

Case report

Bilateral traumatic rupture of Achilles tendons in absence of risk factors treated with percutaneous technique and platelet-rich plasma: A case report



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ABSTRACT

We present a clinical case of a 52-year-old man with bilateral traumatic rupture of the Achilles tendon (AT) in absence of risk factors. In medical history, the patient does not report pre-existing tendon diseases. AT ruptures occurred following a skiing injury in which the forward fall caused a severe stress and elongation of the AT. Associated with tendon injury there was a fracture of the right humeral greater tuberosity. The patient was subjected to percutaneous tenorrhaphy according to Maffulli's technique and subsequently topical injection of autologous platelet-rich plasma (PRP) 7 days after the injury. After surgery, the patient followed an accelerated rehabilitation protocol, allowing the weight bearing with guards (Rom-Walker) and crutches to four weeks then freely to 8 weeks. We performed a clinical (AOFAS ankle-hindfoot score) and ultrasonography follow-up at month 1, 3, 6 and 12, with excellent results in the end. To the best of our knowledge bilateral cases like this have not been described in the literature.

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1. Introduction

The rupture of the AT is the most commonly injured tendon in the lower limb and accounts for approximately 20% of all large tendon injuries [1,2]. Unilateral ruptures are usually observed in healthy, active patients in the third to fifth decades of life and is twice as common in males [3]. It usually occurs following a high-performance sporting activity [3]. Simultaneous bilateral rupture of AT is even more rare. The incidence of AT rupture is around 0.02%, less than 1% of them had bilateral simultaneous rupture [1]. The cases of bilateral rupture of the AT had history of pre-existing risk factors such as the use of corticosteroids [1,4–8], fluoroquinolones [5,8–10], anabolic steroids [11], chronic tendinopathy and previous AT ruptures [12]. We report a case of complete bilateral traumatic rupture of the Achilles tendon (AT), in absence of previous or current risk factors, occurred following a skiing injury treated at a single time with percutaneous tenorrhaphy (Maffulli's

technique) and injection of PRP in surgical site. To the best of our knowledge bilateral cases like this have not been described in the literature.

2. Case report

A 52-year-old man, normal weight, with no medical history of previous diseases and/or tendon risk factors, during a forward fall skiing with strong stress and elongation of the bilaterally gastrocnemius complex and direct trauma to the right shoulder has reported complete bilateral rupture of the AT and fracture of the right humeral greater tubercle. The patient was transported to the first-aid of the referral hospital unit where he was operated for a fracture of the greater tuberosity. Six days after the trauma he came to our observation, at the clinical examination Thompson's test was positive bilaterally. We appreciated a continuous solution by manual palpation from both sides of the tendon, a marked loss of strength in the plantar flexion of the foot resulting in the inability foot elevation on tiptoe.

Ultrasonography and RMN of both ankle confirmed complete bilateral rupture of AT 5–6 cm by the insertion (Fig. 1).

Seven days after trauma both tendon injuries were treated surgically tenorrhaphy according to Maffulli's technique. This

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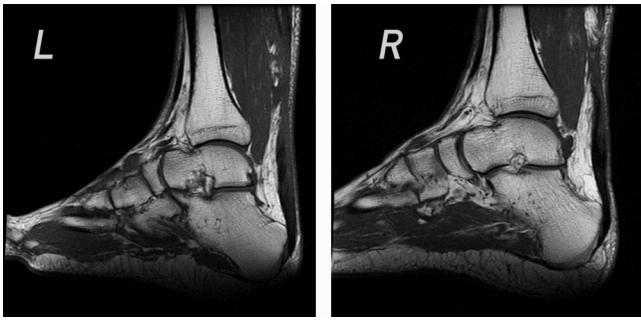


Fig. 1. MRI of both ankles showing tendons ruptures.

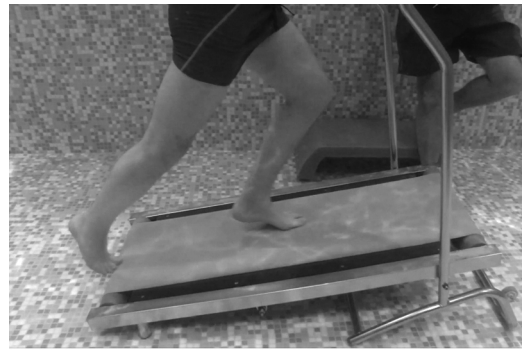


Fig. 3. Underwater photographs while patient is performing hydrokinesitherapy 75 days after surgery.

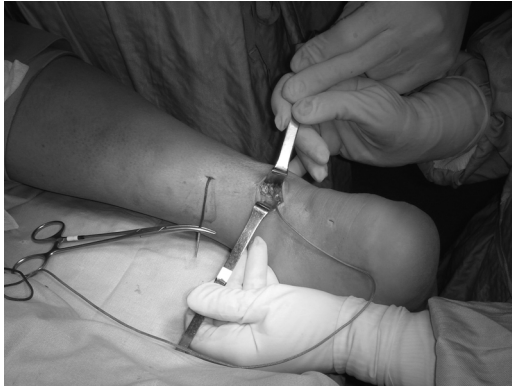


Fig. 2. Intraoperating photograph of the Maffulli's technique.

procedure consists of a horizontal incision of around 2 cm at the rupture site and the use of number five Tycron thread with a 9 cm needle and perform a “end-to-end” suture (Fig. 2). PRP preparation occurs by centrifugation of 60 ml of a venous blood sample of the

patient, from which we obtain 6 ml of plasma containing concentrated platelets, white blood cells and growth factors. Afterward about 4 ml of platelet rich plasma are injected in the tendon fibers once the tendon was sutured.

Postoperatively, guards (Rom-Walker) blocked at 90° with 3 cm wedge at the heel were positioned. The patient was forced to use a

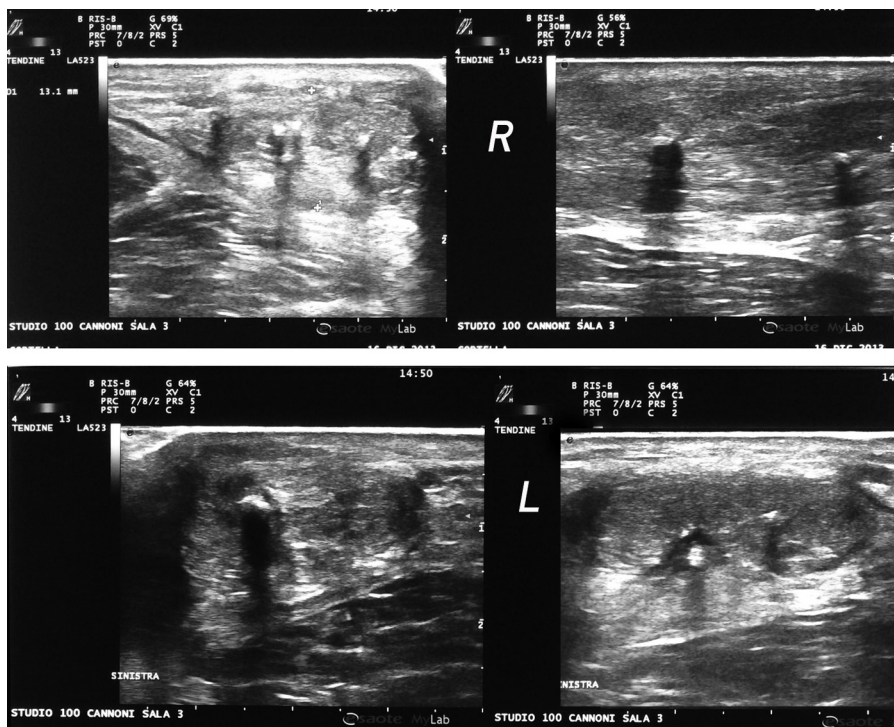


Fig. 4. Ecography after 1 year.

wheelchair because he was unable to use crutches or walker due to humeral greater tuberosity fracture. After two weeks ambulation has been granted with crutches, guards (Rom-Walker) fixed at 90° and three 1 cm wedges at the heel. 1 cm wedge per week was removed and the patient performed an effective physiotherapy–hydrokinesitherapy (Fig. 3). All this allowed him to the free walking 8 weeks after injury. We reviewed our patient with AOFAS ankle–hindfoot score after 1 year, resulting in a score of 95 bilaterally, an excellent result with full satisfaction of the patient and the medical team (Fig. 4).

3. Discussion

Bilateral ruptures are a very rare event, especially in the absence of risk factors. Literature describes both conservative, with knee-high cast in equine, and surgical treatments. According to our experience and in agreement with the literature, surgical treatment is preferable [13–18], if there are no contraindications or if the patient is not suitable for surgery.

The advantages of the percutaneous technique are known. It is a relatively uncomplicated technique, little traumatic, which allows a direct view of the tendon stumps, thus it allows to perform regularization and/or debridement and, subsequently, end-to-end tenorrhaphy. It also ensures an early return to ambulation, reducing the issues about wound healing, providing a better esthetic result and therefore it is more acceptable for the patient. These benefits are amplified into bilateral ruptures [19–24].

PRP contains a set of essential biological mediators in the natural repair as Transforming Growth Factor Beta (TGF- β), Vascular Endothelial Growth Factor (VEGF), Platelet Derived Growth Factor (PDGF), Epithelial Growth Factor (EGF), Hepatocyte Growth Factor (EGF), and Insulin-like Growth Factor (IGF-I).

Inasmuch as many of these growth factors have a key role in the healing of the tendons [25,26], the use of an autologous plasma rich in platelets and growth factors is considered as a viable strategy to improve the cellular response in tendon injury [27].

The tendon cells respond by proliferating, which is fundamental for the healing process, and, equally important, an angiogenic response is stimulated thanks to the synthesis by tendon cells of VEGF and HGF [28]. Several studies, including Sanchez et al. [29], show that the PRP is a safe technique to accelerates cell proliferation tendon. It stimulates the synthesis of type I collagen, promotes neovascularization both in vivo and in vitro [30], thus improves tendon repair process.

In unilateral cases, post-operative treatment provides an approach with plaster cast or with brace. These can immobilize the foot in equine or in the neutral position with the use of wedges or less. Some surgeons even affirm that the immobilization is not necessary [31].

Another interesting point is the weight bearing. Some authors recommend no weight bearing for 3 weeks [32], others allow touch on immediately [33]. We encourage early partial weight bearing with brace and 3 cm wedge at the heel.

Management of bilateral cases is manifold, even more in our specific case, where there was a fracture of the upper limb. To establish a rigid protocol is difficult and much depends on the surgeon experience. In our case it was very useful not only a gradual and proper physiotherapy but especially the hydrokinesitherapy, which allowed the patient to anticipate the recovery time.

4. Conclusion

In our experience, the percutaneous technique is the gold standard in AT bilateral rupture. The use of PRP accelerates the tendon healing, stimulating cell proliferation and the

neovascularization. Postoperative management is not simple and hydrokinetic therapy has proven to be a valuable support.

Conflict of interest

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

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