

Clinical Outcome of Open Achilles tendon Injuries within 12 Hours of Primary Repair

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Abstract: Background :- The Achilles tendon is one of the most frequently ruptured tendons in the human body due to its superficial position. The primary repair of open Achilles tendon injury is important as it is associated with several complications if the treatment is delayed. **Objectives :-** The purpose of this study is to evaluate the final clinical outcome of open achilles tendon injury when the primary repair is perform within 12 hours of injury. **Methods :-** 18 patients who presented within 12 hours of open Achilles tendon injury between the age of 5 to 60 years were included. All the patient were treated with emergency debridement and primary repair using krackow technique. **Results :-** Out of 18 patient, 11 patient returned to its normal activity level without any postoperative complications. 2 patients develop minor wound edge necrosis and 3 patient had superficial wound infection which resolve after regular dressing with course of antibiotic. 2 patient develop foreign body sensation which improved at the final assessment. **Conclusion :-** Open Achilles tendon injuries are uncommon, although the management of these injury is very important as it is associated with several complications and limitation of certain activities of daily living.

Keywords – Achilles tendon, open injuries, primary repair, krackow technique, complications.

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I. Introduction

The Achilles tendon is one of the most frequently ruptured tendons in the human body¹ and has become the third most frequent major tendon injury behind those of the rotator cuff and knee-extensor mechanisms². Despite the fact that Achilles tendon is the largest and the strongest tendon, it is prone to injuries both in athletes and non-athletes due to its superficial position in the body^{3, 4}. However open Achilles tendon injuries are uncommon in both developed and the developing countries as compared to closed Achilles tendon injury^{5, 6, 7}. Injury to Achilles' tendon may occur due to sports injuries, accidental cuts by sharp household tools, penetrating injuries, road traffic accidents and slipping of the foot in Indian type of lavatory pans⁵. The management of open Achilles tendon injuries depends on the mechanism of the injury, type of injury sustained and the time of presentation. The treatment of open Achilles tendon injuries is not controversial but surgical, as conservative management is not recommended⁸. The management ranges from primary repair in patients with tendon lacerations presenting by co-opting the two ends of the tendon to resection of crushed part of the tendon and reconstruction with either grafts or flaps and soft tissue cover.

The aims of this study were to assess the clinical outcome, complications and the factor influencing the final outcome after primary repair of open Achilles tendon injury within 12 hours.

II. Materials And method

The study was conducted at department of Orthopaedic, Regional Institute of Medical Sciences (RIMS), Imphal, Manipur, India, from January 2016 to January 2018 after taking Institutional ethical clearance.

Eighteen (18) consecutive patients with open Achilles tendon injury of less than 12 hours of duration were treated with primary repair.

2.1 Inclusion Criteria

1. Open Achilles tendon injuries
2. Age group – 5 to 60 years.
3. Injury to surgery interval less than 12 hours.

2.2 Exclusion criteria

1. Closed Achilles tendon rupture
2. Associated fracture of the ankle
3. Patient with medical co-morbidities like diabetes mellitus, HIV, Peripheral vascular disease, Immunocompromised patient.
4. Duration of injury more than 12 hour.
5. Associated with vascular injury.

2.3 Pre – operative treatment protocol

Patients were examined in detail. Intravenous antibiotic, cefuroxime 750 mg with sulbactam 375 mg was given. Amikacin 500 mg was added and continued 12 hourly. Tetanus prophylaxis with anti-tetanus serum was given. Preliminary washing of the wound was done in emergency minor OT with plenty of normal saline and povidone iodine solution. Wound was covered with dressing pads soaked with povidone iodine solution. After that patient were taken to emergency OT for debridement and primary repair.

2.4 Operative procedure

Operations were performed under spinal or regional anaesthesia without tourniquet. Thorough irrigation with plenty of normal saline and povidone iodine solution was done. Hydrogen peroxide solution was used only in severely contaminated wound. Surgical debridement and primary repair of the tendon was done within 12 hours of presentation. The lacerations which were either transverse or oblique in orientation were extended in a Lazy-S fashion to create a proximal and distal skin flaps to expose the proximal and distal ends of the tendon. The tendon is mobilized with the paratenon left intact. The two ends of the tendon were approximated using Krackow suture technique using no. 2 to no. 5 ethibond suture. Primary repair for the laceration at or near insertion of Achilles tendon was done by using suture anchor or making a drill hole in the TA insertion site and passing suture through it. Wound was closed in standard manner with corrugated rubber drain. For simple lacerated injury, below knee Plaster of Paris cast were applied, with the ankle in plantarflexion position or above knee cast with knee in 15° of flexion and ankle in plantarflexion position for those requiring excision of damaged ends of tendon. A window was created in each cast to provide access for twice weekly change of dressing.

They were mobilized on non-weight bearing crutches for first 4- 6 weeks followed by gradual weight bearing and range of motion exercises. Follow-up was done at around 2, 4, 8 and 12 week intervals until complete wound healing and satisfactory rehabilitation outcome. The casts were removed in all the patients at 8 weeks in the OPD.



Fig1: Lacerated wound with complete tear of Tendo-Achilles



Fig 2: Intraoperative assessment of wound



Fig3: Showing two ends of tendo-achilles with Krackow suture



Fig4: Showing final repaired tendo-achilles



Fig5: Showing Closure of wound



Fig6: Showing application of above knee cast in slight flexion at knee and planter flexion at ankle

III. Results

Eighteen (18) patients, out of 33 patients who attended the orthopaedic emergency with open Achilles tendon injury met with the criteria for this study. There were 12 males and 6 female patients in the study group. The young adult and teenagers were most commonly affected age group. The mean age of the group was 26.89 (range, 6 – 58 years) with standard deviation of 14.7. The left side was affected in 10 patients (55.6%) and right sided involvement was seen in 8 patients (44.4%). Toilet seat injury was the most common mode of injury in the study group, accounting for 44.4% of the cases followed by motor bike and bicycle spokes injury in 22.2%, broken glass in 16.7% and sharp metal injury in 16.7% of the cases. The injury to Achilles tendon was partial laceration in 4 cases and complete laceration in 14 cases. The mean delay in primary repair from time of injury was 7.83 hrs (range, 2 – 16 hrs) with standard deviation of 3.9. There were 2 cases of minor wound edges necrosis and 3 cases of superficial infection of wound which resolved after series of dressing and antibiotic course. Two patients complain of foreign body sensation and discomfort at the initial postoperative period which improved at the final assessment. There were no cases of granuloma and sinus formation.

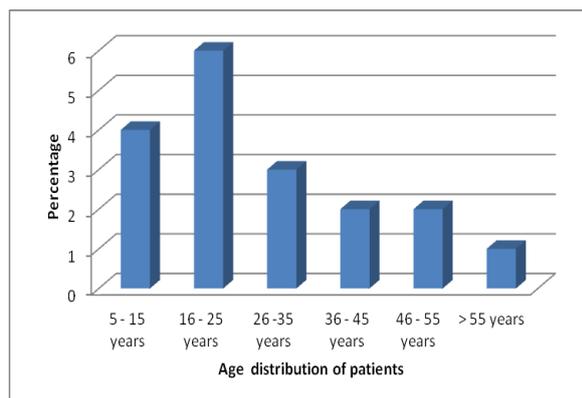


Fig 1: Age Distribution of patients

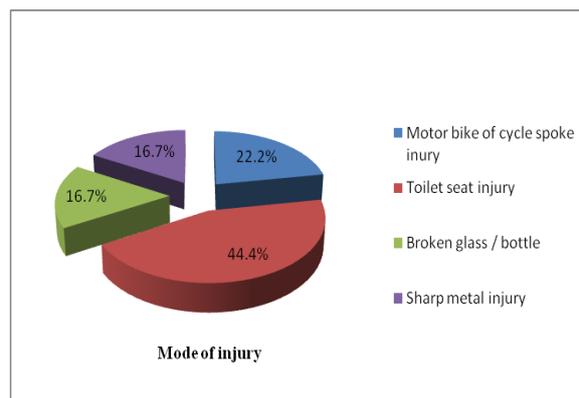


Fig 2: Mode of injury

Table 1:- Clinical profiles of patients

Details	Number / Percentage
Age (mean/ Range)	26.89 (range, 6-58)
Gender	Male = 12 (66.7%)
	Female = 6 (33.3)
Side affected	Left = 10 (55.6%)
	Right = 8 (44.4%)
Injury type	Partial laceration = 4
	Complete laceration = 14
Delay in primary repair	Mean = 7.83 hrs (range, 2 – 16 hrs) STD = 3.9
Complications	Minor wound edge necrosis = 2
	Superficial infection = 3
	Foreign body sensation and discomforts = 2
Final ROM of ankle	56° - 68°

IV. DISCUSSIONS

Literature concerning on open Achilles tendon injury are very sparse globally^{8,9} as compared to the closed Achilles tendon injury which is well documented. However, there is increase in the incidence of open Achilles tendon injury as shown by some literatures.

The main age group affected by the open Achilles tendon injuries are the children and the young adults as these are very active age group who are exposed to accidents and are least concerned about their safety^{9,10,11}. This is similar to our study where the most commonly affected age group was children and teenagers. In many of the studies, mode of injury was motorbike and bicycle spokes injury, sharp metal injury, broken glass injury. However, Chatterjee SS et al⁵ mentioned the toilet seat injury (Indian lavatory Pan) as the common mode of injury in Indian scenario which is also the commonest mode of open Achilles tendon injury in our study. Though mean time to delay in primary repair was 7.83 hours, there was no incidence of failure of primary repair in our study.

Complications in tendo - Achilles injuries mentioned in literature are skin edge necrosis, superficial wound infections, seroma formations, hematomas, re-rupture, fibrotic reactions, sural nerve irritations and deep vein thrombosis^{12,13}. In our study, there were 2 cases of minor wound edges necrosis, 3 cases of superficial infection of wound which resolved after series of dressing and antibiotic course and 2 cases of foreign body sensation and discomfort in the initial postoperative period which improved at the final assessment. Chatterjee SS et al⁵ reported high rate of granuloma and sinus formation with prolene suture. In our study, we used Ethibond suture and there were no incidence of granuloma and sinus formation. Two patients described foreign body sensation or discomfort possibly due to sural nerve irritation as also mentioned by chatterjee SS et al⁵ in their study. The final range of motion was comparable to other studies¹⁴.

V. Conclusion

Though open Achilles tendon injuries are uncommon and literature concerning are not well documented, the management of these injury is very important as it is associated with several complications. The complications and limitation of certain activities of daily living in open Achilles tendon injury arises due to delay in the primary repair and early mobilization.

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