Research Paper

Volume : 5 | Issue : 6 | June 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48

Functional Outcome of Percutaneous Achilles Repair

Medical Science

KEYWORDS : Achilles tendon; percutaneous repair; Achilles tendon Total Rupture Score

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ABSTRACT

Background: Randomized studies have so far failed to show a difference in outcome between operative and non operative management of Achilles tendon rupture, provided that no rerupture occurs. Percutaneous Achilles repair has been suggested to result in superior patient satisfaction compared with open repair in patients with an acute Achilles tendon rupture, but there are no outcome data available with validated methods describing the progression of recovery during the first year.

Purpose: To evaluate the outcome of patients with a ruptured Achilles tendon, managed by percutaneous repair, during the first year following repair with a valid, reliable, and responsive outcome measure. Furthermore, the effects of time between injury and surgery, age, and complications on outcome were also evaluated. Study design: Case series.

Methods: A total of 73 patients (60 males and 13 females) with a mean age of 45.5 years were included. Patient age, length of time between injury and surgery, and complications were documented. Patients were evaluated using the Achilles tendon Total Rupture Score (ATRS) at 3, 6, 9, and 12 months following repair.

Results: The median ATRS results at 3, 6, 9, and 12 months were 42.5, 73, 83, and 89, respectively. The number of patients who reported excellent or good scores (ATRS >84) at 3, 6, 9, and 12 months were 3%, 36%, 57%, and 69%, respectively. There were no significant differences in outcome at each time point for those patients undergoing early (_48 hours) compared with late surgery or between those <65 and those >65 years of age. The complication rate was 13.5%. Patients who had a complication had a lower ATRS result at 3 months following surgery, but there were no differences after that time point.

Conclusion: The patients in the present study reported marked improvement in function between 3 and 6 months following surgery, with continuing but less steep improvement up to 1 year following surgery. The presence of a complication other than rerupture did not affect the end-stage outcome but did affect that at 3 months following surgery.

Clinical Relevance: This study demonstrates improving scores with time over the first year following surgery, against which other treatment methods can be compared.

The assessment of outcome following Achilles repair has focused on rerupture rates, complication rates, and patient subjective scores of function. Most scores are determined at a single point of follow-up and restoration of function for the cohort or function at 1 to 2 years following injury and repair.

Several studies have reported functional outcome at 3, 6, and 12 months,7,14,21,30,31 but these have involved scores with both subjective and objective components.10 In a systematic review of outcome measures, the Achilles tendon Total Rupture Score (ATRS) was identified as the only injury-specific outcome measure that has been developed and evaluated using recommended methods.10 Based on the current evidence, the ATRS is the most appropriate outcome measure for evaluating the management of acute Achilles tendon rupture.10 Functional outcome plateaus at 9 months following the commencement of management,7 and yet outcome at this time point has rarely been studied. The outcome of a series of patients with a ruptured Achilles tendon managed by percutaneous repair followed by early functional rehabilitation at 3, 6, 9, and 12 months following repair is reported. The effects of time of surgery, age of patient, and the presence of complications on outcome were also determined.

MATERIALS AND METHODS

From April 2012 to April 2016, patients diagnosed with a rupture of the Achilles tendon were offered surgical treatment. Diagnosis was made according to the presence of a palpable gap within the tendon, the loss of the normal resting tone of the ankle, and lack of tendon continuity on performing a calf squeeze test. Seventy-six patients requested surgical intervention following counseling regarding management options. Surgical repair was performed using an established percutaneous technique.

After the index procedure, patients followed a standardized postoperative protocol. Patients were given analgesics, but the use of non steroidal anti-inflammatory drugs was discouraged. Full weight bearing in a functional split synthetic cast in equinus was permitted, with the use of elbow crutches, immediately following surgery.

At 2 weeks, the wounds were inspected, sutures were removed, and open kinetic chain mobilization exercises consisting of inversion, eversion, and plantar flexion were commenced by the patient to encourage early movement, improve proprioception, and reduce the formation of adhesions. Dorsiflexion was forbidden.

Several modifications to both the surgical technique and perioperative management were made. Surgical Modifications a tourniquet was no longer used, given the small incisions of this technique.A small midlateral incision 1.5 cm long allowed exploration, visualization, and mobilization of the sural nerve. This was facilitated by the injection of 5 mL of 0.5% bupivacaine with 1:2,00,000 epinephrine into this area to reduce bleeding. The aim of this was to reduce the risk of iatrogenic injury to the sural nerve at this site.

Management Modifications A preoperative dose of intravenous prophylactic antibiotic (1 g flucloxacillin) was used in addition to 2 weeks of a once-daily dose of low-molecular-weight heparin (tinzaparin 5000 IU subcutaneously). Patients were encouraged to walk, and even jog, as comfort and confidence allowed once they were out of the cast. Plyometric exercises and sprinting were not allowed until 3 months following repair.

Follow-up Patients gave consent for the collection of their demographic details and outcome scores in a database.This allowed continued evaluation of scores and awareness of postoperative complications.Patients were asked to com-

plete a modified ATRS5 before each outpatient visit at 3, 6, 9, and 12 months following repair.

Statistical Analysis

For the data analysis of the outcome measure (ATRS), the last observed value was carried forward. There were 7 missing values for ATRS at 3 months, 9 missing values for ATRS at 6 months, 20 values missing for ATRS at 9 months, and 11 values missing for ATRS at 12 months.

RESULTS

Of those 76 patients, 2 were excluded from analysis because they were lost to follow-up prior to the 3-month evaluation and therefore there were no outcome (ATRS) data available. One patient had a rerupture at 8 weeks after injury and was not included in further analysis. The 3 excluded patients were all males, with a mean (SD) age of 40 (11) years. Two had injured the right side and 1 the left side. The injury mechanism was sport for 2 of the patients and during activities of daily living (ADLs) for 1 patient.

The continued evaluation included 73 patients. Their demographic details are typical for a cohort of patients who have sustained a rupture of the Achilles tendon .There was a bimodal age distribution.The most frequent activity during which the tendon ruptured was playing football ,other sports included badminton ,running , rugby (n ¼ 5), and squash (n ¼ 4). All but 2 patients underwent surgery within 14 days of injury (mean, 6 days; range, 0-20 days). Median ATRS results at 3, 6, 9, and 12 months are reported in Table 2 (Figure 2). The number of patients who reported excellent or good scores (ATRS >84) at 3, 6, 9, and 12 months were 3%, 36%, 57%, and 69%, respectively. Timing of Surgery In all, 7 patients were treated within 48 hours and 50 patients within 7 days of injury. There were no significant differences between the groups in either time period (_48 hours and <7 days of injury) concerning age, sex, injured side, mechanism of injury, or outcome. Patient Age In this study, there was a bimodal age distribution. There were 5 patients aged 65 years and older. The older age group sustained rupture during ADLs rather than during sport (P < .00). There was also a significant difference for sex between the 2 age groups

Influence of Complications

Overall, 10 patients sustained complications on outcomes. There was 1 case of traumatic rerupture, 4 cases of sural nerve injury, 2 cases of superficial infection, 2 DVT, 1 prominent knot, and 1 patient had adhesions. One patient experienced a traumatic rerupture at 8 weeks following the initial repair and was excluded from further analysis. At open repair, reconstruction suture material was seen to pass through the sural nerve. Thus, this patient actually had 2 complications.

One patient had a fatigue partial rerupture at 6 months following repair. The ATRS results of these patients are presented in. The overall incidence of patients having complications in this series is 13.5%, assuming a worst-case scenario. There was no significant difference in the demographic details of patients suffering complications compared to those without complications, and notably, there was no significant difference in outcome other than reduced outcome score in those sustaining a complication at 3 months (P ¼ .005)

DISCUSSION

The main finding of the present investigation is that patients reported marked limitation of function by 3 months, little limitation of function by 6months, and a near excellent/good outcome at 9 months following surgery. The greatest improvement in function happened between 3 and 6 months following surgery. The success of this treatment method is similar in younger and older patients, and the timing of surgery within a week of injury does not appear to influence the results. This method of percutaneous repair of the Achilles tendon rupture is a reliable and reproducible method of restoring good function, with minimal limitation or complications.

CONCLUSION

Following percutaneous repair of the Achilles tendon, patients report a marked improvement in function between 3 and 6 months following surgery, with continuing but reduced improvement up to 1 year following surgery. The majority of patients reported excellent or good scores beyond 6 months following repair and an ATRS results of 89 at 1 year. Urgent surgery (48 hours) did not result in improved early or end-stage outcome compared to prompt surgery (7 days) for percutaneous repair. The presence of a complication other than rerupture did not affect endstage outcome but did affect outcome at 3 months following surgery.