ORIGINAL RESEARCH PAPER

Radiology

KEY WORDS:

THE INJURED KNEE: DIAGNOSTIC EFFICACY OF MRI WITH ARTHROSCOPIC CORRELATION

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ABSTRACT

Knee injury represent roughly 6% of all acute injuries treated at emergency department. Knee pain is a complaint in 20% of the general adult population and 15% of all sports injuries involve the knee. 75% of the surgeries done on professional football players involve ligament tear and meniscal injuries.

Magnetic Resonance Imaging [MRI], a non-invasive modality, is now routinely used to assess a wide spectrum of internal knee derangement. Accurate and timely diagnosis increases the likelihood of fully restoring normal and pain free use of affected knee.

In this study we assess the diagnostic efficacy of MRI in assessment of the internal derangement within the injured knee and correlate them with arthroscopic evaluation

INTRODUCTION:

In the acute phase of the knee injury, although clinical examination is most important for the diagnosis of ligament injury, painful stress examinations are not always accurate in the acute phase of the injury. For that reason, MR imaging is indicated for early diagnosis of the acutely injured knee.

MRI is the most sensitive test for the diagnosis of virtually all bone and soft tissue injuries in and around the knee. Additionally, MRI provides information that can be used to grade pathology, guide therapy and evaluate treatment for wide variety of orthopedic conditions in the knee. MRI is capable of depicting detailed knee joint anatomy enabling accurate diagnosis of wide spectrum of abnormalities.

MRI does not utilize ionizing radiation. It is also non-invasive, painless and allows acquisition of images in multiple planes without repositioning the patient. In addition MRI provides excellent spatial and contrast resolution of both intra and extra articular structure. Thus MRI clearly emerged as primary imaging tool in work up of knee joint pathology.

Prompt identification of surgically treatable traumatic injuries of the knee enables early intervention and prevents early unnecessary diagnostic arthroscopic procedures.

AIMS

- To study the spectrum of MRI findings in knee injury.
- To correlate the MRI findings of knee injury with arthroscopic findings (whenever performed).

MATERIALS & METHODS –

The study was conducted in Department of Radiology, Dr. DY Patil Medical College, Hospital and Research Centre, Nerul, Navi Mumbai over a period of 2yrs

100 patients presenting with knee injury referred from OPD& IPD of Orthopaedic department to the Department of Radiodiagnosis for MR imaging were included in the study.

Arthroscopic knee surgery was performed in 39 subjects out of the total 100 subjects.

Statistical analysis was done using percentage and proportions with the help of graphical representation from the data obtained from the study of the patients with knee injuries.

DISCUSSION

Magnetic resonance imaging is capable of depicting detailed knee joint anatomy, enabling accurate diagnosis of a wide spectrum of abnormalities. MR does not require manipulation of the knee joint, is noninvasive, can generally be performed in less than 35 minutes, and is painless. These factors result in a high degree acceptance by both patients and referring clinicians.

Prompt identification of surgically treatable traumatic injuries to the knee trials early intervention and prevents unnecessary diagnostic arthroscopic procedures. An early and accurate diagnosis can have a tremendous impact treatment by identifying those injuries for which surgery will be beneficial. This serves to promote the healing response, and allows the patient's rapid return to activity. In light of its relative cost-effectiveness and accuracy, magnetic resonance imaging (MRI) of the knee has been demonstrated to be a useful modality in assessment of internal derangement injuries of the knee.

IMAGING TECHNIQUE

MRI is the most appropriate screening tool before therapeutic arthroscopy. It is preferable to diagnostic arthroscopy in most patients because it avoids the surgical risks of arthroscopy.

With a high cost/benefit ratio and lack of apparent deleterious side effects, MRI has become the imaging modality of choice for soft tissue visualization.

A good knowledge of anatomy and basic imaging physics is required to understand MR Anatomy of knee joint. Numerous false positive findings have explanations in variants of anatomy or technical artifacts.

In general, the menisci can be evaluated using Spin echo proton density images. Spin echo T1-weighted images and

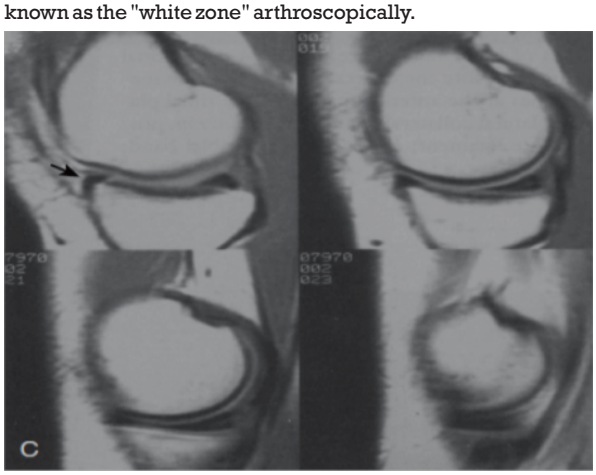
gradient echo techniques can also be very useful. T1W or proton density-weighted sequences are most suitable for visualizing the ligamentous anatomy. When assessing ligaments, tendons or other soft tissues for pathology, the preferred technique will be fluid-sensitive, or T2-weighted sequences. T2 or short tau inversion recovery (STIR) sequences with fat saturation are essential to demonstrate bone marrow edema.

ANATOMY OF MENISCI

The menisci of the knee are well visualized with MRI. The normal meniscus displays low signal intensity on all sequences. The medial meniscus is slightly bigger and has a larger radius than its lateral counterpart. On the sagittal slices, each meniscus has a bow-tie appearance. Towards the midline, the menisci have the appearance of two triangles. The anterior and posterior horns of the lateral meniscus are approximately equal in size, whereas the posterior horn of the medial meniscus is nearly twice as large as the anterior horn.

The entire periphery of the medial meniscus is attached to the joint capsule. In contrast, the anterior horn and body of the lateral meniscus are entirely attached to the joint capsule, but the posterior horn is focally separated from the joint capsule and connected to it by superior and inferior popliteomeniscal fascicles, which form an oblique tunnel called the popliteal hiatus, through which runs the popliteus tendon. In addition to their capsular attachment, the menisci are attached to the tibial plateau by fibrous bands at the roots of their anterior and posterior horns. The anterior horns of the menisci are also connected to each other by the transverse meniscal ligament, and the attachment site of this ligament on the meniscus can sometimes mimic a meniscal tear. The meniscofemoral ligaments of Humphry and Wrisberg are anatomically inconstant structures that run from the lateral aspect of the medial femoral condyle to the posterior horn of the lateral meniscus. The Humphry ligament lies anterior to the PCL while the Wrisberg ligament is posterior to the PCL

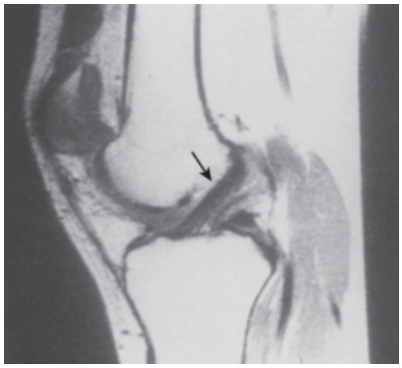
Menisci serve an important role in knee function, stability and load transmission, and are composed of fibrocartilage fibers. The periphery of the meniscus is vascularized and appears as the "red zone" on arthroscopy. Therefore, a tear that is confined to the periphery has greater healing potential than a tear that also involves the avascular central portion, also known as the "white zone" arthroscopically.



ANATOMY OF CRUCIATE LIGAMENTS

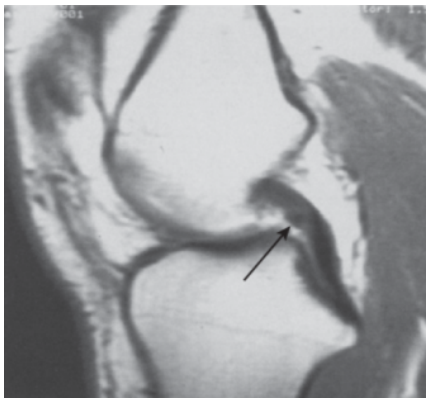
The cruciate ligaments are two other structures very commonly evaluated with MRI. Both the anterior and posterior cruciate ligaments are intraarticular but extra synovial structures linking the femur and tibia.

The anterior cruciate ligament (ACL) is a very important structure, providing stability to the knee and preventing anterior translation of the tibia. It also prevents excessive internal rotation and hyperextension. The anterior cruciate (ACL) is frequently injured during athletic activities.



The anterior cruciate ligament attaches at the posterior aspect of the lateral femoral condyles and on the medial anterior aspect of the tibia plateau. The ACL is best visualized on sagittal images. On the coronal slices, the ACL appears as a flattened structure adjacent to the lateral femoral condyles.

The posterior cruciate ligament (PCL) is seen in all MRI planes and sequences as a band of low signal intensity. It is seen in its entirety on the sagittal slices, appearing as a thick fibrous band originating from the medial aspect of the femoral condyle. From the condyle, it extends inferioriy to the posterior aspect of the tibial plateau. Injury to the PCL occurs as a result of an anterior to posterior force applied to the proximal tibia, such as may occur with contact of the femur against the dashboard in an automobile accident. Injuries to the PCL are relatively rare injury in comparison to an ACL injury.



Anatomy of Collateral Ligaments

The medial (tibial) and lateral (fibular) collateral ligaments are slightly difficult to evaluate than the cruciate ligaments. The medial collateral ligament (MCL) is a flat band running from the epicondyles of the femur and aching into the medial tibia. The MCL fibres are continuous with the joint capsule in its entirety. It also contributes fibres to the medial meniscus. This ligament is best visualized on coronal slices appearing as an area of dark signal, like most ligaments and tendons.

The lateral or fibular collateral ligament (LCL) is a round, cord-like structure joining the distal femur to the fibular head conjointly with the biceps. Unlike the medial collateral ligament, the LCL is not in contact with the Meniscal surface (these structures are separated by the popliteus tendon).

The LCL is only continuous with the articular capsule along the femur. It resists valgus angulations and some internal rotation. Injuries to the LCL are associated with trauma to other posterolateral structures and cruciate ligaments.

Anatomy of Bone

MRI provides superb soft tissue detail, however, it is also a useful tool Gathering information about the subchondral and marrow components of bone Bone marrow patterns varies

with age. In children, usually of age 12 and under 18, most of the marrow space is filled with hematopoietic cells typically of intermediate signal intensity on both T1- and T2-weighted sequences. In adults, the bone marrow signal is usually high on T1-weighted Images and intermediate on T2-weighted images, consistent with yellow, or fatty, marrow.

Injuries to bone, such as contusions or stress fractures, are easily diagnosed with MRI as a change in bone marrow signal. When the signal from marrow is eliminated by fat suppression, bone marrow edema becomes evident. It can be demonstrated on fluid sensitive and fat suppressed Images by focal areas of increased signal.

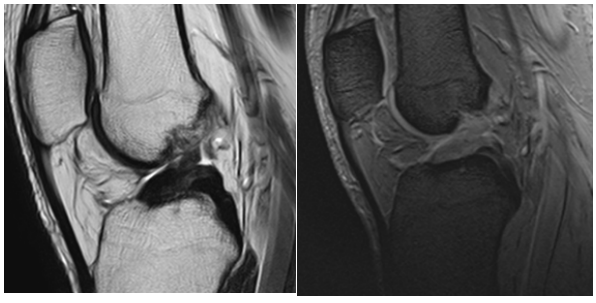
MR APPEARANCES OF INTERNAL DERANGEMENTS IN INJURED KNEE

Anterior cruciate ligament (ACL) injury

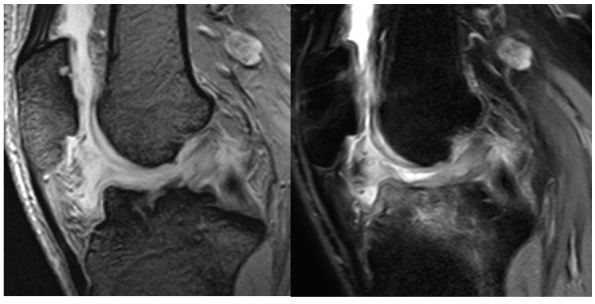
The ACL should be examined in sagittal, coronal, and axial planes for abnormal increased T2- weighted signal or abnormal contour. An oblique coronal plane, prescribed along the line of the ACL in the sagittal plane is most helpful for evaluation of the ACL fibers.

Tear range from low grade, partial thickness to full thickness and are located most commonly in the mid- to proximal aspect of the ligament. ACL tears occur up to eight times more commonly in females than in males.

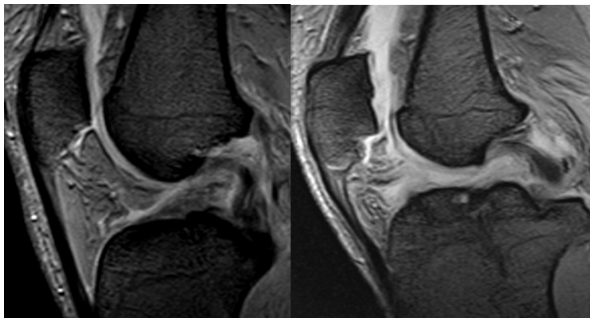
A torn ACL fiber has increased T2-weighted signal and an abnormal contour. In some full-thickness tears, an amorphous mass replaces the discrete ACL fibers. Fluid can fill the gap between the fibers of a full-thickness tear. The location of the tear can be described as proximal, midsubstance, distal, or involving the femoral or tibial attachment.



ACL TEAR AT FEMORAL ATTACHMENT



ACL TEAR AT TIBIAL ATTACHMENT

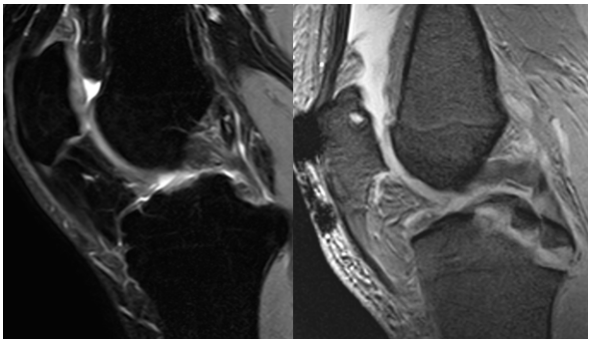


MID SUBSTANCE ACL TEAR

Posterior cruciate ligament injury (PCL)

The PCL is injured less commonly than the ACL, but can demonstrate the same range of appearances on MR imaging, from focal areas of abnormal signal to complete disruption of the ligament.

The PCL is evaluated best on sagittal MR images obtained with a fluid-it sensitive sequence. In PCL most common tear is at the midportion of the ligament

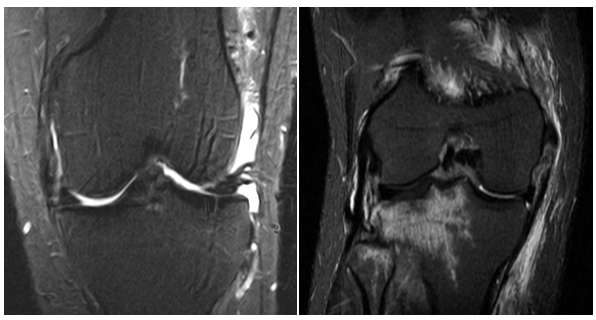


POSTERIOR CRUCIATE LIGAMENT TEAR FRACTURE TIBIAL ATTACHMENT

Medial Collateral Ligament injury (MCL)

Consequently injuries to the collateral ligaments are best appreciated on coronal fat suppressed images.

Lesions of the MCL are graded as follows: Grade 1 (sprain) lesions are defined as high signal intensity superficial to the MCL representing edema, with intact MCL fibers. In grade 2 (partial tear) lesions; fluid signal extends partially through the MCL, although some fibers remain intact. In grade 3 lesions, complete discontinuity of the MCL fibers is seen along with surrounding edema, consistent with a complete rupture.



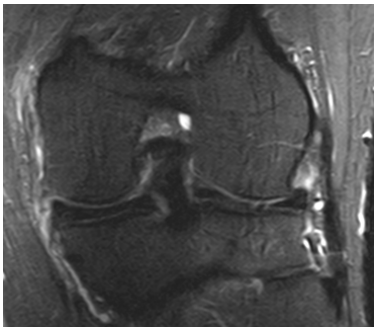
MEDIAL COLLATERAL LIGAMENT TEAR

Lateral Collateral Ligament injury (LCL)

Tears of the lateral collateral ligament are usually combined with other lateral injuries though isolated injuries have been reported.

Lesions of the lateral collateral ligament are divided into sprains, partial tears or complete tears. The most subtle change of injury is fluid within subcutaneous fat abutting the ligament.

The presence of edema surrounding the ligament with an otherwise normal ligament is termed a Grade 1 injury or sprain. These are largely treated conservatively. When the ligament itself becomes disorganised but remains from origin to insertion a partial tear or Grade 2 injury is diagnosed. Complete interruption of the normal low signal constitutes a rupture.



LATERAL COLLATERAL LIGAMENT TEAR

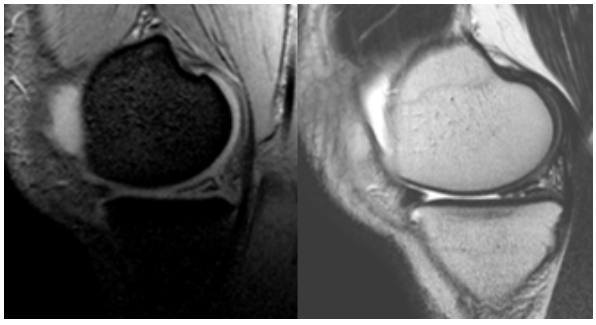
MENISCAL INJURY

The signal within the substance of the meniscus is graded as follows: Grade 1, intrasubstance globular-appearing signal that does not extend to an particular surface; Grade 2, intrasubstance linear signal that does not extend to particular surface; and Grade 3, intrasubstance signal that extends to either superior or inferior surface.

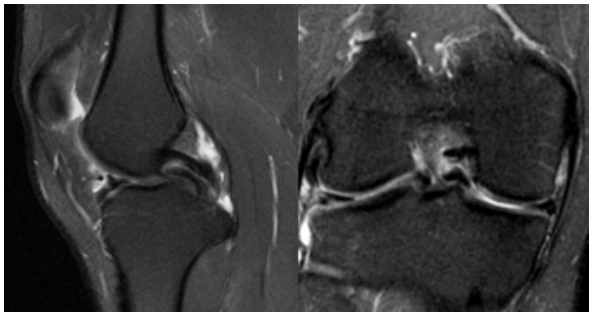
Longitudinal meniscal tears occur parallel to the circumference of the meniscus and divide the meniscus into inner and outer fragments.

A full-thickness longitudinal tear may lead to the development of a bucket handle tear. In a bucket handle tear, the inner fragment becomes displaced centrally into the intercondylar notch.

Radial meniscal tears are also vertically aligned with respect to the plane of the meniscus. Unlike longitudinal tears, radial tears are oriented perpendicular to the circumference of the meniscus dividing it into anterior and posterior of fragments.



GRADE 3 MENISCAL TEAR



BUCKET HANDLE TEAR

Bone bruise or marrow edema pattern

Bone bruises related to trauma may be caused by a direct blow, articular if compression forces, or avulsion injuries. The extent of marrow edema tends ill to be more dramatic with compression or direct trauma, compared with avulsion injuries.

Typically bone bruises are detected easily on MR images using T1-weighted sequences and either short T1 inversion recovery (STIR) or fat-suppressed T2-weighted sequences.

Specific edema patterns are also useful in predicting the mechanism of injury and the associated ligament, tendon, or meniscal involvement.

The overall accuracy in more than 2000 published cases reaches nearly 90%. The accuracy of cruciate ligament ruptures with the arthroscopy as the gold standard ranges from 84 to 100% in ACL (more than 1800 published leases) and 96 to 100% in PCL (more than 1100 published cases). The overall accuracy is estimated to be approximately 94% in ACL rupture and 98% in PCL rupture.

In the literature, MR imaging of the knee is a highly accurate examination in terms of the detection of menisci tears and cruciate ligament ruptures. The accuracy of MR imaging for meniscal tears versus arthroscopy ranges from 72 to 98% in both the medial and the lateral meniscus.

It is the negative predictive value of MR imaging that has taken on a greater significance in clinical medicine. The very high negative predictive value of MR imaging, however, makes the likelihood of missing a clinically significant meniscal tear unlikely and may redirect the clinical examination and foster conservative management.

False-positive MR imaging findings may be-attributable to errors in radiologic interpretation or suboptimal arthroscopy but more typically are due to significant intra-substance tears that do not extend to the meniscal surface.

This difference can be partially overcome by maintaining good lines of the communication between the radiologist and the orthopedic surgeon who can then pursue aggressive probing of localized areas at the time of arthroscopy.False-positive findings in the past have been attributable to normal variants that, with experience and improved resolution, have become less problematic.

OBSERVATION AND ANALYSIS

This study was conducted in the department of Radio diagnosis of DY Patil school of Medicine, Navi Mumbai 100 patients presenting with knee injury referred from OPD (Out Patient Department) & IPD (Inpatient Department) of Orthopaedics to the Department of Radio diagnosis for MR imaging were included in the study.

100 patients of knee injury has undergone MR imaging. MR scans were carried out on 1.5 tesla MR machine (by GE) and studies were performed with sense extremity coil.

Arthroscopic knee surgery was performed in 39 out of the total 100 subjects. Rest of the 61 subjects underwent conservative management.

MR ANALYSIS FOR LIGAMENT INJURY PATTERNS IN 100 PATIENTS

Ligament tears(Complete + Partial)	No. of tears (n)
ACL	50
PCL	19
MCL	17
LCL	16
TOTAL	102

Amongst the 102 ligamentous injuries in 100 subjects, ACL injury (complete / partial) was the most commonly encountered pathology in this series (50%) followed by PCL,MCL and LCL injury which did not show significant variation with each other.

SITE OF ACL TEAR ON MRI

ACL	Number of cases n-50
Femoral attachment	28
Mid substance	15
Tibial Attachment	7

Site of ligament tear was most commonly encountered at femoral attachment (28) followed by midsubstance site (15). Least common site was fibular/tibial attachment with 7 cases.

ANALYSIS OF MENISCAL INJURY PATTERNS IDENTIFIED ON MRI SCANS IN 100 SUBJECTS

Meniscus	Normal	Grade 1	Grade 2	Grade 3	Total
Medial meniscus	51	9	10	30	49
Lateral meniscus	69	7	7	17	31
Total	120	16	17	47	80

49 cases were having abnormal signal intensity in medial meniscus. Incidence of grade 3 signal intensity (meniscal tears) were seen in 30 cases, grade 2 signal intensity were seen in 10 cases followed by grade 1 signal intensity seen in 9 cases.

There were 31 cases having abnormal signal intensity in lateral meniscus. Grade 3 signal intensity (tear) was seen in 17 cases followed by grade 2 signal intensity seen in 7 cases. 7 cases were seen with grade 1 signal intensity.

TYPE AND LOCATION OF MEDIAL MENISCUS TEARS ON MRI

Investigation	Medial Meniscal tears							
	Bucket Handle	Type				Location		
		Complex	Periphiral	Oblique	Radial	Ant	Post	Body
MRI	10	7	4	7	2	11	19	0

Total No. of medial meniscal tears observed on MRI were 30 (30%) most common Type of tear was Bucket handle tear which comprised of 10 cases, complex meniscal tears were seen in 7 cases. Another type of tear observed was oblique which constituted 7 cases. Peripheral and radial tears constituted 4 cases and 2 cases respectively.Most common location of medial meniscal tear was in posterior horn, (19 cases), 11 of the cases showed tears in anterior horn which was second most common location.

TYPE AND LOCATION OF LATERAL MENISCUS TEAR ON MRI

Investigation	Lateral Meniscal tears							
	Bucket Handle	Type				Location		
		Complex	Periphiral	Oblique	Radial	Ant	Post	Body
MRI	4	4	4	7	0	6	11	0

Lateral meniscal tear seen in patients was 17 (17 %) and most common location was in posterior horn which was found in 11 cases (67%). Location like anterior horn were seen in 6 (33%) and there was no case involving body.Most common type was oblique tear which was seen in 7 cases, 4 cases of Bucket handle tear and 4 cases of complex tear was observed

CORRELATION OF MRI FINDINGS AND ARTHROSCOPIC FINDINGS IN 39 PATIENTS

FINDINGS ON MRI

MRI	ACL	PCL	MM	LM	MM+LM
TEAR	29	4	25	4	29
NORMAL	10	35	14	35	49
TOTAL	39	39	39	39	39

FINDINGS ON ARTHROSCOPY

ARTHROSCOPY	ACL	PCL	MM	LM	MM+LM
TEAR	28	2	21	2	23
NORMAL	11	37	18	37	55
TOTAL	39	39	39	39	39

CORRELATION OF MRI AND ARTHROSCOPIC FINDINGS IN ANTERIOR CRUCIATE LIGAMENT TEARS

ACL tear on MRI

Anterior Cruciate Ligament (ACL)	No. of subjects
Tear on MR	29
Tear on Arthroscopy (TP)	28
Normal on Arthroscopy (FP)	1

ACL normal on MRI

Anterior Cruciate Ligament (ACL)	No. of subjects
Normal on MR	10
Tear on Arthroscopy (FN)	0
Normal on Arthroscopy (TN)	10

Agreement between MRI and arthroscopic findings regarding presence or absence of anterior cruciate ligament tears: sensitivity- 100%, specificity-90.9%, NPV- 100%, PPV-96.5% and accuracy- (97.4%)

CORRELATION OF MRI AND ARTHROSCOPIC FINDINGS IN POSTERIOR CRUCIATE LIGAMENT TEARS

PCL tear on MRI

Posterior Cruciate Ligament (PCL)	No. of subjects
Tear on MR	4
Tear on Arthroscopy (TP)	2
Normal on Arthroscopy (FP)	2

PCL normal on MRI

Posterior Cruciate Ligament (PCL)	No. of subjects
Normal on MR	35
Tear on Arthroscopy (FN)	0
Normal on Arthroscopy (TN)	35

Correlation between MRI and arthroscopic findings regarding presence or absence of posterior cruciate ligament tears: sensitivity-100% specificity-94.5%, NPV-100% and accuracy- (94.8%)

CORRELATION OF MRI AND ARTHROSCOPIC FINDINGS IN LATERAL MENISCAL TEARS

LATERAL MENISCUS TEARS ON MRI

Lateral meniscus	No. of subjects
Tear on MR	4
Tear on Arthroscopy (TP)	2
Normal on Arthroscopy (FP)	2

LATERAL MENISCUS NORMAL ON MRI

Lateral meniscus	No. of subjects
Normal on MR	35
Tear on Arthroscopy (FN)	0
Normal on Arthroscopy (TN)	35

Agreement between MRI and arthroscopic findings regarding presence or absence of lateral meniscus tears: sensitivity- 100%, specificity-94.5%, NPV- 100%, PPV-50% and accuracy- (94.8%)

CORRELATION OF MRI AND ARTHROSCOPIC FINDINGS IN MEDIAL MENISCAL TEARS

Medial meniscus tears on MRI

Medial meniscus	NO. of subjects
Tear on MR	25
Tear on Arthroscopy(TP)	19
Normal on Arthroscopy(FP)	6

Medial meniscus normal on MRI

Medial meniscus	NO. of subjects
Normal on MR	14
Tear on Arthroscopy(FN)	2
Normal on Arthroscopy(TN)	12

Agreement between MRI and arthroscopic findings regarding presence or absence of medial meniscal tears: sensitivity- 90.4%, specificity-66.7%, NPV- 85.7%, PPV-76% and accuracy- (79.5%)

CORRELATION OF MRI AND ARTHROSCOPIC FINDINGS IN MENISCAL TEARS

Meniscus tear on MRI

Meniscus (LM +MM)	NO. of subjects (n)
Tear on MR	29
Tear on Arthroscopy(TP)	21
Tear on Arthroscopy(FP)	8

Meniscus normal on MRI

Meniscus(LM +MM)	NO. of subjects (n)
Tear on MR	50
Tear on Arthroscopy(FN)	2
Tear on Arthroscopy(TN)	48

Agreement between MRI and arthroscopic findings regarding presence or absence of meniscal tears: sensitivity- 91.3%, specificity-85.7%, NPV- 96%, PPV-72.4% and accuracy- (87.3%)

SUMMARY OF RESULTS

This prospective study comprised of 100 patients with clinical diagnosis of knee joint injury who underwent MR Imaging for diagnosis of the internal derangements in the injured knee joint.

Out of these 100 subjects arthroscopic surgery was performed in 39 subjects. Arthroscopic findings were recorded. Considering arthroscopy as gold standard MR and clinical findings were compared with arthroscopic findings.

The results and observations of present study are summarized as follow:

- MR analysis for ligament injury pattern in 100 patients showed that ACL was most commonly injured (50 cases) followed by PCL with 19 cases. Injury to MCL was seen in 17 cases followed by LCL (16 cases).
- Site of ACL tear was most commonly encountered at femoral attachment (28 cases) followed by midsubstance tears (15 cases). Tears involving attachment sites at tibial/fibular end had the lowest incidence (7 cases).
- Amongst meniscal injuries tear (Grade 3) to medial meniscus was seen in 30 cases (30%). Injury to lateral meniscus was seen in17 cases (17%).
- Amongst the meniscal injuries, grade II signal intensity was seen in 17(17%) menisci (10 medial and 7 lateral). Grade I signal intensity was seen in 9 medial menisci and 7 lateral menisci.
- Distribution of important trauma findings other than tears was seen in 30 cases out of 100 patients. Contusion was most common finding seen in 24 cases (24%) and most common site for contusion was femoral condyle.

Arthroscopy was done in 39 patients and MRI findings are correlated with arthroscopic findings

- Agreement between MRI and arthroscopic findings regarding presence or absence of anterior cruciate ligament tears is: sensitivity- 100%, specificity-90.9%, NPV- 100%, PPV-96.5% and accuracy- 97.4%
- Sensitivity and specificity for diagnosing PCL tear by MR was 100% and 94.5% respectively. Negative predictive value (NPV) of MR examination was 100% making it a very good screening test. Diagnostic accuracy of MRI in diagnosing PCL tears was 94.8%.
- Correlation of medial meniscal tears between arthroscopy and MR findings were as follows: sensitivity-90.4%, specificity-66.7%, NPV- 85.7%, PPV-76% and accuracy 79.5%.
- Agreement between MRI and arthroscopic findings regarding presence or absence of lateral meniscus tears were as follows: sensitivity- 100%, specificity-94.5%, NPV-100% and accuracy- (94.8%)
- Diagnostic accuracy of MRI in diagnosing meniscal injuries was 87.3%.

CONCLUSION:

Magnetic Resonance Imaging (MRI) is a non invasive modality and is routinely used to assess a wide spectrum of internal knee derangement. It does not utilize ionizing radiation and therefore it is entirely safe. It is painless procedure and allows acquisition of images in multiple planes without repositioning the patient. MRI provides surgeon with accurate details of the internal derangements and thus is instrumental in guiding and instituting a right treatment.

MR is unique in its ability to evaluate the internal structure as well as the surface of the meniscus. MRI is also able to evaluate the structures not accessible on arthroscopy like evaluation of bone and collateral ligaments.

It is a useful modality having high diagnostic accuracy, sensitivity and negative predictive value making it a very reliable screening test for diagnosing internal derangements of knee. Thus MRI clearly emerged as primary imaging tool for work up for knee joint pathology.

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