally aggressive behaviour. Malignant lesions may occur. Such tumours may be primarily malignant in nature, but this rare. More commonly, a benign lesion will become malignant, and this may sometimes occur after irradiation.[4] Radiographs are inaccurate in distinguishing benign from aggressive giant cell tumour.[5] Metastasis to lungs occurs in about 5% of malignant lesions.[6]

Treatment consists of curettage and bone grafting. Recurrence is, however, relatively common. If an en bloc resection is performed with wide margins, only about 10% of tumours recur. Other therapeutic options include curettage with cryosurgery, wide metaphyseal resection with subarticular curettage, joint resection with fusion, and total joint replacement.

References

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