

ORIGINAL RESEARCH

Association of the lateral meniscus tear with high grade anterior cruciate ligament

¹Dr. Shiv Mani, ²Dr. Manvendra Singh, ³Dr. Sarita Kumari

¹Associate Professor, ²Assistant Professor, ³Senior Resident, Department of Radiology, Rajarshi Dashrath Government Medical College, Ayodhya, UP, India

Corresponding author

Dr. Sarita Kumari

Senior Resident, Department of Radiology, Rajarshi Dashrath Government Medical College, Ayodhya, UP, India

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ABSTRACT

Background: Meniscus tears are commonly observed in patients with anterior cruciate ligament (ACL) injuries. The present study was conducted to assess the association of the lateral meniscus tear with high-grade anterior cruciate ligament. **Materials & Methods:** 80 patients with the lateral meniscus tear of both genders underwent MRI of knee joint with 1.5 Tesla high gradient MRI scanner. T1 and T2 weighted sequences in sagittal planes, PD weighted sequences in axial, coronal and sagittal planes and fat suppressed T2 or STIR sequences were recorded. A comparison of findings of magnetic resonance imaging with arthroscopic findings were done. **Results:** Group I had 22 males and 18 females and group II had 25 males and 15 females. The location was bucket handle in 3, complex in 7, flap in 4, horizontal in 6, peripheral in 10, radial in 5 and root in 5 patients. The difference was significant ($P < 0.05$). MRI revealed 37 and arthroscopic findings showed 40 cases of patient with high grade ACL tear with LM tear and 43 MRI and 40 cases of patient with high grade ACL tear without LM tear. **Conclusion:** MRI is an accurate, cost-effective and with high sensitivity imaging modality useful in diagnosis of lateral meniscus tear associated with high grade ACL tear.

Key words: Anterior cruciate ligament tear, lateral meniscus tear, MRI

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INTRODUCTION

Knee is one of the largest and most complex joints in the body. Disease processes and injuries that disrupt ligaments, menisci, articular cartilage and other structures of the knee cause painful knee resulting in significant morbidity and disability.¹ Meniscus tears are commonly observed in patients with anterior cruciate ligament (ACL) injuries, with a reported prevalence of approximately 55% to 65%.² Several studies have shown that associated meniscal tears are strong predictors for the development and progression of knee osteoarthritis (OA) as well as worse patient reported outcomes after ACL reconstruction, especially if a partial or total meniscectomy is performed. Meniscal injuries commonly occur in conjunction with anterior cruciate ligament (ACL) tears.³

Many surgeons think that magnetic resonance imaging (MRI) is a reliable, non-invasive way to identify knee injuries. It provides enough data to support conservative treatment choices and prevent unnecessary arthroscopy for the patient.⁴ As soon as magnetic resonance imaging (MRI) was developed in the early 1980s, it became clear how useful it was for

imaging the knee. The use of MRI in the knee has increased significantly since the advent of special closely coupled extremity coils, high field systems, open systems, extremity units, and other technological advancements.⁵ Non-invasive magnetic resonance imaging (MR) examination is currently widely employed to evaluate a variety of internal knee derangements and articular disorders. It has essentially supplanted traditional arthrography in the assessment of menisci and cruciate ligaments, reducing both morbidity and costs associated with negative arthroscopic examinations.⁶ The present study was conducted to assess the association of the lateral meniscus tear with high grade anterior cruciate ligament.

MATERIALS & METHODS

The present study was comprised of 80 patients with the lateral meniscus tear of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Parameters such as height, weight, body mass index (BMI), type of injury, and mechanism of injury etc.

was recorded. Patients with high grade ACL tear that is when ACL angle >15 degree, are categorized into lateral menisci tear associated with ACL tear (group I) and isolated ACL tear / ACL tear with other combined tears (except lateral menisci tear) (group II). All underwent MRI of knee joint with 1.5 Tesla high gradient MRI scanner. T1 and T2 weighted sequences

in sagittal planes, PD weighted sequences in axial, coronal and sagittal planes and fat suppressed T2 or STIR sequences were recorded. A comparison of findings of magnetic resonance imaging with arthroscopic findings were done. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients based on gender

Group	Group I	Group II
M:F	22:18	25:15

Table I shows that group I had 22 males and 18 females and group II had 25 males and 15 females.

Table II Location of Tear in Lateral Menisci on MRI

Location	Number	P value
Bucket Handle	3	0.01
Complex	7	
Flap	4	
Horizontal	6	
Peripheral	10	
Radial	5	
Root	5	

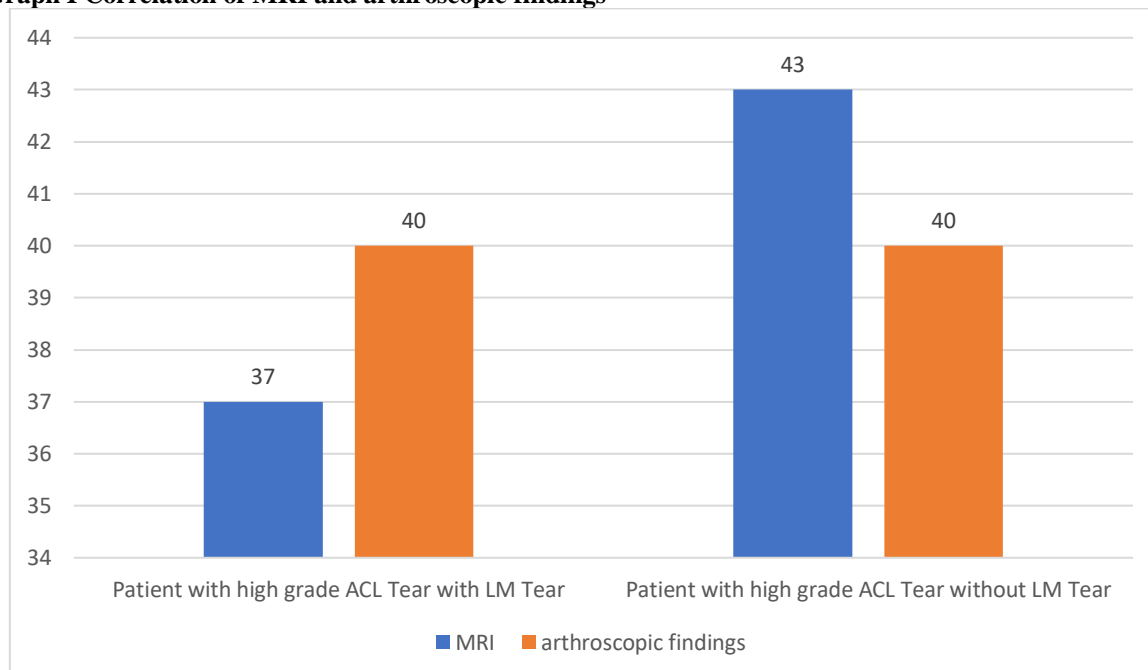
Table II show that the location was bucket handle in 3, complex in 7, flap in 4, horizontal in 6, peripheral in 10, radial in 5 and root in 5 patients. The difference was significant (P< 0.05).

Table III Correlation of MRI and arthroscopic findings

Parameters	MRI	arthroscopic findings
Patient with high grade ACL Tear with LM Tear	37	40
Patient with high grade ACL Tear without LM Tear	43	40

Table III, graph I show that MRI revealed 37 and arthroscopic findings showed 40 cases of patient with high grade ACL tear with LM tear and 43 MRI and 40 cases of patient with high grade ACL tear without LM tear.

Graph I Correlation of MRI and arthroscopic findings



DISCUSSION

Preoperative planning and the selection of surgical candidates have both benefited from the use of MR

imaging.⁷ The orthopaedic community has accepted MR knee studies as a non-invasive alternative to non-therapeutic arthroscopy and arthrography, in part

because of their declining cost. One of the major advantages of MRI is that it allows the manipulation of contrast to highlight different tissue types.⁸ The new surgical and pharmacologic options available to treat damaged cartilage and the need to monitor the effects of treatment, have led to the development of various MRI techniques that allow morphologic assessment of cartilage, quantification of its volume and evaluation of its biochemical composition.⁹ MRI, by virtue of its superior soft-tissue contrast, lack of ionizing radiation and multiplanar capabilities, is superior to more conventional techniques for the evaluation of articular cartilage.¹⁰ Arthroscopy is considered “the gold standard” for the diagnosis of traumatic intraarticular knee lesions. However, arthroscopy is an invasive procedure that requires hospitalization and anesthesia, thus presenting all the potential complications of a surgical procedure.^{11,12} The present study was conducted to assess the association of the lateral meniscus tear with high grade anterior cruciate ligament.

We found that group I had 22 males and 18 females and group II had 25 males and 15 females. Mishra et al¹³ assessed association of the lateral meniscus tear with high grade anterior cruciate ligament. Patients with less than one month of trauma to knee were included. Patients were then subjected to MRI (GE Signa HDX MR Machine with 1.5 Tesla field strength and with Siemens 3T MAGNETOM VIDA). Patients having high grade ACL injuries (61 cases) are categorised into lateral meniscus tear associated with ACL tear and isolated ACL tear / ACL tear with other combined tears (except lateral meniscus tear). A comparison of findings of MRI with arthroscopic was done. Statistical analysis using Microsoft excel done. 61 patients with high grade ACL tear (less than one month of injuries) were included in the study. Of those, 59.01 % (36 cases) had ACL tears without lateral meniscus injury, 40.98 % (25 cases) had associated the lateral meniscus tear.

We found that the location was bucket handle in 3, complex in 7, flap in 4, horizontal in 6, peripheral in 10, radial in 5 and root in 5 patients. We observed that MRI revealed 37 and arthroscopic findings showed 40 cases of patient with high grade ACL tear with LM tear and 43 MRI and 40 cases of patient with high grade ACL tear without LM tear. Gupta et al¹⁴ identified the incidence and relative association of meniscus injuries in complete and partial ACL injuries. Patients were divided into 2 groups; group I: partial ACL tear and group 2: complete ACL tear. Both groups were assessed for meniscal tears; either isolated medial/lateral or combined and odds ratio was measured between two groups. A total of 43 and 219 patients were enrolled in group I and II respectively. The mean age (years) in group I and II were 25.32 ± 7.12 and 28.64 ± 10.84 respectively. There were total of 5 and 28 females in group I and II respectively. Mean pre-injury Tegner score in group I and II was 7.02 ± 2.87 and 6.82 ± 3.14 respectively. Mean time

from injury to surgery (months) in group I and II was 8.04 ± 6.43 and 7.62 ± 4.83 respectively. In group 1 There were a total of 6 with lateral meniscus tears, 9 with medial meniscus tears and 3 with combined meniscal tears in group 1 while in group 2, 47 had lateral meniscal tears, 71 had medial meniscal tears and 71 had combined tears. Group II patients had stronger association for isolated meniscal tears compared to group I, with an odds ratio of 5.05 ($p < 0.05$). Combined meniscal tears had non-significant relation in two groups

Bansal et al¹⁵ evaluated knee MRI and found that meniscal tears were the commonest soft tissue abnormality found in our study. Tears involved posterior horn of the medial meniscus more commonly and were mostly grade 2. Vertical tears were the commonest type of meniscal tear and were associated with a history of trauma. Tear was the commonest pathology affecting the ACL, most being acute in nature. Partial PCL tear was the commonest PCL pathology. 1/3rd of the patients had bone contusion and tibia was more commonly involved followed by lateral femoral condyle. Acute ACL tears were usually associated with bone contusions. Popliteal cyst was the commonest cystic lesion and was associated with effusions and meniscal tears.

CONCLUSION

Authors found that MRI is an accurate, cost-effective and with high sensitivity imaging modality useful in diagnosis of lateral meniscus tear associated with high grade ACL tear.

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