

ORIGINAL RESEARCH

A study on management and outcome of Mucoïd degeneration of the anterior cruciate ligament

¹Dr. Chaudhary Avinash Laljibhai, ²Dr. Uma Shankar, ³Dr. Ajit Singh Yadav, ⁴Dr. B.K. Jain

^{1,2,3}Junior Resident, ⁴Professor and Head, Department of Orthopaedics, L.N. Medical College and Research Centre, Bhopal, M.P., India

Corresponding author

Dr. Ajit Singh Yadav

Junior Resident, Department of Orthopaedics, L.N. Medical College and Research Centre, Bhopal, M.P., India

Received: 22-April-2023

Accepted: 20-May-2023

Abstract

Background: Mucoïd degeneration of the anterior cruciate ligament (ACL) is a little-known pathology. This infiltrating lesion is included in the mucoïd pathology of the intercondylar fossa. The present study was conducted to assess management and outcome of Mucoïd degeneration of the anterior cruciate ligament.

Material & methods: The present prospective study was conducted among 20 patients to assess management and outcome of Mucoïd degeneration of the anterior cruciate ligament. All patients presented with knee pain without instability. Bulky mucoïd ACL was debrided judiciously. The degenerated ACL and mucinous material was sent for histopathology examination.

Results: In the present study, 35% participants were male and 65% were female. Mean age of participants was 56 years. Maximum participants had Intraosseous and soft tissue cysts (75%) followed by Distal or proximal femoral edema (55%). Partial debridement of ACL was done in 90% and complete in 10% patient. None of them required notchplasty. All patients regained complete flexion and none complained of instability.

Conclusion: The present study concluded that partial debridement of ACL was done in 90% and complete in 10% patient. All patients regained complete flexion and none complained of instability.

Keywords: Mucoïd degeneration, anterior cruciate ligament, notchplasty.

Introduction

Mucoïd degeneration (MD) of the anterior cruciate ligament (ACL) is a rare pathological entity that has been found in patients with pain and limited range of motion of the knee in association with a bulky ACL shown on magnetic resonance imaging (MRI).¹ It is characterized by infiltration of mucoïd like substance (glycosaminoglycans) interspersed within the substance of ACL causing knee pain and limited motion. This entity was described only a decade ago by Kumar et al. in 1999.² Kumar et al. referred to the condition as mucoïd cystic degeneration of the ACL.² Kim et al. named this lesion as mucoïd hypertrophy.¹ Bergin et al. specifically used the term, MD.³ One of the explanations for the disagreement on nosology of mucoïd pathology of the ACL is the lack of available patients for studies. It is a rare condition not well known by physicians and thus clinically underdiagnosed or confused with ACL tears.^{4,5} MDACL is diagnosed by MRI, showing a celery stalk sign, and is confirmed by tissue biopsy and histological examination.⁴ Bergin et al. have described the following MRI criteria³: (1) high signal intensity in the T1 and T2 sequences, (2) increased ACL volume and (3) continuous fibres of ACL shown in the T2 sequence. Arthroscopic diagnostic criteria⁴ are (1) continuous ACL fibres, (2) increased ACL volume, (3) yellowish-coloured material expressed on palpation and (4) loss of ACL synovial lining. Histologically, there is a mucoïd substance in connective tissue containing glycoproteins and mucoproteins.⁶ The present study was conducted among 20 patients to assess management and outcome of Mucoïd degeneration of the anterior cruciate ligament.

Material & methods

The present prospective study was conducted among 20 patients to assess management and outcome of Mucoïd degeneration of the anterior cruciate ligament. Before the commencement of the study ethical clearance was taken from the Ethical Committee of the study and informed consent was taken from the patients after explaining the study. All patients presented with knee pain without instability. All of them had failed the trial of conservative management of at least 6-8 weeks. MRI (of 1.5 tesla strength) was done in all patients. All the

patients underwent diagnostic arthroscopy of the knee under tourniquet under appropriate anesthesia. During diagnostic arthroscopy of the knee through standard anterolateral portal, the ACL appeared hypertrophied, bulbous and occupying most of the notch with absent synovial lining over ACL and ligamentum mucosum in all cases. The concomitant meniscal and cartilage lesions were treated as per standard protocol through standard anteromedial portal. Using combination of 4.0 mm shaver blade (Styrker, USA) and arthroscopic basket forceps, bulky mucoid ACL was debrided judiciously, removing mucinous material as much and carefully saving normal fibers. Mostly, the fibers that impinge upon lateral femoral condyle (LFC) are posterolateral group of fibers. Care was taken to save normal fibers with intact femoral and tibial attachment. Occasionally, small amount of mucoid material have been left behind to protect normal ACL fibers as it is impossible to remove all mucinous material without sacrificing remaining normal ACL. Notchplasty was not performed in any of the patients. Other concomitant cysts at the base of ACL or behind posterior cruciate ligament (PCL) were shaved off. The degenerated ACL and mucinous material was sent for histopathology examination. Histopathology was suggestive of MD of ACL. Postoperatively, all patients were permitted immediate weight bearing, knee mobilization and muscle strengthening exercises. Statistical analysis was conducted using IBM SPSS ver. 20.0 (IBM Corp., Armonk, NY, USA). Pre- and postoperative VAS score, IKDC, and TegnerLysholm Knee were compared using paired t-tests. Differences with p -values < 0.05 were considered statistically significant.

Results

Table 1: Demographic data

Variable	N(%)
Gender	
Male	7(35%)
Female	13(65%)
Mean Age (years)	56±0.34

In the present study, 35% participants were male and 65% were female. Mean age of participants was 56 years.

Table 2: Lesions Associated with Anterior Cruciate Ligament MD Observed on Arthroscopy and MRI

Associated lesion	N(%)
Meniscal tears	6(30%)
Medial	4(66.66%)
Lateral	1(16.66%)
Medial and lateral	1(16.66%)
Chonral lesion	9(45%)
Distal or proximal femoral edema	11(55%)
Intraosseous and soft tissue cysts	15(75%)
MD of the posterior cruciate ligament	2(10%)

Maximum participants had Intraosseous and soft tissue cysts (75%) followed by Distal or proximal femoral edema (55%).

Table 3: Management

Management	N(%)
Partial debridement of ACL	18(90%)
Complete debridement of ACL	2(10%)
Notchplasty	0(0%)

Partial debridement of ACL was done in 90% and complete in 10% patient. None of them required notchplasty.

Table 4: Outcome

Outcome	N(%)
Instability	0(0%)
Complete Flexion	20(100%)

All patients regained complete flexion and none complained of instability.

Discussion

MD of the ACL, until now, has been a rare pathological entity because it has been underdiagnosed and confused with other pathologies.¹ It is characterized by infiltration of mucoid-like substance (glycosaminoglycans) interspersed within the substance of ACL causing pain and limited motion of the knee.⁷

In the present study, 35% participants were male and 65% were female. Mean age of participants was 56 years. Maximum participants had Intraosseous and soft tissue cysts (75%) followed by Distal or proximal femoral edema (55%). Partial debridement of ACL was done in 90% and complete in 10% patient. None of them required notchplasty. All patients regained complete flexion and none complained of instability.

Lintz F et al found that treatment of ACL mucoid degeneration by arthroscopic resection is effective for posterior pain and flexion limitation. It results in postoperative laxity, but rarely in frank instability.⁵

Narvekar A et al describes 5 cases of mucoid degeneration of the ACL with clinical features, magnetic resonance imaging (MRI) findings, and a method of arthroscopic management of these cases. Results showed that all patients were pain free and had recovered full flexion except one who experienced painful flexion beyond 120°. None of the patients showed symptoms of instability. Postoperative MRI performed after at least 12 months in 2 patients showed some intact ACL fibers in a now-thinned ACL mass.⁶

Ventura D et al did a study to detail the clinical, radiological, arthroscopic, and pathological findings of mucoid degeneration of the anterior cruciate ligament and report the clinical outcomes following arthroscopic treatment. Seventeen females (67%) and eight males (33%) were included in the final analysis. The mean age at the time of surgery was 57 years (range, 31 to 78 years). Partial resection of the anterior cruciate ligament was done in seven cases and a complete resection in 18 cases. No reconstruction was performed at the same time. A positive Lachman test and a negative pivot shift were noted after surgery in all cases. Anterior cruciate ligament reconstruction was required in only one young patient due to disabling instability. At last follow-up, the mean visual analogue scale score, International Knee Documentation Committee score, and Tegner-Lysholm Knee score improved ($p < 0.01$).⁸

Pandey V et al describes the clinicoradiological presentation of patients with mucoid ACL, partial arthroscopic debridement of ACL and outcomes. Six patients were male and five were female with median age of 40 years (range 21-59 years). All patients complained of knee pain with median duration of 5 months (range 1-24 months). All patients had painful deep flexion with 63.6% (N = 7) reporting trivial trauma before the onset of symptoms. MRI revealed MD of ACL in all with associated cyst in three patients. Partial debridement of ACL was done in ten and complete in one patient. None of them required notchplasty. Histopathology confirmed the diagnosis in all of them. At the mean followup of 13.81 months (range 6-28 months), all patients regained complete flexion and none complained of instability.⁹

Conclusion

The present study concluded that partial debridement of ACL was done in 90% and complete in 10% patient. All patients regained complete flexion and none complained of instability.

References

1. Kim TH, Lee DH, Lee SH, Kim JM, Kim CW, Bin SI. Arthroscopic treatment of mucoid hypertrophy of the anterior cruciate ligament. *Arthroscopy*. 2008;24(6):642–649.
2. Kumar A, Bickerstaff DR, Grimwood JS, Suvarna SK. Mucoid cystic degeneration of the cruciate ligament. *J Bone Joint Surg Br*. 1999;81(2):304–305.
3. Bergin D, Morrison WB, Carrino JA, Nallamshetty SN, Bartolozzi AR. Anterior cruciate ligament ganglia and mucoid degeneration: coexistence and clinical correlation. *AJR Am J Roentgenol*. 2004;182(5):1283–1287.
4. McIntyre J, Moelleken S, Tirman P. Mucoid degeneration of the anterior cruciate ligament mistaken for ligamentous tears. *Skeletal Radiol*. 2001;30(6):312–315.
5. Lintz F, Pujol N, Boisrenoult P, Bargoin K, Beaufile P, Dejour D. Anterior cruciate ligament mucoid degeneration: a review of the literature and management guidelines. *Knee Surg Sports TraumatolArthrosc*. 2011;19(8):1326–1333.
6. Narvekar A, Gajjar S (2004) Mucoid degeneration of the anterior cruciate ligament. *Arthroscopy* 20(2):141–146. <https://doi.org/10.1016/j.arthro.2003.11.030>
7. Makino A, Pascual-Garrido C, Rolon A, Isola M, Muscolo DL. Mucoid degeneration of the anterior cruciate ligament: MRI, clinical, intraoperative, and histological findings. *Knee Surg Sports TraumatolArthrosc*. 2011;19(3):408–411.
8. Ventura D, Nuñez JH, Joshi-Jubert N, Castellet E, Minguell J. Outcome of Arthroscopic Treatment of Mucoid Degeneration of the Anterior Cruciate Ligament. *ClinOrthop Surg*. 2018 Sep;10(3):307-314. doi: 10.4055/cios.2018.10.3.307. Epub 2018 Aug 22. PMID: 30174806; PMCID: PMC6107816.
9. Pandey V, Suman C, Sharma S, Rao SP, KiranAcharya KV, Sambaji C. Mucoid degeneration of the anterior cruciate ligament: Management and outcome. *Indian J Orthop* 2014;48:197-202