

Management of Closed Tendoachilles Rupture- A Case Series

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ABSTRACT

Tendoachilles is the most commonly ruptured tendon of lower limb. Forced eccentric loading on plantar flexed foot is the common cause for the rupture. Even though the frequency of this tendon rupture is high, the mode of treatment is still debatable. Here the authors describe case series of operative management of closed acute tendoachilles ruptures. Eleven cases are hereby presented who underwent this technique of surgery from January 2018 to December 2020. Mean age of patients was 36.54 years. All patients were operated electively under spinal anaesthesia. Postoperative period was uneventful with no complications observed. Physiotherapy was started after removal of cast and independent full weight bearing walking was observed between 8th to 11th postoperative weeks. This is a simple technique of repair of ruptured tendoachilles. Meticulous dissection is the requirement to avoid wound complication. Planned immobilisation followed by physiotherapy helps in early recovery of the patient.

Keywords: Acute closed ruptures, Modified Kessler's technique, Open surgical technique

INTRODUCTION

Tendoachilles tendon is the strongest and largest tendon in the body. Recently, there is a sharp rise in overall incidence of tendoachilles rupture [1,2]. This is mainly due to aging of the population, increase in the prevalence of obesity and inclination in participation of sports [3]. The most frequent mechanism of tendoachilles injury is forced eccentric loading of a plantar flexed foot, but may also occur as a result of direct trauma or as the end result of achilles paratenonitis with or without tendinosis. Most of the tendoachilles tears occur in the substance of the tendon, approximately two to six cm above the calcaneal insertion [4-7].

Ambroise Pare described the treatment of ruptured tendoachilles in 1575 by taping and cast application [8]. Although the frequency of rupture of achilles tendon is high and there is long history of its treatment, the best mode of treatment is debatable.

In the early 20th century, non operative management of ruptured achilles tendon was widely accepted. However, with increase in functional demands of patients and improved surgical techniques operative management has become more popular treatment method.

CASE SERIES

This case series includes 11 patients diagnosed of closed tendoachilles rupture who were treated over a period of three years from January 2018 to December 2020. Cases with isolated closed tendoachilles ruptures were included. Open tendoachilles injuries and cases with associated other injuries were excluded.

All the cases were operated by single surgeon at same centre. Data collected from the hospital records included patient details like age, sex, occupation, aetiology of rupture of tendoachilles and presence of any other co-morbidities. History of the patient and clinical findings were noted. All the patients had positive Thompson's test [4]. X-ray of the involved leg was performed to look for avulsion of the tendon from its insertion which might result in calcaneum fracture. Preoperatively, a single dose of injection cefotaxime was administered. An above knee fibre glass cast was applied for three weeks which was later revised to below knee and was retained for another three weeks. Cast was removed after six weeks and patient was subjected to physiotherapy. Patients were followed-up for a minimum duration of six months to maximum of two years.

Surgical technique: All patients were operated under spinal anaesthesia in prone position. Skin of the affected leg was prepared and under pneumatic tourniquet control a lazy S incision was made on the medial border of tendoachilles [Table/Fig-1]. Dissection was performed under loupe magnification and cut ends of the tendons were visualised [Table/Fig-2]. Care was taken not to damage the paratenon on the tendon. No tendon lengthening procedures were carried in any of the cases as the gap between the cut ends was minimal.

The cut ends of the tendoachilles was repaired by employing four strands Strickland's modification of Kessler's repair using number 2 polyethylene terephthalate and the paratenon was sutured using number 3-0 polypropylene in a circumferential way [Table/Fig-3]. Haemostasis was achieved and the incision was closed in two layers [Table/Fig-4]. Wound dressings performed and elastocrepe bandage was applied. This was followed with fibre-glass above knee cast application immobilising ankle at around 20° plantar flexion and knee at around 45° flexion. Patient was discharged on postoperative day two. Patient was asked to mobilise with assistance with no weight bearing on the operated limb. Partial weight bearing was allowed after removal of the fibre glass cast with assistance for one week followed by independent walking with complete weight bearing.



[Table/Fig-1]: Marking of lazy 'S' incision on the medial border of tendoachilles.
[Table/Fig-2]: Cut ends of tendoachilles. (Images from left to right)



[Table/Fig-3]: Tendoachilles repair by Strickland's modification of Kessler's repair.
[Table/Fig-4]: Closure in two layers. (Images from left to right)

In the present case series, 11 patients underwent open surgical correction of tendoachilles in a period of three years. Majority of the study population constituted of males, n=9 (81.82%) compared to females, n=2 (18.18%). Age of the patients ranged from 18 to 60 years with mean age of 36.54±16.81 years. Side of injury was on left side in six (54.54%) patients and on right side in five (45.45%) patients. Aetiology of tendon rupture in all cases was due to increased physical exertion [Table/Fig-5,6]. Immediate postoperative period was uneventful. No local complications at the operated site in the form of wound infection, wound dehiscence, skin necrosis, re-rupture of sutured tendoachilles was found. Physiotherapy was started after removal of cast on the 7th postoperative week. Independent full weight bearing walking was performed by patients between 8th to 10th postoperative week. Single heel raise test was observed in the operated limb in all patients [Table/Fig-7] [9]. Postoperative images shown in [Table/Fig-8,9].

Variable	Frequency
Age (in years)	
18 to 24	4
25 to 44	3
45 to 60	4
Gender	
Male	9
Female	2
Occupation	
Student	4
Homemaker	2
Manual labour	2
Others	3
Aetiology	
Sports activity	5
Slip and fall	4
Fall from height	2
Presence of co-morbidity	
Diabetes mellitus	1
Hypertension	1

[Table/Fig-5]: Demographic profile.

DISCUSSION

The tendoachilles is formed by the tendons of gastrocnemius and soleus and is the thickest and strongest tendon in the human body [10]. Acute rupture of tendoachilles is a common sports injury, accounting for 35% of all tendon injuries [11]. The mechanisms of injury are sudden forced plantar flexion of the foot, unexpected dorsiflexion of the foot and violent dorsiflexion of a plantar flexed foot [12]. The prevalence is approximately 18 per 100,000 per year [13].

Ambroise Pare described the tendoachilles injuries in 1575 [8]. This was followed by Petit and John Hunter. Polaillon performed the first open repair of ruptured tendoachilles in 1888. The major series of Achilles tendon injuries was reported for the first time in 1929 [14]. Surgical treatment was well popularised in 1920s, however equally good results were obtained in conservative management [15,16]. Current advancements made in surgical technique have made non operative methods unjustifiable. The trend present now favours surgical repair of tendoachilles and early supervised weight bearing [17].

Aetiological factors of acute rupture of tendoachilles are many, but exact pathology is undefined. It has been observed that rupture rates are more common in previously abnormal tendons [12,18], people with mechanical abnormalities of foot [19], adverse drug reactions [20,21] and because of exercise induced hyperthermia [22]. Diagnosis of acute rupture of tendoachilles is clinical and is the favoured method. Clinical diagnosis may be aided by ultrasound and magnetic resonance imaging [23].

Treatment of acute rupture of tendoachilles is debatable. Recent literatures have favoured surgical treatment for an acute rupture as it minimises the risk of re-rupture and have better functional outcome [24,25]. Wound infection leading to wound dehiscence and skin necrosis is one of the main complications encountered in open surgical repair of tendoachilles. Infection and wound problems mostly occur following surgical repair with an incidence of 12.5% [26,27]. In the present series, authors noticed no infection at the wound site. Rettig AC et al., in a series of 89 open repairs, reported 4% wound infection rate [28]. Cetti R et al., found wound infection in two cases out of 111 cases operated by open technique in a level I prospective study [29]. Skin healing complication rate was 14.6% in a quantitative review done by Wong J et al., [30].

Case no.	Age (years)/Sex	Patients history	Clinical findings	Test performed	Diagnosis	Management/Treatment done	Follow-up details
1	18/M	While running in a marathon developed sudden sharp pain in the right ankle.	Inspection- Depression in the tendoachilles area, contused skin over the tendoachilles Palpation- Cut ends of tendoachilles in closed injury Movements- Active plantar flexion- painful and restricted	Positive Thompson test	Closed rupture of tendoachilles on right side.	Exploration and surgical repair of ruptured tendoachilles employing Strickland's modification of Kessler's repair.	Immediate postoperative period was uneventful. Physiotherapy initiated following cast removal after six weeks. Followed-up once in two months for 12 months.
2	56/F	Slip and fall, complains of difficulty in walking.	Inspection- Depression in the tendoachilles area. Palpation- Tenderness Movements- Active plantar flexion- not possible	Positive Thompson test	Closed rupture of tendoachilles on right side.	Exploration and surgical repair of ruptured tendoachilles employing Strickland's modification of Kessler's repair.	Immediate postoperative period was uneventful. Physiotherapy initiated following cast removal after six weeks. Followed-up once in two months for 18 months.
3	25/M	Slip and fall, complains of pain in right ankle.	Inspection- Depression in the tendoachilles area. Palpation- Tenderness Movements- Active plantar flexion- not possible	Positive Thompson test	Closed rupture of tendoachilles on right side.	Exploration and surgical repair of ruptured tendoachilles employing Strickland's modification of Kessler's repair.	Immediate postoperative period- uneventful. Physiotherapy initiated following cast removal after six weeks. Followed-up upto 24 months.
4	60/M	Fall from height	Inspection- Depression in the tendoachilles area. Palpation- Tenderness Movements- Active plantar flexion- not possible	Positive Thompson test	Closed rupture of tendoachilles on left side.	Exploration and surgical repair of ruptured tendoachilles employing Strickland's modification of Kessler's repair.	Immediate postoperative period was uneventful. Physiotherapy initiated following cast removal after six weeks. Followed-up once in a month for 16 months.

5	50/F	Slip and fall, complains of difficulty in climbing downstairs	Inspection- Loss of contour in tendoachilles area. Palpation- Tenderness Movements- Active plantar flexion- not possible	Positive Thompson test	Closed rupture of tendoachilles on left side.	Exploration and surgical repair of ruptured tendoachilles employing Strickland's modification of Kessler's repair.	Immediate postoperative period was uneventful. Physiotherapy initiated following cast removal after six weeks. Followed-up once in two months for 12 months.
6	23/M	Following sports activity complains of acute pain in the left ankle.	Inspection- Depression in the tendoachilles area Palpation- Cut ends of tendoachilles in closed injury Movements- Active plantar flexion- painful and restricted	Positive Thompson test	Closed rupture of tendoachilles on left side.	Exploration and surgical repair of ruptured tendoachilles employing Strickland's modification of Kessler's repair.	Immediate postoperative period was uneventful. Physiotherapy initiated following cast removal after six weeks. Followed-up once in two months for 17 months.
7	60/M	Slip and fall	Inspection- Loss of contour in tendoachilles area. Palpation- Tenderness Movements- Active plantar flexion- not possible	Positive Thompson test	Closed rupture of tendoachilles on left side.	Exploration and surgical repair of ruptured tendoachilles employing Strickland's modification of Kessler's repair.	Immediate postoperative period was uneventful. Physiotherapy initiated following cast removal after six weeks. Followed-up once in two months for 12 months.
8	30/M	Fall from height, complains of difficulty in walking.	Inspection- Depression in the tendoachilles area Palpation- Cut ends of tendoachilles in closed injury Movements- Active plantar flexion- painful and restricted	Positive Thompson test	Closed rupture of tendoachilles on left side.	Exploration and surgical repair of ruptured tendoachilles employing Strickland's modification of Kessler's repair.	Immediate postoperative period was uneventful. Physiotherapy initiated following cast removal after six weeks. Followed-up for 24 months.
9	24/M	Following sports activity, complains of difficulty in walking.	Inspection- Depression in the tendoachilles area, Contused skin over the tendoachilles Palpation- Cut ends of tendoachilles in closed injury Movements- Active plantar flexion- painful and restricted	Positive Thompson test	Closed rupture of tendoachilles on right side.	Exploration and surgical repair of ruptured tendoachilles employing Strickland's modification of Kessler's repair.	Immediate postoperative period was uneventful. Physiotherapy initiated following cast removal after six weeks. Followed-up once in two months for eight months.
10	37/M	While playing volleyball, complains of pain in left foot.	Inspection- Loss of contour in tendoachilles area, Contused skin over the tendoachilles. Palpation- Tenderness Movements- Active plantar flexion- not possible	Positive Thompson test	Closed rupture of tendoachilles on left side.	Exploration and surgical repair of ruptured tendoachilles employing Strickland's modification of Kessler's repair.	Immediate postoperative period was uneventful. Physiotherapy initiated following cast removal after six weeks. Followed-up once in two months for 7 months.
11	19/M	During marathon running developed sudden pain and was unable to run further.	Inspection- Depression in the tendoachilles area Palpation- Cut ends of tendoachilles in closed injury Movements- Active plantar flexion- painful and restricted	Positive Thompson test	Closed rupture of tendoachilles on right side.	Exploration and surgical repair of ruptured tendoachilles employing Strickland's modification of Kessler's repair.	Immediate postoperative period was uneventful. Physiotherapy initiated following cast removal after six weeks. Followed-up once in two months for six months.

[[Table/Fig-6]: Summary of 11 case reports.



[[Table/Fig-7]: Heel raise seen in the follow-up period. [[Table/Fig-8]: Postoperative picture during follow-up showing healed wound. (Images from left to right)



[[Table/Fig-9]: Follow-up picture showing plantar flexion.

Tendon re-rupture is found as one of the most important consideration in selecting the surgical method of treating rupture of tendoachilles versus non operative technique. Authors noticed no re-rupture of operated tendoachilles in the follow-up period. Rettig AC et al., in their series reported 4% of re-rupture of tendoachilles [28]. Cetti R et al., have reported 4% of re-rupture in their study [29]. Tendoachilles re-rupture rate of 2.2% was observed in the study by Wong J et al., [30].

CONCLUSION(S)

Open surgical repair is one of the preferred techniques in managing acute rupture of tendoachilles. Proper immobilisation followed by physiotherapy aids in early recovery and independent full weight bearing walking.

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