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Pathological Femoral Fracture Due to an Aneurysmal Bone Cyst Mimicking Telangiectatic Osteosarcoma: A Case Report

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Abstract **Case Report**

This case underscores the challenge of distinguishing aneurysmal bone cysts (ABC). from telangiectatic osteosarcomas when MRI shows lytic lesions with fluid-fluid levels. In a 70-year-old woman, biopsy confirmed an ABC after pathologic fracture. Curettage, grafting, and fixation led to full recovery. Accurate histologic diagnosis is essential to prevent overtreatment. Multidisciplinary assessment improves outcomes in such rare diagnostic dilemmas today.

Keywords: Aneurysmal bone cyst, Telangiectatic osteosarcoma, Pathological femoral fracture, Differential diagnosis.

INTRODUCTION

Primary aneurysmal bone cysts (ABCs) and telangiectatic osteosarcomas (TOS) are rare primary bone tumors that share overlapping clinical and radiological characteristics. Both entities often present in relatively young individuals, typically affect the appendicular skeleton, and exhibit a predominantly lytic appearance on radiographs. On magnetic resonance imaging (MRI), they are commonly associated with fluid-fluid levels (FFLs), further complicating the differential diagnosis.

Despite these similarities, ABCs are benign, expansile lesions composed of blood-filled spaces separated by fibrous septa, whereas TOS is a highly aggressive malignant tumor requiring prompt oncologic management. Distinguishing between the two is critical but often challenging based solely on imaging, and histopathological confirmation is essential. [1]

We report the case of a 70-year-old female who presented with a pathological fracture of the femoral diaphysis, initially raising concern for telangiectatic osteosarcoma based on imaging features. Final histological analysis revealed a primary aneurysmal bone cyst an uncommon diagnosis at this age and location, illustrating a rare diagnostic pitfall.

CASE PRESENTATION

A 70-year-old female patient was initially evaluated at another institution for persistent right thigh pain of insidious onset. An MRI was performed, revealing an expansile, multiloculated, lytic lesion of the right femoral diaphysis with fluid-fluid levels, suggestive of a primary aneurysmal bone cyst (ABC). However, the possibility of a telangiectatic osteosarcoma (TOS) could not be ruled out based on imaging findings alone. (Figure 1)

The patient subsequently experienced a sudden onset of severe pain in the right thigh, accompanied by complete functional impairment of the right lower limb, prompting her to seek emergency care at our hospital. An x ray of the right femur revealed a pathological fracture of the mid-diaphysis occurring through the previously identified lytic lesion. (Figure 2)

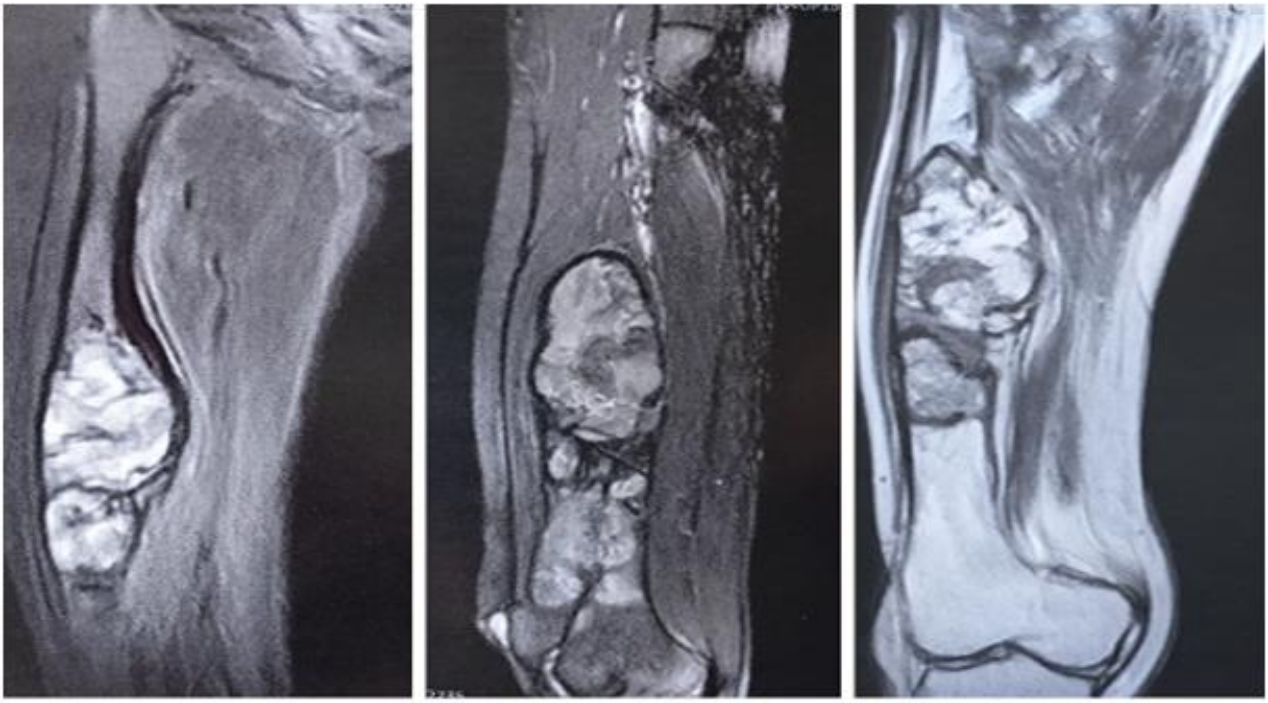

Figure 1: Figure shows sagittal, coronal, and axial MRI of the right femoral shaft, revealing a multiloculated, expansile lytic lesion with fluid-fluid levels, suggestive of an aneurysmal bone cyst (ABC) but not excluding telangiectatic osteosarcoma (TOS)

Figure 2: Radiograph of the right femoral shaft showing a pathological mid-diaphyseal fracture through a lytic lesion

An initial bone biopsy was performed to clarify the diagnosis and exclude malignancy. Histopathological analysis confirmed the presence of a primary aneurysmal bone cyst, with no evidence of malignant transformation. (Figure 3)

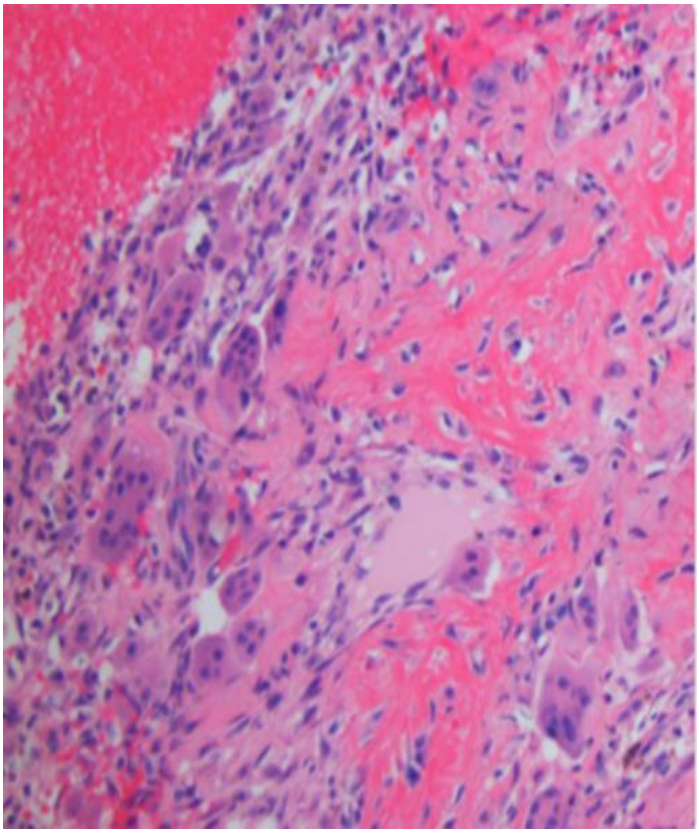

Figure 3: Histology showing a cystic lesion with hemorrhagic content, lined by a fibro-osseous wall rich in fibroblastic cells and multinucleated giant cells

A second surgical procedure was performed, consisting of intralesional curettage of the lesion, filling of the bone cavity with a synthetic bone substitute, and autologous bone grafting harvested from the iliac crest. Internal fixation was achieved using a long gamma nail to stabilize the femoral fracture. (Figure 4)

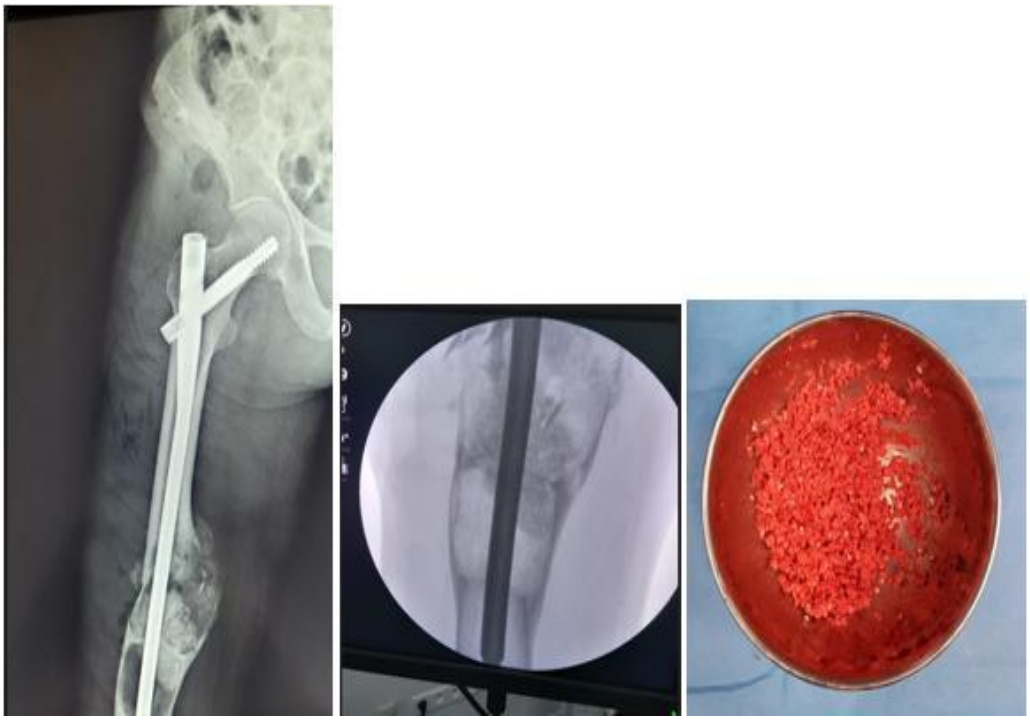

Figure 4: Intraoperative curettage, bone cavity filled with a mixture of autologous bone graft and bone substitute, internal fixation with a long gamma nail, and postoperative radiograph showing proper alignment

At three months follow-up, radiographic evaluation showed fracture healing with no signs of recurrence (Figure 5). Clinically, the patient had regained full weight-bearing capacity, was walking independently without crutches, and reported no residual pain. (Figure 6)

Figure 5: three months follow-up radiograph showing fracture healing with no evidence of lesion recurrence

Figure 6: Three-month follow-up showing the patient walking independently, illustrating good functional recovery

DISCUSSION

Aneurysmal bone cysts (ABCs) are rare, benign but locally aggressive bone lesions, most commonly affecting the metaphyseal regions of long bones in adolescents and young adults. Pathological fractures due to ABCs are uncommon, particularly in weight-bearing bones such as the femur, and may complicate diagnosis and management. [2]

In our case, the presentation mimicked a telangiectatic osteosarcoma, underlining the diagnostic challenge posed by such lesions. ABCs typically appear as expansile osteolytic lesions with cortical thinning or

breach, often demonstrating characteristic fluid-fluid levels on MRI. [3]

These findings, however, are not pathognomonic and can overlap with other entities such as giant cell tumors, chondroblastomas, or telangiectatic osteosarcomas. [4]

Advanced imaging plays a crucial role in evaluating lesion extent, fracture involvement, and differential diagnosis. MRI remains the best modality for identifying fluid-fluid levels and internal septations. [5]

Despite these radiologic clues, biopsy remains the gold standard for definitive diagnosis, especially when imaging suggests malignancy. [6]

Telangiectatic osteosarcoma remains a critical differential diagnosis due to its similar radiologic appearance and more aggressive behavior, necessitating histologic confirmation. [7]

In our patient, the diagnosis of a primary ABC was confirmed histologically, guiding a more conservative but definitive surgical approach. Curettage, with bone grafting or bone graft substitute, remains the standard treatment approach. [8,9]

Internal fixation with a long gamma nail was necessary in our case, not only to stabilize the associated femoral fracture, but also to protect the entire femur.

This case highlights the importance of integrating imaging findings with histopathology to avoid overtreatment of benign lesions and emphasizes the need for a multidisciplinary approach in the management of bone tumors with pathological fractures. [10]

Although a few cases of aneurysmal bone cysts of the femur complicated by pathological fracture have been reported in the literature, cases mimicking telangiectatic osteosarcoma remain exceptionally rare. Our case contributes to this limited body of evidence, underscoring the diagnostic challenge and therapeutic considerations involved.

Aneurysmal bone cysts (ABCs) are rare benign lesions that can mimic malignant tumors like telangiectatic osteosarcoma. This case underscores the need for careful clinical, radiological, and histological evaluation to ensure accurate diagnosis. Appropriate surgical management can lead to good outcomes, and ABCs should be considered in the differential diagnosis of lytic femoral lesions in adults. (10)

Conflict of Interest: No conflicts of interest.

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