

MANAGEMENT OF OPEN ACHILLES TENDON INJURY: PRIMARY REPAIR AND EARLY MOBILIZATION

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ABSTRACT

Background: Achilles tendon injuries have progressive increase worldwide in the last few decades. This is attributable to increase in both competitive and recreational sports. In most of the literature written on Achilles tendon injuries there were rarely any information about open Achilles tendon lacerations. In fact, Achilles tendon injuries were erroneously equated to Achilles tendon ruptures and subsequently the management.

Objective: To show that primary repair of open Achilles tendon lacerations (or incisions) and early post-operative mobilization in carefully selected patients may give excellent results.

Methods: This was a prospective study that took place at the Plastic Surgery Unit of Irrua Specialist Teaching Hospital, Edo State, Nigeria over a period of 5 years. There were 52 cases of open Achilles tendon injuries that presented but only 12 of them, with lacerations or incisions, had primary repair and early post-operative mobilization. The study was between February 2010 and January 2015. The exclusion criteria included: (i) Achilles tendon injuries like avulsions and crush injuries; (ii) Patients that presented later than six hours of injury; (iii) Patients who had other system injuries or co-morbidity. The following data were collected which include biodata, side involved, the aetiology and complications and then analyzed.

Results: There were 12 cases that fit into this study. There were 5 males (41.7%) and 7 females (58.3%) with male: female ratio of about 2.5:1. The average age was 37.6 years (range 6-60 years). Forty one point seven percent of them were within the paediatric age group of 0-15 years while the rest were adults. The most common aetiology was motorbike spoke. Nine (75%) of the injuries were on the left side. Two patients had infection which resolved with oral antibiotics.

Conclusion: Literature on open Achilles tendon injuries are sparse, however it is an important subset of Achilles tendon injuries. Primary repair and early post-operative mobilization in open uncomplicated Achilles tendon lacerations or incisions gives excellent results.

Key words: Open, Achilles tendon, Lacerations, Primary repair, Complications

INTRODUCTION

Achilles tendon injuries have increased progressively in the last few decades. This is due to increase in competitive and recreational sports. However, the incidence of open Achilles tendon injuries has not been documented. In fact, in literature open Achilles tendon injuries are almost synonymous to Achilles tendon rupture or tendonitis. So also, the management provided having been tailored along the same line. We are of the opinion that this topic should be separated from the tendon rupture or tendonitis because the pathogenesis is different. Therefore the management protocols should be similar to open post-traumatic tendon injuries elsewhere in the body.

Tendons are elastic structures in the body that have properties to stretch and recoil. In patients with tendon rupture the elasticity of the tendon is lost due to overuse and then snaps, when this tendon had gone past the elastic limit. Patients with open lacerations or incisions, have otherwise normal tendons with intact elastic properties. The fibers were just severed with

sharp objects such as broken bottles, broken toilet seats, machete, motorbike spoke etc. We present the management of 12 cases of open Achilles tendon injuries, who had simple primary repairs and early post-operative mobilization.

MATERIALS AND METHODS

This was a prospective study of 12 cases of open Achilles tendon injuries that presented to the Plastic Surgery Unit, of the Department of Surgery, Irrua Specialist Teaching Hospital Irrua Edo State Nigeria between February 2010 and January 2015. The hospital is one of the teaching hospitals situated in a sub-urban community in Southern Nigeria. It is located along the busy Benin-Abuja expressway (one of the commercial nerve routes of the country). This made it very easy to access. These patients were carefully selected with the exclusion criteria: a) Patients who had crush injury or avulsion to the Achilles tendon; b) Patients who presented later than six hours after the injury and those whose injury had been contaminated with traditional

medicine; c) Those who could not have immediate primary repair due to other injuries or co-morbidity.

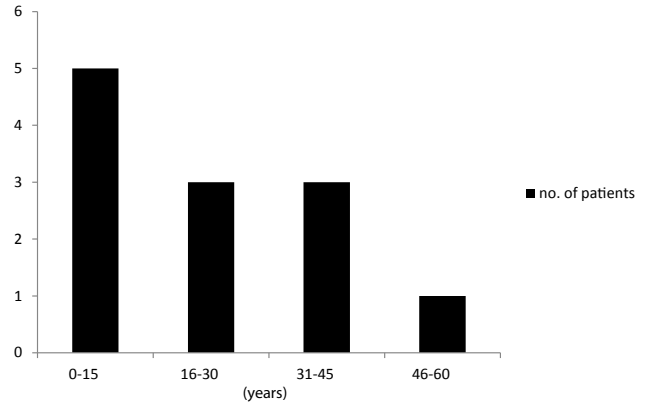
The data obtained from the patients includes age, gender, aetiology of the injury, type of injury, duration of the injury and side involved. These were analyzed using the SPSS version 16 (SPSS, Chicago). Wounds were located 1–5 cm proximal to tendon attachment on calcaneum tuberosity. Standard treatment principles were applied. This included thorough irrigation and commencement of intravenous antibiotics in the emergency room. Surgical debridement and repair of the tendon was done within 24 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 modified Kessler’s core suture technique and continuous peripheral sutures. Patients were kept in the hospital 1–3 days. Postoperatively, below knee Plaster of Paris cast were applied, with the ankle in Plantigrade position. 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 3- 4 weeks followed by gradual weight bearing and range of motion exercises. Outpatients follow up was done in 1–2 weeks. Further follow-up visits 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 clinic. None of the cases needed a second procedure. Two of the patients had Grade 2 post-operative wound infection and were treated with antibiotics following sensitivity tests. The study had limitation of the small sample size.

RESULTS

There were 52 cases of open Achilles tendon injuries that presented to the unit during the period of the study, but only 12 (34.3%) were appropriate for the study.

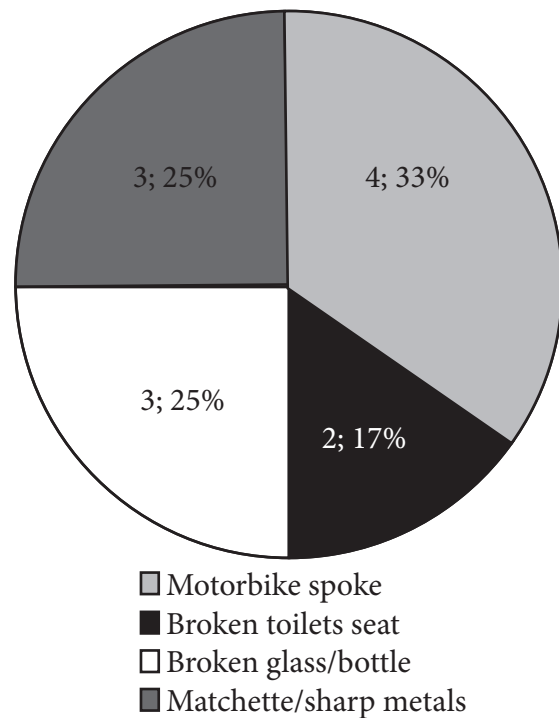
The ages of the patients ranged from 6 years to 56 years. The mean, median and modal age was 23, 24 and 34 years respectively, with a standard deviation of 13.58. The youngest was a male child who had his left leg trapped in a motorbike spoke while being carried to school on the same motorbike while the oldest was a male retired civil servant who had an incision close to his heel from a broken bottle when walking around his compound. Forty one point seven percent were children, n=5 (Figure 1). Forty one point seven percent of the patients were male while the rest were females. The male: female ratio was 1:1.4.

Figure 1
Age of the patients



In this study, motorbike spoke had the highest incidence of 4 (33.3%), then broken bottle 3 (25%), broken toilet seats 2 (16.7%) and machete cuts 3(25%). The data of the patients is as shown in the Figure 2.

Figure 2
The causes of the laceration



Thirty three point three percent of the patients had incision while the remaining had lacerations. Three (25%) had partial transection of the tendon and the rest were complete transection.

All the patients in this study presented within the first 6 hours of the injury which made simple primary repair possible without any fear of serious infections which could lead to possible disruption and dehiscence (Figures 3-8). There was slight left side preponderance in this study accounting for 58.3%.

Figure 3
Wound at presentation



Figure 6
After the closure of paratenon



Figure 4
Exposing the lacerated tendon



Figure 7
Closure of the skin



Figure 5
Putting the core sutures



Figure 8
Application of boot cast



DISCUSSION

Open Achilles tendon lacerations is common in our environment. This has also been reported in India which are due to break in the porcelain lavatories (1-3). These are usually heavily contaminated wounds, which needed secondary closure. The causes of the injuries in our study include motorbike spokes, broken bottles, sharp metals which has been mentioned in previous studies (3,4). The patients in this study are those with clean wounds or clean contaminated wounds of the Achilles tendon. These wounds were closed primarily at the operating room.

In these carefully selected patients who are non-athletes, the structure and the physiology of the tendon are considered to be normal before the laceration or transection of the tendon. Also there was no significant loss in the length because these patients were those without or with minimal crush component. In fact most of the patients walked or were assisted into the emergency room with pain and wound usually transverse in orientation on the distal half of the surface anatomy of the Achilles tendon. Wound exploration reveals partial or complete transection of the tendon. The proximal part of the injured tendon usually retracts proximally away from the wound while the distal part is almost always in the wound. The wound is extended proximally and distally raising two inter-digitating cutaneous flaps that will close in a form of Z-plasty.

The proximal part of the tendon is identified and pulled down and sutured to the distal part using the modified Kessler's core suture technique and continuous peripheral sutures to re-establish continuity (5). The wounds were closed in Z-plasty to prevent contracture and a below knee boot cast is applied in a plantigrade position in order to facilitate mobilization. The patients are usually admitted for 2 days following which the window is created to have access to the wound for dressing.

These patients were discharged on non-weight bearing crutches for the first 4 weeks. Then weight bearing crutches on the next 2 weeks. About 6 weeks following the repair the boot cast is removed in the clinic and the patient walk home unaided without any significant complication (6 7).

Two of the patients developed post-operative wound infection at 10th and 14th day. These were treated with oral antibiotics for two weeks and resolved completely without any complication. Eight of the patients demonstrated calf muscle atrophy with an average calf circumference loss of 1.0cm. All the patients can do single heel raise without any pain along the tendon. These patients were followed up for the next 12 months

without any complication i.e. infection, pain from trapped sural nerve or equinus deformity. Due to the ease of mobilization of these patients and the shortness of the period of immobilization, most of our patients needed short or no passive physiotherapy.

This study shows that patients with this type of injury could actually be effectively managed with this protocol with optimal outcome. There is no need for these patients to be immobilized for a period of 12 weeks as applicable to Achilles tendon rupture, where there is need for the tendon to regain elasticity and strength. Also most of the patients with tendon rupture are athletes who are most likely to return to the sport that led to the injury.

This protocol has been used in the carefully selected patients, who have no significant loss of length, no, or minimal crush component and minimal contamination and presented in the first six hours of the injury. Other patients who did not fit into these inclusion criteria were managed the conventional way with delayed or secondary repair and closure, immobilization for 12 weeks with ankle in plantar flexion.

CONCLUSIONS

Though the literature concerning open Achilles tendon injuries are sparse, simple non-complicated open Achilles tendon lacerations (or incisions) can be managed with primary repair and early post-operative mobilization when they present early. These patients do not need to be immobilized for a long time with its attendant challenges. The hospital bill and the economic loss of the patient is remarkably reduced.

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