

GREATER TROCHANTERIC FRACTURE OF YOUNG HEALTHY MALE WITH A LYTIC LESION: A DIAGNOSTIC AND MANAGEMENT DILEMMA

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HISTORY AND PHYSICAL EXAM

This is a 30-year-old gentleman that began having some left knee pain several months prior to presentation. It felt like a tight muscle in his distal thigh. On 02/17/2005, he suffered a mechanical fall at work as a forklift driver and was seen at an outside hospital complaining of worse thigh and knee pain. An x-ray showed a fracture to the greater trochanter and a radiolucent lesion in the intertrochanteric area and greater trochanter on the left hip. He was placed on crutches and assigned non-weight bearing status. On 03/14/2005, his hip "gave out" as he suffered another fall. He re-fractured at the same site now with displacement. He was admitted to the outside hospital where he underwent an ORIF of his left hip fracture and a biopsy on 03/15/2005. This was done with a DHS. He was then transferred to us for further evaluation of this lesion.

On examination, he is healthy in appearance and has bilateral axillary crutches. He is able flex his hips to 90 degrees and extend it fully without much difficulty. He has pins and



Figure 1

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Figure 2

staples and his wound is clean and dry. He is able to straight leg raise against resistance. We measure him to be 2 cm short on the left from medial malleolus to anterior superior iliac spine. His pedal pulses are 2+ and equal. Sensation in both lower extremities is intact to light touch and all motor groups are 5/5 to manual testing with

the exception of hip abductors and flexors, which are not formally tested because of his recent fracture. There is no redness, warmth, or erythema around the wound and there is no palpable distinct mass. There is no adenopathy or abdominal mass.

Plain radiographs are shown. The initial imaging from 2/17/2005 (Fig. 1) reveals a purely radiolucent, delineated but not marginated lesion of his intertrochanteric and greater trochanteric area. There is a minimally displaced trochanteric fracture, but an intact calcar. The film from 03/14/2005 (Fig. 2) shows a displaced fracture with no change of the lesion. The film on 3/27/2005 shows a well placed DHS that has reconstituted the femoral neck shaft angle and fixed the fracture, although it appears that there was medial displacement either at the time of surgery or postoperatively accounting for a shortening. The lesion is still present without change.

Based on the history, physical exam and imaging studies, what is the differential diagnosis?

DIFFERENTIAL DIAGNOSIS

- Aneurysmal Bone Cyst
- Chondroblastoma
- Giant Cell Tumor
- Eosinophilic Granuloma
- Telangiectatic Osteosarcoma

Intraoperatively, the hardware appeared intact and well fixated to the side of the femur and up the femoral head. There was virtually no greater trochanter and the entire intertrochanteric area was filled with tumor. It extended along the medial aspect of the plate and down the femoral shaft medially near the

lesser trochanter and into the femoral neck. This was curetted widely and packed with allograft bone graft. Biopsies were taken and photomicrographs are shown.

HISTOLOGY INTERPRETATION

The specimen revealed large areas of necrosis, surrounding reactive spindle cell proliferation, and new bone formation. (Fig. 3)

Based on the history, physical findings, imaging studies, and the histologic appearance, what is the diagnosis?

DIAGNOSIS

Giant Cell Tumor

DISCUSSION

Giant cell tumor (GCT) is a rare, benign, but locally invasive and highly destructive tumor that comprises only 4% to 5% of all primary bone tumors in the United States. The percentage rises to approximately 20% of all primary bone tumors in Southeast Asia. The majority of cases are seen in persons between 20 and 40 years of age with a peak incidence in the third decade of life. It is extremely rare to arise in persons younger than 13 years and approximately 10% of cases are found in persons older than 65 years. There is a slight female to male predominance. GCT is unique due to its presence in the epiphysis of long bones. Most commonly, they are found in the distal femur, proximal tibia and distal radius with 60% occurring about the knee. Vertebral and sacral involvement have been found in 10% of cases. When found in children with open growth plates, the lesion is metaphyseal.^{2,4,6} Multiple GCT of bone in the same patient is rare. Though the tumor is considered benign, there is a high recurrence rate after local removal ranging from 10% to 50% depending on mode of treatment, that is, curettage alone versus curettage with cementing or bone packing.⁵ In addition, approximately 2% of patients develop metastasis to the lungs known as “benign metastasizing giant cell tumor”.⁶ A secondary malignant GCT can occur after radiation or with recurrence.

Clinically, patients will present with pain referable to the joint involved and swelling secondary to the aggressive and destructive nature of the tumor. There may also be decreased joint range of motion. Rarely, a pathologic fracture can occur if the found on exam along with disuse atrophy of the muscles.^{2,5,6}

Radiographically, they appear as well-delineated, purely lytic, eccentric lesions. There is an expanding zone of radiolucency at the epiphyseometaphyseal end of a long bone often bordering subchondral bone. There is no matrix calcification or reactive host bone at the periphery of the lesion. The endosteal margins are irregular appearing as an indistinct, permeative surface with surrounding bone. According to Campanacci's

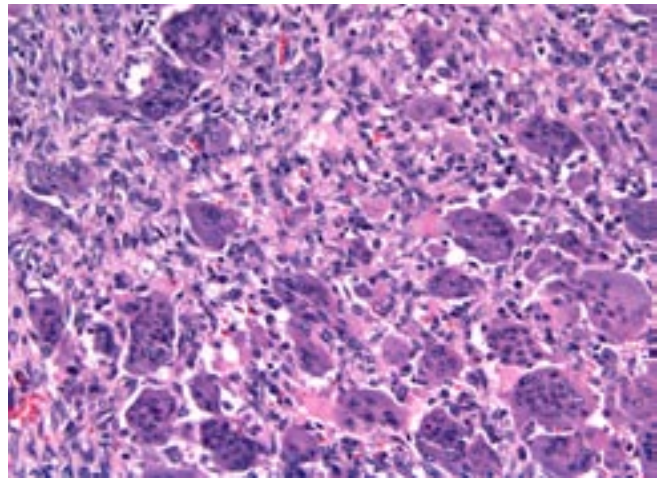


Figure 3

staging system, a majority of GCT present as stage 2 (cortical thinning with with aneurysmal appearance), or stage 3 (aggressive form of disease).¹

Histologically, there are abundant osteoclast-like giant cells within a backdrop of mononuclear cells that are polyhedral or spindle-shaped. There may be mitotic figures and peripheral osteoid. There is little evidence of matrix production. It is important to note that new bone formation after fracture can alter tumor histology.⁴

In short, treatment consists of curettage with adjuvant therapy such as cryotherapy, phenol, or polymethylmethacrylate (PMMA) to minimize the incidence of recurrence. Curettage should be aggressive while preserving the involved joint. However, aggressive resections need to be weighed against the fact that, in most cases, GCTs are benign tumors. They should be reserved for recurrent GCTs, highly destructive GCTs, and GCTs involving expendable bone. The resulting defect, which can be of considerable size following resection, should be filled with PMMA or bone graft. The success rate of this treatment regimen is 85% to 90%.^{3,4}

This case emphasizes the importance of early recognition and diagnosis of bone tumors in the community in order to provide appropriate care and avoid complicated management. In addition, a red flag must be raised when a young healthy male suffers a fracture that is out of proportion to the injury. The diagnosis of pathologic fracture must be entertained. Had this lesion been detected at first presentation, this patient would have been spared multiple surgeries. The community orthopedist needs to be skilled in recognizing lytic bone lesions so that appropriate referrals can be made if he is not comfortable with management. Fortunately, our patient is doing well in the post-operative period with stable fixation and good mineralization of bone graft.

References

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