

ACHILLES TENDON RUPTURE REPAIR IN NORTHERN GHANA

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ABSTRACT

The Achilles tendon (Tendo-Calcaneus) is the largest tendon in the human body. As the number of persons who participate in athletics or sports into their later years increases, so has the incidence of overuse injuries to the Achilles tendon. An Achilles tendon rupture, causes considerable morbidity with reduced leg function following the injury. Various treatment techniques do exist for the treatment of an acute Achilles tendon rupture. However, there is no consensus among orthopaedic surgeons regarding the surgical technique and the post-operative rehabilitation programme. Here in Northern Ghana, to the best of our knowledge, there exist no scientific data on Achilles tendon rupture, its management and rehabilitation protocol. This study seeks to evaluate functional outcome results of patients who had undergone open invasive repair for fresh Achilles tendon rupture followed by early rehabilitation programme, at the Tania Specialist Hospital, Tamale, Ghana.

Method: 20 patients who underwent open invasive repair of Achilles tendon rupture from January 2006 -to- December 2007 in Tania Specialist Orthopaedic Hospital, Tamale, Ghana, were independently reviewed with an average follow-up period of 11 months (range 10-12 ,months). The mean age of patients was 35 (range 20 -50 years). A functional rehabilitation protocol based on early range of motion exercises was used postoperatively. The American Orthopaedic Foot and Ankle Society Score (AOFAS) was used to evaluate the outcomes of the patients. Ankle range of motion and thigh, calf and ankle circumference of both legs were compared each time a patient was reviewed; and also when a patient returned to work or sporting activities were evaluated.

Results: No patient (0%) had a re-rupture ,but one patient(5%) had a superficial wound infection, and another one (5%) had a hypertrophic scar. The mean American orthopaedic foot and ankle society score was 93 (80-100) .All patients returned to work at a mean time period of 7 weeks (range 6-8 weeks) and to pre-injury sporting activities mean time of 3.5 months (range 3- 4 months).Ankle circumference measurements did not reveal any significant difference between the leg sizes.

Conclusion: This study attest to the fact that open invasive Achilles tendon repair and early rehabilitation protocol provides satisfactory results, with early return to previous functional status and few complications risks.

Keywords: Achilles Tendon , Rupture, Open Invasive Surgery, Early Rehabilitation.

INTRODUCTION

The Achilles tendon (tendo-calcaneus) is formed by the union of the two bellies of gastrocnemius muscle with that of the Soleus . In some cases, the Plantaris muscle is inclusive. Their common tendon (Achilles) fuses into the posterior aspect (tuberosity) of the calcaneus bone of the foot.The etiology of acute Achilles tendon rupture is multifactorial and includes bio-mechanical factors and training errors. The incidence of

acute Achilles tendon rupture has increased because of the increased involvement of people in sports, increase number of young obese and overweight people, increased number of diabetes mellitus and cardio-vascular diseases with the highest incidence in men aged 30-50 years[2]. For these youthful and active people, successful treatment is the ability to return to pre-injury sporting activities or normal life as early as possible. To accomplish this, the most appropriate medical care must be provided.

Conservative treatment is generally prescribed for the aged, or patients with poor anaesthetist pre-operative assessment score who are not expected to benefit surgical repair [3,4,5]. However for young active individuals, surgical repair is preferred [6,7,8,9]. Open repair techniques, are usually associated with higher rates of adhesion, local infections, wound healing problems, sural nerve damage and the like [10, 11,12, 15].

An open invasive surgical method provides a satisfactory exposure of the ruptured tendon, without markedly compromising the blood circulation[13].

This study examined the clinical and functional outcomes of open invasive repair of patients with fresh Achilles tendon rupture, and whether this type of repair leads to any functional impairment.

Materials and Methods

20 patients with a mean age of 35 (range 20- 50 years) who were treated for acute Achilles tendon rupture with open invasive repair, between January 2006 -to- December 2007 were evaluated retrospectively. Eighteen (18) {90% } of the patients were males and two (2) {10% } were females. Six (6) {30% } of the patients sustained their injuries during sports (Football) and fourteen (14) {70% } were due to road traffic accidents. Only ruptures that were located 2 - to -6 cm proximal to the calcaneus tuberosity were included in this study. All the repairs were done within 48 hours after the rupture. Patients with pre-existing conditions such as diabetes mellitus, rheumatoid arthritis or patients on medications such as steroids and ciprofloxacin were excluded from this study.

Diagnosis

Diagnosis was done using clinical history, physical examination, Thompson's test, gap palpation test and functional impairment. Additionally investigations done were ankle ultrasonography and radiograph of the ankle and foot, but not MRI (magnetic Resonance Imaging) since none exist in Northern Ghana as at now.

Procedure

Under aseptic environment, preoperatively intra-venous 2 gm Ceftriazone was given just before the skin incision, then a longitudinal medio-posterior incision was made over the tendon rupture site as patient was already put in prone position, following a spinal anaesthesia. Dissection of soft tissues were done to expose the injured tendon and its sheath; then tissue debridement, irrigation of wound and coagulation of bleeding tissue sites; the tendon ends were then pulled together using two(2) separate core sutures of Vicryl-2. Both core sutures were placed centrally in the antero-posterior plane. The transverse limb of the core suture was placed 3 cm from the repair site. Both ends of the core sutures were tied, and the repair was strengthened with a continuous Vicryl-3.0 suture. Finally, the fascia was

repaired with Vicryl – 0 suture. A flat drain was inserted and the skin closed- up with Nylon 1.0 suture. However, when the tendon sheath was intact, the tendon ends were approximated using the same technique; and only one continuous core suture was used and tied to itself at the proximal upper corner of the repair. Following the wound closure , a knee level POP cast was applied with a dressing window. Postoperatively the “RICE”(R=Rest, I=Immobilize, C=cool, E=Elevate) principle was observed for seven(7) to twelve(12) days

Rehabilitation Protocol:

In the first three (3) weeks, the ankle was kept at 25- 30 degrees of plantar flexion. This was increased by 10 degrees every forth-nightly until the 6th week. In between POP angle change, full active plantar flexion of the ankle joint was permitted and encouraged few times, lasting up to 6hours. At the end of the first 6 weeks ,no POP cast was applied again. Partial body weight bearing starting with 15 kg of body weight was permitted, together with physiotherapy (active stretching, isometric and proprioceptive exercises). Patient was permitted to progressively increase body weight bearing over three(3) months period. Ultrasonography evaluation was performed at each follow-up visit; 6 weeks, 3 months, 6 months, 9 months and 1 year.

DISCUSSION

This study presents the functional results of 20 acute Achilles tendon rupture repair cases with a mean AOFAS score of 93. With no re-rupture case reported up to one year postoperatively. This result is comparable to those of [2]. The open invasion surgery preserves, the vascular supply, which potentially enhances the tendon healing at the repair site. The early rehabilitation protocol may have contributed to the prevention of contractures developing around the ankle, making it possible for early recovery and return to previous work places. In a retrospective study of 169 patients, [2], observed sural nerve damage in 7% of the patients treated with open repair method[2].However this study did not record any sural nerve damage. Our ability to carefully identify and protect the sural nerve from damage in this study was therefore commendable. Complications such as skin retraction, subcutaneous nodule, flexor hallucis longus tendon entrapment in the lesion ,were observed by [7], reporting rate such as 8.6 - to - 15%. We reported zero (0%) percent. [14] reported that the time needed to return to sporting activities was nearly three (3) months and to return to work was twenty-two(22) days . This study however reported that, the time to return to sports activities and to work was three (3) to four (4) months with a mean of 3.5 months and six (6) to eight (8) weeks ,giving a mean of 7 weeks respectively. The nutritional status of our patients compared to those of [14] may explain the differences. Immobilizing the ankle with a knee level POP cast with a dressing window at 25 - to- 30 degrees of plantar flexion for three(3) weeks was reported to be adequate for safe tendon healing. We kept our patients in plantar flexion for three (3)weeks, and then increased the range by 10 degrees, two (2)weekly until the 6th week post-opertively, with short intervals of active ankle activity within each six(6) hours during the POP changing time or angle adjustment time.

CONCLUSION

This study confirms that the combined use of open invasive repair of the Achilles tendon, and early rehabilitation techniques is a good enough method, with excellent outcomes and few complications, especially for developing countries.

REFERENCES

- 1) Saltman , Tearse D.C: Achilles tendon injuries ,Am acad. Of orthop .surgeons, 1998
- 2) Assal M. Jung M. Stern R. et al. Limited open repair of Achille s ,tendon rupture; a technique with a new instrument and finding of a prospective multicenter study .J. Bone Surg. Am, vol 84,200, pp 161-170.
- 3) H.Gillies; J Chalmers ;the management of fresh ruptures of the tendo-Achilles. J Bone joint surg, vol 52-A,issue 2, 1970, pp 337-343.
- 4) R.B Lea, L Smith: Non-surgical treatment of tendo-achilles rupture.J Bone joint surg vol. 54-A;issue 7,1972, pp.1398-1407.
- 5)Nistor ; surgical and non –surgical treatment of Achilles tendon rupture; a prospective randomized study; J Bone joint surg , 63-A issue 3, 1981 pp 394-3
- 6) B. T. Esemeli; H. Guundes. M Mecikoglu;A method of combined percutaneous and open surgical repair of Achilles tendon ruptures a report on three cases. Foot –Ankle int.vol.17,1986 , pp 217—220.
- 7) R. J Khan. D Fick, A Keogh, et al. Treatment of acute Achilles, tendon rupture; a meta-analysis of randomized, controlled trials. J bone joint surg .Am vol.87 ,2005,pp .2202-2210.
- 8) T. Movin, A Ryberg, D, J McBride et al;acute rupture of the Achilles tendon;Foot Ankle.clin, vol.10, 2005,pp 331-356
- 9)Y. Yildirim, T. Esemeli; Initial pull-out strength of tendon sutures; an in vitro study in sheep Achilles tendon.Foot-Ankle int,vol .23,issue 12,2002,pp 1126-1130
- 10)C. P chiodo.M.G Wilson;current concepts review;acute ruptures of Achilles tendon;Foot Ankle int,vol 27, 2006,pp 305-313.
- 11) N. Maffulli; rupture of the Achilles tendon. J bone joint surg.vol 81-A issue 7, 1999 ,pp 1019-1036.
- 12) J.Wong, V.Barrass, N. Maffulli; Quantitative review of operative and non-operative management of Achilles
- 13) Rippenstein P.F Jung M. Assal M; surgical repair of acute tendon rupture using a “mini-open technique Foot Ankle clin. Vol.7 2002,pp 611-619
- tendon ruptures. Am .J sports med.vol 30,2002. Pp 565-757
- 14) Calder R.D, Saxby T.S; early active rehabilitation following minimal open repair of Achilles tendon rupture; a prospective study.Br. J. sport med,vol. 39. 2005.pp 857-859.
- 15) A. Molloy, E.V. Wood; foot Ankle clin. 2009 Dec.14 (4);745-759. Post- operative complications following treatment for Achilles tendon rupture including tendon re-rupture, sural nerve morbidity, wound healing problems, change in tendon morphology, Deep Vein Thrombosis, elongation of the complex regional pain syndrome and compartment syndrome
- 16) A.A. Schak, Bistick e t al;a)the optimal rehabilitation protocol after surgical repair of an Achilles rupture has not been well defined. b) early weight- bearing after surgical repair of an acute Achilles tendon rupture improves health related quality of life in the early post-operative period and has no detrimental effect on recovery.
- 17) A. Amendola, J sports med. 2014.Jan;24(1);90-1. The rates of complications of surgery, such as deep infections, non-cosmetic scarring, and sural nerve disturbances are higher in operative than non-operative cases.