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Atraumatic Tibialis Anterior Tendon Ruptures: A Case Report and Literature Review

EL Mekkaoui Mohamed Jalal[1], Ghannam Abdelaziz, Boufettal Moncef[1], Bassir Reda Allah[1], Kharmaz Mohamed[1], Lamrani Moulay Omar[1] and Berrada Mohamed Salah[1]

[1]Department of Orthopaedic Traumatology, CHU Ibn Sina, Faculty of Medicine and Pharmacy of Rabat,
[2] Mohamed V University, Rabat, Morocco

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ABSTRACT

Spontaneous rupture of the tibialis anterior tendon is uncommon. This article presents a case report of an Atraumatic Tibialis Anterior Tendon.Rupture of the tibialis anterior tendon can be caused by open, closed, direct, or indirect trauma, or it can occur spontaneously. Closed rupture is uncommon. Review of the literature reveals fewreported cases of spontaneous rupture.

Introduction

The rupture of the anterior tibial tendon is a rare pathology (1). Most commonly, they are noted in males aged 50 to 70 years (2).

The tibialis anterior muscle is the most medial of the four muscles of the anterior compartment of the leg. Proximally, it inserts on: Gerdy's tubercle; the lateral tuberosity and lateral aspect of the tibia to the distal third of the the distal third of the tibia; the proximal and medial part of the interosseous membrane; the proximal quarter of the deep surface of the aponeurosis leg fascia; and the fibrous septum which in the proximal part of the leg separates it from the extensor hallucis longus. (5)

The blood supply to the TAT is provided proximally by muscular branches of the Anterior Tibial artery and distally by Medial Tarsal arterial branches. They both supply a fine vascular network that perfuse the peritenon with a longitudinal intratendinous blood vessel which is supported by a synovial sheath (10)

Most often, lesions of the TA muscle are represented by edematous tenosynovitis, stenosing tenosynovitis with its characteristic crackling aï, (11) very rarely haemorrhagic or nodular tenosynovitis (12) These injuries are related to the passage of the tendon under the reflective pulleys on the anterior aspect of the ankle, although this is a "soft" frictional contact. The tight shoes will aggravate the conflict under the pulleys, especially if the tendon is very prominent under the skin. Another pathology is encountered in the TA muscle: tendinopathy of insertion.

Ruptures are never spontaneous; they follow a fall, with the foot going into forced plantar flexion at the talocrural joint associated with eversion of the midfoot. This is the opposite movement of the TA muscle which is trying to resist.

One of the influencing factors is the question of infiltration. There are different views on this subject. Publications report several cases of rupture of the calcaneal tendon after injection of corticoids. (13)

Case Report

A 69-year-old woman felt acute, severe pain on the anterior surface of her left ankle during a fall from a step. following the trauma, the patient felt a snapping sensation and loss of extension in her left foot. Close inspection showed a gap in the course of the anterior tibial tendon compared with the contralateral side. Clinical examination revealed a clear deficit in active extension without local sensibility.

Neurologic findings were normal. A radiograph of the foot excluded an osseous lesion. Ultrasonography confirmed the tendon rupture. MRI showed a rupture of the anterior tibial tendon in frank T2 hypersignal with tenosynovitis and subcutaneous soft tissue edema in T2 hypersignal.

The ruptured tendon was repaired 4 days after the injury. An anteromedial approach along the course of the tendon was used.

The distal stump of the tendon was frayed, and the proximal portion of the tendon was split in two parts.

After debridement of the stumps, an end-to-end anastomosis was done. The fine adaptation was accomplished with Vicryl sutures.

During the first postoperative week, the foot was immobilized in a below-knee cast in neutral position. After the first week, the cast was replaced with an orthopedic shoe for the next 7 weeks. After 12 weeks of rehabilitation, the patient was reexamined. The tendon was palpable along its entire length and, apart from minor weakness in extension, the patient had no complaints. After one year, the patient reported no subjective limitation of foot function.

Tele:
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Discussion

There are two types of TA tendon rupture: total ruptures and longitudinal ruptures or fissural tendinopathies.

For total ruptures, the lesion is located under the reflection pulleys or distally with bone disinsertion. For ruptures in the middle of the body under the reflection pulleys, the tendon is frayed with a necrotic and not very "reassuring" aspect.

For distal ruptures, it is an avulsion of the tendon at bone level; the aspect is much less worrying

Regarding the longitudinal fissures, it is an almost transfixing stage II of Sobel and is located under the superior and inferior retinaculum. Consequently, soft friction may give fissural lesions.

Predisposing factors for spontaneous rupture of the ATT include diabetes mellitus, inflammatory arthropathy, a history of steroid injections or fluoroquinolone use (3). Diabetic patients with neuropathy are known to have an increased risk of tibialis anterior tendon rupture (4). The age of appearance corresponds to a period of physiological changes that constitute factors that are conducive to favourable factors for the occurrence of a tendon injury:the decrease in the elasticity of the tendon, the reduction of the compensation mechanisms of the muscular contraction; and the increase in the reaction time to stretching (5)

In most cases, the rupture zone is between 5 and 30 mm from the distal insertion. This location corresponds to the hypovascular zone described by Petersen.

The clinical presentation can be depending on the mode of occurrence of the lesion, which explains the frequent delayed diagnosis observed (6,7). When a violent trauma is invoked in a young subject, one of the pitfalls is to evoke an ankle sprain and not to search for signs of tendon injury. In older but healthy patients, the trauma may be minor. The initial pain is often moderate and the inflammatory signs improve rapidly. (8)

The clinical examination allows to make the diagnosis. The examination of the walking shows a stepping, but in some cases, this can be minimal or only appear with fatigue after a certain period of time. appear only with fatigue after a certain duration of walking. Instability during walking is sometimes observed. The dorsal flexion is most often preserved but the strength is clearly diminished. The tendon is no longer palpated and we note recruitment of the accessory dorsal flexors. This explains the appearance in the medium term of a toe claw by loss of flexor-extensor balance. (5)

Sometimes a more or less painful tumefaction can be seen under the upper part of the retinaculum, corresponding to the retracted tendon stump

Ultrasound and magnetic resonance imaging allow to: Confirm the diagnosis; locate the tendon ends; and define the state of the tendons (9)

These examinations are very useful in doubtful cases, for example when the tendon sheath of the tendon is preserved, leaving a palpable cord, while the tendon is ruptured or severely damaged or stretched. The extent of fatty involution and muscle degeneration can also be assessed as prognostic factors in cases of late diagnosis or chronic injury.

There is no evidence-based medicine for the treatment of anterior tibial tendon ruptures.

Most authors recommend surgical treatment for patients who are athletic, young or in good general condition for their age.

In elderly, debilitated, functionally undemanding patients or those with a history of painless foot drop for several months, therapeutic abstention is appropriate. If the functional discomfort is more marked, physical therapy can contribute to restoring the most functional walking possible by limiting compensations and maintaining the flexibility of the accessory dorsal extensor muscles. When the handicap is more marked, the wearing of an orthosis

Godevilla type orthosis or equivalent allows to: limit stepping ; reduce the recruitment of the accessory extensors; and limit the pronation of the mid-tarsus and the hindfoot.

In athletes, young people and patients who wish to regain as normal a function as possible, most authors recommend surgery.

Its goal is to restore normal walking and prevent secondary deformities (toe claw) by restoring the dorsal flexion strength of the tibial anterior tibial flexion strength.

Direct suture is the treatment of all clear tendon injuries without significant dilaceration and not requiring significant tendon recutting. It supposes the absence of retraction of the muscle body as can be observed in the case of in case of long diagnostic delay. The technique is common to all end-to-end tendon sutures, as are the as are the postoperative procedures. It should be noted that when the lesion is located under the proximal retinaculum, some authors prefer to leave the prefer to leave the tendon subcutaneously or leave the retinaculum partially retinaculum partially open in order to avoid loss of function due to function due to adhesions.

Markarian [11] describes the more proximal reinsertion of the anterior tibial tendon on the navicular by means of one or more anchors. This technique does not seem to make much sense to us because of the loss of dorsal flexion strength that it causes by shortening the lever arm.

When there is a loss of tendon substance due to dilaceration or degeneration, but the condition of the muscle is preserved, the tendon can be reconstructed by a plasty. This can be done in many ways by allograft or autograft (small plantar, extensor digitorum longus.

Spontaneous TAT ruptures are an unusual clinical presentation. A detailed physical examination and accurate, early diagnosis are key to reducing long-term morbidity. Often, this is difficult because patients are presenting with vague symptoms and do not have a focal defect due to compensatory support of the extensor complex. Markarian et al (14) noted a 71-day median time from first symptoms to final diagnosis of a rupture. Years ago, it was preferred that patients with a delayed diagnosis of a TAT rupture be treated conservatively with splinting and modification of activities. However, recent data have shown that good outcomes are possible with delayed surgical intervention, even in patients with late presentation. (14, 15)

Ouzounian, in 12 cases (mean follow-up 22 months), five of which were treated conservatively and seven surgically, recommends a surgical approach in young or active patients and conservative treatment in elderly patients with little activity. He found that all the operated cases had functional improvement.

Markarian et al (16) compared the results (AOFAS and Kitaoka scores) of 16 patients with anterior tibial tendon rupture who were treated either conservatively or surgically. They found no significant difference but noted that these were two different populations: one younger and more demanding had surgical treatment; and the other, older population received conservative treatment.

Kopp et al (17) evaluated the results (mean follow-up 27.9 months) after direct suture (five cases) or plastic surgery (five cases) in ten patients with anterior tibial tendon rupture

(five traumatic cases and five spontaneous ruptures). All patients were satisfied. The AOFAS score increased from 71.9 to 89.8 postoperatively. Isokinetic testing showed a persistent decrease in dorsal flexion and inversion strength compared with the healthy side

Conclusion

This review highlights the need for further study regarding the treatment of TA ruptures. Larger, randomized studies with validated scoring systems for preoperative and postoperative function would offer more insight onto the best treatment options for these complex injuries.

Figure 1. MRI showing a rupture of the anterior tibial tendon in frank T2 hypersignal with teosynovitis and subcutaneous soft tissue edema in T2 hypersignal.

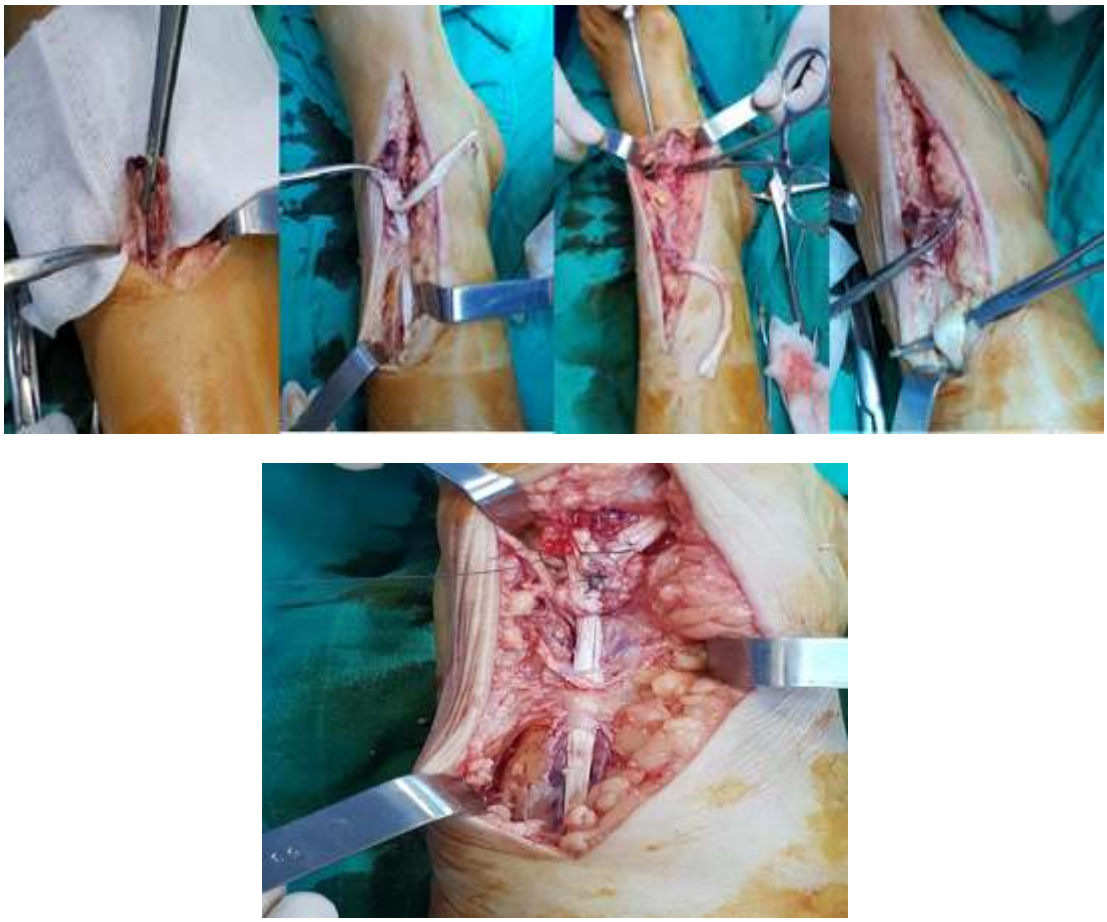

Figure 2-4. Surgical times showing the reparation of anterior tibial tendon rupture

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