Original Research Article

A Prospective Study of Surgical Management of Chronic Neglected Tendoachilles Rupture With Teuffer Technique

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Abstract

Introduction: Reconstruction of degenerated tendonachil ruptures is a task. The ruptured tendons and the remaining tendon ends are irregular. A number of methods have been identified in the literature on the reconstruction of tendoachilles, but with variable results. **Aims:** Repair of damaged Achilles tendon in ignored cases is one of the difficult and challenging procedures for surgeon. Here, we share our experience with the use of two innovative approaches for repair of chronic rupture of Achilles tendon. **Materials and methods:** It is a prospective study included 23 patients of chronic neglected tendoachilles rupture were operated under spinal anaesthesia with Teuffer's technique for a period of one year .At the final follow-up, patients' satisfaction was assessed with Kerkhoffs' Modified Rupp Scoring system. **Results:**In present studyaverage dorsiflexion was 18° (compared to 24°on the noninjured side) and average plantarflexion was 26° (compared to 36°on the non-injured side). Results of testing the patient's ability to toe raise for 60 seconds, 43 patients were able to sustain, while 6 patients were able to raise the toe but could not sustain it. 3 patients could not do raise the toe at all. 4 patients complained of sensory hypoesthesia. For Rupp scoring , 82 % patients had excellent or good results and 18% had fair or poor results. **Conclusion:** Results of reconstruction of chronic Achilles tendon ruptures using Teuffer technique have shown that the technique is a good and stable repair that enables early weighting and ambulation, with favourable clinical outcomes, in most cases.

Keywords:surgical,management

Introduction

Ruptures of the Achilles tendon cause marked deterioration of the foot and ankle functions[1]. The treatment of acute ruptures is discussed. Ruptures are usually treated on an operational basis unless there are contra recommendations for surgery. The tendon ends may be thin and atrophic and, where a surgical increase is needed, tendon grafts, a turnaround flap, a transfer of local tendons and synthetic materials have all been used for reconstruction, with little evidence that one is obviously superior to the other[1]. The treatment of chronic Tendoachilles tendon rupture is generally different from that of acute rupture, as the tendon ends have receded. The blood flow to this region is low, and the tendon ends need to be refreshed when shredded. End-to-end repair of such torn tendons is difficult and vulnerable to failure, infection, and necrosis of the skin. Therefore, also in fresh ruptures, the reconstruction of the tendon of Tendoachilles with tendon graft, tendon transfer or reinforcement with synthetic materials should be increased. The tendon of the flexor hallucis longus, plantaris and peroneus brevis are used for increase. The transfer of Peroneus Brevis tendon was popularised. The injury mechanism usually involves eccentric loading on a dorsiflexed ankle with the knee extended. Risk factors includes Diabetes, Long term corticosteroid intake or corticosteroid injection near tendon, Certain drugs likefluroquinolones, RA, gout, SLE, Cushing syndrome, improper footwear[2].We conducted a prospective study of surgical management of chronic neglected tendoachilles rupture with teuffer technique.

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Materials and Methods

It is prospective study of management of chronic ruptures of the Achilles tendon were repaired using peroneus brevis tendon between August 2011 and July 2012 at Mamata Medical College. All studies describing the results of managing all skeletally mature adults over the age of 18 years. Patients presented within a few days due to the inability to walk normally after the accident. Medical appearance was typical with pain and a snapping feeling behind the ankle following a sudden jerk while involved in sports or related activities. Patients complained of trouble walking and failure to run. Clinical examination showed local site tenderness, inability to actively plantarflex the ankle (passive plantarflexion was possible) and positive Thompson test 7.

Inclusion Criteria: includes age Group between <60 years, > 4weeks old neglected rupture, both type rupture - near tendon insertion & in watershed area, gap <5cm.
Exclusion Criteria: are age > 60 years, Acute rupture, Associated with calcaneum fracture, gap >5cm, foot deformity, Neuromuscular deformity.
With the patient in prone position, a posterolateral longitudinal incision was made along the tendoachilles also exposing the calcaneal tuberosity. The sural nerve was identified and retracted proximally in the wound. Incision was made through the tendoachilles sheath to expose the ruptured ends. Scar tissue was resected and the tendon dissected proximally to free it if needed. The peroneus brevis was then detached from its insertion on the fifth metatarsal following a mini incision and brought through to the first

wound. Ruptured tendon ends were approximated using the modified Krackows' technique with No. 2 ethibond suture. Drilled a hole large enough for the peroneus brevis through the transverse diameter of the calcaneal tuberosity. The peroneus brevis was passed through this hole and then back proximally beside the site of rupture for reinforcement; finally, it was sutured to itself to produce a dynamic loop similar to modified Teuffer technique All patients were followed up for assessment of integrity of repair and functional status. At each follow-up, ankle range of movements was measured by goniometer. The calf thickness was measured and compared with that of contralateral limb. The neurological status of foot, single limb hopping, strength of plantar flexors with heel raised standing, and ability to perform repeated heel raises were assessed. At the final follow-up, patients' satisfaction was assessed with Kerkhoffs' Modified Rupp Scoring system[3]. Results of this scoring were rated as excellent (>30 points), good (15–30 points), fair (5–15 points), and poor (<5 points).Patients were put in a plaster cast with the ankle in 10-15° plantarflexion and the knee in 15 degree of flexion for 4 weeks. This was followed by a below knee cast with the ankle in neutral position for another 4 weeks. Weight bearing was started 6 weeks post-operatively and cast was discontinued 8 weeks post operatively. A progressive strengthening rehabilitation programme followed.

Statistical Analysis

Descriptive statistics were performed for all data, and sufficient statistical comparison tests were performed. With the T test continuous variables were evaluated and categorical variables analysed. Statistical significance was taken as $P < 0.05$. The data was analysed using Microsoft Excel 2010.

Results

All patients were followed up for at least 18 months. (range, 19-48 months).

Table-1:Demographic details of study

Gender	**Number of Patients**	**Percentages**
Males	14	61
Females	9	39
Side of injury		
Left	13	56.5
Right	10	43.5

Of the 23 Patients, 14 were female and 9 male, and average age was 42 years (range, 39-52 y). Most of the patients had left side injury of 56.5%.

Table-2: Objective measures at follow up

Objective criteria		**Operated side**	**Non operated side**
Range of motion	Dorsiflexion	Average -18º	Average -24º
	Plantar flexion	Average -26º	Average -36º
Toe raise	Sustained	14	
	present but <60 seconds	6	
	Unable	3	
Neurological examination	Sensory hyposthesia	4	
	Normal	19	

Average dorsiflexion was 18° (compared to 24°on the noninjured side) and average plantar flexion was 26° (compared to 36°on the non-injured side). Results of testing the patient's ability to toe raise for 60 seconds, 14 patients were able to sustain, while 6 patients were able to raise the toe but could not sustain it. 3 patients could not do raise the toe at all. 4 patients complained of sensory hypoesthesia.

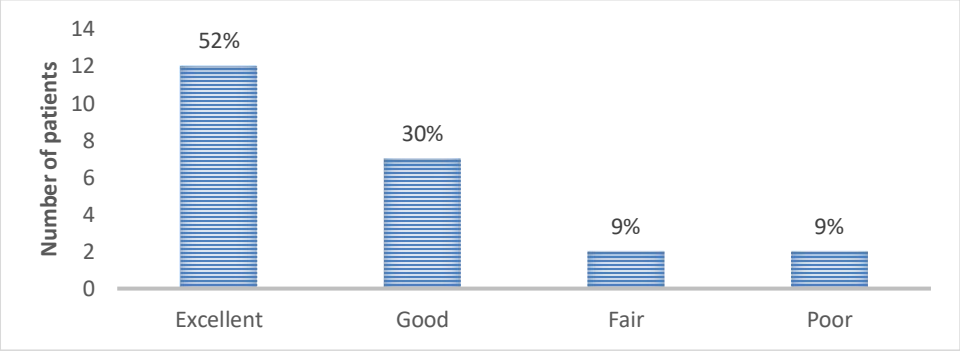

Fig 1:Subjective measures of follow up

For Rupp scoring , 82 % patients had excellent or good results and 18% had fair or poor results.

Table 3: Complications in following surgery

Complications	**Number of patients**	**Percentages**
Rerupture	1	4
Superficial infections	2	9
Hypertrophic scar	2	9
hypoesthesia	4	17

One patient suffered a re-rupture, 2 patient had a superficial postoperative infection, which was managed with debridement followed by wound closure using free flap and needing plastic surgery intervention. Two of patients developed hypertrophic scarring and have problems with footwear.

Discussion

Degenerative ruptures of tendoachillae typically occur after 30 years of age. An triggering event may be linked to tendon atrophy, as is normal in weekend athletes. Injury process typically requires an eccentric loading of the dorsiflexed ankle with the knee extended.Studies indicated that good results can be achieved using this technique,[3] although the outcome for patients with chronic rupture is not as good as for those with direct repair of an acute rupture. Other authors have reported promising results. Maffulli et al. [4] published the results of a minimally invasive technique using PB with proximal medial incision and a distal lateral incision over the Achilles tendon, leaving an intact skin bridge over area of the rupture. This technique highlights possible advantages regarding wound healing problems. Recent long-term results using this technique demonstrated that recreational athletes could return to sports; younger competitive athletes had difficulties in activities related to eversion. [5]

There are many treatment choices for Achilles tendon rupture, many of which have been controversial for a long time, including closed operations, open surgery, percutaneous sutures, v-y lengthening of gastrocnemius, enhanced central gastrosoleus aponeurosis repair, and flexor hallucis longus reconstruction. In present study surgical management of chronic neglected tendoachilles rupture with teuffer technique were peroneus brevis torn ends of the tendons are already unhealthy. Further, the healing capacity of the injured tendon is further limited due to hypovascularity resulting in decreased tissue regeneration with a high probability of rerupture[7,8]. In present study average dorsiflexion was 18° and average plantarflexion was 26° . Results of testing the patient's ability to toe raise for 60 seconds, 14 patients were able to sustain, while 6 patients were able to raise the toe but could not sustain it. 3 patients could not do raise the toe at all. 82 % patients had excellent or good results and 18% had fair or poor results.Akhil A Tawari et al results were satisfactory within 85% good or excellent results as per modified Rupp criteria[9]. Krishnagiri Sundaresh et al study results are as 70% good or excellent results[10]. Similarly, Teufferet al. reported that this is a dynamic loop repair technique which is biomechanically more sound than static repair[11].

Similar augmented techniques have been published in the literature. For example, Demirel et al. noted that in combination with immediate weight-bearing ambulation, the primary repair of acute tendon achilles rupture increased with gastrosoleus turn-down flip technique results in good overall outcomes, but is correlated with similar complication rates noted above[12].The use of peroneus brevis has two advantages: it incorporates a healthy tendon with a more reliable healing potential; it is an expandable tendon and has no disability in its absence at the donor site. Disadvantages of this technique: a more systematic approach includes advanced surgical skills. Infection, while uncommon, is a possibility. Superficial infection and skin loss occurred in one patient in our study and was treated with extreme debridement and free flap, altered wound healing in the form of hypertrophic scarring may lead to difficulties in wearing a shoe, the use of plantaris tendon in chronic rupture is restricted as it is difficult to distinguish between scar tissues.[11,12]

Conclusion

Results of reconstruction of Achilles tendon ruptures using peroneus brevis tendon show a good and stable repair that enables early weight-bearing ambulation with favourable clinical outcomes in most patients. Disadvantages of the procedure should be shared with patients in detail before seeking informed consent. Care must be taken to avoid wound complications and deep infections that could require more thorough dissection. Further trials involving professional athletes should be undertaken to confirm the effectiveness of this improved technique.

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