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ORIGINAL ARTICLE

Outcomes of Single Stage Repair of Open Tear of Achilles Tendon

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ABSTRACT

Objective: To determine the outcome of debridement and repair of open achilles tendon tear in a single setting.

Material and Methods: In this study, we included 30 patients who presented with open tendon rupture. The study was conducted from June 2021 to Dec 2021 in Islam Medical College Sialkot and CMH Lahore. Each injury was treated with appropriate debridement and primary repair using Pennington's variation of Kessler's approach. Surgery was performed in a single sitting, with the paratenon closed circumferentially and plantaris reinforcement applied when an end-to-end repair couldn't be obtained. Cast was applied below knee for two months. Weight bearing was started at end of three months.

Results: Among the 30 patients in this series, all were male with a median age of 37 years and range 18-68 years. The commonest source of injury was agriculture fields in 14 (46.7%) cases, road traffic accidents in 10 (33.3%) cases, play grounds in 4 (13.3%) and Pakistani toilet in 2 (6.7%) case. At 6 months follow-up, there was not a single case of wound infections or wound dehiscence. Mild restriction of range of motion was diagnosed in 23 (76.7%) patients, moderate in 4 (13.3%) patients and severe in 3 (10%) cases.

Conclusion: Early debridement and proper repair of the ruptured tendon are critical in the treatment of an open tendoachilles tear. Soft tissue handling and a modified Kessler approach with additional circumferential suturing and paratenon closure provide appropriate strength to the repaired tendon.

Keywords: Achilles tendon, Open tear, Modified Kessler's technique.

INTRODUCTION

In terms of tensile strength, the Achilles tendon ranks near the top among tendons in the human body. Sports activities can put the tendon through tensile loads of up to 10 times its own strength.[1] Every year, 06 to 18 people per 100,000 suffer from ruptured Achilles tendons. Twenty percent of large tendon ruptures are caused by ruptures of the Achilles tendon rupture accounts for 20% of all tendon injuries. Incidence is estimated to be between 11% to 37% per 100,000 people. Achilles tendon rupture occurs 2 to 12 times more frequently in men than in women.[2, 3]

As reported by Soroceanu et al., in their 2012 meta-analysis of 826 individuals who suffered an acute Achilles tendon rupture, the mean age at the time of the injury was 39.8 years. The authors reported bimodal age distribution of injury, first peak in age of 25 to 40 years and second peak after 60 years. In young age, high energy trauma is the commonest cause of injury while in 2nd peak age low energy trauma is commonly responsible e.g., spontaneous tendon rupture due to tendon degeneration or rupture due to tendinopathy.[4] This injury can be linked with, but is not always related with, a pre-existing tendinopathy, and as a result, the injury can be classified as either acute or chronic. Some patients may suffer from this injury as a result of a vehement laceration.[5, 6]

Depending on the severity of the damage and the location of the rupture, there are variety of treatments for treating an Achilles tendon rupture. There is considerable dispute over the best ways to treat and rehab an Achilles tendon rupture.[7] In this case series we reported the outcomes of debridement and repair of open Achilles tendon tear in a single setting.

MATERIAL AND METHODS

In this study, we included 30 patients who presented with open tendon rupture. The study was conducted from June 2021 to Dec 2021 in Islam Medical College Sialkot and CMH Lahore. Informed and written consent was obtained from each patient.

For surgical repair, the patient was kept in a prone posture, with his foot dangling over the edge of the bed in gravity-assisted equinus. Surgery was carried out under spinal anesthetic. A thorough debridement was carried out in order to eradicate any traces of contamination. The skin incision was extended 1 cm proximally over the Achilles tendon's medial border. Ragged edges were removed from both of the cut-off ends. Both ends were dragged in an effort to approximate tear. Ethibond was applied to both ends of the torn tendon and a modified version of Kessler's approach was used to repair the tendon in individuals with adequate approximation of the tendon ends. The plantaris tendon was used to support the repair in patients whose equinus showed signs of stress on the repair. We used 2-0 vicryl to bolster the repair around the margins. 2-0 vicryl was used to seal the surrounding paratenon. The paratenon was carefully handled to prevent tendon substance entanglement. A manual dorsiflexion and plantar flexion of the ankle were used to test the stability of the repair during the procedure. Staples were used to seal the skin on top. After application of a sterile dressing, the limb was casted down to the knee for maximum support. The cast has a window cut into it so that the wound could be examined and stitches can be removed at two weeks. On the first postoperative day, oral aspirin was initiated as DVT prophylaxis for a period of six weeks.

At four weeks, the cast was re-applied with the foot in neutral position, and the patients were re-evaluated. Ankle mobilization was advised for four weeks after the cast was removed at eight weeks. Patients were allowed to start weight bearing on the limb for the first time at 12 weeks, initially with the assistance of a walker and then without it. At three, six- and 12-months patients were re-evaluated. Wound state, scar adherence, and ankle range of motion were assessed at each follow-up visit. Results were judged significant when the ankle range of motion was evaluated at the 12-month final follow-up and compared with that on the contralateral side using the paired sample test.

RESULTS

Among the 30 patients in this series, all were male with a median age of 37 years and range 18-68 years. There were 4 (13.3%) patients with diabetes and 7 (23.3%) were having positive smoking history. The commonest source of injury was agriculture fields in 14 (46.7%) cases, road traffic accidents in 10 (33.3%) cases, play grounds in 4 (13.3%) and Pakistani toilet in 2 (6.7%) case. In 18 (60%) cases left foot was injured and in remaining 12 (40%) cases right foot was injured. There were no case of bilateral feet damage (Table 1).

At 12 months follow-up, there was no single cases of wound infections and dehiscence. Mild restriction of range of motion was diagnosed in 23 (76.7%) patients, moderate in 4 (13.3%) patients and severe in 3 (10%) cases (Table 2).

Table 1: Baseline Study Variables.

Age	37 (18-68)
Diabetes	4 (13.3%)
Smoking History	7 (23.3%)
Source of Injury	
Agriculture Filed	14 (46.7%)
Road Traffic Accidents	10 (33.3%)
Play Ground	04 (13.3%)
Toilet	02 (6.7%)
Site of Injury	
Left foot	18 (60%)
Right foot	12 (40%)

Table 2: Comparison of Study Outcomes.

Wound Infections	0 (0.0%)
Wound Dehiscence	0 (0.0%)
Restriction of Range of Motion of Ankle	
Mild (>30)	23 (76.7%)
Moderate (15-29)	04 (13.3%)
Severe (<15)	03 (10.0%)

DISCUSSION

The most common type of Achilles tendon injury is a closed rupture, rather than an open laceration, as described in most medical literature. Closed ruptures account for the great majority of Achilles tendon injuries worldwide. Searching online for open Achilles tendon laceration is likely to lead to more closed ruptures than open injuries.[8] Because it's a big subcutaneous structure, it's more vulnerable to injury. But as it is located in the back, it is less vulnerable to sharp items. Because of its vertical position, it is less vulnerable to damage from falling objects.[9]

When Abduljabbar Alhammoud et al. evaluated 322 tendoachilles injuries with laceration, they found that numerous demographic characteristics had an impact on tendon healing after repair.[5] There were 52 open tendoachilles injuries described by Awe OO et al. who studied the pattern and management of the same.[6] However, there is currently a lack of information on how to treat an open tendoachilles lesion.

In our series of patients, the time range from injury to operation was 8 to 22 hours. This is because many injuries occur in rural areas with a resultant delay in transportation. Some patients came to the ER after receiving first aid and skin suturing in a nearby hospital. This suggests a lack of understanding of tendon injury and its treatment at the regional centers. It was detected that in all cases rupture was at about 3-5 cm from the insertion location over the calcaneus. This location is thought to have low vascularity, making it more vulnerable to injury.[10, 11]

Regardless of the space left after debridement, we advocate a full and aggressive removal of the contaminated and ragged tendon ends. In 27 patients, we used a locking loop approach called the Pennington variation of Kessler's technique for tendon repair, resulting in a robust repair with exceptional pullout strength. Plantaris reinforcement was done in 3 patients. Additional simple sutures were used to strengthen the cut ends of the tendon fibers. In comparison to previous approaches, the modified Kessler's technique has been found to give sufficient strength for a suitable time period after repair.[12]

The small sample size is the major limitation of this study.

CONCLUSION

Early debridement and proper repair of the ruptured tendon are critical in the treatment of an open tendoachilles tear. Gentle soft tissue handling and a modified Kessler approach with additional circumferential suturing and paratenon closure provide appropriate strength to the repaired tendon.

REFERENCES

1. Dederer KM, Tennant JN. Anatomical and Functional Considerations in Achilles Tendon Lesions. Foot and ankle clinics. 2019;24(3):371-85.
2. Park SH, Lee HS, Young KW, Seo SG. Treatment of Acute Achilles Tendon Rupture. Clin Orthop Surg. 2020;12(1):1-8.
3. Longo UG, Salvatore G, Risi Ambrogioni L, Cella E, Candela V, Carnevale A, et al. Epidemiology of Achilles tendon surgery in Italy: a nationwide registry study, from 2001 through 2015. BMC Musculoskelet Disord. 2020;21(1):687.
4. Soroceanu A, Sidhwa F, Aarabi S, Kaufman A, Glazebrook M. Surgical versus nonsurgical treatment of acute Achilles tendon rupture: a meta-analysis of randomized trials. J Bone Joint Surg Am. 2012;94(23):2136-43.
5. Alhammoud A, Arbash MA, Miras F, Said MN, Ahmed G, Al Dosari MA. Clinical series of three hundred and twenty two cases of Achilles tendon section with laceration. Int Orthop. 2017;41(2):309-13.
6. Awe AA, Esezobor EE, Aigbonoga QO. EXPERIENCE WITH MANAGING OPEN ACHILLES TENDON INJURIES IN A TERTIARY HOSPITAL IN SOUTHERN NIGERIA. Journal of the West African College of Surgeons. 2015;5(4):30-40.
7. Bowers MW, Turner NS, Ryssman DB, Moran SL. Outcomes Following Treatment of the Infected Achilles Tendon. Foot & ankle orthopaedics. 2019;4(2):2473011419846943.
8. Said MN, Al Ateeq Al Dosari M, Al Subaii N, Kawas A, Al Mas A, Al Ser Y, et al. Open Achilles tendon lacerations. 2015;25(3):591-3.
9. Zhu Y, Xu Y, Li J, Yang J, Ouyang Y, He X, et al. [Treatment of spoke heel injuries in children]. Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi. 2009;23(10):1180-2.
10. Lagergren C, Lindholm A. Vascular distribution in the Achilles tendon; an angiographic and microangiographic study. Acta Chir Scand. 1959;116(5-6):491-5.
11. Theobald P, Benjamin M, Nokes L, Pugh N. Review of the vascularisation of the human Achilles tendon. Injury. 2005;36(11):1267-72.
12. Graham JG, Wang ML, Rivlin M, Beredjiklian PK. Biologic and mechanical aspects of tendon fibrosis after injury and repair. Connect Tissue Res. 2019;60(1):10-20.