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Teaching cases

Femur chondrosarcoma misdiagnosed as acute knee arthritis and osteomyelitis—Further developing a hitherto unreported complication of tumor embolic ischemic ileal perforation after arthroscopic lavage

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ABSTRACT

The differentiation between osteomyelitis and bone tumor may be difficult due to their overlapping clinical and radiological features. A 25-year-old lady presented with left knee pain and joint effusion associated with redness and hotness. A sub-optimally taken plain radiograph showed mixed osteolytic and osteoblastic lesion in the left lower femur with surrounding soft tissue swelling. Since the clinical diagnosis was acute osteomyelitis and arthritis, arthroscopic lavage was performed as a diagnostic and therapeutic procedure. The removed loose bodies and fibrinous tissue showed pathological features suspicious of chondrosarcoma. Subsequent MRI revealed an infiltrative tumor eroding through the cortex and joint cartilage. En bloc excision of the left lower femur, upper tibia including the knee joint and patella was performed, and the final diagnosis was grade 2 chondrosarcoma. The patient developed bilateral pulmonary metastasis 33 months after operation. Five months later, she suffered from a hitherto undescribed complication of ischemic perforation of the terminal ileum secondary to tumor embolic arterial obstruction with no macroscopic intestinal or peritoneal tumor deposit. The patient developed multiple brain metastases and died 43 months after initial presentation.

Our case illustrates that malignant bone tumor as a differential diagnosis of acute osteomyelitis and arthritis merits recognition and exclusion before arthroscopic lavage, which may enhance tumor dissemination and in our patient results in embolic ischemic ileal perforation.

Introduction

Osteomyelitis is inflammation of bone and marrow resulting in bone destruction. By convention, the term applies to inflammation due to infectious microorganisms [1]. Three types of osteomyelitis can be differentiated clinically and pathophysiologically [2]. It may result from hematogenous seeding seen mostly in prepubertal children and in elderly patients; or from direct inoculation of microorganisms into intact bone following trauma, bone surgery or joint replacement, and thus can occur at any age and involve any bone. Finally, osteomyelitis may occur in the setting of vascular insufficiency mainly in diabetics, and in almost all cases follows a soft-tissue infection in the foot that spreads to bone.

The differentiation of hematogenous osteomyelitis from bone tumor can be difficult because clinical findings may be noncontributory, and they share similar and overlapping radiological features [3]. In this article, we report a young lady with chondrosarcoma of the left distal femur misdiagnosed initially as acute knee arthritis and osteomyelitis. She later developed ischemic ileal perforation as a result of tumor embolism, a hitherto undescribed complication of bone chondrosarcoma. In addition to alerting one to the possibility of an underlying malignancy in patients with symptoms and signs of acute osteomyelitis and/or arthritis, the potential hazards of facilitating tumor dissemination through arthroscopic lavage in such patient is discussed.

Case report

Clinical presentation

A 25-year-old clerk was admitted to our hospital because of increasing left knee pain, limitation of movement and swelling for 2 weeks. The patient noticed no fever but slight redness around the area, and there was no antecedent trauma. She enjoyed good past health all along. Physical examination revealed left knee swelling with positive patellar tap, associated with mild tenderness, redness

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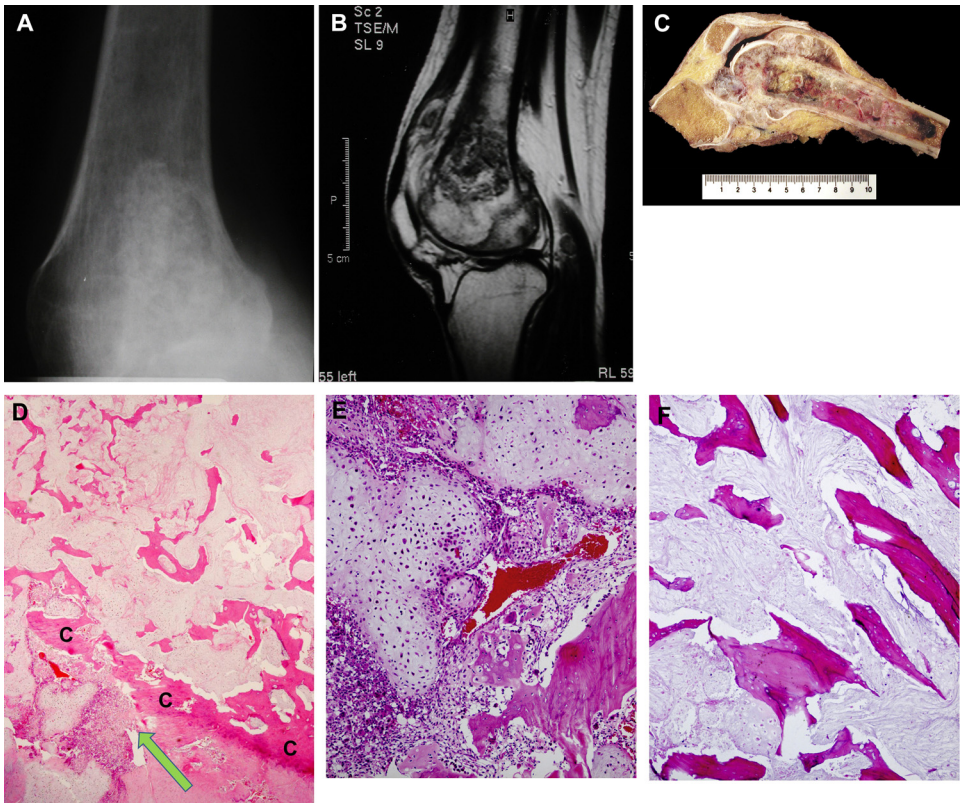

Fig. 1. (A) Sub-optimally taken plain radiograph of the left knee showing only the left lower femur infiltrated by a mixed osteolytic and osteoblastic lesion with ill-defined borders. There is surrounding soft tissue swelling. (B) MRI of the left knee showing replacement of the lower femur by an infiltrative tumor which invades through the anterior cortex and focally the covering hyaline cartilage into the surrounding soft tissue and knee joint respectively. (C) Resected specimen showing an infiltrative chondroid tumor in the left lower femur with invasion through the cortex and hyaline cartilage into the adjacent soft tissue and knee joint respectively. The tumor consists of lobulated soft to firm light gray translucent tissue with focal chalky white calcification. (D) Microscopy reveals extensive marrow infiltration by the tumor which surrounds and destroys the bony trabeculae. There is invasion through the bone cortex (C) (arrow). (E) The tumor consists of moderately cellular chondroid cells showing moderately hyperchromatic nuclei and supported in a chondroid matrix. (F) The tumor infiltrates among and destroys native bony trabeculae and shows focal necrosis.

and hotness. Plain radiograph of the left knee was sub-optimally taken and included only the left lower femur but not the knee joint. There was infiltration by a mixed osteolytic and osteoblastic lesion with ill-defined borders and surrounding soft tissue swelling (Fig. 1A). As the clinical diagnosis was acute arthritis and osteomyelitis, arthroscopic lavage was performed. The knee joint was acutely inflamed with focal erosion, fibrinous exudation, a few loose bodies and irregularities in the femoral cartilage. These fibrinous material, loose bodies and necrotic cell debris were removed using a motorized shaver, and all the materials were sent for pathological examination. Histology showed tissue fragments harboring chondroid cells with moderate nuclear pleomorphism and hyperchromatism, suspicious of chondrosarcoma. Magnetic resonance imaging (MRI) was thus arranged, revealing an infiltrative lesion in the lower femur with invasion through the cortex and focally joint cartilage, extending into the adjacent soft tissue and knee joint respectively (Fig. 1B). The MRI features coupled with the histopathology were indicative of femur chondrosarcoma masquerading as acute arthritis and osteomyelitis. Total en bloc resection of the left lower femur and upper tibia including the knee joint and patella was performed, followed by allograft reconstruction with knee arthrodesis. The patient made an uneventful recovery.

Pathological examination of the resected femur

The resected specimen consisted of the inferior 12 cm of the left femur, the knee joint including the patella and the superior 4 cm of the tibia (Fig. 1C). An infiltrative chondroid tumor, 5 cm × 6 cm × 10 cm in maximal dimension, was seen in the lower femur, composing of lobulated soft to firm and light gray translucent tissue with focal chalky white calcification. It invaded through the cortex and hyaline cartilage into the adjacent soft tissue and knee joint, respectively (Fig. 1C). The specimen was serially sectioned at 5 mm thickness and carefully examined; the tumor was then all embedded for histological examination. There was extensive marrow infiltration by the tumor which surrounded and destroyed the bony trabeculae with focal invasion through the cortex and extension into the adjacent soft tissue (Fig. 1D). The tumor consisted of moderately cellular chondroid cells showing moderately hyperchromatic nuclei supported in a chondroid matrix (Fig. 1E). Mitosis averaged 2/10 high-power field. Myxoid matrix and tumor necrosis (Fig. 1F) were focally seen. There was no neoplastic lace-like osteoid deposition. The features were grade 2 chondrosarcoma. There was no lymphovascular permeation, and the resection margins were clear.

Clinical course

She remained well on follow up until 33 months after surgery when she developed persistent unproductive cough. Chest X-rays showed a few nodular deposits in both lungs. They were confirmed as metastatic chondrosarcoma by imaging-guided FNA cytology. Palliative chemotherapy with doxorubicin and ifosfamide was started, but 5 months later, she developed symptoms and signs of peritonitis. Radiographs revealed free gas under the diaphragm, and the pulmonary nodules increased in number and dimensions to canon ball sizes (Fig. 2A). Emergency laparotomy showed a