

Functional Outcome of Arthroscopic Debridement of Muroid Degeneration of the Anterior Cruciate Ligament

Bhadra Hamal,¹ Mahesh Karmacharya,¹ Kuldeep Mangal Joshi,¹ Rajendra Gorkhali¹

ABSTRACT

Background: Muroid degeneration of the anterior cruciate ligament is a rare pathological condition. This is a condition where the anterior cruciate ligament becomes bulky and seems like a celery stalk appearance. The most common symptom is a pain in the posterior aspect of the knee and consistent clinical finding is a mechanical block to an extension of the knee. This study aims to find out the functional outcome of arthroscopic debridement of this entity.

Methods: This is a prospective observational study from Jan 1st 2021 to Dec 31st 2021 done in 17 patients. The outcome was measured in terms of preoperative and postoperative visual analogue scale, Tegner Lysholm score and International Knee Documentation Committee score.

Results: Eleven females and six males were included in this study. The mean age of the patients was 51.41 years. Arthroscopic debridement of muroid degeneration of the anterior cruciate ligament was done. Preoperative and 6 months postoperative VAS score was 8.12 and 2.00 respectively ($p < 0.05$), preoperative and 6 months postoperative Tegner Lysholm score was 44.00 and 86.29 respectively ($p < 0.05$), and preoperative and 6 months postoperative IKDC score was 29.06 and 79.94 respectively ($p < 0.05$)

Conclusions: Arthroscopic debridement serves as an effective way of treatment of muroid degeneration of the anterior cruciate ligament.

Keywords: Anterior cruciate ligament; arthroscopic debridement; muroid degeneration.

INTRODUCTION

Muroid degeneration (MD) of the anterior cruciate ligament (ACL) is a rare pathological condition.¹ This condition is mostly an incidental finding on a magnetic resonance imaging (MRI).² This is a condition where the anterior cruciate ligament becomes bulky because of the infiltration of muroid-like glycosaminoglycans.³ The condition is described as a “celery stalk” like appearance.⁴ The most common symptom is pain at the posterior aspect of the knee and the consistent clinical finding is the mechanical block to the extension of the knee. Its prevalence on MRI has been reported to be 1.8 to 5.3%⁵ This condition is common in middle-aged patients without a history of significant trauma.^{6,7} Male to female ratio is 1:1 to 1.28:1.^{5,8} The exact etiopathogenesis of this condition is not known however several hypotheses such as synovial, traumatic, degenerative, ectopic,

and the theory of altered joint mechanics have been postulated.³

Various methods of management of MD of ACL have been described. Some authors described total removal of ACL while others have described debridement of mucinous substance with partial debulking as an effective therapeutic option.⁹ In our set up this condition is managed by arthroscopic debridement.

METHODS

This prospective study was conducted from Jan 1st 2021 to Dec 31st 2021 after the approval from the Institutional Review Board (Ref. No. 147/2078/79). A total number of 17 patients were included in this study. All the patients with complaints of posterior knee pain were assessed. Plain radiographs of the knee with anteroposterior

Correspondence: Dr Bhadra Hamal, Department of Orthopaedics, National Academy of Medical Sciences, National Trauma Center, Kathmandu, Nepal. Email: drbhadrahamal@gmail.com, Phone: +9779841366188

Author Affiliations

¹Department of Orthopaedics and Trauma Surgery, National Academy of Medical Sciences, National Trauma Center, Kathmandu, Nepal.

weight-bearing, posteroanterior weight bearing with 45° of flexion, and lateral views were obtained. Magnetic resonance imaging (3 tesla) of the affected knee was obtained. The radiographic diagnosis was made by radiographic criteria which are abnormally thickened and ill-defined ACL, maintenance of normal orientation and continuity, and increased intraligamentous signals in MRI.¹ Preoperative visual analog scale (VAS) Score¹⁰, Tegner Lysholm¹¹ knee score, and IKDC¹² score were noted.

The diagnostic arthroscopy of the knee was performed under spinal anesthesia. A thorough evaluation of the ACL was done through the standard anterolateral and anteromedial portal with a standard 30° lens. The ACL was found to be abnormally bulky but mechanically intact which was devoid of the synovial lining. All the knee compartments were evaluated and the injury of other structures like meniscus, cartilage, and other ligaments were treated accordingly. Radiofrequency ablator and a 4 mm shaver blade were used for the debridement of MD of ACL. The mucoïd material from the bulky ACL was removed as much as possible and intact fibers of ACL were preserved. Postoperatively patients were advised to do range of motion exercises weight-bearing, quadriceps, and hamstring strengthening exercises. Sutures were removed after the 10th postoperative day. The VAS Score, Tegner Lysholm Knee score and IKDC score were assessed at subsequent follow up at 3 and 6 months postoperatively. The statistical analysis was made with the help of SPSS version 20 and preoperative and postoperative data were compared using paired t-tests and p values < 0.05 were considered statistically significant.



Figure 1. T2 weighted MRI showing hyperintense signal changes in intact bulky ACL.

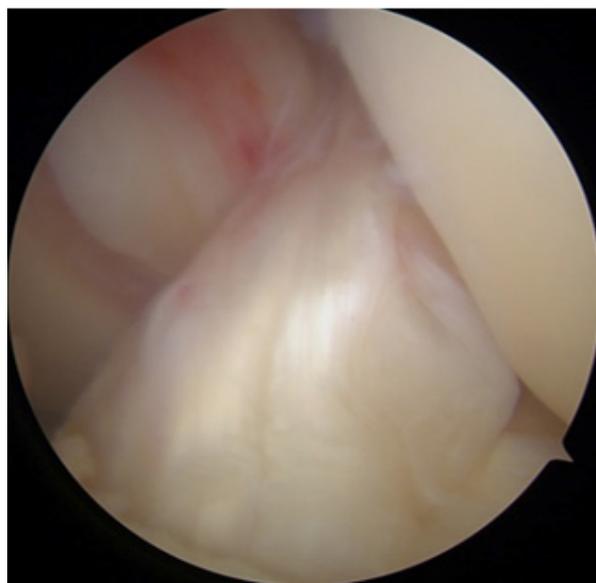


Figure 2. Bulky ACL with mucoïd degeneration found in diagnostic arthroscopy.

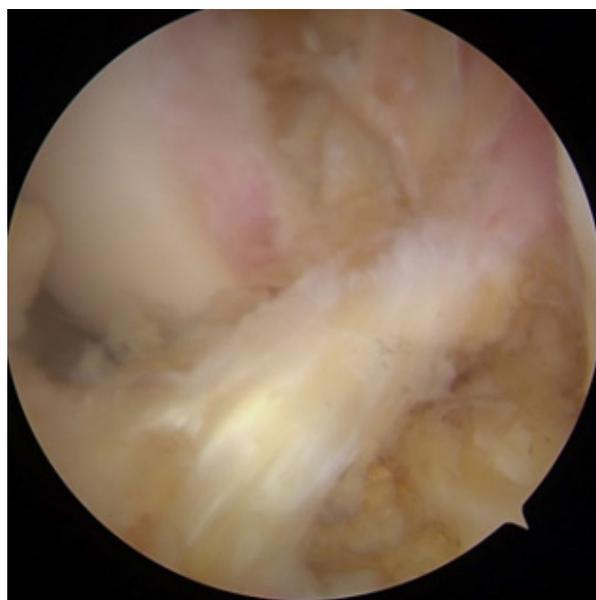


Figure 3. Mucoïd degeneration of ACL after arthroscopic debridement.

RESULTS

Seventeen patients were enrolled in this study. Among them 11 were females and 6 were males with a ratio of 1.83:1. The condition was more prevalent in middle-aged people. The preoperative mean VAS score was 8.12 which decreased to 3.46 at 3 months and 2.00 at 6 months follow up. The preoperative mean Tegner Lysholm score was 44.00 which increased to 64.32 at 3 months and 29.00 at 6 months follow-up. The preoperative mean IKDC score was 29.06 which increased to 58.04 at 3 months and 94.00 at 6 months follow-up. We compared

the preoperative and 6 months follow-up outcome data which was statistically significant (Table 2). The preoperative mean extension deficit was 6.2° which decreased to 1.6° at 3 months follow-up and 0.7° at 6 months follow-up. The range of motion was significantly improved. No complication was noted.

Table 1. Demographic variables of patients.

SN	Variables	Number of patients (%)	
1	Sex	Male	6(35.3%)
		Female	11(64.7%)
2	Side of affection	Right	8(47.06%)
		Left	9(52.94%)
3	Mean age (years)	51.41(36-63)	

Table 2. Preoperative and 6 months follow-up outcome scores.

SN	Variables	Preoperative	6 months Follow-up	P-value
1	VAS score	8.12 ± 1.36	2.00± 1.22	<0.01
2	Tegner Lysholm score	44 ± 7.15	86.29± 12.2	<0.01
3	IKDC score	29.06 ± 5.39	79.94± 11.08	<0.01

DISCUSSIONS

Mucoïd Degeneration of the Anterior Cruciate ligament is a rare pathological condition that presents mostly with the symptoms of knee pain in terminal extension.¹ Patients complain of inability to extend knee fully because of pain. In most of the cases this entity is incidental finding in MRI. Sometimes the clinicians may miss the diagnosis by plain X-ray only.¹ ACL ganglion cyst may mimic this condition.⁴ During diagnostic arthroscopy sometimes the coexistence of ACL ganglion cyst, meniscal injuries and cartilage injuries may be found.

Chudasma et al. reported that the mean age of the patients was 42.2 years, the mean preoperative IKDC score was 33.60 which was increased to 73.2 postoperatively¹³ whereas in our study the mean age of the patients was 51.41 years and the mean preoperative IKDC score was 29.06 and 6 months mean postoperative IKDC score was 79.94. In a similar study done by Ventura et al. the mean age of patients was 57 years, the mean preoperative VAS score was 8 which significantly decreased to 2 postoperatively at final follow-up.¹⁴ The mean preoperative IKDC score was 27 and the post-operative IKDC score was 81. Preoperative Tegner Lysholm score was 47 which increased to 85 postoperatively. In our study, the mean preoperative VAS score was 8.12 which decreased to 2.00 postoperatively. Similarly, the preoperative mean Tegner lysholm score was 44.00 which increased to 86.29 postoperatively. Our study is comparable to both the studies.

Some authors described arthroscopic total or partial excision of MD of ACL in their study.¹⁴ In our study total excision of ACL was not done but only arthroscopic debridement of the involved ACL was done because all the patients those were enrolled for the study had some normal fibers of ACL. Excising the involved ACL may decrease the outcome because the activities like squatting, jumping, running which are the components of Lysholm score will be affected as there will be gross laxity of the knee. Most authors advocate that debridement of mucinous substances is a safe therapeutic option.^{2,15} During our follow-up most of the patients have a satisfactory outcome.

CONCLUSIONS

In elderly people with knee pain in terminal extension without a history of trauma, mucoïd degeneration of anterior cruciate ligament should be suspected. Arthroscopic debridement of mucoïd degeneration of anterior cruciate ligament effectively relieves knee pain and improves the functional outcome.

CONFLICT OF INTEREST

None

REFERENCES

1. Kim T-H, Lee D-H, Lee S-H, Kim J-M, Kim C-W, Bin S-I. Arthroscopic Treatment of Mucoïd Hypertrophy of the

- Anterior Cruciate Ligament. *Arthroscopy: The Journal of Arthroscopic & Related Surgery*. 2008 Jun;24(6):642–9. [\[PubMed\]](#)
2. Motmans R, Verheyden F. Mucoïd degeneration of the anterior cruciate ligament. *Knee Surg Sports Traumatol Arthrosc*. 2009 Jul;17(7):737–40. [\[PubMed\]](#)
 3. Pandey V, Suman CPS, Sharma S, Rao SP, Acharya KVK, Sambaji C. Mucoïd degeneration of the anterior cruciate ligament: Management and outcome. *Indian J Orthop* 2014 Apr;48(2):197–202. [\[PubMed\]](#)
 4. McIntyre J, Moelleken S, Tirman P. Mucoïd degeneration of the anterior cruciate ligament mistaken for ligamentous tears. *Skeletal Radiol*. 2001 Jun;30(6):312–5. [\[PubMed\]](#)
 5. Bergin D, Morrison WB, Carrino JA, Nallamshetty SN, Bartolozzi AR. Anterior cruciate ligament ganglia and mucoïd degeneration: coexistence and clinical correlation. *AJR Am J Roentgenol*. 2004 May;182(5):1283–7. [\[PubMed\]](#)
 6. Narvekar A, Gajjar S. Mucoïd degeneration of the anterior cruciate ligament. *Arthroscopy*. 2004 Feb;20(2):141–6. [\[PubMed\]](#)
 7. Makino A, Pascual-Garrido C, Rolón A, Isola M, Muscolo DL. Mucoïd degeneration of the anterior cruciate ligament: MRI, clinical, intraoperative, and histological findings. *Knee Surg Sports Traumatol Arthrosc*. 2011 Mar;19(3):408–11. [\[PubMed\]](#)
 8. Salvati F, Rossi F, Limbucci N, Pistoia ML, Barile A, Masciocchi C. Mucoïd metaplastic-degeneration of anterior cruciate ligament. *J Sports Med Phys Fitness*. 2008 Dec;48(4):483–7. [\[PubMed\]](#)
 9. Kumar A, Bickerstaff DR, Grimwood JS, Suvarna SK. Mucoïd cystic degeneration of the cruciate ligament. *J Bone Joint Surg Br*. 1999 Mar;81(2):304–5. [\[PubMed\]](#)
 10. Wewers ME, Lowe NK. A critical review of visual analog scales in the measurement of clinical phenomena. *Res Nurs Health*. 1990 Aug;13(4):227–36. [\[PubMed\]](#)
 11. Lysholm J, Gillquist J. Evaluation of knee ligament surgery results with special emphasis on the use of a scoring scale. *Am J Sports Med*. 1982 Jun;10(3):150–4. [\[PubMed\]](#)
 12. Irrgang JJ, Anderson AF, Boland AL, Harner CD, Kurosaka M, Neyret P, et al. Development and validation of the international knee documentation committee subjective knee form. *Am J Sports Med*. 2001 Oct;29(5):600–13. [\[PubMed\]](#)
 13. Chudasama CH, Chudasama VC, Prabhakar MM. Arthroscopic management of mucoïd degeneration of anterior cruciate ligament. *IJOO*. 2012 Oct;46(5):561–5. [\[PubMed\]](#)
 14. Ventura D, Nuñez JH, Joshi-Jubert N, Castellet E, Minguell J. Outcome of Arthroscopic Treatment of Mucoïd Degeneration of the Anterior Cruciate Ligament. *Clin Orthop Surg*. 2018;10(3):307. [\[PubMed\]](#)
 15. Cha JR, Lee CC, Cho SD, Youm YS, Jung KH. Symptomatic mucoïd degeneration of the anterior cruciate ligament. *Knee Surg Sports Traumatol Arthrosc*. 2013 Mar;21(3):658–63. [\[PubMed\]](#)