

Ossification of the bilateral Achilles tendon: a rare entity

Abhishek J Arora and Richa Arora

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Abstract

Ossification of the Achilles tendon is a rare clinical entity comprising of one or more segments of variable sized ossified masses in the fibrocartilaginous substance of the tendon. The etiology of ossification of the Achilles tendon is multifactorial with recurrent trauma and surgery comprising major predisposing factors, with others being metabolic, systemic, and infectious diseases. The possibility of a genetic predisposition towards this entity has also been raised, but has not yet been proven. We present a rare case of ossification of the bilateral Achilles tendons without any history of trauma or surgery in a 48-year-old female patient.

Keywords

Achilles tendon, ossification, computed tomography, adult, ankle, calcification

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Introduction

The Achilles tendon is subjected to high tensile load up to 3.9 times the body weight in walking and 7.7 times when running (1). Functional overload is one of the important risk factor for Achilles tendinopathy. Increased degenerative changes in Achilles tendon are seen in persons engaged in heavy physical activity such as active military personnel and soccer players, leading to the concept of accumulated micro damage in Achilles tendon degeneration (2). On the other hand, various structural faults were seen in athletes with Achilles tendon overuse injuries, with forefoot varus showing significant correlation with Achilles tendinopathy. Apart from traumatic lesions such as acute tear in degenerated tendons, chronic conditions such as partial tear can also occur (3). However, rare conditions such as Achilles tendon ossification may be encountered in few cases of Achilles tendinopathy (4).

Case report

We report the case of a 48-year-old woman who presented with bilateral pain and swelling posterior to the ankle joints for 6 months. The patient did not give any history of trauma or previous surgery and was not suffering from any metabolic or other chronic diseases.

There was no significant previous treatment history available. Clinically, the patient had minimal restricted movement on dorsiflexion of the feet. On computed tomography (CT) examination, there were multiple ossified bone fragments of varying sizes seen within the substance of the Achilles tendon (five on the right and six on the left side). The lesions involved 3.6 cm of tendon length, 1.4 cm above the insertion site on the right side, and 3.5 cm of the tendon length – 1 cm above the insertion site on left side. The craniocaudal dimension of the largest fragment was 2.7 cm on the right and 2.4 cm on the left side (Figs. 1 and 2). The maximum anteroposterior dimension of tendons was 1.6 cm on the right and 1.7 cm on the left – at the level of the ossified fragments. There were associated degenerative changes in form of osteophytes seen at the talo-navicular joint bilaterally at the articulation of the navicular bone with the medial and middle cuneiform bones. Bilateral tendon involvement with multiple ossified fragments within the substance of tendon and no

Department of Radiology, Nizam's Institute of Medical Sciences, Hyderabad, India

Corresponding author:

Abhishek J Arora, Department of Radiology, Nizam's Institute of Medical Sciences, Hyderabad, India 500082.
Email: dr.abhiarora@gmail.com



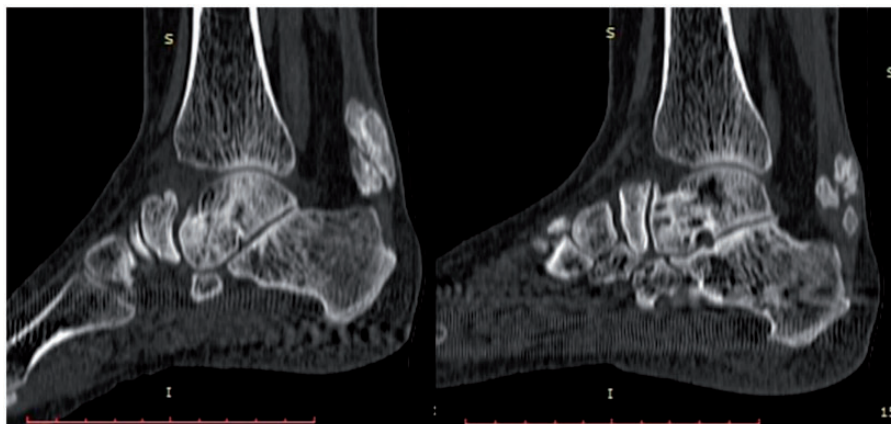


Fig. 1. Reformatted sagittal sections of the right and left feet, showing multiple ossifications within the substance of the Achilles tendon. The lesions involved the full thickness of the tendon with anteroposterior diameter measuring 1.6 cm on right and 1.7 cm on the left side. The largest fragment on the right side measured 2.7 cm in craniocaudal dimension while that on the left side measured 2.4 cm.

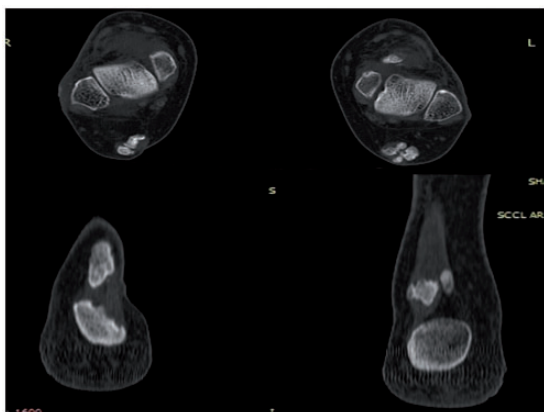


Fig. 2. Axial and reformatted coronal sections of both ankle joints show multiple ossified bone fragments within the Achilles tendons.

history of previous trauma makes this case unique as most of the cases described in literature had either unilateral tendon involvement or had few intrasubstance ossified fragments. The patient was managed conservatively with non-steroidal anti-inflammatory drugs with reduction of pain. The patient was also advised to take care of the involved site and wear comfortable footwear to prevent friction over skin surface leading to infection. The patient had relief of symptoms after taking non-steroidal anti-inflammatory medication for 3 days and refused the option of surgery on being presented with tendon resection and reconstruction techniques.

Discussion

Ossification of the Achilles tendon was first described by Horing in 1908 and being a rare entity its true

incidence is not known (4). A Medline search with “Achilles tendon Ossification” as keywords gave 148 results. Thirty-nine were case reports/series in humans totaling about 60 reported cases. The largest case series reported 12 cases (5). A few reports have stated a double incidence in men compared to women (6,7). Various hypotheses have been proposed for this condition, trying to explain the ossification in the substance of the tendon. Some of them are osteoid bone formation due to circulating osteoblasts, bone growth in the torn/injured periosteum, bone formation by fibroblasts or osteoblasts that have generated from fibroblasts, calcium deposition over the degenerated change in collagen secondary to vascular insufficiency, and decreased oxygen tension (7). Among the above stated hypotheses, none has been proven. However, assumption of decreased oxygen tension leading to transformation of tendon into regions of fibrocartilage in which chondrocytes mediate the deposition of calcium at multiple foci may explain the increased incidence of tendinous ossification among patients aged over 40 years (8). One case report showed the ability of the pericytes to differentiate into both chondrocytes and osteoblasts (9). The possibility of hereditary component for this entity has also been raised, however, has not yet been proven (10).

Other predisposing conditions like diabetes, fluorosis, Wilsons’ disease, ochronosis, diffuse idiopathic skeletal hyperostosis, seronegative arthropathies, renal failure, gout, and retinoid therapy have been associated with ossification in the Achilles tendon (7). In our case, CT sections of both feet revealed degenerative changes, which could result in malalignment of the longitudinal foot arch. Such malalignment puts strain on the Achilles tendon thus leading to micro tears, which may lead to bilateral Achilles tendon calcification.

Morris et al. (11) have classified Achilles tendon ossification into three types based on the anatomical site of ossification on radiographs: Type 1, ossification is located at the tendinous insertion; type 2, lesion located 1–3 cm from the tendon insertion; and type 3, lesions localized up to 12 cm from the tendon insertion. Lesions can further be categorized into partial ossification and complete ossification of the tendon. Based on the above classification, our case falls into the type 2 category of the lesion. None of the published articles have correlated type of ossification with prognosis of the disease or treatment outcome.

On radiographs, the lesion appears as ossified masses. In one case report, full thickness sheet like calcification of the Achilles tendon was also reported (12). On ultrasonography, the intratendinous ossifications appear as echogenic foci with aftershadowing and obscuration of the deeper structures, which show increased vascularity on color Doppler examination.

In terms of treatment, conservative methods are most commonly used and are adequate in most cases with no fracture of the ossified mass (13). Excision of the calcified masses with repair of the Achilles tendon and plaster immobilization for 6–8 weeks is the treatment of choice in cases with severe pain and fracture of the ossified fragments. Reconstruction techniques have been described with aim to preserve the function of the Achilles tendon in cases where direct tendon repair is not possible due to a large intratendinous gap occurring due to removal of a large ossified segment (14). Histologically, ossified fragments show either intramembranous or enchondral ossification patterns (15).

In conclusion, Achilles tendon ossification is a rare entity having multifactorial etiology. It is one differential diagnosis for swelling and pain in the region of the Achilles tendon. Proper history of any previous insult or surgery has to be taken. The disease usually responds well to conservative treatment, however in cases involving fracture of the ossified fragment and disease involving removal of large ossified fragments, various surgical reconstruction techniques are used to preserve the function of Achilles tendon.

Conflict of interest

The authors declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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