Research Article
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Evaluation of the result of early repair of open tendo achilles injury

Abstract

Introduction: Toilet pan injury or accidental cut injury which causes open tendo achilles injury is very much common in our country. The Achilles tendon injury is very difficult to treat, sometimes it creates a disabling condition due to calf muscle contracture, wound infection or skin necrosis. Therefore even in immediate repair of fresh injury will need reconstruction. So early repair of Tendo-Achilles injury after meticulous surgical toileting give best result.

Objective: Assessments of result in primary repair of open Tendo-Achilles injury and evaluate the outcomes. To calculate the percentage of results of early repair of open Tendo-Achilles injury. Assess the rate of infections, skin necrosis, and failure of healing in primary repair.

Material & methods: Thirty patients who had acute open Tendo-Achilles injury were studied. Variable level of open acute Tendo-Achilles injury were treated at Sher-E-Bangla Medical College Hospital, Barishl in the period from July 2018 to June 2020. After thorough surgical toileting cut tendon was repaired end to end by modified Kessler method. Plaster cast was given for immobilization & broad spectrum antibiotic given for two to three weeks.

Result: Final outcome measured according to Juhana Leppilahti modified scoring scale. Thirty patients with Tendo-Achilles injury were studied. Fifteen cases result were excellent, eleven cases good, two case fair and two cases poor.

Conclusion: In early repair of open Tendo-Achilles injury need short period of post operative inactivity. It will help to return a Tendo-Achilles injured patient to his normal work early as well as reduce burden of hospital cost and his family. Early repair of open Tendo-Achilles injury within 12 hours is effective procedure for patients as for surgeon.

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Md. Ferdous Rayhan,[1] Mazharul Rezwan,[2] Dr. Md. Mohoshin Sarker[3]

[1]Resident surgeon (Orthopaedic surgery) Sher e Bangla medical college hospital Barishal, Bangladesh
[2]Registrar, Department of Orthopaedics, SBMCH, Barishal, Bangladesh
[3]Medical Officer, OSD, DGHS, Mohakhali, Bangladesh

Correspondence: Dr. Md. Ferdous Rayhan, Resident surgeon (Orthopaedic surgery) Sher e Bangla medical college hospital Barishal, Bangladesh, Tel 01713799030, Email Ferdousrayhanshuvo@gmail.com

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Introduction

Achilles, the warrior and hero of Homer's Iliad, lends his name to the Achilles tendon, the thickest and strongest tendon in the human body. Thetis, Achilles's mother, made him invulnerable to physical harm by immersing him in the river Styx after learning of a prophecy that Achilles would die in battle. However, the heel by which he was held remained untouched by the water and thus Achilles had a vulnerable point. Achilles led the Greek military forces, which captured and destroyed Troy after killing the Trojan prince Hector. However, hector's brother Paris killed Achilles by firing a poisoned arrow into his heel.[1]

Rup tures of the Achilles tendon have been described since antiquity and have in the past been associated with near certain death. This belief is mirrored in Greek mythology. Achilles died after suffering an injury of the calcaneal tendon through an arrow released by goddess Apollo.[2]

The achilles tendon

The tendinous portions of the gastrocnemius and soleus muscles merge to form the Achilles tendon. The gastrocnemius tendon begins as a broad aponeurosis of the distal margin of the muscle bellies, whereas the soleus tendon begins as a band proximally on the posterior surface of the soleus muscle. The length of the gastrocnemius component ranges from eleven to twenty-six centimeters and that of the soleus component, from three to eleven centimeters.[3]

In Bangladesh most of the cases, come to hospital with open type of Tendo Achilles injury, occur in all age group of people and both sexes. In contrast to western countries, most people in our country uses flat pan in the latrine, which are at a same level of the toilet floor. Many people use a common latrine, so that surroundings of the latrine remain wet and slippery. Moreover bathroom and latrine are placed in same small room, so it remains always wet and slippery. Maximum people are barefooted or using sandal, which cause them to slip and fall on the toilet pan. Some cases of open tendon injuries occur due to road traffic accident, cut by broken glass and assault. About a week after rupture, the space between the tendon ends fills with scar tissue. If left untreated, the tendon will not heal, leaving the patient unable to push off in the affected side. Running, jumping and activities such as ascending or descending stairs are severely compromised. If there is gap or functional impairment foot or disabling, for this case reconstruction is indicated.[4]

Surgical procedure

After regional anesthesia (Spinal/epidural/local) patient position was prone. Then proper surgical toileting of the wound was done with sterile water, soap and hexiscrub. After cleaning of the wound than tourniquet applied in the thigh and wound was painted with antiseptic solution especially with povidon-lodine and proper drapping was done. Carry the incision sharply through the skin, subcutaneous tissue, and tendon sheath. Extend the wound upward and downward from the previous lacerated or cut margin. Asceptic surgical toileting was done

with diluted povidone-iodine. Finally wound was wash with 4-5 liter normal saline and a swab was taken for culture and sensitivity test.

Than tendon was repair as end to end with No-1 nonabsorbable suture like proline by krackow method, paratenon was sutered by 2/0 absorbable vicryl.(2) Skin was loosely apposed by 3/0 or 4/0 porline interruptedly and sterile dressing was given. A short leg anterior plaster slab was applied with the ankle in gravity equinus position.[5]

After admission tetanus prophylaxis was given to all patient. Preoperatively injection cefuroxime- 1.5 gm was given to every patient and second and third dose of injection cefuroxime 750 mg was given 8 hours interval. When patients were discharged oral ciprofloxacin given for 2 weeks. Oral metronidazol were administered for a week starting on day one. After getting culture and sensitivity report antibiotics were changed accordingly if needed.

Plaster immobilization

All patients were immobilized by long leg casts for the period of 4 to 6 weeks.

In knee 60° and ankle 60°. Short leg anterior slab were given in all cases (100%) for 4 weeks with ankle in gravity equinus. Stitches were removed at 14th post operative day.

Material & methods

Thirty patients who had acute open Tendo-Achilles injury was studied. Variable level of open acute Tendo-Achilles injury were treated at Sher-E-Bangla Medical College Hospital, Barishal in the period from July 2018 to June 2020. After through surgical toileting cut tendon was repaired end to end by modified crackow method. Plaster cast was given for immobilization & broad spectrum antibiotic given for two to three weeks (Table 1).

Table 1 Juhana Leppilahti Modified Scoring Scale

Clinical factor	Scores (points)
Pain	
None	15
Mild, no limited recreational activities	10
Moderate, limited recreational, but not daily activities	5
Sever, limited recreational and daily activities	0
Stiffness	
None	15
Mild, no limited recreational activities	10
Moderate, limited recreational, but not daily activities	5
Sever, limited recreational and daily activities	0
Calf muscle weakness (subjective)	
None	15
Mild, no limited recreational activities	10
Moderate, limited recreational, but not daily activities	5
Sever, limited recreational and daily activities	0
Footwear restrictions	
None	10
Mild, most shoes tolerated	5
Moderate, unable to tolerate fashionable shoes, modified shoes	0
tolerated	
Active range of motion difference between ankles	
Normal (≤ 50)	15
Mildly limited (60-100)	10
Moderately limited (110-150)	5
Severely limited (≥160)	0
Subjective result	
Very satisfied	15
Satisfied with minor reservations	10
Satisfied with major reservations	5
Dissatisfied	0
Power of planter flexion	
BMRC-5	15
BMRC-4	12
BMRC-3	9
BMRC-2	6
BMRC-1	3
Overall results	
Excellent	90-100
Good	75-85
Fair	60-70
Poor	≤ 55

Observation and results

This prospective study on the Evaluation of the result of Early repair of open Tendo Achilles injury was carried out to evaluate the result of primary repair of open Tendo Achilles injury and to find out the common causes of injury, age & sex incidence, organism found in wound swab and to propose a protocol for treating the such cases in a safer and cost effective way. This study was done at orthopaedics department of Sher-E-Bangla Medical College Hospital, Barishal, cases were operated at Casualty OT. Patients were hospitalized for 24 hours. Then patients were followed up at ortho OPD and ortho indoor routinely.

Among 30 patients 25 were male and 05 were female. Mean age was 30½ years. 77% injury was due to sharp edge of broken toilet pan following accidental fall in the pan. It is very much alarming. Right

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side were more affected about 60% and left side 40%. In this series median level of cut was 2.8 cm where interquartile range was 2.42-3.28 cm. In 76 % cases E. coli, 7% Klebshiela, 7% Pseudomonus, 3% no growth and 7% others organisms found in culture. In 67% cases I had not to change my prescribed antibiotics at first time, Because of 67% organism were sensitive to ciprofloxacin others changed accordingly. Median delay of repair was 5 hours 42 minutes, where interquartile range was 4 hours 48 minutes to 6 hours 42 minutes. All the patients were advised for regular follow up at Orthopaedics out door or in Orthopaedics ward. 1st visit was 3-5 days after operation for looking sign of inflammation and 2nd visit at 14th POD for stitches removal, then regular visits at four weeks interval upto total return of normal daily activity. Median follow- up period 7 months.

In 15 (50%) cases shown no complications and in another 15 (50%) cases shown different types of complications In 15 (50%) cases shown no complications and in another 15 (50%) cases shown different types of complications. Among minor complications 5 (19%) was superficial skin infection, 15 (51%) was pain, 4 (15%) was swelling and 4 (15%) was ugly scar. Among major complications 1 (50%) was failure of tendon healing due to deep wound infection and 1 (50%) was skin necrosis requiring flap coverage.

Final outcome

Final out come measured according to Juhana Leppilahti modified scoring scale (Table 2).[6]

Table 2 Distribution of final outcome

Grade	No of cases	Percentage
Excellent	15	50%
Good	11	36.67%
Fair	2	6.67%
Poor	2	6.66%
Total	30	100%

Satisfactory = Excellent + Good

= 50% +36.67%

= 86.67%

Unsatisfactory = Fair + Poor

= 6.67+6.66%

= 13.33%

Pie chart showing final outcome.

I divided 30 cases into two groups. Patients whose open cut Tendo Achilles repaired before 6 hours and who's Tendo - Achilles repaired within 6-12 hours (Table 3).

In group-I clinical outcome score was 90.77±4.4. In group –II clinical out come score was 75.94±60.33. By comparing between these two groups, group-I score significantly (P<0.01) higher than group-II score. It indicates that open Tendo Achilles injuries repaired before six hours achieved maximum functional outcome.

Table 3 Functional outcome scoring

Groups	Cases		Clinical score Mean ± SD	Z-value	P-value
	Number	Percentage			
Group - I	13		90.77±4.4	3.57	< 0.01
Group - II	17		75.94±60.33		

Discussion

Most the literature was published in journal on calcaneal tendon rupture which were mostly deals with spontaneous closed rupture (M Kakiuchi 1995, Roger A 1991)(7). Limited papres were published on diagnosis and early treatment of few cases of open lacerations of Tendo Achilles (Inglis 1976, Mahmoud 1992). In our country open Tendo Achilles injury is common. In this series of 30 patients, 23 cases (76.66%) were caused by sharp edge of the broken toilet pan, 6 cases were (20%) caused by sharp cut (by knife or glass), 1 case caused (3.33%) by machinery injury. All these patients included in this study treated within 12 hours of injury. Age distribution in this series was ranging form 18 years to 60 years. So most of patients were young adult (18-30 year), Male were common victim in our study. Mean age was 30.5±10.23. All patients were immobilized by plasters casts for a period of 6 to 8 weeks. Short leg anterior slab were given in all cases for 2 weeks post operatively in ankle gravity equinus. All anterior slabs were removed during the time of stitch removal at 14th post operative day and below knee cast were given with few degree corrections of ankle equinus. Below knee cast were changed after 4 weeks and another below knee cast were given with correction of equinus for another 2 weeks. After removal of cast all patients were advised for ankle movement exercise and partial weight bearing with crutches. All the tendons were repaired by krackows method. Paratenons were repaired as much as possible. 13 patients were (43.33%) treated before 6 hour of injury. The rate of infection were less in these patient, those received treatment before 6 hour of injury. The functional result of treatment assessed in terms of the patients ability in stand or rise on tip toes.[7] In this series we took it as a parameter of assessment and assessed after 16 weeks of treatment. 27 patients were able to stand on tip toes (90%), 2(6.67%) patients could not stand on tip toes of affected foot unsupported and 1 patient failed to stand on affected foot unsupported (3.33%) due to failure of tendon healing. Failure of tendon healing rate in this series is 3.33%; which is less in comparison to other study (6.66%-Monirul's 2002, 4%- Moller 2001). Failure of healing occurs after 4 weeks due to severe infection. Changes the motion of the ankle, indicates, tendon shortening or lengthening (Monirul's 2002,Moller 2001). Ankle motion were normal in 15 (50%) cases and change of motion were up to 5 degree in 11 (36.66%) patients in this series, which is very much acceptable in comparison to above studies. Common complications were skin infection (29%), pain persists for months (26%), and swelling persists for months (21%). Other complications (ugly scar, skin necrosis requiring flap coverage etc) in 21% cases. In this series I used 7 parameters to asses the final outcome of the patient functionally. These were stand on affected tip toes unsupported, range of ankle motion of affected side, power of plantar flexion of injured leg, calf muscle wasting, presence or absence of pain, footwear restriction and subjective results. These parameters were also used in various study described in various literature already mentioned. The

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final result was as follows: Excellent 50%, Good 36.67%, Fair 6.67%, Poor 6.66%. So the result of this study is acceptable in 26 (86.67%) cases, which is comparable with the result described in other[8] study.

Conclusion

The injury of the Achilles tendon is a disabling condition, which is difficult to treat because a gap or defect developed between the two ends of the injured tendon if repair is delayed. The gap between two ends of the injured tendon is due to contracture of the calf muscles, so end to end repair become difficult.[9] Therefore even in immediate repair of fresh injury will need reconstruction. In delayed repair patient needs longer period of post operative inactivity (Minimum 16 weeks), but in early repair need short period of post operative inactivity. So it will help to return a Tendo Achilles injured patient to his normal work early as well as reduce burden of hospital cost and his family.

Repair of open Tendo Achilles is not difficult but early diagnosis, proper surgical]toileting, meticulous repair, adequate post operative immobilization and physiotherapy is the important part of management. So from the encouraging result of this study, treatment protocol use here can followed, which is easy for surgeon as well as convenient and cheap for the patient.

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None.

Conflicts of interest

The authors declare no conflicts of interest.

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