

Sonographic Diagnosis of Acute Achilles  
Tendon Tear: A Case ReportArash Babaei-Ghazani<sup>1,2</sup>, Safoora Ebadi<sup>1,2</sup>, Bijan Forogh<sup>1,3</sup> and Bina Eftekharsadat<sup>4\*</sup><sup>1</sup>Neuromusculoskeletal Research center, Iran University of Medical Sciences, Tehran, Iran<sup>2</sup>Assistant professor, Department of Physical Medicine and Rehabilitation, School of Medicine, Iran University of Medical Sciences, Tehran, Iran<sup>3</sup>Associate professor, Department of Physical Medicine and Rehabilitation, School of Medicine, Iran University of Medical Sciences, Tehran, Iran<sup>4</sup>Associate professor of Physical Medicine and Rehabilitation, Physical Medicine and Rehabilitation Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

## Article Information

Received date: Jul 02, 2016

Accepted date: Aug 09, 2016

Published date: Aug 11, 2016

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**Keywords** Achilles; Tendon rupture; Ultrasonography

**Article DOI** 10.36876/smmd.1002

## Abstract

Achilles tendon is a common site of foot and ankle discomfort but its rupture is not frequent. It's a superficial tendon and this lends it to excellent evaluation by sonography instead of magnetic resonance imaging. Recently ultrasonography has been widely used in musculoskeletal practice. We present a case of Achilles tendon ruptures diagnosed based on fundamental sonographic findings.

## Introduction

Complete ruptures of the Achilles tendon occur relatively infrequently and it has a disabling effect on the level of function and gait. Prompt diagnosis and operative repair continued with rehabilitation is required to assure an optimal result. We present a case of complete achilles tendon tear in a patient, using Ultrasonography (US) with accuracy and efficiency in a dynamic real-time property and cost-effective manner.

## Case presentation

A 41-year-old man referred to our physical medicine and rehabilitation department with mild swelling and pain in posterior portion of left ankle and lower one third of posterior leg. He stated that 7 days prior to his visit he had a mild kick to his posterior leg during a non-professional friendly sport activity. During seven days he had limping and only used 400 mg of Ibuprofen and Ice pack for first 48 hours with continuing his daily work.

His past medical history was negative for any acute or chronic disease. He had no allergies, had never smoked cigarettes and had never consumed alcoholic beverages. He was working in a sedentary office work, and did have regular sport activity including juggling and football.

Physical examination of his left leg and ankle demonstrated a deformity in the contour of the achilles tendon and gastrocnemius-soleus muscle. There was no significant ecchymosis. He was unable to toe walking in the affected side. At the rest the left ankle was in mild dorsiflexion in compare to right side (Figure 1). There was an obvious plantar flexion weakness with 4/5 power in Manual Muscle Testing (MMT) and no tendon was palpable in middle third of actual tendon site. Dorsiflexion MMT was 5/5. His left ankle active Range Of Motion (ROM) was 35 degrees in plantar flexion, 20 degrees in dorsiflexion. Passive ROM was normal.

His right achilles tendon and gastrocnemius-soleus muscle had normal contour and palpation. He had plantar and dorsiflexion power 5/5. His right ankle active and passive ROM was 50 degrees in plantar flexion, 20 degrees in dorsiflexion. Functions of Tibial, Deep Peroneal, Sural, Saphenous, Superficial Peroneal, Medial and Lateral plantar nerves were intact on both sides, and the vascular status was normal.

We performed the palpation test [1], a recommended test and position to observe differences in the contour and shape of the achilles tendon. This test is performed by having the patient lied in the prone position with the feet extending over the edge of the examining table. This action permits maximum relaxation of the achilles tendon in its resting position. The examiner gently palpates the contour of tendon and looking for a gap and tenderness. This test was positive only in the left side. The Thompson<sup>1</sup> test, used in the assessment of Achilles tendon rupture was also positive in left side. In the Thompson test, the examiner provides squeezing the calf muscle and looking for plantar flexion of the foot. The test result is considered positive when no plantar flexion produced with this maneuver. Thompson test was positive only in the left side. Tests for lumbosacral radiculopathy and sensory tests were normal bilaterally.

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ISSN: 2576-5442

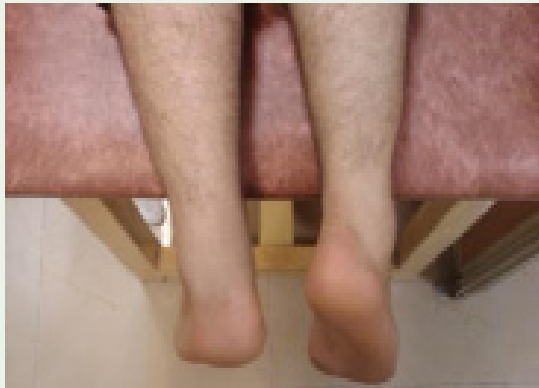


Figure 1: Left side Achilles tendon rupture.

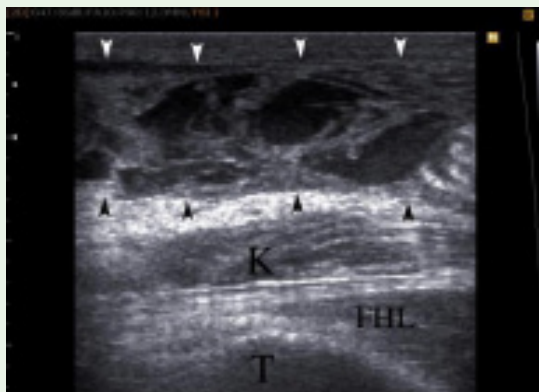


Figure 2: Longitudinal (long axis) view of complete disruption of achilles tendon fibers surrounded by heterogeneous hypoechoic fluid and debris (arrowheads) (right side of the image is proximal; K, Kager's fat pad; T, Tibial bone; FHL, flexor hallucis longus muscle).

Instead of Magnetic Resonance Imaging (MRI), we preferred to perform Ultrasonographic (US) evaluation due to low cost, availability and dynamic picture with a high resolution [2] Evaluation was performed with a commercially available sonographic scanner (SonoAce X8, Medison, South Korea), 5.0 to 12-MHz linear transducer. While the patient lies prone, his feet were placed extending over the end of table. We placed the probe both transversely and longitudinally (short axis and long axis) on the posterior aspect of the ankle and distal third leg. In both views, complete fiber disruption (Figure 2) and retraction of tendon stump surrounded by hypoechoic fluid was evident in the left side (Figure 3). In dynamic imaging during the ankle dorsi and plantar flexion free movement of distal stump with muscle contraction was seen.

Achilles tendon rupture diagnosis and need for surgical repair was explained to the patient. Rest and avoiding from aggravating activities recommended and boot type footwear with high quarter and axillary crutch advised until surgery. Patient referred to podiatrist and rehabilitation after surgical reconstruction began with mobilization and controlled early active ROM followed by controlled weight bearing. Three months after diagnosis he had an uneventful recovery.

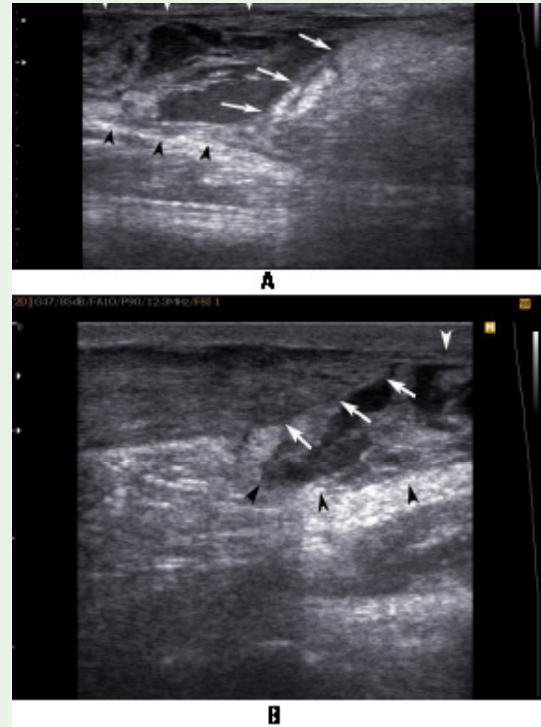


Figure 3: Longitudinal (long axis) view of retracted proximal (A) and distal (B) stump of achilles tendon (arrow) surrounded by hypoechoic fluid and debris (arrowheads), (right side of the image is proximal).

## Discussion

This case report with practical sonographic evaluation of achilles tendon rupture aimed at highlighting Musculoskeletal Ultrasound (MSK-US) use in daily practice of practitioners in musculoskeletal injuries. Achilles tendon rupture is a serious and not rare tendinous lesion, resulting from excessive loading or degenerative changes. Early diagnosis and treatment of this lesion is critical based on the gastrocnemius and soleus muscles function in the gate biomechanics. Accurate and early management can restore the structure and allow for normal daily activity in short period of time; however previous studies reported the high rate of misdiagnosis (up to 20 %) and delay in treatment initiation which results in a longer rehabilitation course [3].

Achilles tendon injury commonly affects middle-aged men who play quick start-and-stop sports. The region 5 to 7 cm proximal to the calcaneus insertion has long been considered as most vulnerable site for Achilles rupture. Rupture in one side carries a 200-fold risk of sustaining a contralateral Achilles tendon rupture [1].

Complete tears can often be suspected clinically. Partial tendon tears may be more difficult to detect since some degree of function is maintained. Magnetic Resonance Imaging (MRI) is suitable imaging modalities and allow for detailed examination of the soft tissues. However, it is expensive, time consuming and not available in every clinical situation. In other hand ultrasonography is rapid, easily accessible and relatively inexpensive. Achilles superficial location lends it to excellent evaluation by sonography. Application of MSK-US in diagnosing tendon injuries is growing in recent

years. Ultrasound can differentiate between complete and partial tears, as well as demarcate the location of the Achilles rupture and visualization of proximal and distal stumps [2].

As other tendon tears, Achilles tendon sonographic criteria for the diagnosis of rupture could be described in two categories: complete tear and partial tear. The criteria for complete tear include: complete disruption of normal tendon fibrillar pattern, hypoechoic or anechoic fluid between proximal and distal stumps with or without hemorrhagic debris, retracted and thickened distal and proximal stumps, real-time dynamic evaluation of tendon retraction during the muscle contraction. Diagnosis of partial achilles tendon tears is somewhat difficult and is based on incomplete disruption of fibrillar pattern, hypoechoic fluid around the tendon and bursitis of the retro-achilles or retro-calcaneal burs, hypervascularity in power Doppler images, thickened tendon in acute phase and loss of tendon thickness in chronic situation in longitudinal view [2].

MSK-US has some limitations and attention should be paid to operator dependency and sonographic artifacts. Most important ultrasound artifact in tendon evaluation is anisotropy and should be considered to avoid any misdiagnosis.

The fundamental goal of an acute Achilles tendon rupture treatment is to restore length and tension of the tendon in order to optimize a patient's ability to return functionally to their previous level of activity. Treatment options include operative or non-operative and much controversy exists. Previously there was a swung towards operative treatment especially of younger patients

but recently investigations have reported better results with non-operative treatment, often using aggressive functional rehabilitation protocols. Overall, management methods should be tailored to each patient according to factors such as age, functional status, activity level, medical comorbidities, surgeon preference and skills and patient expectations [3,4].

## Conclusions

Musculoskeletal ultrasound is a useful imaging modality in diagnosis of achilles tendon complaints. MSK-US has an advantage of dynamic real-time property and low-cost availability with high resolution image. When used for proper indications, MSK-US has a definite role among other imaging methods in the diagnosis of musculoskeletal disorders.

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