

Open Fracture as a Rare Complication of Olecranon Enthesophyte in a Patient With Gout

Rafid Kakel, MD, and Joseph Tumilty, MD

Abstract

Enthesophytes are analogous to osteophytes of osteoarthritis. Enthesopathy is the pathologic change of the enthesis, the insertion site of tendons, ligaments, and joint capsules on the bone. In gout, the crystals of monosodium urate monohydrate may provoke an inflammatory reaction that eventually may lead to ossification at those sites (enthesophytes). Here we report the case of a man with chronic gout who sustained an open fracture of an olecranon enthesophyte when he fell on his left elbow. To our knowledge, no other case of open fracture of an enthesophyte has been reported in the English literature.

Enthesophytes are analogous to osteophytes of osteoarthritis. Enthesopathy is the pathologic change of the enthesis, the insertion site of tendons, ligaments, and joint capsules on the bone. Enthesopathy occurs in a wide range of conditions, notably spondyloarthritides, crystal-induced diseases, and repeated minor trauma to the tendinous attachments to bones. Enthesopathy can be asymptomatic or symptomatic.

In gout, crystals of monosodium urate are found in and around the joints—the cartilage, epiphyses, synovial membrane, tendons, ligaments, and enthesis. These crystals may provoke an inflammatory reaction that eventually may lead to ossification at those sites (enthesophytes).

Here we report the case of a man with chronic gout who sustained an open fracture of an olecranon enthesophyte when he fell on his left elbow. To our knowledge, no other case of open fracture of an enthesophyte

has been reported in the English literature. The patient provided written informed consent for print and electronic publication of this case report.

CASE REPORT

A 50-year-old man with chronic gout being treated with allopurinol (and indomethacin on an as-needed basis) presented to the emergency department. He reported



Figure 1. Small wound at patient's left elbow.



Figure 2. Radiograph of the patient's left elbow shows long enthesophyte at tip of olecranon.

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Figure 3. Tiny bone chip removed from open wound.

that he had fallen to the floor and injured his left elbow 12 hours earlier. Although in moderate pain, he did not seek immediate medical help because he was still able to move the elbow. The pain increased, however, so he took a closer look and noticed a small bone chip sticking out of the wound. He removed the bone chip with a pair of tweezers. When he found another small piece of bone, which he could not remove, he presented to the emergency department.

The patient reported no fever during the preceding 12 hours. Examination revealed a small wound at the tip of the olecranon (Figure 1), but no swelling or erythema around the elbow. His elbow range of motion was full, and there was no sign of triceps rupture clinically, although he reported local tenderness at the tip of the olecranon process. The patient was neurovascularly intact on examination. A radiograph of the left elbow showed a long enthesophyte where the triceps tendon attached to the olecranon (Figure 2).

A small piece of bone was removed through the wound (Figure 3). Ultrasonography of the left elbow showed typical enthesopathic changes (Figure 4). The wound was gently débrided. When the wound was being irrigated with 500 mL of normal saline, the fluid distended the olecranon bursa. The wound was left open to heal. Radiographs showed a similar but asymptomatic lesion in the contralateral olecranon process (Figure 5). The patient was treated with antibiotics and an anti-inflammatory for 10 days.

DISCUSSION

Entheses are sites of tendon and ligament attachment to bone. Enthesopathy is a disease process at these sites. It has various causes: inflammatory (spondyloarthritis), degenerative (osteoarthritis), metabolic (crystal-induced disorders), and traumatic.¹ When inflammatory changes are prevalent, the condition is called enthesitis.²

As the tendinous attachment to bone has 4 consecutive zones (tendon, unmineralized fibrocartilage,

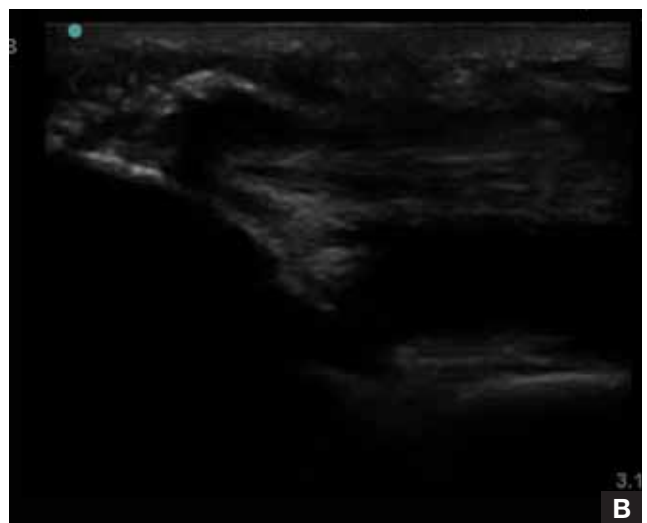


Figure 4. (A) Ultrasonography of the patient's left elbow shows typical enthesopathic changes: heterogeneous hypoechogenicity of enthesis, loss of normal fibrillar echotexture of insertion of tendons, intratendinous focal changes (hypoechoic areas in insertional tendon [straight line]), punctiform calcification foci (short arrows), thickening of insertional tract of tendon, and hyperechoic bony spur (enthesophyte). (B) Same as (A) but without annotation.

mineralized fibrocartilage, and bone), in the later stages of enthesitis a proliferative process of cartilage metaplasia and endochondral ossification leads to fibrosis, focal calcification, bone rearrangement (erosions, reactive sclerosis), and formation of woven bone (enthesophyte).³

The shape of the enthesophyte is influenced partly by the direction of traction of tendinous fibers and partly by external pressure. The developed enthesophyte has a bony structure, and its lamellae fuse with the trabeculae of the underlying bone. Radiologic changes in the enthesis often are found incidentally.³

It is well documented that gout is associated with bone proliferation, particularly at the enthesis.⁴ Bone proliferation at the triceps attachment to the olecranon, however, is very rare and seldom reported in osteoar-



Figure 5. Radiograph of the patient's right elbow shows enthesophyte as well, but this lesion was asymptomatic.

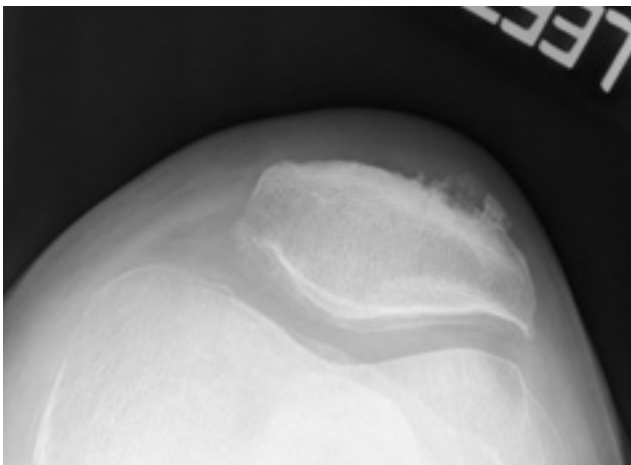


Figure 6. Tooth sign or patella whiskering caused by enthesopathy at quadriceps attachment to the patient's patella.

thrititis, diffuse idiopathic skeletal hyperostosis, psoriatic arthritis,⁵ or gout.⁶

Gout can cause enthesopathy through deposition of monosodium urate crystals at the insertion of tendons and surrounding structures.⁷ These deposits are not visible with plain radiography but are readily seen with computed tomography.^{8,9} Moreover, inflammatory involvement of perientheseal synovial structures (bursa or joint) can contribute to enthesophyte development in perientheseal bone.²

Common sites of enthesopathy in chronic gout are around the patella (in the superior part, at the quadriceps tendon insertion, and in the inferior part, at the patellar tendon insertion) and around the calcaneus (at the Achilles tendon and plantar fascia insertions).⁷

In the patella, irregular excrescences are evident radiographically as hyperostosis or “whitening” of the patellar surface—termed *tooth sign* or *patellar whiskers*¹ (Figure 6). This may lead to quadriceps muscle rupture.¹⁰

In chronic gout, tophaceous deposits may occur in the Achilles tendons—the result being nodular tenosynovitis and, in some cases, erosive changes (“rat bite” erosions caused by pressure from the tophi or from pre-Achilles bursa¹¹ in the upper part of the calcaneus can be observed¹²) (Figure 7). Again, this may predispose to rupture of the Achilles tendon.¹³

Other potential sites for tophaceous deposits include the pelvis, the femoral trochanter, the humeral tuberosity, and portions of the vertebral column, where deposition of tophi can lead to bone erosions and reactive bone formation causing syndesmophytes that bridge the disk space to connect the 2 neighboring vertebrae. Tophaceous lesions can also cause reactive osteophytes on the dorsum of the foot¹⁴ (Figure 8).

Widespread calcification of monosodium urate crystals has been documented (but noted to be unusual) in post mortem studies of gout.¹⁵

Ultrasonography is a simple but very useful tool that can be used to evaluate the enthesis. In cases of enthesopathy, ultrasonography shows “heterogeneous hypoechogenicity” of enthesis with loss of normal fibrillar echotexture of the insertion of tendons, punctiform calcification foci, thickening of insertional tract of tendon, irregularities and thinning of the subentheseal cortical bone surface, and bony erosions.¹⁶

In cases of gout, ultrasonography may show very specific changes, such as the double contour sign (Figure



Figure 7. Radiograph of the patient's left foot shows pressure bone erosion (caused by gouty tophi) along posterior aspect of calcaneus.



Figure 8. Reactive osteophytes on dorsum of the patient's foot caused by tophaceous deposits. Note calcaneal erosion 2 years before same one in Figure 7.



Figure 9. Ultrasonography of the patient's distal femur shows double contour sign: hyperechoic (bright), slightly irregular layer of crystal deposits (D) overlying anechoic hyaline cartilage (C) and bony contour of distal femur (B).

9); a hyperechoic (bright), slightly irregular layer of crystal deposits overlying anechoic hyaline cartilage; and the bony contour of the distal femur.¹⁶

It is important to remember that, in sports and occupational medicine, enthesopathies are well known to be associated with prolonged hyperactivity of muscles.¹⁷ Enthesopathy of the medial humeral condyle occurs in javelin throwers and golfers, enthesopathy of the triceps insertion at the olecranon occurs in baseball players and woodcutters, and enthesopathy of the Achilles tendon occurs in marathoners. Magnetic resonance imaging

and ultrasonography demonstrate that enthesopathy is often asymptomatic in both the axial and peripheral skeleton.²

AUTHORS' DISCLOSURE STATEMENT AND ACKNOWLEDGMENTS

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