Ultrasound assessment of Achilles tendon tear

Poster No.: C-1955
Congress: ECR 2015
Type: Educational Exhibit
Authors: S. Stefurac, E. O. Arhire, D. Negru; Iasi/RO
Keywords: Trauma, Inflammation, Acute, Surgery, Localisation, Diagnostic procedure, Ultrasound, Musculoskeletal joint
DOI: 10.1594/ecr2015/C-1955

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Learning objectives

The aim of the study is:

To describe the most frequent types of Achilles tendon rupture and to illustrate the importance of ultrasonography in the accurate diagnosis of this pathology and in the surgery planning for its treatment.

To evaluate how ultrasonography is efficient for confirming or excluding a tear in Achilles tendon and for the assessment of the tear gap dimensions.

To illustrate the treatment options accessible for different types of Achilles tendon injuries.
Background

The Achilles tendon is the most commonly harmed ankle tendon, although it is the thickest and strongest tendon in the human body. Achilles tendon ruptures occur mainly in people who are between 30 to 40 years old, who generally have a sedentary life, but during weekend overworked themselves, for instance while playing basketball, badminton or soccer. Less often Achilles tendon ruptures occur in competitive professional athletics.

The mechanisms leading to the rupture of Achilles tendon are variable. The rupture occurs more often due to sprinting or jumping movements, when pushing off the weight-bearing foot while extending the knee joint. Moreover, the rupture can also result from jumping or falling from a height causing a violent dorsiflexing in plantarflexed foot. It has also been shown that this type of lesion is more frequent in patients suffering from gout, hyperthyroidism, renal insufficiency or arteriosclerosis. Also drugs like anabolic steroids, costicosteroids, fluoroquinolones may play a role in this type of pathology.

Clinical manifestations

Clinically, the patient presents with pain, ecchymosis and/or difficulty in walking, the patient being unable to perform repetitive heel rises. The inability to tiptoe on the injured side may also be a symptom. In some cases, when the rupture occurs, patients may hear a breaking noise caused by the rupture of the tendon. In these situations, a gap of 2 cm to 6 cm becomes palpable above the insertion of Achilles tendon. The cause for the localization of the lesion at this level is not completely understood, some studies indicating that this might be because the blood flow in this area is relatively poor. In some cases, some of the symptoms may be absent or hidden and the patient may be wrongly diagnosed with a partial rupture. This can happen when the functional flexor hallucis longus, flexor digitorum longus, posterior tibial and peroneal tendons still allow the patient to do the plantarflex. Moreover, the pain may miss on palpation, the typical ecchymosis and edema may not appear early and the swelling could hide the palpable defect, leading the physician to a wrong diagnostic.

Diagnostic

When a lesion in Achilles tendon is clinically suspected, ultrasound is useful for evaluating the site of the tear, the degree of retraction and its extent. Ultrasound is fast, noninvasive, inexpensive and nonionizing. Also it can help the surgeon decide whether to operate and which operation is preferable. If the evaluation indicates that the intertendinous gap is short with well-oriented fibers, the chances of tendon healing with conservative treatment are significant. If the diagnostic is still doubtful, an MRI can help elucidate the case.

Treatment
The main option for treatment in young patients without other associated diseases is surgical. The conservative treatment is also an option, especially for old patients, who need to perform fewer demanding physical activities. Both surgical and non-surgical treatment are usually followed by rehabilitation procedures.
Findings and procedure details

We reviewed the cases of 21 patients who underwent surgery for an acute closed Achilles tendon rupture and had follow-up. All patients underwent radiographic and ultrasound (US) evaluation, along with Power Doppler imaging, in the period from September 2013 to July 2014. For ultrasonography we used a 7-18 Mhz US probe on Toshiba Aplio 500, General Electric and Esaote MyLab ultrasound machines. Our study showed that, of the 21 selected patients, 13 (62%) had suffered Achilles tendon rupture at a distance of 2 to 6 cm superior to the os calcis, with additional tendon enlargement and retraction, with hemorrhage and edema in the intratendinous or peritendinous soft tissue. Moreover, the ultrasonographic evaluations revealed that 9 (43%) patients had suffered partial ruptures, 6 (29%) patients had suffered complete rupture with a tendinous gap of 3 cm, 4 (19%) patients had suffered complete rupture with a tendinous gap of 3 to 6 cm and 2 (9%) patients had suffered complete rupture with a defect greater than 6 cm.

US was required for the diagnostic and also for treatment planning. US allowed the clinician to monitor the effectiveness of treatment over time as well as the risk of complications such as infections, abscess, bursitis or recurrent rupture after surgery.
Fig. 1: Achilles tendon complete rupture

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**Fig. 2:** Achilles tendon complete rupture - panoramic view

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Fig. 3: Achilles tendon complete rupture

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**Fig. 4:** Achilles tendon complete rupture

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**Fig. 16:** Achilles tendon - post surgical appearance

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Fig. 15: Achilles tendon - post surgical appearance

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Fig. 5: Achilles tendon rupture - post surgical complications

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Fig. 6: Achilles tendon rupture - post surgical complications

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Fig. 7: Achilles tendon rupture - post surgical complications

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Fig. 8: Achilles tendon rupture - post surgical complications

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Fig. 9: Achilles tendon rupture - post surgical complications

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Fig. 13: Achilles tendon rupture - post surgical complications

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Fig. 12: Achilles tendon rupture - post surgical complications

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**Fig. 14:** Achilles tendon complete rupture

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Fig. 11: Achilles tendon partial rupture

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Fig. 10: Achilles tendon partial rupture

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Conclusion

Ultrasonography (US) is a method which is able to determine the degree and the extent of the rupture of Achilles tendon with high accuracy and which has proven precise in differentiating partial-thickness tears or tendinosis from full-thickness tears. US has also proven to be useful in treatment planning and evaluation.
References


