

Clinical Image

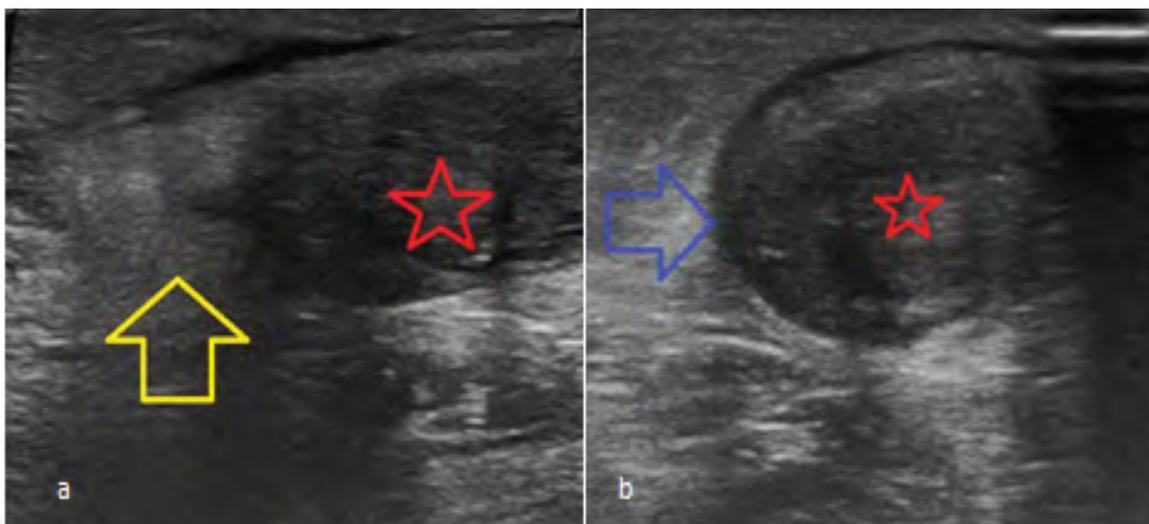
## Atypical Presentation of Achilles Tendon Rupture: MRI Evaluation

Sharma BB\*, Dewan S, Bhardwaj N and Aziz MR

Department of Radio-diagnosis, SGT Medical College Budhera (Gurgaon) Haryana



**Figure 1:** Plain X-ray foot A) Lateral view shows calcified distal insertional end of Achilles tendon (white arrow) with fuzzy Kager's triangle (white star). B) Magnified view of calcaneum in lateral view shows calcified insertion of the tendon (vertical white arrow), small spurs on superior (yellow arrow) and inferior (red arrow) aspect of calcaneum. Ankle joint is preserved (green vertical arrow) but Kager's triangle is ill defined (white star).

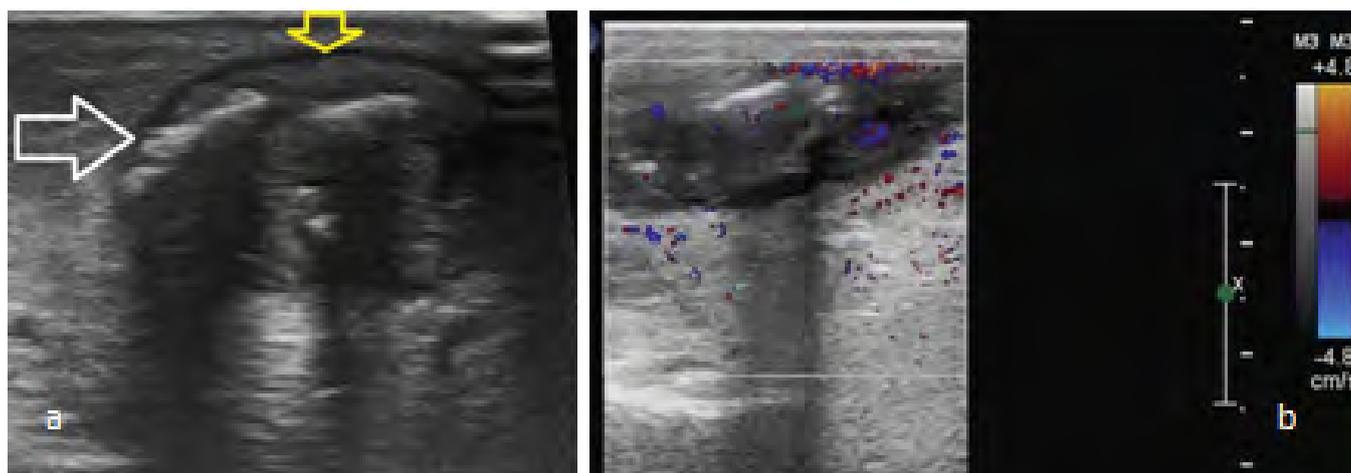


**Figure 2:** Ultrasound of proximal part of the Achilles tendon. A) Long axis shows crumpled torn muscle (yellow arrow) with fluid collection in the distal part (red star). B) Axial section defines well defined margins (blue arrow) with inhomogeneous internal echotexture (red star).

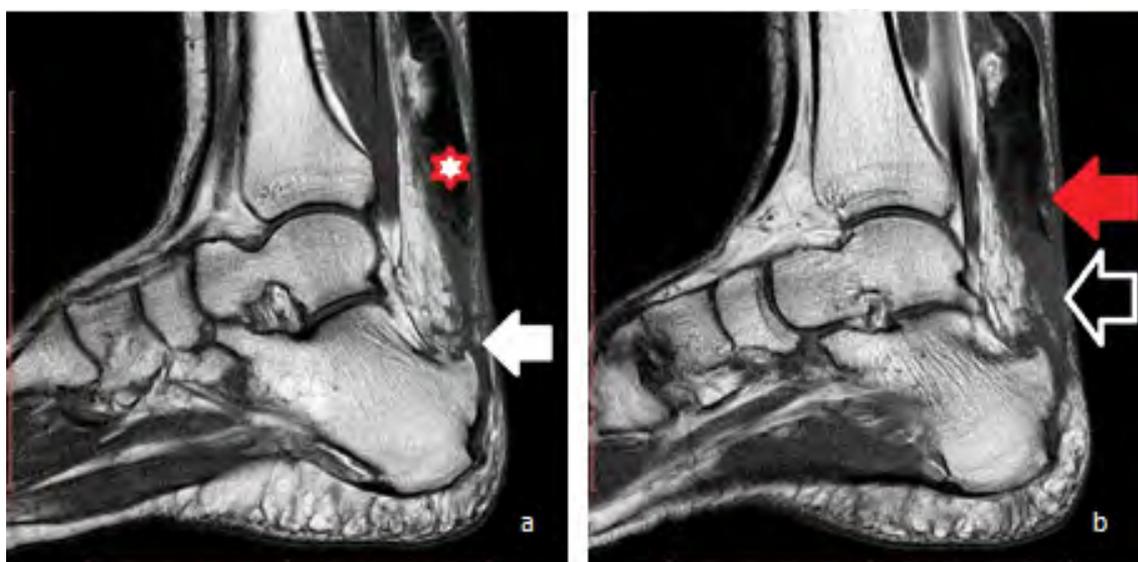
\*Corresponding author: Sharma BB, Department of Radio-diagnosis, SGT Medical College Budhera (Gurgaon) Haryana, India, Tel: 98181113557; E-mail: [bbhushan986@gmail.com](mailto:bbhushan986@gmail.com)

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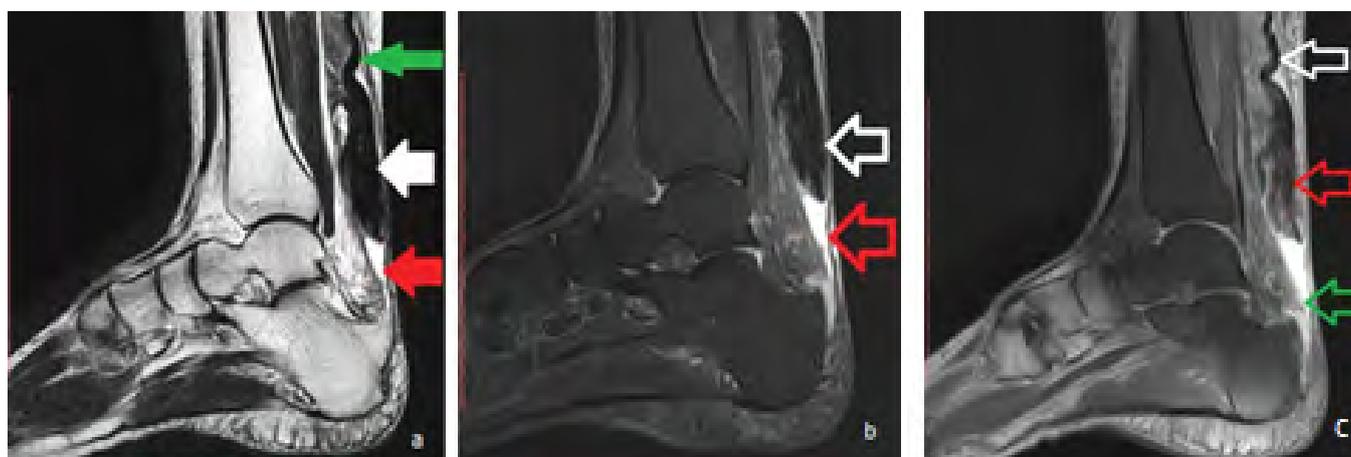
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**Figure 3:** Color doppler images A) Ultrasound image of torn tendinous fibers (white arrow) with well defined margins of the tendinous sheath (yellow arrow) B) color doppler of the same region does not reveal any vascularity in the region.



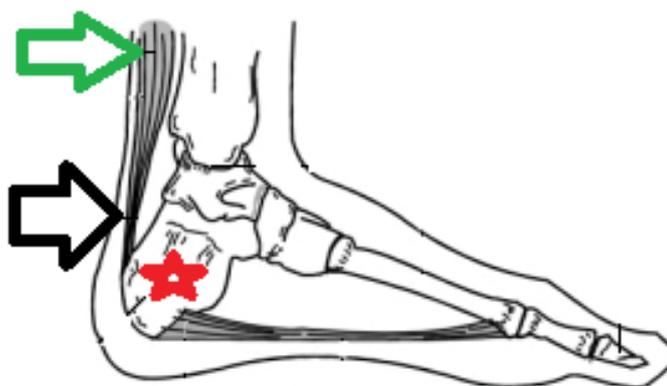
**Figure 4:** Magnetic resonance T1W images of right ankle A) Sagittal section shows disrupted Achillis tendon (white arrow) B) Parasagittal section shows space without tendon (white arrow) and torn end of the same tendon (red arrow).



**Figure 5:** MRI sagittal sections of right ankle. A) T2W image shows complete tear of the Achillis tendon (white arrow) with fluid in the torn space (red arrow). Tendon is seen in serpentine fashion after rupture (green arrow). B) Short tau inversion recovery (STIR) image shows fluid (red arrow) and the ruptured end of the tendon (white arrow). c) Proton density (PD) spectral attenuated inversion recovery (SPAIR) image shows crumpled tendon (white arrow) with ruptured tendon end (red arrow) and fluid in the emptied out space (green arrow).



**Figure 6:** MRI T2W images of the same patient. A) axial section shows preserved tendinous sheath (arrow). B) Coronal section at the posterior most section which shows rupture demarcation (green arrow) from the tendinous sheath (red arrow). C) Anterior section which shows fluid collection (blue arrow), mixed intensity middle region (red star) and torn crumpled fibers (green arrow).



**Figure 7:** Diagrammatic representation of Achilles tendon (black arrow) connecting the calf muscle girth (green arrow) with the calcaneum bone (red star).

## Case Report

### Abstract

**Background:** Achilles tendon is subjected to great wear and tear because of excessive physical use, infections and rheumatoid arthritis which may results in tendonitis or rupture.

**Case Presentation:** We present 63-years old diabetic female of right heel pain of one year duration. There was no relief in spite of analgesics and local steroid injection. Now reported after twisting of her right foot and there was no relief after RICE (rest, ice, compression and elevation). Plain X-ray foot did not reveal any fracture. MRI revealed complete rupture of the Achilles tendon.

**Conclusion:** The case is atypical as there was complete illusion of the underlying cause of Achilles tendon rupture as multiple factors have come to play for the cause.

**Keywords:** Achilles tendon; Tendonitis; Rupture; Steroids; RICE; MRI, Case report

### Introduction

Achilles tendon is very important tendon which connects the calf muscles to the heel bone. This is mainly responsible for the plantar flexion. This can rupture or torn which may be complete or incomplete. The rupture is more commonly noticed between third to fifth decades of life. The incidence is 1 in 15000 of general population and is doubled in active athletes. Male to female ratio is around 20:1 and majority occur by trauma. Ambroise Pare described the complete tear first time in 1575.

### Case Report

A 63-years old diabetic female reported to the orthopedic department as she had twisted her right foot accidentally. In

addition to that she had complaints of pain and difficult movements of two months duration. She is on ant diabetic treatment for the last two years, She had also had taken the course of ciprofloxacin for ten days because of some respiratory infection three months back and the details are not known. On examination she is slightly on obese side with slight difficulty in walking. Blood pressure revealed 144 mm of Hg systolic and 92 mm of Hg diastolic. Systemic examination was grossly normal. Locally the left foot had swelling on the posterior side of the heel. Thompson's squeeze test was positive. There was no local bruise or ulceration. All the blood investigations were within normal limits. Random blood sugar and haemoglobin were 110 mg/dl and 11 g/dl respectively. Plain X-ray of the left foot revealed obliteration of Kager's triangle and calcification of the insertional end of the Achillis tendon (Figure 1a and 1b).

Ultrasound examination had revealed the torn tendon with well defined sheath outline. The torn tendon was visualized with fluid collection (Figure 2a and 2b). Color doppler study did not reveal any vascularity in the torn tendinous fibers (Figure 3a and 3b).

The patient was subjected to magnetic resonance imaging of left foot with leg to evaluate the achills tendon morphology in relation to bones and joints (Figures 4-6).

C) Proton density (PD) spectral attenuated inversion recovery (SPAIR) image shows crumpled tendon (white arrow) with ruptured tendon end and fluid in the emptied space (green arrow)

Patient had been advised for debridement and tendon transfer in the tertiary hospital.

## Discussion

Sports related injuries are responsible for various injuries to Achilles tendon. Achilles is one of the strongest tendons of the body and measures about 15 cm connecting three muscles (gastrocnemus, soleus and plantaris) to the calcaneum (Figure 7).

This receives blood supply from musculo-tendinous junction and nerve supply from sural and tibial nerves. This muscle helps in walking, running and jumping by strong contraction. Two most common pathologies of this tendon are: tendinopathy and tear or rupture. The inflammation of the tendon can either be at non insertional part or insertional part. The former is seen more common in young and active people and the later in middle aged and elderly individuals. The main cause of the tear or rupture is trauma which can cause mild to severe injury. There can be micro tears and interstitial tears which are parallel to the muscle fibres. Repeated traumas can lead to these injuries which can become chronic in nature with duration of more than four weeks. Platt mentioned that untreated rupture may lead to adherence of tendinous sheath to the underlying torn tendon. This will further makes the movements difficult and surgical interventions are not smooth. Many factors other than trauma are also responsible for this entity like rheumatoid arthritis, diabetes mellitus, gout and SLE, local steroid injection, medication of steroids and quinoline antibiotics (ciprofloxacin and ofloxacin). The commonest site is proximal to the insertion which is quite hypo vascular in nature [1].

The rupture can easily be diagnosed by clinical Thompson's or Simmonds squeeze test. There is palpable gap in the lower end of the tendon near insertion with decreased plantar flexion and increased passive dorsiflexion. The rupture of Achilles tendon had been classified by Kuwada[2] as follow:

type i - less than 50% rupture and treated with cast immobilization

type ii - complete rupture with gap <3 cm.

type iii - complete rupture with gap 3-6 cm

type iv - when tendinous gap is >6 cm

type iii and type iv requires graft repair but type ii is treated with end to end anastomosis. Type i is treated conservatively [3,4].

Lateral plain X-ray of ankle shows obliteration of Kager's triangle which is pre-achilles fat pad. This can also show any calcaneal avulsion. There can be calcification of insertion end because of the chronicity. Ultrasonography is done with high frequency 7.5 MHz linear array probe. This modality is inexpensive and repeatable. Partial tear shows the hypoechoic or anechoic nature of the tendon along with >1 cm thickness of the tendon whereas full thickness shows torn ends with dirty shadowing [5,6]. MRI is required to categorize the rupture for the purpose of management. MRI can depict better tissue characterization. Normal tendon shows low intensity in all the sequences. Ruptured tendon shows increased thickness with gap filled up with either fluid or blood T2W shows increased intensity with >7 mm antero-posterior thickness. Ruptured tendon can be visualized within the tendinous sheath [7,8].

Management depends upon the type and grading of injury. Gastrocnemius recession is undertaken in non-ruptured tendon. RICE is indicated in mild cases. Debridement and repair is advised where tear is less than 50%. Debridement and tendon transfer in other cases where damage is more than 50% [9,10].

## Conclusion

Achilles tendon trauma can sometimes lead to chronicity because of the delayed diagnosis. It becomes difficult to pinpoint

the underlying cause when multiple factors are responsible. The earliest diagnosis can be picked up by high frequency ultrasound examination and grading can further be done by MRI evaluation. The correct management can be undertaken as per the final assessment by MRI.

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