International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2019; 5(3): 73-75

www.orthopaper.com
Received: 17-05-2019
Accepted: 19-06-2019

Dr. Yash Mohan Lal
Assistant Professor,
Department of Orthopaedics,
SGRRIMH&S, Uttarakhand,
India

Dr. Aditya Kumar Mishra
Assistant Professor, Department of Orthopaedics, SGRRIMH&S, Uttarakhand, India

Dr. Utkarsh Singh
Consultant Orthopedic Surgeon, SGRRIMH&S, Uttarakhand, India

Akhilesh Singh Kushwaha
Senior Resident,
Department of Orthopaedics,
SGRRIMH&S, Uttarakhand,
India

Correspondence
Dr. Aditya Kumar Mishra
Assistant Professor, Department of Orthopaedics, SGRRIMH&S, Uttarakhand, India

Newer modality of fixation of ACL avulsion with the help of suture disc and endobutton

Dr. Yash Mohan Lal, Dr. Aditya Kumar Mishra, Dr. Utkarsh Singh and Dr. Akhilesh Singh Kushwaha

DOI: https://doi.org/10.22271/ortho.2019.v5.i3b.1511

Abstract
Introduction: ACL avulsion mainly occurs from its tibial attachment. Open are arthroscopic fixation is required in comminuted avulsions. Screw fixation is stronger construct than any other modality. In this study we have included patients operated by arthroscopic fixation with suture disc and endobutton. This is cheaper modality with simple instrumentations. Purpose of study was to assess the clinicoradiological outcome of such patients.
Material Methods: 15 patients were included in the study. Who were assessed by lachman test and radiographs pre operatively, post operatively and follow up. Suture disc and endobutton were used for the arthroscopic fixation. Knee bending exercises and quadriceps strengthening exercises advised post operatively.
Result: Union was present in 100% patients on radiographic evaluation. 93.3% patients were returned to their pre injury status within one year. 6.6% patient developed extension lag and stiffness. Infection was not seen in any patient.
Conclusion: This is newer and cheap modality of fixation with satisfactory outcome. Large sample size studies are required.

Keywords: ACL avulsion, sututre disc, endobutton

Introduction
ACL avulsion injury mainly occurs on tibial insertion of ligament. These avulsion fractures are rare and usually common in in children [1]. According to Meyers and McKeever classification type 1 fractures are treated conservatively and type 2-4 are treated surgically by open or arthroscopic fixation [2, 3, 4]. type 1 has minimal or no displacement and is usually treated conservatively; type 2 involves partial anterior 'duck-bill' elevation of the bony fragment but with preservation of a posterior hinge with the tibial eminence; type 3 involves complete fragment elevation anteriorly and posteriorly; and this system was modified by Zaricznyj [5] who suggested that communition of a displaced avulsion fracture should be classified as a type IV fracture. In adults with large bony fragments, screw fixation provide strong fixation strength [3, 4]. Although various fixation devices have been introduced for Arthroscopic Reduction and Internal Fixation of Anterior Cruciate Ligament (ACL) tibial avulsion fractures such as cannulated screws, staples, Kirschner wires, wires and non-absorbable sutures [6-15]. Till now, no equivocally accepted technique is available that can be applied regardless of skeletal maturity, fragment size or communition. Here we use a newer cost effective technique of Arthroscopic assisted ACL tibial avulsion fracture fixation with suture disc and Endobutton using simple instrumentation. The purpose of this study was to assess the clinic radiological outcome of patients with ACL avulsion fractures (type 2 to type 4) fixed arthroscopically using suture disc and Endobutton.

Material methods
We included 15 patients in this study in which 13 were male and 2 were female. Average age of patient was 24 year (range 21 – 36 year). Mode of injury was road traffic accident in 11 patients and sport injury in 4 patients. Preoperatively patients were having positive lachman and anterior drawer test. Hemarthrosis was aspirated immediately to relieve the pain.

Antero-posterior and lateral x-rays of knee were advised pre and post operatively. All the patients were planned for surgery as early as possible after pre-anesthetic checkup. All patients were assessed clinically by calculating their Lachman test and the radiological union was assessed in the follow up radiographs.

Surgical procedure

Patient position supine with knee hanging from the side of table, pneumatic tourniquet was applied. Standard anterolateral and antero medial portals were made then diagnostic arthroscopy was done. Avulsion identified and bed of avulsion was cleared of any clots and soft tissue. After reducing the avulsion in place ACL zig is used to drill the guide pin through the fragment and 4 mm cannulated drill bit is used to drill through the fragment. Then number 5 ethibond suture is passed through the tunnel using the eyelet over the back of guide pin and retrieved from anteromedial portal. Fiber wire is passed through the loose endobutton in w shape and both the free ends of fiber wire are sutured through the tibial tunnel using ethibond suture. Endo button is seated over the avulsion and keeping the avulsion reduced free ends of fiber wire are tightened over the suture disc in extension.

Result

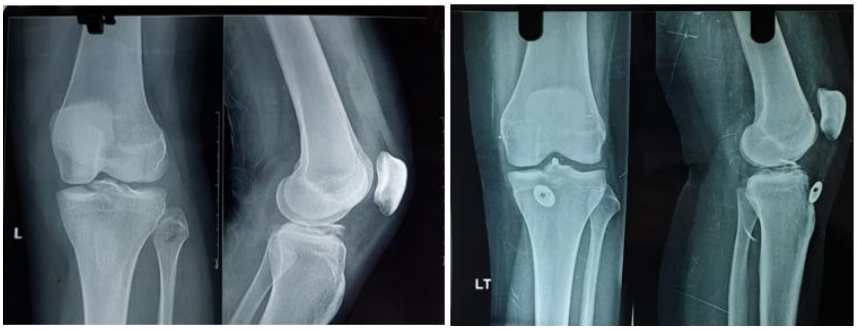
fourteen (93.3%) out of 15 operated patient by this technique have returned to their pre injury state in 8 months to 12 months except one patient (6.67%) who suffered from extension lag and knee stiffness. Operated knee was examined on every follow-up and found stable on lachman and ant. drawer test. Union was present in all the 15 patients (100% cases). No symptom or sign of infection was found in any patient.

Lachman test: Performed in 30 degree flexion of affected knee.

Table 1: Shows Lachman test Preop finding (no. & % of patients) and Post op finding (no. &% of patients)

Lachman test	Preop finding (no. & % of patients)	Post op finding (no. &% of patients)
Negative	0	15 (100% patients)
Grade 1	0	0
Grade 2	5(33.33%)	0
Grade 3	10(66.67%)	0

Radiographs



Pre-operative x-ray Post op X-ray

Clinical picture

Conclusion

This retrospective observational case series study shows qualitative advantage of this newer modality surgical technique of arthroscopic fixation of comminuted ACL avulsion fracture using suture disk and endobutton. This technique is cheap, reliable and applicable to any type of avulsion fracture to achieve a good clinic radiological result. Limitation of the study was the small sample size so further studies with large sample size are required.

References

1. Wiley JJ, Baxter MP. Tibial spine fractures in children. Clin Orthop Relat Res. 1990; 225:54-60.
2. Kluempr CT, Snyder GM, Coats AC, Johnson DL, Mair SD. Arthroscopic suture fixation of tibial eminence fractures. Orthopedics. 2013; 36:1401-6.
3. Pan RY, Yang JJ, Chang JH, Shen HC, Lin LC, Lian YT. Clinical outcome of arthroscopic fixation of anterior tibial eminence avulsion fractures in skeletally mature patients: a comparison of suture and screw fixation technique. J Trauma Acute Care Surg. 2012; 72:88-93.
4. Wiegand N, Naumov I, Vamhidy L, Not LG. Arthroscopic treatment of tibial spine fracture in children with a cannulated Herbert screw. Knee. 2014; 21:481-5.
5. Zaricznyj B. Avulsion fracture of the tibial eminence: treatment by open reduction and pinning. J Bone Joint Surg Am. 1977; 59(8):1111-1114.
6. Berg EE. Pediatric tibial eminence fractures: arthroscopic cannulated screw fixation. Arthroscopy. 1995; 11(3):328-331.
7. Jung YB, Yum JK, Koo BH. A new method for arthroscopic treatment of tibial eminence fractures with eyed Steinmann pins. Arthroscopy. 1999; 15(6):672-675.
8. Kogan MG, Marks P, Amendola A. Technique for arthroscopic suture fixation of displaced tibial intercondylar eminence fractures. Arthroscopy. 1997; 13(3):301-306.
9. Lehman RA, Murphy KP, Machen MS *et al*. Modified arthroscopic suture fixation of a displaced tibial eminence fracture. Arthroscopy. 2003; 19(2):6.
10. Matthews DE, Geissler WB. Arthroscopic suture fixation of displaced tibial eminence fractures. Arthroscopy. 1994; 10(4):418-423.
11. Oohashi Y. A simple technique for arthroscopic suture fixation of displaced fracture of the intercondylar eminence of the tibia using folded surgical steels. Arthroscopy. 2001; 17(9):1007-1011.
12. Osti L, Merlo F, Liu SH *et al*. A simple modified arthroscopic procedure for fixation of displaced tibial eminence fractures. Arthroscopy. 2000; 16(4):379-382.
13. Reynders P, Reynders K, Broos P. Pediatric and adolescent tibial eminence fractures: arthroscopic cannulated screw fixation. J Trauma. 2002; 53(1):49-54.
14. Senekovic V, Veselko M. Anterograde arthroscopic fixation of avulsion fractures of the tibial eminence with a cannulated screw: five-year results. Arthroscopy. 2003; 19(1):54-61.
15. Yip DK, Wong JW, Chien EP *et al*. Modified arthroscopic suture fixation of displaced tibial eminence fractures using a suture loop transporter. Arthroscopy. 2001; 17(1):101-106.