

Symptomatic Calcification of the Adductor Hallucis Tendon at the First Metatarsophalangeal Joint: Report of Two Cases

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INTRODUCTION

Calcifying tendinopathy is characterized by large deposits of calcium between or on degenerated collagen fibrils. Although this pathologic phenomenon was first described by Wolff in the semitendinosus tendon,²⁶ the supraspinatus tendon is the most commonly affected tendon.⁹

Tendon calcification often is an asymptomatic incidental finding,⁹ and calcification of the rotator cuff has been estimated to occur in approximately 20% of the normal population.^{9,16,23} The frequency of supraspinatus calcification increases with age; calcification is more common in women than in men¹⁶ and can cause severe shoulder pain. While reports of pathologic tendon calcifications of the rotator cuff^{8,9,16,22,23,24} have been frequent in the literature, calcification in other sites of the musculoskeletal system have been described only in isolated case reports.^{1,4,5,6,15,17,18,25}

Because symptomatic soft-tissue calcifications are rare in locations other than the shoulder, they may be confused with other conditions that have similar symptoms. This report describes the clinical, radiographic, and histopathologic findings in two patients with symptomatic calcifications of the abductor hallucis brevis tendon at the level of the first metatarsal head.

CASE REPORTS

Two patients presented to our outpatient clinic with acute pain on the medial side of the first metatarsal head. The time between onset of pain and first medical advice was 2 days in one and 4 weeks in the other. No acute prior injury was reported. Both patients were women, between the ages of 18 and 20 years. Both patients had a painful bunion with swelling and severe local tenderness on the medial side of the first metatarsal head. Range of motion of the metatarsophalangeal (MTP) joint was restricted because of pain. Neither had splayfoot deformity.

Conventional radiographs showed a normal first intermetatarsal angle (8 and 9 degrees), and in both women there was a dense, rounded, calcific deposit of approximately 0.5 × 1 cm on the medial side of the metatarsal head (Figure 1). No degenerative, posttraumatic, or osteolytic changes were seen.

At the initial visit, both patients were treated with non-steroidal anti-inflammatory drugs (Voltaren®, Ciba Geigy, Wehr) for 2 to 3 weeks. Because pain persisted, the calcific deposit was excised through a small dorsomedial approach. In both patients, the deposit was localized within the abductor hallucis brevis tendon and the overlying bursa. In both it had a dense consistency like toothpaste (Figure 2). No bony elements were present. There was no contact with the first MTP joint capsule. Postoperatively, both patients were immediately free of pain.

After a mean followup of 3 and 7.5 years, both patients remained pain free, and radiographic examination revealed no recurrence of the calcific deposit (Figure 3). Histologic evaluation of biopsies obtained during surgery showed nodular deposition of calcium on collagen fibers, vascular proliferations, and inflammatory changes of the bursa and tendon tissue (Figure 4).

DISCUSSION

Calcifying tendinitis is a well known disease of the rotator cuff tendon, but it also has been described in other

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Fig. 1: Preoperative radiograph shows calcific deposit at the level of the first metatarsal head.

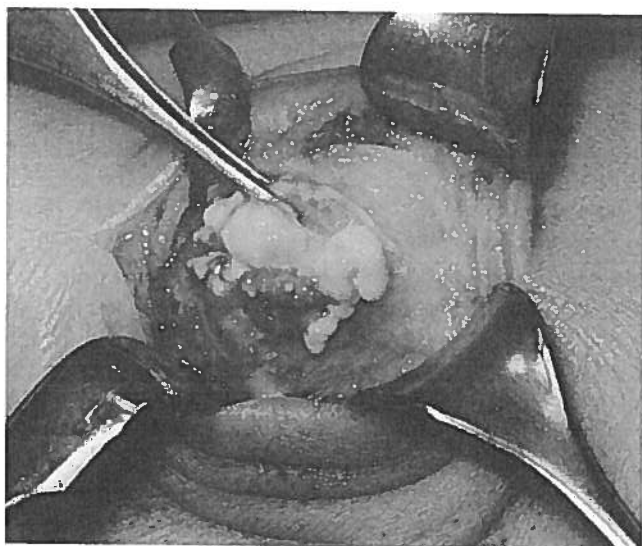


Fig. 2: Intraoperative photograph shows removal of calcific deposit through a dorsomedial approach. It had a toothpaste-like consistency and was localized within the abductor hallucis brevis tendon and the overlying bursa.

tendons such as the gluteus maximus, pectoralis major, rectus femoris, posterior tibial, vastus lateralis, peroneus longus, and flexors of the forefoot.^{1,4,5,6,15,17,18,25} Calcifications have been reported in the bursae of the phalangeal joints of the hand,^{13,19,27} and Kernohan et al.¹⁰ described calcification of the lateral sesamoid bursa of the great toe.¹⁰ We did not find any report of symptomatic calcification on the medial side of the first MTP joint as was present in our two patients.

Since calcifying deposits in locations of the musculoskeletal system other than the shoulder are rare, misdiagnosis is common and may delay treatment and recovery.⁷ Our two patients were much younger than the typical patient



Fig. 3: Postoperative radiograph: complete resection of the calcific deposit.

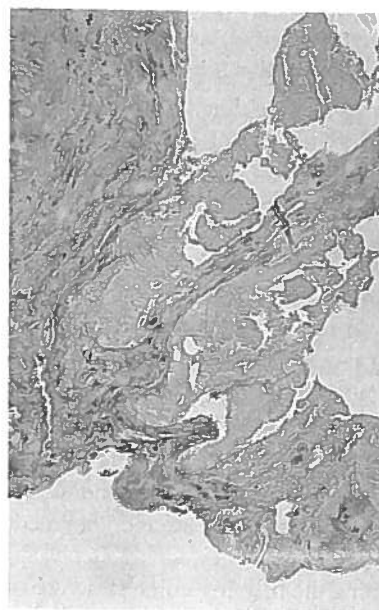


Fig. 4: Histologic appearance suggests chronic inflammation of the soft tissue, including rare chondrocytes and calcific particles.

with calcifying tendinitis of the rotator cuff (40 to 50 years). In these two young women, a typical differential diagnosis is a painful bunion caused by hallux valgus deformity. Other differential diagnoses to be considered include a ganglion, an enlarged bursa from pressure of the shoe, hallux rigidus, and inflammatory changes secondary to arthritis. The radiographic changes could mimic an old bony avulsion fracture of the first metatarsal head. Another differential diagnosis for bone-like tumors of the small bones of the feet¹² is bizarre

parosteal osteochondromatous proliferation (Nora lesion), but the radiographic and histologic appearances of this lesion are different from those in our patients.¹¹

Heterotopic ossification frequently occurs in muscle tissue and has a consistency of hard bone histologically. In our patients we found a toothpaste-like white material in the tendon clinically and histologically. The distinction between calcifying tendinitis and heterotopic ossification is important, because resection of heterotopic ossification is required to avoid recurrence.

The exact mechanism of calcium deposition in calcifying tendinopathy is not clear. Codman³ believed that calcium is deposited in necrotic and inflammatory tissue; however, Uthoff²² described cases of supraspinatus calcification with no tendon degeneration or inflammatory tissue. These authors suggested that, because of persistent tissue hypoxia in a poorly vascularized tendon, a part of the tendon is transformed into fibrocartilage in which chondrocytes mediate the deposition of the calcium. This hypothesis is supported by anatomical studies that have shown that frequent locations of tendon calcifications are poorly vascularized.^{14,20} In our patients the calcification was localized to the abductor hallucis tendon at the level of the metatarsal head, but the literature provides no microvascular studies about this tendon.

Uthoff et al.²³ stated that calcifying tendinitis is a chondrocyte-mediated self-healing process. Chondrocyte mediated calcification is a physiologic process that occurs during endochondral ossification.²¹ Other authors could not confirm the findings of Uthoff²² in calcifications of other tendons.^{2,4} Józsa et al. and Tillman^{8,21} found that in locations other than the shoulder some calcifications occurred without signs of fibrocartilaginous transformation. One explanation for this discrepancy may be that calcifying tendinitis as described by Uthoff and Sarkar²³ in the rotator cuff, and calcifying tendinopathy in other locations are entirely different disease entities.^{8,9}

In our two patients, calcific deposits were at the level of the first metatarsal head where the tendon of the abductor hallucis brevis tendon turns around the medial eminence which serves as a bony pulley for this tendon. We found no studies describing the histologic fine structure of this tendon, but both biopsies found a fibrocartilaginous deposit.

CONCLUSION

On the basis of these two patient's outcomes, we recommend open resection of the calcific tendon deposit when the initial nonoperative approach is unsuccessful.

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