

Evaluation of the outcome of primary repair of open Tendo Achilles injury due to fall in the toilet pan

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ABSTRACT:

Introduction: Tendo Achilles injury causes a disabling condition with failure to push-off, resulting in difficulty in walking, the inability of running and sports activities. Tendo Achilles injury requires immediate treatment; if treatment is delayed there appears a gap or defect between the two ends of the injured tendon, due to contracture of the calf muscles. Primary repair prevents gaping, hastens the healing and obviates the necessity of reinforcement of repair. **Objective:** The aim of this study was to determine the functional outcome of primary surgical repair as a better method of treatment for open Tendo Achilles injury caused by fall in toilet pan in Bangladesh. **Methods:** This prospective study was done in NITOR during the period of July 2006 to June 2008, including 32 patients. **Results:** Median age of the patient was 31.5 years. The injury repaired early (median interval 5 hours 15 minutes) and followed up for 4 months to 14 months (median 7.5 m) and evaluated according to modified Juhana scoring method. Outcomes were excellent in 13 cases (40.63%), good in 15 cases (46.88%), fair in 3 cases (9.37%), and poor in 1 case (3.12%). In this series no major complication was found, all complications were minor. **Conclusion:** Primary repair of the open Tendo Achilles injury may be the best method of treatment due to satisfactory healing, excellent outcome to be obtained by early mobilization and vigorous physiotherapy and patients can return to their pre-injury activities.

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INTRODUCTION:

Tendo Achilles is the thickest and strongest tendon in the human body. It is a powerful plantar flexor of the foot. It is very much important in walking, running and jumping. It is also known as Tendo Calcaneus.

In this Tendo Achilles injury, a gap between the cut or ruptured ends of the tendon appears soon. Delay in diagnosis and treatment, laceration followed by infection, fraying of ends, contracture of the calf muscles contributes to gaping of the cut ends.

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It has long been conceded that repair of defects in the Tendo Achilles by replacement with fibrous tissue is unsatisfactory. Delayed repair or repair of old defects presents an entirely different problem. Actually, calf muscles contracture develops very rapidly, causing difficulty in regaining cooptation of the ends.

Most of the literature described repair and result of closed rupture of the Tendo Achilles. Only a few cases are found caused by road traffic accidents and agricultural accident. In our country, most of the people use flat toilet pan which is at the same level as the floor. People slip and fall into the toilet pan and cause open injury to the Tendo Achilles; these patients with Tendo Achilles injury caused by broken toilet pan attend commonly (60% of total Tendo Achilles injury) in our hospital for early treatment.¹ Western people use commode; such injury is not possible there.

The traditional view was stated by Quenu and Stoianovitch in 1929, compared the results of conservative and operative treatment and stated that "Rupture of the Achilles tendon should be operated on and operated on without delay".² Inglis et al, also confirm the superiority of surgical treatment.³ The main argument against surgical treatment is the high incidence of wound complications.⁴

Methods of treatment include an end to end suture, use of fascia lata graft, peroneus brevis tendon reinforcement, Strips of fascia, a v-y tendinous flap, Plantaris tendon graft and strip of gastrocnemius tendon turned down from the proximal stump.^{5,6,7,8}

This study presents the evaluation of the outcome of primary repair of open tendo Achilles injury caused by broken toilet pan using a scoring method after Juhana et al (modified).⁹

METHODS AND MATERIALS:

This quasi-experimental study was done in National Institute of Traumatology and Orthopedic Rehabilitation (NITOR), Dhaka, from July 2006 to June 2008. All patients presented with tendo-achilles injury due to fall in the toilet pan were included as the study population. A total of 32 cases were enrolled by non-random probability sampling technique. Patients were followed up for four months to fourteen months. Inclusion criteria were, 18 to 60 years of ages of both sexes with a history of Achilles tendon injury within 24 hours and the injury was caused by slipping in the toilet pan. Patients over 60 years and below 18 years, closed rupture of tendon, more than one-day-old open injury, injury caused by other than toilet pan, with associated muscle (gastrocnemius / soleus / tibialis posterior) and tibial nerve injury, were excluded.

After a detailed history and proper examinations, forty cases were included in the study. Eight cases were lost during follow up and were discarded from the study. The follow-up period ranges from 4 months to 14 months. All patients (32 cases) were selected, admitted and operated in NITOR of Bangladesh. Culture sensitivity of wound swab was done in every case pre-operatively.

Methods of repair:

All operations were done under regional or general anaesthesia. After giving regional anaesthesia patients are positioned prone and a tourniquet is used. Plantar flexion of foot and flexion of the knee were done by using sand bag or pillow to minimize the tension of the injured site. After painting with antiseptic lotion, the operation field was draped. Surgical toileting of the wound was done. The wound was extended upward and downward from the previous lacerated or cut margin usually on the posteromedial aspect of the tendon. The incision was done sharply through the skin, subcutaneous tissue, and tendon sheath. Thorough debridement of the wound was done with povidone iodine, Hexiscrub and normal saline. Then tendon sheath was reflected with the subcutaneous tissue. Threaded margins of the tendon were trimmed. Approximation of the cut ends of the cleaned tendon with no-1, non-absorbable monofilament (proline) tension suture, using a modified Kessler suture through the stump, 2-2.5 cm from the cut margin and circular absorbable suture. Paratenon was repaired as much as possible. Closure of the fascial sheath and subcutaneous tissues were done with 4/0 absorbable (vicryl) suture materials. Skin was closed with 2/0 silk or proline and sterile dressing was applied.

Post operative care:

1. Post operative antibiotic (ceftriaxone) was given for 2 days. Then oral Cephalosporine (Cefixime 200mg 12

hourly) was continued for another 7-10 days.

2. Proper analgesics were given initially intramuscular then oral.
3. The operative limb was kept elevated.
4. The operative limb was immobilized by plaster cast.
5. Toe movement, isometric quadriceps exercise were started immediately postoperatively.
6. Patients were discharged when they could manage crutch walking by themselves.
7. All patients were requested to come to the hospital for follow-up regularly.
8. The patient was requested to contact if any problem arises.

Follow up :

Five follow up visits were done within 14th to 16th week. On the fifth visit (15-16th week), assessment of the functional improvement was done clinically and patient were advised to walk without aid of the stick. Subsequent visits were advised at 3 months' interval till the satisfactory functional improvement of the injured leg was achieved or a final follow up was done. Jumping, running or lifting heavy weight were allowed after 6 months of injury. At final follow up, outcomes were evaluated according to modified scoring method of Juhana.⁹

RESULTS:

This prospective study was carried out in NITOR from July 2006 to June 2008. Thirty-two patients with open Tendo Achilles injury, caused by a fall in toilet pan, were included. Primary repair was done. The

patients were evaluated to find out the age & sex incidence, level of injury, result of the repaired tendon and to propose a suitable protocol for treating such cases.

Patients were included in the study ranging from 18 to 60 years.

1. 18 – 30 yrs. 21 patients (65.62%)
2. 31 – 45 yrs. 5 patients (15.63%)
3. 46 – 60 yrs. 6 patients (18.75%)

Male patients were common (91%). In this series, the median level of cut was 3.0 cm, ranging from 2 cm to 6 cm. Most of the cases were operated within 6 hours of injury (84.38%) and median duration of stay in the hospital was 8 hours only. Patients were followed up routinely.

Level of cut: (1) At 2-3 cm, 16 cases. (2) At 3-4 cm, 13 cases. (3) Over > 4 cm, 3 cases.

Time of Repair: (1) Within 6 hours–27 cases (84.38%). (2) Beyond 6 hours–5 cases (15.62%). Median delay of the repair was 5 hours 15 minutes.

Plaster immobilization: Operated limbs were immobilized by plaster cast with the ankle in gravity equines. 17 patients were immobilized by long leg cast with knee flexion and 15 patients were immobilized in below-knee cast with ankle in equines position. All long leg casts were removed after 2 weeks and the below-knee cast was applied.

Hospital Stay: (1) Hospital stay 6-8 hours–17 cases, (2) Hospital stay 9-12 hours–12

cases, (3) Hospital stay >12 hours–3 cases; median stay 8 hours.

Follow up period: (1) Follow up 4-6 months–13 cases. (2) Follow up 7-9 months–14 cases. (3) Follow up 10-14 months–5 cases.

Persistence of pain: There was no pain in 22 cases (68.75%), mild pain with no limitation of recreational activities in 8 cases (25%) and moderate pain with limited recreational activities were in 2 cases (6.25), assessed at 16th weeks.

Stiffness: None in 10 cases (31.25%), Mild in 21 cases (65.63%), Moderate in 1 case (3.12%).

Power of plantar flexion (BMRC scale): Power 5 in 15 cases (46.88%), Power 4 in 14 cases (43.75%), Power 3 in 3 cases (9.37%).

Active Range of Motion: A full range of motion was regained in 20 cases. A change of 5 degrees or more was found in 11 patients. In 1 case more than 10-degree movement was restricted.

Calf muscle wasting: Up to 3% in 20 cases (62.50%), 4-5.9% in 11 cases (34.38%), 6-9.99% in 1 case (3.12%), in comparison to the non-injured side.

Complications: In this series no major complication was found. Complications were all minor, such as, mild wound infection occurred in 5 cases, swelling of the ankle occurred in 8 cases, bad scar occurred in 5 cases sensory disturbance in 3 cases, skin sloughed out in 1 case, delayed healing

occurred in 2 cases and suture granuloma occurred in 1 case.

The final outcome: According to a new scoring method (modified scoring scale of Juhana et al)⁹ both subjective & objective functional outcome was assessed as follows.

Table - I: Distribution of final outcome

| Grade | No of cases | Percentage |
|-----------|-------------|------------|
| Excellent | 13 | 40.63% |
| Good | 15 | 46.88% |
| Fair | 3 | 9.37% |
| Poor | 1 | 3.12% |
| Total | 32 | 100% |

Satisfactory = Excellent + Good

$$40.63 + 46.88 = 87.51\%$$

Unsatisfactory = Fair + Poor

$$3.12 + 9.37 = 12.49\%$$

DISCUSSION:

In our country, open Tendo Achilles injury is common, most of which are caused by broken toilet pan.¹ A few number of studies are reported on cases of laceration of Tendo Achilles.^{5,8,10,11}

Most literature published worked on the closed rupture of Tendo Achilles. Commonest cause was degeneration of the tendon and sports injury.^{8,10,11,12} No literature was available that reports Tendo Achilles injury by broken toilet pan.

In this series, age distribution ranges from 18 to 60 years, most patients were young adults (18-30 years, 85.02%). Males were the common sufferer (90%), with left side predominance (53%).

In all patients, the tendons were repaired by simple end to end cooptation by modified kessler stitch suture. Paretenons were repaired as much as possible. 27 patients (84.38%) were treated within 6 hours of injury. Immobilization of the operated ankle was maintained for 6 weeks, followed by gradually increasing physiotherapy and weight-bearing.

In this study, a new clinical scoring system was followed after Juhana et al.⁹ This scoring system is a standardized protocol for evaluation of Achilles Tendon ruptures and consists of seven parameters for assessment of subjective symptoms, clinical evaluation of ankle ranges of motion and measurements of plantar flexion strength measured by BMRC scale instead of isokinetic measurements.

The pain was not a common problem but mild morning stiffness and stiffness after recreational activities were more common.

Any change in the range of motion of the ankle indicated tendon shortening or lengthening.^{12,15} Our patients had some loss of dorsiflexion, due to shortening of the tendon, but this did not have any effect on function. Some shortening may make plantar flexion more powerful. No changes of range of motion were seen in 20 cases (62.5%), mildly limited dorsiflexion in 11

(34.38%), which is comparable to previous studies.^{16,17,18}

Reduction of calf circumference is usual, even many years after rupture.¹⁶ In this series, calf muscle wasting was seen mild in 11 (34.38%), moderate in 1 (3.12%) cases and none in 20 (62.50%) cases.

This strength results comparable with those of other studies. In the literature review by Cetti et al. the mean plantar flexion strength after operative treatments was 87.3%.¹⁹ In our study power of plantar flexion was normal in 15 cases and near normal in 14 cases (90%).

The major problem of surgical treatment has a high rate of surgical complications. In the review of Cetti et al, the complication rate for surgical treatment was 11.8% whereas for non surgical treatment was 18.1%.¹⁹ The mean re-rupture frequency of surgical patients was 1.4% and that of non-surgically treated patients was 13.4%, whereas the mean re-rupture true rate in the Juhana series was 3.7%.^{9,19} In our study there was no re-rupture. There were only some minor complications like swelling which caused some restriction of footwear.

CONCLUSION:

From the study, it may be concluded that primary repair of the open Tendo Achilles injury may be followed as the best method of treatment as the outcome of primary repair of Tendo Achilles injury is satisfactory, by early mobilization and vigorous physiotherapy excellent outcome can be obtained and most of the patients can

return to their pre-injury activities in short time.

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