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Asymmetrical Achilles tendon ossification and rare rear heel pain

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CASE STUDY

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ABSTRACT

Achilles tendon ossification is not a frequent association of posterior heel pain in pain physicians' daily practice. The condition has been reportedly common following rear heel trauma (repetitive heel stress injury), surgery (club foot surgery); however, some endocrino-metabolic, haematological disorders can also contribute to Achilles tendon ossification. Shape of ossified tendon mass varies from discrete (single/multiple) to extensive variety; and as per literature review, in bilateral cases they are alike. To be intriguing, here in this write-up, we demonstrate asymmetrical (in terms of clinical features and radio-imaging findings), bilateral Achilles tendon ossification in a 70-year-old retired farmer, first time in literature.

Key Words
Achilles tendon ossification, asymmetrical, rear heel pain

Implications for Practice:

1. What is known about this subject?
Achilles tendon ossification is rare and common following posterior heel trauma, surgery, etc.

2. What new information is offered in this case study?
Bilateral Achilles tendon ossification can be developed as a consequence of intra-substance degeneration of tendon; however, pain may be unilateral. The shape of ossified mass may not be alike either.

3. What are the implications for research, policy, or practice?
Though isolated Achilles tendon ossification possible, all patients should be evaluated for primary conditions associated with it.

Background

Rear heel pain is not rare in Algologists' including interventional physiatrists' daily practice; and this is multi-factorial.[1,2] Like various focal musculoskeletal factors, systemic clinical entities such as spondyloarthropthy (SpA), dyslipidemia, hypothyroidism, gout, even fluoroquinolones exposure can attribute to posterior heel pain.[1–5] Back heel pain due to retrocalcaneal bursal infection has also been reported.[6]

Among various heel anatomical structures, Achilles tendon (AT), paratenon, retrocalcneal bursa, calcaneus, etc. are the common posterior heel pain generators; but, the most commonly involved structure is Achilles tendon. To describe AT tendon pathology, following terms namely Achilles tendinopathy, tendinitis, tendinosis, paratendonitis, etc. has been used often in literature[7].

Tendinopathy is an umbrella term, indicating a non-rupture mechanical injury involving either tendon or paratendon or both; and newer evidences unveil inflammation accompanies with it. In contrast, tendinosis is a term frequently used to describe chronic mid-portion tendon pathology, nonetheless frequently used to define tendinitis by some physicians. Sometimes, both these terms are used interchangeably to define tendinosis. Paratendonitis involves paratendon, alone or in combination with tendinosis; and clinical appearance of paratendonitis can be alike of tendinosis.[7]

The scenario of clinically apparent Achilles tendinopathy varies across its length. OAT is one of them, though has

been surfaced in literature infrequently. Here, in this article, we demonstrate an uncommon, asymmetrical bilateral Achilles tendon ossification in a 70-year-old farmer.

Case details

A 70-year-old farmer presented with the complaints of both rear heel cord pain and swelling for approximately eight months. The pain was more on the left side that aggravated during walking on uneven surface. Using Foot/Ankle questionnaire we found the patient experienced worst pain while standing long-time, more than an hour. There was not any significant trauma event in either foot preceding the pain. No history of back, neck, or joint pain of inflammatory nature. Search in favour of crystal induced arthropathy was also unremarkable. He was non-diabetic either.

On biochemical analysis, his lipid, thyroid, and parathyroid hormone profiles were normal as well. We further examined, patient's both ankles using X-ray and MRI, revealing area of opacification at osseous insertion of Achilles tendon to calcaneus. Osteoarthritic changes had also been discerned in ankle/subtalar joints on both sides. However, the most intriguing and unique radio-imaging feature was the shape of ossified Achilles tendon mass: in left (Figure 1a) heel they were fragmented and aggregated (3 in number), whereas it appeared sickle shaped in right side (Figure 1b), extending cephalad from tendon insertion. Same thing echoed in MRI study (Figure 2 and Figure 3). Further scrutiny of the patient's left rear heel under musculoskeletal ultrasonogram (linear probe-10MHz, Chison CEO1, China) depicted several ossified masses, where most distant one was 32.40mm away from Achilles tendon insertion and 6.40mm away from skin surface (Figure 4a); on right side theses distances were 10.57mm and 3.60mm (Figure 4b) respectively.

Considering all these data we assumed the pathology belonged to patient's heel was 'ossification of Achilles tendon (OAT) with intra-tendinous calcification'. There was associated asymptomatic osteoarthritis of ankle/sub-talar joint as well. According to Morris radiological classification for OAT, he grouped into type-II category[1]. Both Achilles tendons were also found thickened, nevertheless, ultrasonographic changes suggestive of retrocalcneal bursitis were absent. Achilles tendon integrity was well-maintained. Last but not least, the patient reported improved pain while taking pain killer preferably etoicoxib on short-term basis providing that the heel pathology plunged him into serious trouble.

Discussion

The first medical report regarding Achilles tendon ossification (OAT) had been published in 1908[1]. Among published papers concerning OAT, maximum were either case reports or case series; and poorly explained the explicit aetiology behind such clinical entity. Though, trauma and ankle/foot surgery remain the top reason of Achilles tendon ossification, heterotopic ossification may be seen in patients' with endocrino-metabolic, autoimmune (SpA)/crystal-induced arthropathy, ochronosis, diffuse idiopathic skeletal hyperostosis, flurosis, etc.[2,3] OAT existence in siblings has also been demonstrated, nevertheless, yet to prove in longitudinal study.[1]

Achilles tendinopathy is reportedly common among young athletes participating volleyball, soccer, racquet sports, etc. nonetheless, the condition is not that much scarce among other professionals with vigorous physical activity.[4] In an article, Arora, described bilateral Achilles tendon ossification in a 48-year old woman with altered foot biomechanics.[2] Similarly, Tamam and colleagues depicted bilateral OAT, in a 41-year old man with inappropriate footwear, using ultrasonography and Single Photon Emission Computed Tomography.[8] In their endeavour, Majeed and colleagues found ossification within the Achilles tendon substance in a young male with history of reconstructive clubfoot surgery in his childhood.[9] As per Leumann, childhood Achilles tendon lengthening for congenital clubfoot disorder may result in ossification of the respective tendon at his 59.[10]

In acute AT pathology, extrinsic factors predominate, but in chronic cases, besides extrinsic, intrinsic factors like tendon vascularity, age, gender, BMI (body mass index), foot biomechanics, etc. contribute tendon disorders. In long-standing cases, tendon resident fibroblast-like cells undergo metaplasia to osteoblasts, chondocytes, adipocytes, with resultant, bone, cartilage, or adipocyte transformation respectively; and metaplasia is discernible on imaging providing that it has been ossified, henceforth radio-imaging has some value in diagnosing tendon ossification alongside clinical examination.[7] Since, in our study subject, radio-imaging findings as to knee/ankle joints simulated with degenerative arthritis, associated degenerative change in Achilles tendon due to repeated mechanical stimuli even at normal physiological limits[11] in an aged individual,[4] might result in tendon ossification.[9] However, OAT can be possible even without any known risk factor, simulating our study result with.[12]

Regarding the shape of ossified mass, ossified Achilles tendon lesions can be shaped from discrete focal to extensive variety, regardless of presence of any known risk factor so far described in literature.[3,9,10,12] As per previous clinical reports by Ross,[3] Leumann,[10] Richards,[12] and colleagues, apparently larger ossified mass described in patients' with previous childhood clubfoot surgery and removal of one of the largest ossified masses reported in the literature, was sized 11.0cm×2.5cm×2.0cm with another 6.5 cm elongated intra-tendinous calcification.[3] Majeed et al. described three different patterns of ossification.[9] Achilles tendon ossification can also be symmetrical in bilateral cases;[2,13,14], to be interesting, here, in our study subject, we recognized it as two different shaped structures: in left painful heel, there was three discrete ossified masses; and it was segmented/sickle shaped in less painful right side, and to our best knowledge it is being presented first through this manuscript. Though most of the time, ossified Achilles tendon remain asymptomatic,[2] mechanical and biochemical factors causing fracture through ossified mass may induce heel pain, and may be the reason of our patient's heel pain as well.[1,2] Moreover, concentrated glutamate and substance P, rather prostaglandins E2 (PGE2) (present high in inflammatory tendinitis), play pivotal role in pain induction in Achilles tendon degeneration as documented in both animal and human studies.[7] Fortunately, in maximum cases, symptoms respond well with conservative approaches such as oral medications (analgesics, Non-steroidal Anti-inflammatory Drugs, NSAIDs) and physical therapy; but excision of the intra-tendinous ossified mass may require in some patients.[2,3,15] In addition, etidronate, the single most extensively studied bisphosphonate preparation to be efficacious in treating and halting heterotopic ossification following hip arthroplasty, spinal cord injury, though, its impact on OAT is yet to prove[16]. Role of low-dose radiation to deter post-surgical recurrence of heterotopic ossification is also promising[17]. In our observation, occasional oral etoricoxib was enough for our patient; furthermore we advised him to avoid walking on uneven surface, minimize stair up-down, longstanding walking, in order to impede pain recurrence. To have complete pain relief, we asked him to go through surgical removal of the ossified tissue, though he denied doing that; and it was our study limitation.

Conclusion

There are many faces of ossified Achilles tendon mass and their morphology varies from patient to patient. In this recent study, we document two different morphologies of ossified Achilles tendon lesion in a farmer, first time in literature. Nonetheless, we are yet to know, why heel pain was more on left side instead of bilateral Achilles tendon ossification. Why ossified masses were different in both Achilles tendons? We surmise, prospective, longitudinal study will provide the answers of these quests in the ensuing days.

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CONFLICTS OF INTEREST

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PATIENT CONSENT

The authors, *Md Abu Bakar Siddiq, Israt Jahan,* declare that:

1. They have obtained written, informed consent for the publication of the details relating to the patient(s) in this report.
2. All possible steps have been taken to safeguard the identity of the patient(s).
3. This submission is compliant with the requirements of local research ethics committees.

Figure 1: X-ray both ankle/foot. Asterisks (*) in Figure 1a and Figure 1b indicate Achilles tendon ossification in left and right foot respectively. In left side, ossified mass appeared as multiple, fragmented multiple, whereas it was sickle shaped in right side

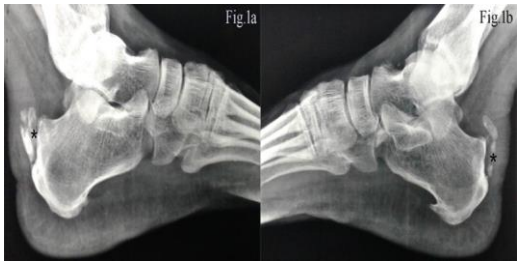

Figure 2: MRI of both ankles (longitudinal view). Asterisks (*) in Figure 2a and Figure 2b indicate Achilles tendon ossification in left and right foot respectively

Figure 3: MRI of both ankles (axial view). Arrow heads in Figure 3a and Figure 3b indicate Achilles tendon ossification in left and right foot respectively

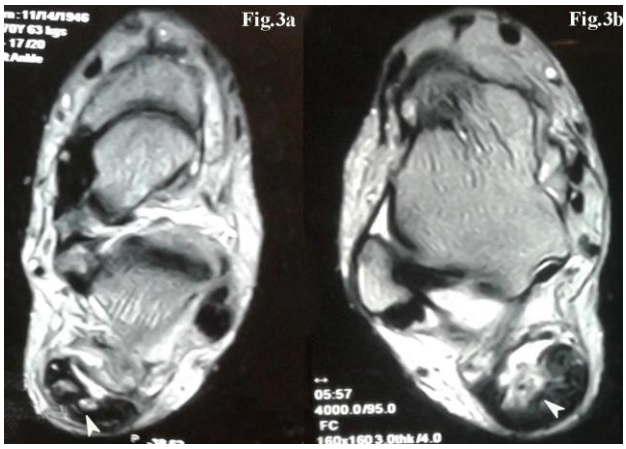

Figure 4: Ultrasonogram of Achilles tendon: Asterisks (*) in Figure 4a and Figure 4b indicate intratendinous calcification in left and right side respectively. Positioning of tendinous ossified mass from postero-inferior calaneum and skin surface has also been shown. C, calcaneum