

Assessing Pattern of Distribution of Ligamental and Mensical Injuries Using Magnetic Resonance Imaging: An Observational Study

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Received: 10-12-2023 / Revised: 06-01-2024 / Accepted: 28-01-2024

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Conflict of interest: Nil

Abstract

Aim: The aim of the present study was to evaluate the pattern of distribution of ligamental and mensical injuries using Magnetic Resonance Imaging.

Methods: A total number of 50 cases with internal derangement of knee who underwent MR imaging of knee in the Department of Radiodiagnosis, Indira Gandhi Institute of Medical science, Patna, Bihar, India, served as the subjects for this study.

Results: Majority of the patients belonged to 21-40 years of age. 42% patients had ACL tear, 28% had joint effusion and 20% had meniscus. 8 patients had Posterior horn medial meniscus followed by Posterior horn lateral meniscus.

Conclusion: MRI is a noninvasive, useful, radiation free and reliable diagnostic tool for evaluating knee injury and it should be done in suspected menisci and ligamentous injury. Duration of symptoms should also be taken into account as patients with longstanding symptoms are more likely to find pathology in MRI Knee.

Keywords: pattern of distribution, ligamental and mensical injuries, Magnetic Resonance Imaging

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Introduction

Internal derangement to the knee joint is particular cause of morbidity in the adult and old individuals especially among the workers, labour, sports person, etc. An exact diagnosis of injuries is important for early operative as well as non-operative treatment. It requires an accurate clinical history, a thorough physical examination and proper diagnostic tools. With the help of use of advanced imaging, perfect treatment of the knee becomes more helpful. [1] Magnetic resonance imaging (MRI) has become the best imaging equipment for non-invasive review of knee injuries. It has a high diagnostic accuracy and does not involve the use of ionizing radiation. MRI is generally measured as a valuable diagnostic tool. MRI uses magnets and radio-frequency pulses for imaging of soft tissues. [2]

The knee is the most commonly injured joint because of its anatomical structure, its exposure to external forces, and its functional demands. [3,4] Ligament injuries are among the most frequent knee injuries resulting from contact sports like hockey, football, and kabaddi, however, RTAs and

workplace accidents also contribute. The most common ligament to be injured, causing knee instability and pain, is the anterior cruciate ligament (ACL). [5,6] Meniscus tears can be brought on by trauma or develop over time as a result of the instability brought on by ACL damage. Meniscal and cartilage lesions in the knee joint are frequently accompanied by long-standing ACL injuries. [7]

There are some disagreements over the correlation of MRI and clinical diagnosis with knee joint arthroscopy results. [8,9] According to literature reports, the accuracy of clinical examination of the knee to diagnose meniscal injury is about 64-85% and is about 90-100% for ACL injury. [10] MRI helps in assessing occult bone contusion and soft tissue trauma like ligament and meniscal tears. [11] Eighty-five per cent of meniscal tears and 90% to 100% of ACL injuries are correctly identified by MRI, although the sensitivity of the scanner affects the accuracy of the diagnosis. [13]

The aim of the present study was to evaluate the

pattern of distribution of ligament and mensical injuries using Magnetic Resonance Imaging.

Materials and Methods

A total number of 50 cases with internal derangement of knee who underwent MR imaging of knee in the Department of Radiodiagnosis, Indira Gandhi Institute of Medical science, Patna, Bihar, India for two years, served as the subjects for this study.

All patients are subjected to MR imaging and followed by arthroscopy in selected cases (wherever applicable. MRI i. T1 and PDFS weighted sequences in sagittal and coronal planes. ii. T2- weighted in axial, coronal and sagittal planes. MRI Data evaluated for: Joint effusion , Anterior Cruciate Ligament tear, Partial/Complete Posterior Cruciate Ligament tear, Partial/Complete Medial Collateral Ligament tear with grading, Lateral Collateral Ligament tear with grading, Medial Meniscal Tear

with grading, Lateral Meniscal Tear with grading and Osseous/Osteochondral lesions. Arthroscopy/ Arthrotomy were carried out in OT by orthopedic surgeons in selected and available cases for diagnostic or therapeutic purposes.

Written informed consent was taken from all the patients presenting with internal derangement of knee undergoing MRI knee joint in our department the same was followed. And in selected cases MRI was followed by arthroscopy after taking proper written inform consent in the department of orthopedics.

Statistical Methods:

Agreement of MRI with arthroscopy or arthrotomy in terms of percentage is analyzed .

Results

Table 1: Distribution of cases according to age groups

Age groups in years	Number of patient	%
11-20	6	12
21-30	16	32
31-40	15	30
41-50	8	16
51-60	5	10
Total	50	100

Majority of the patients belonged to 21-40 years of age. Table 2: MRI findings

MRI findings	Number of patient	%
ACL tear	16	32
PCL tear	6	12
MCL tear	2	4
Joint effusion	14	28
Meniscus	10	20
Barker’s cyst	2	4

42% patients had ACL tear, 28% had joint effusion and 20% had meniscus. Table 3: Meniscus findings

Meniscus	N
Medial	8
Lateral	4
Posterior horn medial meniscus	5
Anterior horn medial meniscus	1
Posterior horn lateral meniscus	2
Total	20

8 patients had Posterior horn medial meniscus followed by Posterior horn lateral meniscus.

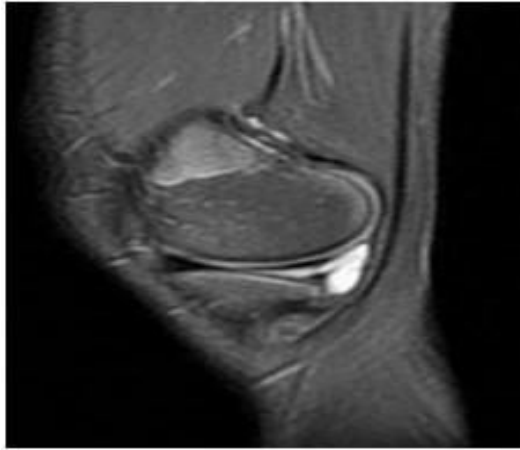


Figure 1: Sag T2 shows complete tear of ACL

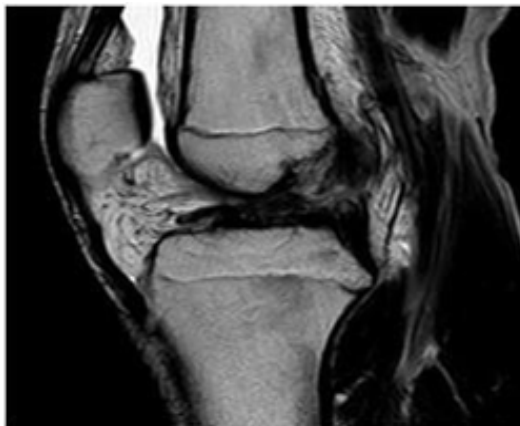


Figure 2: Sag T2 showing buckled but intact PCL



Figure 3 Sag T2FS showing tear communicating with parameniscal cyst

Discussion

MRI signs - The direct signs include¹⁴⁻¹⁶ Discontinuity of ACL fibers. ii) Abnormal contour of anterior cruciate ligament. The indirect signs include [14,17] i) Buckling of posterior cruciate ligament. ii) Anterior translation of tibia. iii) Overhanging of posterior horn of the lateral meniscus. iv) Deep lateral femoral sulcus exceeding 2mm in depth v) Segond fracture of the lateral tibia. vi) Chip fracture of the posterior tibia vii) kissing bone contusion. Subacute phase is the best time for

evaluation of tear. Proximal end may be displaced posterior to the PCL giving the appearance of a loose body. Chronic ACL tears are difficult to evaluate due to associated atrophy. The distal end of the ACL may be seen intact and attached to the PCL without visualization of the proximal end and is commonly reported as normal. Posterior cruciate ligament (PCL): MRI appearances include thickening of the middle portion of the ligament with hyperintensities on both T1- and T2- weighted images. Unlike acute ACL tears, continuity of the ligament is maintained

in the PCL with acute trauma. [16,18]

Majority of the patients belonged to 21-40 years of age. 32% patients had ACL tear, 28% had joint effusion and 20% had meniscus. 8 patients had Posterior horn medial meniscus followed by Posterior horn lateral meniscus. Sonnin et al [19] found the incidence of PCL tear to be 3 percent. Collateral ligaments: We have found in our study LCL tears (14.49%) are commoner than the MCL tear (13.04%). Grade 3 (5.75%) MCL tear were more common in our study. Most of the collateral injuries were associated with other ligamentous and meniscal injuries which is in concordance with the study of Mink JH et al. [20] They observed on MRI and arthroscopy of 11 patients who had tear of LCL, 7 patients had tear of MCL, 4 patients had tear of lateral meniscus and 1 patient had tear of medial meniscus.

Uppin et al [21] conducted a study in which the maximum number of patients were between 20 and 40 years and the most common cause of knee injury was RTA followed by sports injuries. When compared to our study, we also observed that the maximum number of patients were between 19 and 40 years of age and the most common cause of injury was observed to be a twisting force. Some authors also proposed that clinical examination and MRI evaluation show no significant differences in the diagnostic accuracy of ACL and meniscal injuries. [22,23] Kocabey et al [24] concluded that there are no real advantages of MRI over clinical examination in the diagnosis of meniscal and ACL tears before knee arthroscopy.

Conclusion

MRI is a noninvasive, useful, radiation free and reliable diagnostic tool for evaluating knee injury and it should be done in suspected menisci and ligamentous injury. Duration of symptoms should also be taken into account as patients with longstanding symptoms are more likely to find pathology in MRI Knee.

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