

Original Research

Assessment of knee joint pathologies using magnetic resonance imaging

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ABSTRACT:

Background: Regarded as "the gold standard," arthroscopy is utilized to diagnose traumatic intraarticular knee injuries. The present study was conducted to assess the efficacy of MRI in patients with knee joint pathologies. **Materials & Methods:** 66 patients with painful knee joint 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. **Results:** Out of 66 patients, males were 30 and females were 36. The age group 21-30 years had 6 patients, 31-40 years had 8, 41-50 years had 12, 51-60 years had 24 patients. The difference was significant ($P < 0.05$). The common knee pathologies were anterior cruciate ligament tear in 15, posterior cruciate ligament tear in 11, rheumatoid arthritis in 6, medial meniscal tears in 2, lateral meniscal tear in 1, osteochondritis dissecans in 3, infection in 7 patients, medial collateral ligament tears in 10, and lateral collateral ligament tears in 11 patients. The difference was significant ($P < 0.05$). **Conclusion:**

Key words: Arthroscopy, MRI, gold standard

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INTRODUCTION

Regarded as "the gold standard," arthroscopy is utilized to diagnose traumatic intraarticular knee injuries.¹ All the possible risks associated with a surgical operation are present with arthroscopy, though, since it is an invasive technique that necessitates hospitalization and anesthesia.² Magnetic resonance imaging (MRI) has grown in popularity as a musculoskeletal disorder diagnostic technique since its introduction in the 1980s. Many doctors think that magnetic resonance imaging (MRI) is a reliable, non-invasive way to identify knee problems. It provides enough data to support conservative treatment choices and prevent unneeded surgery for the patient.³

As soon as magnetic resonance imaging (MRI) was developed in the early 1980s, it became clear how useful it was for imaging the knee.⁴ The use of MRI in the knee has increased significantly since the advent of specific closely connected extremity coils, high field systems, open systems, extremity units, and other technological advancements.⁵ In the evaluation of menisci and cruciate ligaments, magnetic resonance imaging (MR) examination has largely replaced

conventional arthrography. This non-invasive modality is now routinely used to assess a wide range of internal knee derangements and articular disorders, reducing the morbidity and costs associated with negative arthroscopic examinations.⁶ The present study was conducted to assess the efficacy of MRI in patients with knee joint pathologies.

MATERIALS & METHODS

The present study consisted of 66 patients with painful knee joints of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. A thorough clinical examination of knee joints was performed. 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. 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

Total- 66		
Gender	Males	Females
Number	30	36

Table I shows that out of 66 patients, males were 30 and females were 36.

Table II Age-wise distribution of patients

Age group (Years)	Number	P value
21-30	6	0.05
31-40	8	
41-50	12	
51-60	24	
60-70	16	

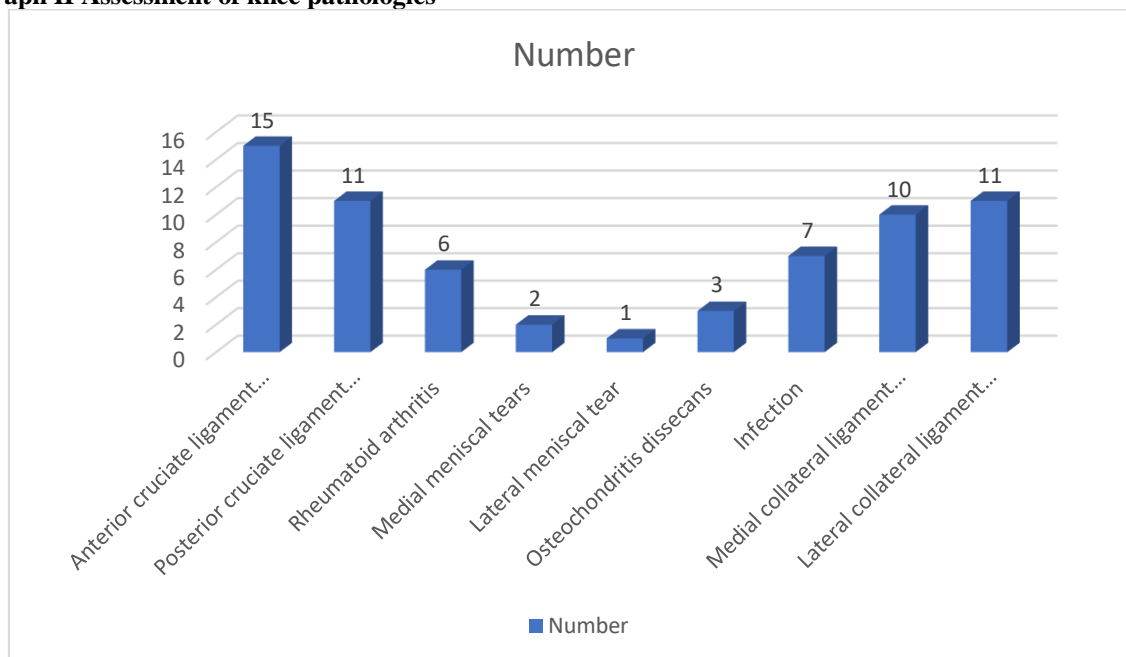
Table II shows that age group 21-30 years had 6 patients, 31-40 years had 8, 41-50 years had 12, 51-60 years had 24 patients. The difference was significant (P< 0.05).

Table III Assessment of knee pathologies

Knee pathologies	Number	P value
Anterior cruciate ligament tears	15	0.05
Posterior cruciate ligament tears	11	
Rheumatoid arthritis	6	
Medial meniscal tears	2	
Lateral meniscal tear	1	
Osteochondritis dissecans	3	
Infection	7	
Medial collateral ligament tears	10	
Lateral collateral ligament tears	11	

Table III, graph II shows that common knee pathologies were anterior cruciate ligament tear in 15, posterior cruciate ligament tear in 11, rheumatoid arthritis in 6, medial meniscal tears in 2, lateral meniscal tear in 1, osteochondritis dissecans in 3, infection in 7 patients, medial collateral ligament tears in 10, and lateral collateral ligament tears in 11 patients. The difference was significant (P< 0.05).

Graph II Assessment of knee pathologies



DISCUSSION

In both clinical and scientific settings, magnetic resonance imaging (MRI) has emerged as the most

significant method for evaluating pathologic alterations in knee cartilage. The ability to adjust contrast to emphasize distinct tissue types is one of

MRI's main benefits.^{7,8} The development of multiple MRI techniques that enable morphologic assessment of cartilage, quantification of its volume, and evaluation of its biochemical composition has been prompted by the availability of new surgical and pharmacologic options to treat damaged cartilage, as well as the need to monitor the effects of treatment.^{9,10} When assessing articular cartilage, MRI is preferable over more traditional methods due to its superior soft-tissue contrast, non-ionizing radiation, and multiplanar capabilities. Therefore, MRI is the most crucial imaging technique for the evaluation of traumatic or degenerative cartilaginous lesions in the knee.^{11,12} The present study was conducted to assess the efficacy of MRI in patients with knee joint pathologies.

We observed that out of 66 patients, males were 30 and females were 36. Rubin et al¹³ investigated the accuracy of MR imaging of knees having varying degrees and numbers of ligament injuries. Patients were divided into three groups: no ligament injuries, single ligament injuries, and multiple ligament injuries. Using MR imaging, they found overall sensitivity and specificity for diagnosing ligament tears to be 94% and 99%, respectively, when no or one ligament was torn and 88% and 84%, respectively, when two or more supporting structures were torn. Sensitivity for diagnosing meniscal tears decreased as the number of injured structures increased, but the relationship achieved statistical significance only for the medial meniscus.

We found that the age group 21-30 years had 6 patients, 31-40 years had 8, 41-50 years had 12, 51-60 years had 24 patients. Robertson et al¹⁴ evaluated the accuracy and reliability of multiple signs of anterior cruciate ligament (ACL) tears with magnetic resonance (MR) imaging. Two independent reviewers retrospectively evaluated 103 sets of ACL MR images for the presence of 22 signs of ACL tears. There were 43 patients with ACL tears and 58 patients whose ACLs were proved to be intact at surgery. Although variable imaging protocols were used, T1- and T2-weighted images were obtained in nearly all patients. Direct non-visualization, intrinsic ACL abnormalities, associated osseous and cartilage abnormalities, and other indirect signs were evaluated. Discontinuity of the ACL in the sagittal and axial planes and failure of the fascicles to parallel the Blumensaat line were the most accurate signs of a tear. Discontinuity of the ACL, disruption of fascicles, a posterolateral tibial bruise, a buckled posterior cruciate ligament, positive posterior cruciate ligament line sign and positive posterior femoral line sign were the best predictors of an ACL tear at logistic regression analysis.

We found that the common knee pathologies were anterior cruciate ligament tear in 15, posterior cruciate ligament tear in 11, rheumatoid arthritis in 6, medial meniscal tears in 2, lateral meniscal tear in 1, osteochondritis dissecans in 3, infection in 7

patients, medial collateral ligament tears in 10, and lateral collateral ligament tears in 11 patients. Shah et al¹⁵ conducted a study on 150 patients. All patients were subjected to radiographs of knee anterior-posterior and lateral view. MRI was performed. Articular cartilage defect was found in 90 patients (60%). Out of 90 patients with articular cartilage defects, 30 patients (20%) had full-thickness cartilage defects. Subchondral marrow edema was seen in 30 patients (20%) with articular cartilage defects. 32 patients (21.1%) had a complex or macerated meniscal tear. Complete anterior cruciate ligament tear was found in seven patients. Joint effusions were detected in 70% (105) of the knees. Large Baker cysts were observed in 6.1% of the knees.

CONCLUSION

Authors found that common knee pathologies were anterior cruciate ligament tear, posterior cruciate ligament tear, rheumatoid arthritis, medial meniscal tears, lateral meniscal tears, osteochondritis dissecans, infection, medial collateral ligament tears and lateral collateral ligament tears. MRI found to be accurate and affordable radiographic tool for diagnosing knee pathologies.

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