



Case report

Achilles tendon recurrent rupture following surgical repair: Report on two cases[☆]

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ABSTRACT

Background: Rerupture is a main complication in Achilles tendon rupture surgery, with an incidence of 2–8%. Although wound break-down and rerupture are well known complications, spontaneous open rerupture has not been previously reported to the authors' knowledge.

Methods: We report on two cases of open rerupture of Achilles tendon following augmented repair, through a transverse wound perpendicular to the primary incision line. Reruptures occurred 80 and 54 days after primary repair.

Results and conclusions: After surgical repair long term follow-up results are good in both cases. This complication could be related to subtotal closure of the paratenon due to the bulk of the augmented repair and to an inadequate and a too extended period of postoperative ankle immobilization.

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1. Introduction

Achilles tendon tears are becoming more common [1]. Complications in patients treated for Achilles tendon ruptures are frequent with a high incidence of recurrent tear of 2–8% [2]. Wound breakdown and deep infection are the other main complications found after the surgical repair of the Achilles tendon [1]. There is controversy regarding the best treatment option for acute rupture, but current evidence still points to operative repair as the gold standard treatment [3]. Conservative treatment could avoid wound-related problems but is associated with a higher risk of recurrent rupture [4]. Percutaneous surgery for acute rupture is gaining in popularity since it was introduced in 1977 [5].

We report on two cases of spontaneous open recurrent rupture of the Achilles tendon following augmented repair performed through a transverse incision perpendicular to the primary surgical incision. To our knowledge this has not been previously reported in the literature.

We retrospectively reviewed the medical records and performed a physical evaluation of each patient to complete the AOFAS ankle–hindfoot score.

2. Case report 1

A 41-year-old man sustained an indirect injury to his right ankle during a football match. No general or local predisposing factors were present, he had no systemic diseases or exposure to corticosteroids or fluoroquinolones and there was no evidence of chronic tendinopathy. He was a mild smoker.

He was admitted via the Emergency Department where complete rupture of the Achilles tendon was diagnosed. Under tourniquet control a posterior midline longitudinal incision was used for tendon repair. A Bunnel-type suture with size-0 non-absorbable braided suture was used. Interrupted circumferential sutures completed the repair, which was then augmented with a turn down flap of the gastrocnemius-soleus fascia following the Christensen technique. Incomplete closure of the paratenon due to the bulk of the repair was noted in the operative report. The postoperative rehabilitation protocol consisted of immobilization in an above-knee cast with the ankle in plantar flexion for the first 2 weeks. It was then changed to a below the knee cast which was changed every 2 weeks until neutral ankle flexion with a plantigrade position was reached at 6 weeks. At 8 weeks protected weight bearing was allowed and the patient received physiotherapy. No wound complications occurred.

After 80 days and whilst being in the Rehabilitation Department gymnasium the patient, being non-compliant, suddenly sprained,

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Fig. 1. Spontaneous complete open rerupture, at the same level as the primary rupture, through a transverse wound perpendicular to the primary incision line.

suffering an open recurrent rupture of the Achilles tendon. He presented with a 5 cm transverse wound, perpendicular to the original surgical wound 3 cm above the bony insertion of the tendon (Fig. 1). When the wound was explored the underlying tendon showed a complete rerupture at the same level as the primary rupture.

Open surgery was performed through the primary longitudinal incision. Dissection was difficult because of extensive scarring and adhesion of the tendon scar to the overlying tissues. Complete recurrent rupture at the same level as the primary rupture was evident. Both ends of the ruptured tendon were debrided, correct apposition of both ends was possible and end-to-end suture was performed with size-0 non-absorbable braided suture in a locked Krakow fashion. The standard postsurgical protocol and rehabilitation as described before was followed with no complications. Special care was taken to avoid adhesion by frequent massage of the wound. Nineteen months after the rerupture the patient had a good functional result with a complete range of movement, subjective ankle strength was comparable to the contralateral leg. The AOFAS ankle–hindfoot score was 100 (pain 40, function 50, alignment 10). He resumed sport activity and is now fully satisfied with the treatment.

3. Case report 2

A 31-year-old male presented after hearing an audible snap followed by pain in his left ankle whilst playing tennis. No general or local predisposing factors were present such as systemic diseases' exposure to corticosteroids or fluoroquinolones or chronic tendinopathy. Subcutaneous acute complete rupture of Achilles tendon was diagnosed and the patient underwent surgery.

The tendon was sutured with a size-0 non-absorbable braided suture using a Bunnel-type suture and augmented with a double

flap from the gastrocnemius-soleus fascia as described by Lindholm [6]. Correct complete closure of the paratenon was not possible.

Postoperative treatment followed as described for Case 1, consisting of immobilization in an above-knee cast with ankle in plantar flexion for the first 2 weeks. We then changed it to a below the knee cast; this cast was changed every 2 weeks until neutral ankle flexion with a plantigrade position was reached after around 6 weeks when protected weight bearing in a cast was begun. Minor wound scarring was noted.

Fifty-four days after the initial rupture and 2 days after cast removal, the patient stumbled on a step at home, presenting a complete open rerupture with a skin defect similar to the previous case and again not through the initial surgical incision but perpendicular to it. At operation extensive scarring was evident with adherence to overlying tissues. End-to-end repair was performed with size-0 non-absorbable braided suture by the Krakow technique. The standard rehabilitation as described before followed including wound massage. Minor wound break-down occurred but healed with no need for plastic surgery procedures. At 10-month follow-up the patient had minor discomfort in his ankle but has no limitation in his normal life. He has returned to sporting activity at a recreational level. His AOFAS ankle–hindfoot score is currently 90 (pain 30, function 50, alignment 10).

Both patient and their families were informed that data concerning these cases would be submitted for publication.

4. Discussion

Recurrent rupture remains a significant complication of Achilles tendon rupture surgery with an incidence of 2–8% [2]. A study addressing recurrent rupture and infection following treatment of 409 Achilles tendon ruptures reported a 5.6% incidence of recurrent rupture and 2.2% of deep infection. Open recurrent rupture was not described [1].

Open operative repair of acute Achilles tendon rupture probably produces better functional results at the expense of postoperative wound complications [7]. On the other hand, percutaneous repair could avoid wound complications but is associated to a higher rate of rerupture [3], loss of calf circumference [8] and sural nerve dysfunction [9]. Although percutaneous repair has a higher rate of recurrent rupture, it has shown that if correct apposition of the tendon ends is achieved good results can be expected [10].

Although wound break-down and rerupture are well known complications, spontaneous open recurrent rupture has not been previously reported to the authors' knowledge. We hypothesise on the cause being the incomplete closure of the paratenon due to the bulk of the augmented repair and to an improper and too conservative postoperative regimen. The paratenon consist of a deep layer in direct contact with the epitenon and a superficial layer, the peritenon. Both layers are connected by the mesotenon. The paratenon surrounds the epitenon leaving a thin layer of fluid that allows tendon movement with reduced friction [11]. The role of the well-vascularised paratenon is of paramount importance in the surgical treatment of a rupture and the correct closure could help vascularisation and avoid adhesion to superficial layers [12]. Careful dissection of the paratenon during surgical approach to the rupture is necessary to ensure integrity that enables a correct closure. A good gliding surface and nutrition of the tendon by the paratenon is needed but may be impaired by the bulk of a local regional flap [13].

In both of our cases complete closure of the paratenon was not possible because of the augmented repair, probably leading to adhesion formation to the overlying skin and finally to open rerupture.

The important role of the paratenon has already been pointed out by those who defend non-operative treatment, criticising the violation of its integrity during open repair [14]. Good results with operative repair with low wound complications (wound break-down, infection and rerupture) have been reported when special care is taken to perform a correct separate repair of the paratenon as described by Mellor and Patterson [15]. Synthetic materials are being used experimentally to try to emulate this effect [16]. In both of our cases an augmented repair was performed because it was the choice of the surgeon. Although not a standard approach for acute ruptures, augmented repair is still advocated by some authors [17]. In most cases of augmented repair the correct closure of the paratenon is not possible leading to adhesion formation and possibly increasing the incidence of complications.

Augmented repair has traditionally been used to try to increase the strength of the repair. In chronic ruptures normally both ends will have retracted, and although there are no comparative studies and no randomized controlled trials, there is a trend towards surgical treatment with augmented repair and tendon transfer in these cases [7,18]. In acute primary ruptures the use of augmented repairs could actually have a deleterious effect. The incidence of complications is higher, primarily because of skin adhesion and wound break-down [17]. Tendon thickness and local tenderness are also more frequent in augmented repairs [19], as well as a high incidence of calcification [20]. Furthermore, when compared to simple end-to-end suture, augmented repairs seem to be of no benefit with no difference in the rate of recurrent rupture or other clinical outcomes [19,21,22]. End-to-end repair provides a safer and more reliable treatment with a lower risk of complications [19].

Pajala et al. found that of the 28 patients with recurrent rupture or infection after surgical treatment, 20 had been treated with augmented repair [1].

The postoperative regimen could have also played a role in the adhesion formation leading to the open rerupture. The use of a non weight-bearing rigid immobilization may increase the risk of recurrent rupture [23]. Functional bracing is associated with a significantly lower rate of complications [4]. Twaddle et al. have postulated that controlled early movement could be the most important factor to influence outcome in the treatment of ruptured Achilles tendon with similar results obtained in conservative treatment and open surgery if early movement was allowed [24].

Others have even proposed immediate full weight-bearing after minimally invasive Achilles tendon repair [9], or even avoiding immobilization of the ankle in well motivated athletes [7]. Care should be taken being too aggressive in patients under 30-year of age, as the recurrent rupture rate could be higher [25]. A better orientation of the collagen fibres is achieved during healing with increase in scar resistance when intermittent tension is applied to the repaired tendon [26]. There is a definite trend towards aggressive functional postoperative regimens in the treatment of Achilles tendon rupture to provide better results than the traditional prolonged immobilization [27].

In conclusion we report on two cases of open rerupture of Achilles tendon associated to augmented repair. This complication had not been previously reported to the author's knowledge. We hypothesise this complication could have been related to the incomplete closure of the paratenon because of the bulk of the augmented repair, leading to adhesion and incomplete healing of the rupture. Incorrect and extended postoperative casting protocol can play a role in adhesion formation and rerupture.

Conflict of interest statement

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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