DOI: https://doi.org/10.3329/medtoday.v37i1.79318

Original Article OPEN ACCESS

Evaluation of the Outcome of Primary Repair within 24 Hours of Open Tendo Achilles Injury

Mohammed Abdul Kadir *[1], Liton Kumar Roy[2], Mahabub Alam[3], Apel Chandra Saha[4], Md. Khorshedul Alam[5], Abdullah Al Rafi[6]

Abstract

Introduction: *The outcome of open Achilles tendon injury is always challenging, primary repair is considered as gold standard procedure for open Tendo Achilles injury.* ***Objective:*** *To assess the outcome of primary repair within 24 hours of open Tendo Achilles injury.* ***Materials and Methods:*** *This prospective observational study was carried out among 50 patients attending at the Department of Orthopaedics, Comilla Medical College Hospital, Cumilla within the defined period from January 2022 to December 2022. Ethical clearance was obtained from the Institutional Review Board (IRB) of Comilla Medical College Hospital. Purposive sampling was done according to availability of the patients. Statistical analyses of the results were obtained by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-20.1). Evaluation was done according to Juhana Leppilahti's modified scoring scale.* ***Results:*** *The mean age of the patients were 29.48 years with standard deviation of 13.53 years. More than two-thirds of the patients 34(68.0%) were male, whereas 16 (32.0%) were female. The majority of patients 30(60.0%) underwent surgery within 6-12 hours of injury. Moreover, half of the patients 28(56.0%) had been followed up for more than 6 months. According to Juhana Leppilahti's modified scoring scale, mild pain was found in 26 patients 52.0%) and no pain in 24 patients (48.0%). Mild stiffness was found in 46 patients (92.0%), moderate in 1 patient (2.0%) and no stiffness was found in 3 patients (6.0%). Mild calf muscle weakness was found in 11 patients (22.0%). Mild footwear restrictions were found in 3 patients (6.0%). Half of the patients (n=25, 50.0%) had normal ROM (Range of motion) difference between affected and normal ankle after operation, 24 patients (48.0%) had mild ROM difference and 1 patients (2.0%) had moderate ROM difference. Almost half (n=24, 48.0%) of the patients had MRC grade 5, 20 patients (40.0%) had 4 MRC grade and 6 patients (12.0%) had 3 MRC grade. Subjective results very satisfied was found in 36 patients (72.0%), satisfied with minor reservations was in 13 patients (26.0%) and satisfied with major reservations was in 1 patients (2.0%).* ***Conclusion:*** *The present study suggests that primary repair within 24 hours of open Tendo Achilles injury is a safe and effective procedure with low complication rates. The majority of patients reported high levels of satisfaction with the procedure, and excellent to good outcomes were achieved in most cases.*

Key words: *Achilles tendon Injury, Primary repair, Open Achilles tendon injury.*

Number of Tables: 04; Number of Figures; 02: Number of References: 10; Number of Correspondences: 03.

***1. Corresponding Author:**
Dr. Mohammed Abdul Kadir
Medical Officer
Department of Orthopaedics
Cumilla Medical College and Hospital
Cumilla, Bangladesh.
Phone: 01616304060
Email: mahabubalam.mbbs@gmail.com

2. Dr. Liton Kumar Roy
Associate Professor and HOD
Department of Orthopaedics
Cumilla Medical College and Hospital
Cumilla, Bangladesh.

3. Dr. Mahabub Alam
Assistant Professor
Department of Orthopaedics
Dhaka Medical College and Hospital
Dhaka, Bangladesh.

4. Dr. Apel Chandra Saha
Assistant Professor
Department of Orthopaedics
Cumilla Medical College and Hospital
Cumilla, Bangladesh.

5. Dr. Md. Khorshedul Alam
Assistant Professor
Department of Orthopaedics
Cumilla Medical College and Hospital
Cumilla, Bangladesh.

6. Dr. Abdullah Al Rafi
Assistant Registrar
Department of Casualty
Cumilla Medical College and Hospital
Cumilla, Bangladesh.

Received: *15 July 2024* ***Accepted revised version:*** *29 October 2024*

Introduction:

The Achilles tendon is one of the most frequent ruptured tendon in the human body[1], and it's the 3rd most frequent major tendon injury behind those of the rotator cuff and knee extensor mechanism[2]. TA injury is a disabling condition, which is difficult to treat if there is a large gap in between two ends of the disrupted tendon, this gap may result from several factors like open laceration followed by infection, allowing retraction and degeneration of the tendon[3].This gap occurs very rapidly due to calf muscle contracture, within 3 / 4 days. So that difficulty may be experienced in repossession of the rupture ends of tendon[4]. About a week after rupture the gap between two ends fills with scar tissue. If left untreated, the tendon will not heal. Running, jumping, going up and down the stairs are severely compromised[5]. It's a generally accepted that surgical repair of fresh ruptures of TA give excellent result. The complication of operative intervention however are not infrequent which are include adherence of the scar, wound infection, sloughing of the overlying skin and tendon, keloid formation[6]. The aim of this study is to evaluate the outcome of primary repair of open Tendo Achilles injury

Materials & Methods:

This Prospective observational Study study was carried out among 50 patients attending at the Department of Orthopaedics, Comilla Medical College Hospital,Cumilla within the defined period from January 2022 to December 2022. Ethical clearance was obtained from the Institutional Review Board (IRB) of Comilla Medical College Hospital. Purposive sampling was done according to availability of the patients. The collected data were entered into the computer and analyzed by using SPSS (version 20.1) to assess the outcome of primary repair within 24 hours of open Tendo Achilles injury. Evaluation was done according to Juhana Leppilahti's modified scoring scale. Juhana Leppilahti's modified scoring scale given below

Clinical feature Score	Score
Pain	
None	15
Mild, no limitations on recreational activities	10
Moderate, limitations on recreational, but not daily activities	5
Severe, limitations on recreational and daily activities	0
Stiffness	
None	15
Mild, occasional, no limitations on recreational activities	10
Moderate, limitations on recreational, but not daily activities	5
Severe, limitations on recreational and daily activities	0
Call muscle weakness (Subjective)	
None	15
Mild, no limitations on recreational activities	10
Moderate, limitations on recreational, but not daily activities	5
Severe, limitations on recreational and daily activities	0
Footwear restrictions	
None	10
Mild, most shoes tolerated	5
Moderate, unable to tolerate fashionable shoes, modified shoes tolerated	0
Active range of motion (ROM) difference between ankles	
Normal (<6)	15
Mild (6-10)	10
Moderate (11-15)	5
Severe >15)	0
Subjective result	
Very satisfied	15
Satisfied with minor reservations	10
Satisfied with major reservations	5
Dissatisfied	0
Power of plantar flexion	
MRC -5	15
MRC -4	12
MRC -3	9
MRC -2	6
MRC -1	3
Result (Total score)	100
Rating	
Excellent	90-100
Good	75-89
Fair	60-74
Poor	<60

Results:

Table I shows that majority of the (n=16, 32.0%) patients belonged to age group 21-30 years. The mean age was 29.48 with standard deviation of 13.53 years.

Table I: Distribution of the study patients (n=50)

Age (years)	Number	percentage
≤20	13	26%
21-30	16	32%
31-40	10	20%
41-50	07	14%
>50	04	08%
Mean±	29.48±13.53	

Figure 1 shows that more than two third (68.0%) patients were male and 16(32.0%) were female.

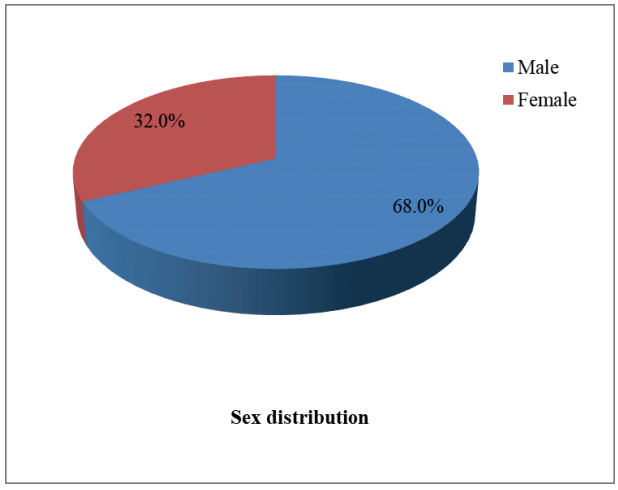

Figure 1: Distribution of the study patients by sex (n=50)

Table II shows that majority (n= 30, 60.0%) patients underwent surgery within 6-12 hours of injury. The mean delay of repair was 9.98 with standard deviation of 4.45 hours.

Table II: Distribution of the study patients by duration of underwent surgery (n=50)

Duration of underwent surgery (hours)	Number	percentage
<6	8	16%
6-12	30	60%
13-18	9	18%
19-24	3	06%

Mean±SD- 9.98±4.45 hours

Table III shows that more than half (56.0%) patients were >6 months follow up. The mean total follow up period was 6.78 with standard deviation of 1.61 months.

Table III: Distribution of the study patients by total follow up period (n=50)

Total follow up period (months)	Number	percentage
<5	5	10%
5-6	17	34%
>6	28	56%

Mean±SD - 6.78±1.61 month

Table IV shows mild pain was found in 26 patients 52.0%) and no pain in 24 patients(48.0%). Mild stiffness was found in 46 patients (92.0%), moderate in 1 patient (2.0%) and no stiffness was found in 3 patients (6.0%). Mild calf muscle weakness was found in 11 patients (22.0%). Mild footwear restrictions were found in 3 patients (6.0%). Half of the patients (n=25, 50.0%) had normal ROM (Range of motion) difference between affected and normal ankle after operation, 24 patients (48.0%) had mild ROM difference and 1 patients (2.0%) had moderate ROM difference. Almost half (n=24, 48.0%) of the patients had MRC grade 5, 20 patients (40.0%) had 4 MRC grade and 6 patients (12.0%) had 3 MRC grade. Table IV shows that subjective results very satisfied was found in 36 patients (72.0%), satisfied with minor reservations was in 13 patients (26.0%) and satisfied with major reservations was in 1 patients (2.0%).

Table IV: Distribution of the study patients by Juhana Leppilahti's modified scoring scale (n=50)

Parameter	Number	percentage
Pain		
mild pain	26	52%
no pain	24	40%
Stiffness		
mild	46	92%
Moderate	01	2%
No stiffness	03	6%
Calf muscle weakness		
mild weakness	11	22%
No	39	78%
Footwear Restrictions		
mild restrictions	3	6%
No	47	94%
Range of motion		
Normal ROM	25	50%
Mild ROM difference	24	48%
Moderate ROM difference	01	2%
power of planter flexion (MRC)		
MRC - 3	6	12%
MRC - 4	20	40%
MRC - 5	24	48%
Subjective Results		
Very satisfied	36	72%
Satisfied with minor reservations	13	26%
Satisfied with major reservations	01	2%

Figure 2 shows that excellent outcome was found in 30 patients (60.0%), good in 16 patients (32.0%), fair in 3 patients (6.0%) and poor in 1 patients(2.0%).

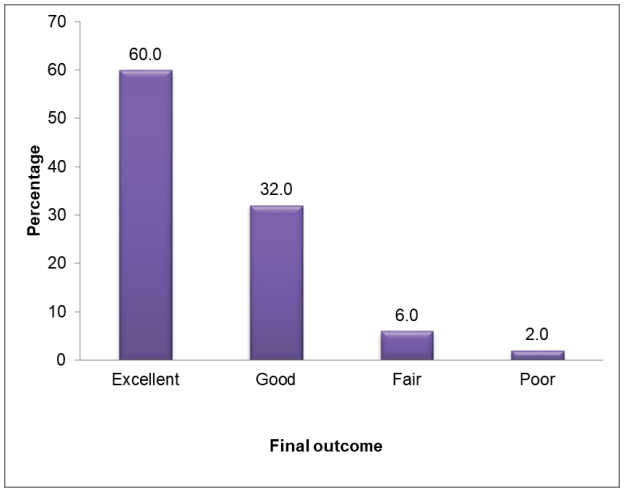

Figure 2: Distribution of the study patients by final outcome (n=50)

Discussion:

The majority of the 16 (32.0%) patients in this study were between the ages of 21 and 30. The mean age was 29.48 years, with a standard deviation of 13.53 years. The peak incidence of Achilles tendon ruptures occurs in the middle age group rather than in the older population. Ahmed et al. reported the mean age was 30.02 years with a standard deviation of 7.71 years[6]. Rayhan et al.reported mean age was 30.5 years[7]. Bishop et al. reported that the mean age was 41.1 years[8]. de Oliveira et al.reported that the mean age of the patients was 32 years[9]. In terms of gender, this study observed that about two-thirds (68%) of patients were male and one-third (32%) were female, which is consistent with other studies that found a higher prevalence of tendo Achilles injuries in males. Bishop et al.reported 314(85.1%) were male, and 55(14.9%) were female[8]. Awe et al.reported these comprised 28 (53.8%) males and 24 (46.2%) females with male: female ratio of 1.2: 1[10]. Regarding timing of surgery, the majority of patients in the current study underwent surgery within 6-12 hours of injury (60%), with a mean delay of repair of 9.98 hours. This is consistent with Ahmed et al. (mean delay of repair 6 hours 7 minutes) and Rayhan et al. (median delay of repair 5 hours 42 minutes)[6,7]. In terms of follow-up, more than half of the patients in the current study (56%) had follow-up periods of over 6 months, with a mean total follow-up period of 6.78 months. Other studies such as Ahmed et al. and Rayhan et al. also reported relatively long follow-up periods of 9 months and 7 months respectively[6,7]. The final assessment of this research shows that 60% of the outcomes were excellent, 32% were good, 6% were fair, and 2% were poor. Another study by Ahmed et al. found that 56% of the outcomes were excellent, 32% were good, 8% were fair, and 4% were poor. Similarly, Rayhan et al. reported that 50% of the outcomes were excellent, 36.67% were good, 6.67% were fair, and 6.6% were poor[6,7].

Conclusion:

Based on the findings of the study, primary repair within 24 hours of open Tendo Achilles injury is a feasible treatment option. The results of the study showed that primary repair resulted in good to excellent outcomes in 92% of patients, with 72% very satisfied with the subjective result. Overall, the study suggests that primary repair within 24 hours of open Tendo Achilles injury is a safe and effective treatment option that can lead to good functional outcomes and lower complication rates. With this encouraging result of the study, the treatment protocol of this study can be followed by the surgeon for better management of an open Tendo Achilles injury.

Conflict of Interest: None.

Acknowledgements:

The authors are grateful to the entire staff of department of Orthopaedic Surgery at Cumilla Medical College Hospital, Cumilla during the study period.

References:

1. Leppilahti J, Puranen J, Orava S. Incidence of Achilles tendon rupture. Acta orthopaedica Scandinavica. 1996;67 (3):277-9.https://doi.org/10.3109/17453679608994688

PMid:8686468

2. Lesic A, Bumbasirevic M. Disorders of the Achilles tendon. Current Orthopaedics. 2004;18 (1):63-75.

https://doi.org/10.1016/j.cuor.2003.10.002

3. Wagdy-Mahmoud S, Megahed A-H, El-Sheshtawy O. Repair of the calcaneal tendon. An improved technique. The Journal of bone and joint surgery British volume. 1992;74(1):114-7.

https://doi.org/10.1302/0301-620X.74B1.1732237

PMid:1732237

4. Bosworth DM. Repair of defects in the tendo achillis. The Journal of bone and joint surgery American volume. 1956;38-A 1:111-4.

https://doi.org/10.2106/00004623-195638010-00011

5. Campbell WC, Canale ST, Beaty JH. Campbell's Operative Orthopaedics: Mosby/Elsevier; 2017;chap-48, pp.2422-2423.

6. Ahmed SU, Hasan MH, Haque MA, Haque ME, Imam Z. Evaluation of the Result of Surgical Repair of Open Achilles Tendon Injuries by Pulling Down of The Proximal Tendon. TAJ: Journal of Teachers Association. 2021; 34(2):15-23.

https://doi.org/10.3329/taj.v34i2.58551

7. Rayhan F, Rezwan M, Sarker M. Evaluation of the result of early repair of open tendo achilles injury. MOJ Orthop Rheumatol.2022; 14(1):24-7.

https://doi.org/10.15406/mojor.2022.14.00572

8. Bishop ME, Comer CD, Kane JM, Maltenfort MG, Raikin SM. Open repair of acute Achilles tendon ruptures: is the incidence of clinically significant wound complications overestimated?Foot & Ankle Orthopaedics. 2017 ;(2):1-6.

https://doi.org/10.1177/2473011417699834

9. De Oliveira RL, Martins JS, Silva PH. Minimally invasive repair of acute Achilles tendon injury: description of technique and evaluation of outcomes. Journal of the Foot & Ankle. 2020;14(1):62-7.

https://doi.org/10.30795/jfootankle.2020.v14.1169

10. 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.

https://doi.org/10.4103/1597-1112.139455