

# Radiology for the surgeon

## Musculoskeletal case 37

### Presentation

A 42-year-old man was playing football when he noticed pain in the left thigh after a twisting motion. The pain failed to resolve with the usual soft-tissue injury regimen, so he approached his

family physician who ordered radiographs (Fig. 1). On the basis of the plain radiographic findings, MRI was performed. Figure 2 is a representative sagittal gradient echo image, and Figure 3 a transverse axial  $T_2$ -weighted image.

What is the most likely diagnosis?



FIG. 1. Plain radiograph of the painful area.

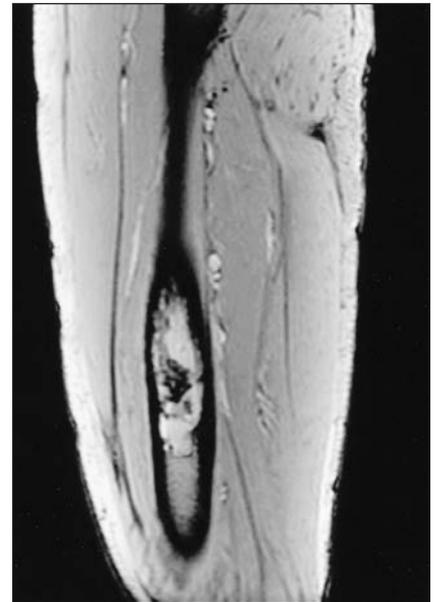


FIG. 2. MRI: sagittal gradient echo image.

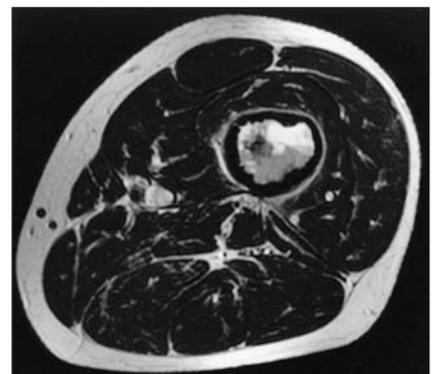


FIG. 3. MRI: transverse axial  $T_2$ -weighted image.

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## Diagnosis

### Diaphyseal mid-femur telangiectatic osteosarcoma

The anteroposterior and lateral plain radiographs (Fig. 1) demonstrate an ill-defined expansile lytic lesion involving the diaphysis of the mid-femur. A central osteoid matrix was seen.

On sagittal gradient echo MRI (Fig. 2), a lesion of intermediate signal intensity was visualized, with absence of a soft-tissue mass. The axial  $T_2$ -weighted image (Fig. 3) again demonstrated the cystic nature of the mass with multiple fluid–fluid levels within various locules of the lesion. A coronal short tau inversion recovery (STIR) weighted image (Fig. 4) demonstrated the expansile lytic mass, with marked thinning, of high signal intensity in the medial and lateral femoral cortex. Sagittal section (Fig. 5) revealed cystic, hemorrhagic and bony mass filling the medullary cavity, 10.5 cm long and 3 cm in diameter. The resection margins measured 5.9 cm proximally and 4.4 cm distally. Dilated lakes of blood were present, and the cortex was partially eroded.

Microscopic examination revealed a

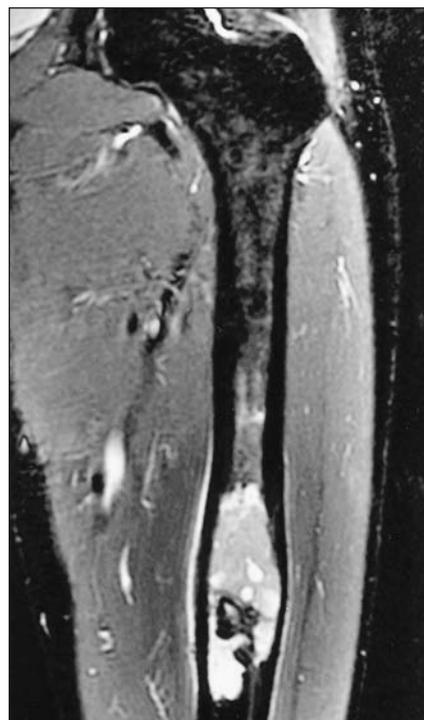


FIG. 4. Coronal STIR weighted image shows lytic mass in the femur with thinning of the cortex.

high-grade osteosarcoma based in the medullary cavity, with a telangiectatic and osteoblastic growth pattern (Fig. 6). The tumour focally eroded through cortex but remained confined by periosteum. Less than 10% was necrotic; most of the osteosarcoma cells were histologically viable.

Telangiectatic osteosarcoma is an aggressive rare type of osteosarcoma comprising 5% of all osteosarcomas.<sup>1,2</sup> The clinical presentation is usually local pain, a soft-tissue mass and a fracture.<sup>3</sup>

Males are affected almost twice as frequently as females, and most patients are aged between 10 and 20 years, similar to conventional osteosarcoma.<sup>4</sup> Most tumours are formed in the metaphysis of long bones although, as in our case, they may arise in the diaphysis.<sup>4</sup> Plain radiographs show an osteolytic tumour with little or no matrix or periosteal reaction.<sup>1,5</sup> CT or MRI of a telangiectatic osteosarcoma often shows a fluid–fluid level, indicating the presence of intralesional hemorrhage,<sup>1</sup> particularly on  $T_2$ -weighted images. Fluid–fluid levels are not specific and can be seen in aneurysmal bone cysts, giant cell tumours, fibrous dysplasia and unicameral bone cysts.<sup>6–8</sup> Pathologically, telangiectatic osteosarcoma is char-



FIG. 5. Sagittal section of the excised femur shows the mass consisting of cystic, hemorrhagic and bony lesions filling the medullary cavity.

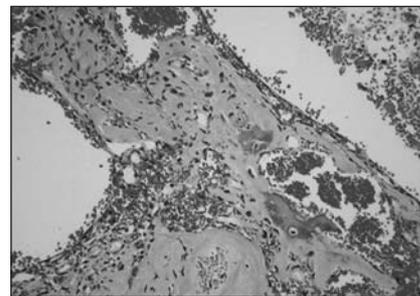


FIG. 6. High-power magnification shows a high-grade osteosarcoma of the femur with a telangiectatic and osteoblastic growth pattern (hematoxylin–eosin stain).

acterized by large cavities filled with fresh or clotted blood or necrotic tissue, with septa composed of anaplastic tumour cells.<sup>2</sup> Early papers describe a poor prognosis, but more recent work employing neoadjuvant chemotherapy plus surgery has demonstrated survival rates better than conventional osteosarcoma.<sup>4</sup>

Competing interests: None declared.

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