

Xanthogranulomatous Osteomyelitis of Proximal Femur Masquerading as Benign Bone Tumor

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Abstract

We describe a case of xanthogranulomatous osteomyelitis (XO) of the proximal femur in a 65-year-old woman who presented with pain of 6 months' duration in the right hip. Plain radiographs showed a lytic well-defined lesion in the right peritrochanteric region suggestive of a benign neoplastic etiology. The gross and histopathologic examination of the curettage specimen was consistent with XO.

Xanthogranulomatous osteomyelitis is a rare chronic inflammatory process that is characterized by the presence of a large number of lipid-containing macrophages with an admixture of lymphocytes, plasma cells, and neutrophils. Gross and radiologic examination of this entity can mimic malignancy, and differentiation should be confirmed by histopathologic evaluation.

To the best of our knowledge, XO of the femur has not been reported in the English-language literature. The rarity of this condition and its resemblance to bone tumors form the basis of this case report.

Xanthogranulomatous osteomyelitis (XO) is a type of chronic inflammatory process that is characterized by the collection of foamy macrophages along with mononuclear cells in the tissue.¹ Xanthogranulomatous osteomyelitis is characterized by the presence of granular, eosinophilic, periodic acid–Schiff–positive histiocytes in the initial stages, followed by the mixture of foamy macrophages and activated plasma cells and, last, by the presence of suppurative foci and hemorrhage. This is an uncommon process best known to occur in the gallbladder, kidney, urinary bladder, fallopian tube, ovary, vagina, prostate, testis, epididymis, colon, and appendix.^{2–4} Very rarely, it can affect lungs, brain, or bone. Only 5 cases of XO have been reported in the literature.^{5–8}

We report XO of the proximal femur in a 65-year-old woman who initially had a clinical and radiologic diagnosis of aneurysmal bone cyst; however, histopathologic examination confirmed the diagnosis of XO. Xanthogranulomatous osteo-

myelitis mimics a neoplastic pathology in gallbladder, kidney, and prostate on gross clinical and radiologic examination.⁹ The pathogenesis of XO is best characterized by a delayed type of hypersensitivity reaction.¹⁰ The differential diagnosis includes chronic recurrent multifocal osteomyelitis, xanthoma, infiltrative storage disorder, malakoplakia, Langerhans cell histiocytosis, fibrohistiocytic tumor, Erdheim-Chester disease, and metastatic renal cell carcinoma.^{11–14} The patient provided written informed consent for print and electronic publication of this case report.

Case Report

A 65-year-old hypertensive woman presented with complaints of pain in the right hip for a duration of 6 months. Pain was radiating from the right hip region to the anteromedial aspect of the knee and progressively increasing, with a history of pain at rest suggestive of a nonmechanical pathology in the hip. There was no history of fever, weight loss, loss of appetite, pain in any other joint, or morning stiffness. The patient was mobile without support and was able to squat and sit cross-legged; however, the stance phase on the right side was less than on the left side, suggestive of an antalgic component in the gait.

On examining the patient, there was anterior hip joint tenderness with no local sign of any infective or inflammatory pathology. Trochanteric tenderness was present, but there was no irregularity, broadening, or thickening of the trochanter. There was no restriction in the range of motion, and no coronal or sagittal plane deformity in the right hip. There was no limb-length discrepancy. However, the patient was not able to raise her leg actively, probably because of pain in the right hip.

On plain radiographs of the pelvis with bilateral hips, a well-defined nonexpansile uniloculated lytic lesion with sclerotic margins was present in the neck of the right femur, extending to the intertrochanteric area (**Figure 1**). Ground-glass appearance was also noted. Considering the benign nature of the lesion radiologically and clinically, a differential diagnosis of hyperparathyroidism, renal osteodystrophy, multiple myeloma, and fibrous dysplasia was considered. Hematologic investigations, skeletal survey, and magnetic resonance imaging (MRI) of the bilateral hips were performed to rule out the differential diagnosis.

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Figure 1. Plain radiograph of the pelvis, with bilateral hips, showing a well-defined nonexpansile lytic lesion with sclerotic margins in the neck of the right femur extending to the intertrochanteric area.



Figure 2. T2-weighted magnetic resonance imaging showing hyperintense lesion in the neck and intertrochanteric area of the right hip.

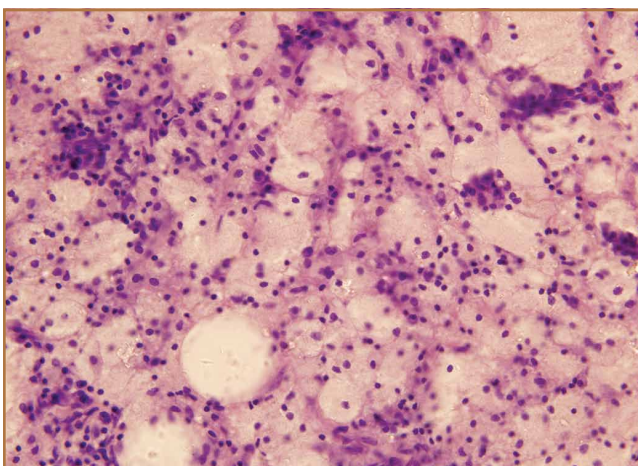


Figure 3. Light microscopy of specimen showing inflammatory infiltrates, including lymphocytes admixed with foamy macrophages.



Figure 4. Plain radiograph of right hip at 6-month follow-up showing healed lesion with proximal femoral nail in situ.

The patient's hemoglobin level was 11.8 g/dL with total white blood cell count of 10,300/ μ L. Renal and hepatic functions were within normal limit. Serum erythrocyte sedimentation rate (ESR) was 12 mm/h and C-reactive protein level was normal. Serum parathyroid level was 32 pg/mL, which was within normal limits, with an alkaline phosphatase level of 101 U/L. The skeletal survey showed no other bony lesion in the body. T1-weighted MRI of both hips showed a well-defined hypointense lesion in the neck and intertrochanteric area of the right hip, which was hyperintense on T2-weighted MRI, suggestive of aneurysmal bone cyst (**Figure 2**).

Normal ESR, hemoglobin, alkaline phosphatase, and serum parathyroid levels and normal skeletal survey almost ruled out multiple myeloma and hyperparathyroidism. Normal renal profile ruled out renal osteodystrophy and the osteitis fibrosa cystica lesion associated with it. We planned for prophylactic internal fixation of the lesion to prevent a patho-

logic fracture. According to Mirels,¹⁵ if there is a lytic lesion covering more than two-thirds of the circumference of the bone in the peritrochanteric area, the chances of a pathologic fracture are high and such fractures should be fixed.

We planned for curettage of the lesion with bone grafting and in situ intramedullary fixation of the lesion. Curettage was done according to the plan and the sample was sent for histopathologic examination. In situ internal fixation and bone grafting were performed by using

a proximal femoral intramedullary nail. To our surprise, the biopsy sample was reported as xanthogranuloma, with multiple foamy macrophages mixed with inflammatory cells and aggregates of lymphocytes (**Figure 3**). Mycobacterial and routine bacterial cultures were reported as negative. The patient was kept on oral antibiotics (cefixime and moxifloxacin) for 6 weeks, and she made an uneventful recovery. At 6-month follow-up, a radiograph of the right hip showed a healed lesion with proximal femoral nail in situ (**Figure 4**).

Discussion

To the best of our knowledge, a total of 5 cases of XO have been reported in the literature. The earliest of these reports were by Cozzutto and Carbone,¹ who reported 2 cases of XO of the first rib and of the epiphysis of the tibia, respectively. The importance of these lesions to diagnosis is their confusion with a neoplastic disease, as XO is itself a benign disorder. These

lesions can mimic a neoplastic lesion in clinical and radiologic presentation and the only way to differentiate the lesion from a neoplastic disease is by histopathologic examination of the tissue. Hypothetically, xanthogranulomatous disorders can be related to trauma or infection.

In 2007, Vankalakunti and colleagues⁶ reported XO of the ulna in a 50-year-old postmenopausal woman. In that case, progressive swelling was present on the extensor aspect of her right forearm for a period of 2 years, for which curettage and bone grafting were performed, using autograft from the ipsilateral iliac crest. The tissue culture was sterile, and XO was diagnosed as a result of the histopathologic examination. In 2009, Cennimo and colleagues⁷ reported XO of the index finger and wrist of a man complaining of pain and swelling for 1 year, which was unresponsive to antibiotics. The diagnosis of XO was confirmed histopathologically, when the culture of the same tissue grew *Mycobacterium marinum*. Radical synovectomy of the lesion was performed, after which minocycline, clarithromycin, and ethambutol were administered. In 2012, Borjian and colleagues⁸ reported a case of XO of the proximal humerus and proximal fibula in a 14-year-old child. The child, who presented with fever, pain, and restriction of shoulder movements, was started on oral antibiotics as the tissue culture grew *Staphylococcus aureus*; the patient did not complete the course of treatment in the hospital. No surgical intervention was done in this case. The diagnosis of XO was confirmed by microscopic examination of the tissue.

An association between bacterial infection and xanthogranulomatous inflammation has existed in several organs, such as the kidneys, and in the gastrointestinal system, but such an association of the 2 is yet to be determined for bone.^{5,10,16-19} Because of the paucity of literature on the disease, a management protocol for XO of bone has not been defined, and decisions have to be made considering the natural history of the disease in other organs. We present this case primarily because of its rarity, curability, and its close resemblance to bone tumors. While XO is benign, it can mimic a neoplastic bone lesion in its imaging and clinical manifestations, and appropriate differentiation is crucial. Currently, histopathologic examination of lesions is the most specific and is the gold standard for diagnosis.

Conclusion

Xanthogranulomatous osteomyelitis is a very rare entity, and only a few cases have been reported in the English-language literature. Though rare, XO warrants greater emphasis than it receives in the literature. It is a chronic inflammatory disease having a close resemblance to bone tumors. A high index of suspicion must be practiced to differentiate XO from tumors. Histopathologic examination is mandatory to establish definitive diagnosis and correct treatment.

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This paper will be judged for the Resident Writer's Award.