VOLUME - 12, ISSUE - 04, APRIL - 2023 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Plastic Surgery

STUDY OF OUTCOMES OF DOUBLE KESSLER SUTURE TECHNIQUE IN PRIMARY REPAIR OF ACHILLES TENDON RUPTURE: A CASE SERIES

Dr Sachin Jangle Assistant Professor, Department of Plastic Surgery, Government Medical College Aurangabad, Maharashtra, India

Dr Varun Gowda* Senior Resident, Department of General Surgery, Government Medical College Aurangabad, Maharashtra, India *Corresponding Author

Dr Supriya Patil Senior Resident, Department of General Surgery, Government Medical College Aurangabad, Maharashtra, India

ABSTRACT

Introduction Achilles tendon rupture is a common injury, especially in young and active individuals. The management of Achilles tendon rupture has been a topic of debate, with both surgical and non-surgical methods being used to treat this injury. The surgical repair of Achilles tendon rupture has shown better outcomes in terms of patient satisfaction, return to activities, and decreased re-rupture rates. This case series describes the outcomes of 15 patients who underwent primary surgical repair of Achilles tendon rupture using the Double Kessler suture technique at a tertiary care hospital in India. This study aimed to evaluate the surgical technique's efficacy and the postoperative outcomes of patients. The study's observations and results will provide valuable insights for orthopaedic surgeons and general surgeons to improve the management of Achilles tendon rupture. **Aim of this study** To Study The Outcomes Of Double Kessler Suture Technique In Primary Repair Of Achilles Tendon Rupture **Procedure** We performed a prospective study on 15 patients undergoing surgical repair of Primary Achilles tendon ruptures using Double Kessler suture technique. Skin sutures were taken with foot in neutral position to avoid post op suture dehiscence complications. Post operatively foot positioned using Splint in slight plantar flexion. From four weeks after surgery, every patient started an active rehabilitation under guidance, and they were all followed up for six months. **Conclusion** The Double Kessler technique using a nonabsorbable suture provides a strong and reliable construct for Achilles tendon repair. Less complication as less suturing thread as exposed outside of repaired tendon. Results to date in 15 patients have shown good to excellent results with regard to plantar flexion strength, rerupture, and return to previous level of activity. The technique requires further investigation with direct comparison with the gold standard Krackow techniques with regard to strength, rerupture rate, suture pull-out, return to athletic activity, and long-term patient satisfaction. Preliminary results, however, have been promising for its utility.

KEYWORDS :

INTRODUCTION

Achilles tendon rupture is a common injury, especially in young and active individuals. The management of Achilles tendon rupture has been a topic of debate, with both surgical and non-surgical methods being used to treat this injury. The surgical repair of Achilles tendon rupture has shown better outcomes in terms of patient satisfaction, return to activities, and decreased re-rupture rates. This case series describes the outcomes of 15 patients who underwent primary surgical repair of Achilles tendon rupture using the Double Kessler suture technique at a tertiary care hospital in India. This study aimed to evaluate the surgical technique's efficacy and the postoperative outcomes of patients. The study's observations and results will provide valuable insights for orthopaedic surgeons and general surgeons to improve the management of Achilles tendon rupture.

METHODS

In this study, 15 patients with primary Achilles tendon ruptures were enrolled for surgical repair using the Double Kessler suture technique at a tertiary care hospital in India. The study was approved by the institutional review board and written informed consent was obtained from all patients.

All patients received spinal anaesthesia administered by an experienced anaesthesiologist and were given intravenous antibiotics prior to the procedure. The patients were positioned in the prone position with adequate padding to protect bony prominences. The operative site was prepared and draped in the standard sterile fashion, including the opposite non-injured ankle.

An incision of 8 to 10 cm was made longitudinally over the tear site on the posterior aspect of the ankle, centred over the Achilles tendon. The paratenon was exposed by dissecting through the soft tissue and then incised sharply to create full-thickness flaps. The damaged ends of the tendon stumps were debrided back to healthy tissue.

The Double Kessler suture technique was then performed by experienced plastic surgeon for repairing the ruptured Achilles tendon. A standardized postoperative rehabilitation protocol was followed for all patients, and follow-up visits were conducted to assess healing, strength, and range of motion. The collected data were analysed using appropriate statistical methods.

Double Kessler Technique

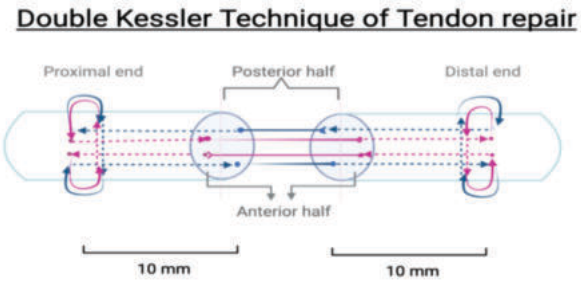

Figure 1: Double Kessler Technique

Step 1: Creating grasp loop in proximal posterior half (blue line)

- Pass the polypropylene 1-0 through the posterior half of the tendon 10 millimetres away from the cut end and exit, creating a suture loop.
- Pass the needle transversely across the tendon, deep to the first suture, and create a grasp loop on the far side.

Step 2: Creating grasp loop in distal posterior half

- Pass the needle through the posterior half of the tendon, distal and deep to the transverse suture, across the gap,

and repeat the process.

Step 3: Creating grasp loop in proximal anterior half (pink line)

- Pass the polypropylene 1-0 through the anterior half of the tendon, 10 millimetres away from the cut end. Then exit, creating a suture loop.
- Pass the needle transversely across the tendon, deep to the first suture, and create a grasp loop on the far side.

Step 4: Creating grasp loop distal anterior half (pink line)

- Pass the needle through the anterior half of the tendon, distal and deep to the transverse suture, across the gap, and repeat the process.

Step 5: Approximate the two tendons by knotting the posterior one first, then the anterior one.

- Pull the grasping loops tight, one by one, to avoid any gaping on the repair side, and knot in the gap.

Paratenon closure:

- The wound will be cleaned thoroughly, and the paratenon will be closed in an interrupted fashion using 5-0 Polypropylene suture.

Skin closure:

- To prevent complications such as suture dehiscence after surgery, Polyamide 2-0 Reverse Cutting sutures will be used to close the skin. The foot will be positioned neutrally during suturing.

Post-operative instructions:

- After surgery, the wound will be covered with a sterile dressing, and a posterior splint will be applied to the ankle, with the foot resting in approximately 15 degrees of plantarflexion to reduce stress on the tendons. This splint should be worn for four weeks.
- For the first four weeks after surgery, the patient should avoid putting weight on the affected leg.
- Gentle active dorsiflexion can begin at four weeks post-op, and passive range of motion exercises can be gradually introduced starting at eight weeks post-operatively.

Potential Complications:

As with any surgical procedure, there are potential complications associated with the double Kessler technique. These include bleeding, infection, thromboembolic disease, damage to surrounding soft tissues and neurovascular structures, and wound healing complications. In addition, there are specific risks related to the technique, such as tendon over tensioning, loss of tension due to loose sutures, inability to reapproximate the paratenon due to large suture knots, and inability to regain dorsiflexion postoperatively. However, with careful consideration and appropriate knowledge, these risks can be mitigated.

OBSERVATION AND RESULTS:

Table 1: Demographic details and Outcomes of Patients

Serial number	Age (in year) & Sex	Hospital Stay (in days)	Time to return to Work (in days)	Complications
1	16y/Female	6	28	Nil
2	23y/Male	9	40	Superficial Surgical Site Infection
3	26y/Male	6	32	Nil
4	42y/Male	8	34	Nil
5	31y/Male	6	33	Nil
6	26y/Male	7	32	Nil
7	24y/Male	5	22	Nil
8	30y/Male	6	27	Nil
9	22y/Female	7	30	Nil
10	12y/Female	8	33	Nil
11	33y/Male	7	29	Nil
12	23y/Male	7	34	Nil
13	25y/Male	8	38	Nil
14	27y/Male	9	37	Nil
15	37y/Male	7	33	Nil

- Male preponderance was seen in our study.
- Average Hospital stay was 6.8 days
- The mean time to return to work was 31.2 days.
- A single patient developed a superficial surgical site infection, which was resolved with oral antibiotics for seven days.
- There were fewer complications observed due to the use of minimal suture material exposed outside of the repaired tendon.
- At a minimum follow-up of six months, there were no cases of re-rupture.
- All patients were able to resume their prior activities within six weeks following the operation.

CONCLUSION

In conclusion, the Double Kessler technique using a nonabsorbable suture is a viable option for Achilles tendon repair, with good to excellent results in terms of strength, rerupture, and return to activity. While further investigation is needed to directly compare its efficacy with the gold standard Krackow technique, early indications are positive for its utility. This technique represents a potential alternative for surgeons performing Achilles tendon repairs, offering a strong and reliable construct that may result in favourable patient outcomes.

Figures:

Figure 2: 8–10-centimetre Longitudinal incision

Figure 3: After taking Single Kessler Suture

Figure 4: Before approximation of two cut ends of Achilles Tendon

Figure 5: After completion of Double Kessler Knot

Figure 6: After Paratenon Closure

Figure 8: Repair of Achilles tendon rupture, Double Kessler technique for distal complete tear; Continuous Suturing for Partial tear of Proximal fibres.

Figure 10: After skin closure

Figure 11: After approximation of paratenon fascia

Figure 12: After approximation of two cut ends of Achilles tendon

Figure 13: After creating grasp loop in posterior half both proximal and distal cut ends of Achilles tendon

Figure 14: Cut ends of Achilles tendon after refreshening of ends

Figure 15: Preoperative preparation

REFERENCES:

1. Miller TL, Harwood JL, Harrison RK, Nerone VS. Achilles Tendon Repair Using Nonabsorbable Suture Loop for Modified Giftbox Technique. Techniques in Orthopaedics. 2015 Mar;30(1):33–8.
2. Paavola M, Kannus P, J arvinen TA, Khan K, J´ ozsa L, J arvinen M. Achilles tendinopathy. J Bone Joint Surg Am. 2002 Nov;84(11):2062-76
3. Doral MN, Alam M, Bozkurt M, Turhan E, Atay OA, D onmez G, Maffulli N. Functional anatomy of the Achilles tendon. Knee Surg Sports Traumatol Arthrosc. 2010 May;18(5):638-43. Epub 2010 Feb 25
4. Chen TM, Rozen WM, Pan WR, Ashton MW, Richardson MD, Taylor GI. The arterial anatomy of the Achilles tendon: anatomical study and clinical implications. Clin Anat. 2009 Apr;22(3):377-85.
5. Benjamin M, McGonagle D. The anatomical basis for disease localisation in seronegative spondyloarthropathy at entheses and related sites. J Anat. 2001 Nov;199(Pt 5):503-26
6. Lohrer H, Arentz S, Nauck T, Dorn-Lange NV, Konerding MA. The Achilles tendon insertion is crescent-shaped: an in vitro anatomic investigation. Clin Orthop Relat Res. 2008 Sep;466(9):2230-7. Epub 2008 May 28
7. O'Brien M. Functional anatomy and physiology of tendons. Clin Sports Med. 1992 Jul;11(3):505-20.
8. Uquillas CA, Guss MS, Ryan DJ, Jazrawi LM, Strauss EJ. Everything Achilles: Knowledge Update and Current Concepts in Management: AAOS Exhibit Selection. The Journal of Bone and Joint Surgery-American Volume. 2015 Jul;97(14):1187–95.
9. Benjamin M, Toumi H, Ralphs JR, Bydder G, Best TM, Milz S. Where tendons and ligaments meet bone: attachment sites ('entheses') in relation to exercise and/or mechanical load. J Anat. 2006 Apr;208(4):471-90.
10. Y. Ochen, R. B. Beks, M. van Heijl et al., "Operative treatment versus nonoperative treatment of Achilles tendon ruptures: systematic review and meta-analysis," BMJ, vol. 364, p. k5120, 2019.
11. Doany ME, Paulus MC. Open Achilles Tendon Rerupture: A Case Report and Review of the Literature. Kolb W, editor. Case Reports in Orthopedics. 2020 Dec 2;2020:1–5.
12. D. M. van der Eng, T. Schepers, J. C. Goslings, and N. W. Schep, "Rerupture rate after early weightbearing in operative versus conservative treatment of Achilles tendon ruptures: a meta-analysis," The Journal of Foot and Ankle Surgery, vol. 52, no. 5, pp. 622–628, 2013.
13. K. Willits, A. Amendola, D. Bryant et al., "Operative versus nonoperative treatment of acute Achilles tendon ruptures: a multicenter randomized trial using accelerated functional rehabilitation," The Journal of Bone and Joint Surgery. American Volume, vol. 92, no. 17, pp. 2767–2775, 2010.
14. Costa ML, MacMillan K, Halliday D, Chester R, Shepstone L, Robinson AHN, et al. Randomised controlled trials of immediate weight-bearing mobilisation for rupture of the tendo Achillis. The Journal of Bone and Joint Surgery British volume. 2006 Jan;88-B(1):69–77.
15. J. Liles and S. B. Adams Jr., "Management of Complications of Achilles tendon surgery," Foot and Ankle Clinics, vol. 24, no. 3, pp. 447–457, 2019.
16. A. Gigante, A. Moschini, A. Verdenelli, M. del Torto, S. Ulisse, and L. de Palma, "Open versus percutaneous repair in the treatment of acute Achilles tendon rupture: a randomized prospective study," Knee Surgery, Sports Traumatology, Arthroscopy, vol. 16, no. 2, pp. 204–209, 2008.
17. Thompson TC. A Test for Rupture of the Tendo Achillis. Acta Orthopaedica Scandinavica. 1962 Jan 1;32(1–4):461–5.
18. Simmonds FA. The diagnosis of the ruptured Achilles tendon. Practitioner. 1957;179:56-8.