

Case Report

Tendoachilles reconstruction by a gastrosoleus turn-down flap: a case report

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Received: 24 September 2021

Accepted: 19 October 2021

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ABSTRACT

Acute and chronic rupture of the Achilles tendon (TA) is a common entity which requires surgery to either bridge the gap or to reinforce the strength of the repair or the tendon. This was done with a turn down flap of the gastrosoleus. Both the above conditions of acute and chronic rupture were usually misdiagnosed and mistreated. Hence, they presented to us late or with complications affecting the gait. Here, we presented a case of acute rupture of the TA presented late in a young female in which the defect was managed with a gastrosoleus aponeurosis turn down flap. Primary repair of acute TA rupture augmented with a gastrosoleus turn down flap provides a good outcome.

Keywords: Tendoachilles, Rupture, Surgical repair, Gastrosoleus turn down flap

INTRODUCTION

Achilles tendon rupture was first described by Ambroise Paré in 1575 and reported in the literature in 1633.¹ There are many procedures to treat this condition as it is the most commonly ruptured tendon of the lower limb but a serious injury.²⁻⁷ Chronic TA rupture is usually defined as the rupture that occurs in 4 to 6 weeks after injury.⁸ They are easily diagnosed clinically and on examination, standing on tip toe on the affected side is not possible and a gap can be palpated between the injured ends. Chronic TA rupture often occurs 2 to 6 cm proximal to the stumps, but it sometimes can also be observed at the stumps.⁸ Magnetic resonance imaging (MRI) has been a imaging tool of choice for diagnosing TA rupture.⁹ The treatment of TA rupture includes conservative management and surgical intervention, but surgical intervention has been the preferred treatment in the late 1980s and 1990s.¹⁰⁻¹³ Non-operative treatment consists of immobilization of the ankle in plantar flexion for 6 and 8 weeks using plaster cast but this results in a lengthened tendon with reduced power of the gastrosoleus muscle

and a high rerupture rate.^{10,12,14-16} The advantages of open repair are that it is convenient for patients who require a short rehabilitation time due to work or sporting activities and also lowers the rerupturing rate to 2-5%.¹⁷ Usually, small gaps of about 2 cm of TA rupture can be directly closed in an end-to-end manner.¹⁸ Augmentation of end-to-end repair has been recommended for acute injury by many with fascia flaps or adjacent tendon.^{13,19-21} Lindholm et al described the method of augmentation that reinforces the repair by two-sided gastrosoleus fascial flaps flipped 180° and thereby prevents adhesion of the repaired tendon to the overlying skin.¹⁹

CASE REPORT

30 year old female presented to us with pain and difficulty in walking since 1 month of the right ankle. She gives history of slipping from the stairs 1 month ago with no external injury following which she had the above mentioned complaints. There was no history of any comorbid illnesses. On examination, the right ankle was unremarkable. There was tenderness of the right TA

region with a gap in the tendon on palpation. The Thomson's test and the tip toe test were positive. A clinical diagnosis of a post traumatic closed rupture of the right TA was made. We planned for exploration and repair of the affected tendon. Under spinal anaesthesia, tourniquet control and in semi-prone position, a lazy S shaped incision was made over the TA region and deepened in layers. A 4 cm defect of right TA was identified with a 3 cm of distal stump (Figure 1). Both the ends were freshened. Primary closure was difficult due to the tension. A gastrosoleus turn over flap was harvested from the mid third of the TA leaving a 2 cm intact tendon at the proximal end (Figure 2). The flap was turned over and inset was given to distal stump with 1-0 polypropylene core suture with 4-0 polypropylene for epitendinous and skin sutures (Figure 3). Dressing was done and a dorsal POP slab was applied with ankle in equinus position. The post-operative period was uneventful.



Figure 1: Defect in the tendoachilles.



Figure 2: Gastrosoleus turn down flap dissected.



Figure 3: Continuity of tendoachilles re-established with a gastrosoleus turn down flap.

DISCUSSION

Acute rupture of the TA was most common in individuals playing a sport especially football. The etiology of the TA rupture remained unclear, but some of the investigations had supported the theory of chronic degenerative changes based on histological examination of material obtained from the ruptured area during surgery.^{22,23} Inglis et al in their study had performed histological examination of acute TA rupture and have found evidence of acute pathological changes like hemorrhage and inflammation rather than chronic tendonitis.¹¹ Also, most of the patients described themselves non-conditioned and began sportive activity without an appropriate stretching exercise when the tendon rupture occurred. They proposed that there was an inhibitor mechanism that regulated the length versus power mechanism of the musculotendinous unit, which limits the tendon length when sudden overloading of the tendon was applied and they suggested that this mechanism was suppressed or activated by physical condition.¹¹ There were many treatment options for Achilles tendon rupture such as non-operative closed methods, open surgical repair or percutaneous sutures. The disadvantages of closed procedures were high rerupture rate and less strength and endurance as compared with open surgical repair.²⁴⁻²⁶ The proper indications for surgical repair appeared to be an active patient who demanded to return to functional status at the earliest day with a short rehabilitation program. Nistor found only minor differences between the results of surgical and non-surgical treatment.²⁴ Simple end-to-end suture was easier to perform and required a less-extensive dissection, but to approximate a poor quality tendon with only end-to-end suture was not safe. Percutaneous suture techniques have been developed to perform end-to-end suture of the TA but the incidence of sural nerve injury and rerupture rate was higher.^{16,27,28} Augmented repairs

provided stronger reconstruction and gave more biomechanical stability to the repair. Central gastrosoleus aponeurosis flap repair was superior to standard Kessler repair by virtue of its strength. Gerdes et al in their series of acute injuries, flap augmented repairs had a better strength than the conventional repair with two interrupted Kessler sutures.²⁹ But, Nyssönen et al in their retrospective study of acute TA rupture, there were no differences in the final outcome between augmented reconstructions and end-to-end suture.³⁰ Earlier, whether non-operative closed methods, open surgical methods or percutaneous procedures were done casting in equinus without weightbearing for a minimum of 6-8 weeks had been widely accepted. The current approach to the rehabilitation of TA rupture surgery was a short period of immobilization and immediate weightbearing because of the complications due to prolonged immobilization such as arthrofibrosis, joint stiffness, calf atrophy, damage of the articular cartilage and deep vein thrombosis.^{31,32} Also, prolonged immobilization, weight-bearing accompanied and prolonged rehabilitation results in a weakened, atrophic, less-vascularized tendon that was prone to reruptures.^{33,34} Early full-weightbearing after surgical repair by protection from overloading may allow newly formed collagen fiber to grow and be remodeled rapidly, ultimately sustaining tendon strength.^{35,36} The major disadvantages of augmented reconstruction were increased rate of wound complication and infection due to the more extensive approach.³⁷ A deep infection after surgical repair of an TA rupture was a relatively rare but causes skin and soft-tissue defects the around ankle. Another problem was enlargement of the posterior site of the ankle. The repaired part of the tendon heals with a bulky tissue that might cause contact ulcers with shoeing and unaesthetic in young women. Zell et al reported no rerupture in their augmented repair series of 25 acute TA rupture.³⁸ However, rerupture was a troublesome complication that was difficult to manage for both the surgeon and the patient. The sural nerve injury can also overshadow the success of the operation even if most of the injuries are transient.^{37,38} In order to prevent this complication, the sural nerve can be protected in the lateral skin flap of the posteromedially placed skin incision. A recent article by Metz et al suggested that non-operative treatment of acute TA ruptured with functional bracing reduces the number of complications compared with surgical treatment of minimally invasive technique.³⁹ Chronic TA ruptured with large gaps may lead to ankle dysfunction as gap was bridged by scar tissue, ankle weakness and gait disturbances may occur due to severely infiltrated fat composition.^{4-7,40,41} Abraham et al first used V-Y advancement flap for treatment for neglected TA rupture.⁴² Ahmad et al mentioned that gaps greater than 6 cm in chronic TA rupture was a big challenge to reconstructive surgeon.⁷ McClelland et al reported that V-Y advancement could achieve satisfactory results in treating chronic TA ruptured measured over 6 cm in length.⁴³ Gastrosoleus fascial turndown flap was also a useful technique in repairing chronic TA ruptured with great defect.

Christensen in 1931 first reported his method in which the defect was filled using a fascial turndown flap sized 2 cm by 10 cm.⁴⁴ Tay et al reported that chronic TA rupture was treated with two turndown flaps and FHL augmentation yielded satisfactory results during two-year follow up.⁴⁵ Hartog used a flexor hallucis longus tendon (FHLT) transfer for all defects over 2 cm.¹⁸ But Park et al deemed that gaps greater than 4 cm in chronic TA rupture that underwent various reconstruction methods depending on the state of the remaining could achieve good outcomes.⁴⁶

CONCLUSION

Augmented repair of acute TA ruptures using gastrosoleus fascial flaps are strong and stable enough to allow early weight-bearing ambulation with good clinical results. Care must be taken about wound problems and deep infection because of more extensive dissection. MRI is used in the healing process observation and is a useful tool for postoperative rehabilitation.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Mahipathy SRRV, Durairaj AR, Sundaramurthy N, Jayachandiran AP, Rajendran S. Tendoachilles reconstruction by a gastrosoleus turn-down flap: a case report. *Int Surg J* 2021;8:3467-71.