

ORIGINAL RESEARCH

An observational study correlating the diagnostic accuracy of clinical examination, MRI and arthroscopic findings in sports related knee injuries in tribal population, in a tertiary care center

¹Dr. Govind Kumar Gupta, ²Dr. Subhajit Halder, ³Dr. Tapash Kumar Murmu

¹Associate Professor and HOD, ^{2,3}Junior Resident, Department of Orthopaedics, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India

Corresponding Author

Dr. Subhajit Halder

Junior Resident, Department of Orthopaedics, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India

Received: 12 February, 2023

Accepted: 16 March, 2023

ABSTRACT

Introduction: Anterior cruciate ligament (ACL) and meniscal injuries are one of the most common ligamentous knee injuries related to sports. In the last few years Magnetic resonance imaging (MRI) become an indispensable part for diagnosis of ligamentous injuries of knee. However the extent of ligamentous damage to be assessed for its appropriate management. **Aims:** To compare the Sensitivity, Specificity, PPV & NPV of clinical examination, MRI and Arthroscopic findings in sports related injuries in tribal population of Jharkhand. **Materials and Methods:** The present study was a Prospective, Comparative Study. This Study was conducted from May, 2021 to November, 2022 at Department of Orthopaedics, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand. Total 188 patients were included in this study. **Result:** We showed that the Lachman test Sensitivity was: 94.4, Specificity: 100.0, Positive Predictive Value: 100, Negative Predictive Value: 50 and Accuracy: 94.6%, McMurry's test for Lateral meniscus was Sensitivity: 88.0, Specificity: 73.0, Positive Predictive Value: 33.3, Negative Predictive Value: 91.5 and Accuracy: 75.0%, McMurry's Test for Medial Meniscus was Sensitivity: 90.9, Specificity: 91.0, Positive Predictive Value: 84.5, Negative Predictive Value: 94.9 and Accuracy: 90.9%, MRI Findings for ACL injury was Sensitivity: 95.5, Specificity: 90.0, Positive Predictive Value: 99.4, Negative Predictive Value: 52.9 and Accuracy 95.21%, MRI Findings for Medial Meniscus was Sensitivity: 87.9, Specificity: 91.0, Positive Predictive Value: 84.1, Negative Predictive Value: 93.3 and Accuracy 89.89% and MRI Findings for Lateral Meniscus was Sensitivity: 76.0, Specificity: 82.2, Positive Predictive Value: 39.6, Negative Predictive Value: 95.7 and Accuracy 81.38%. **Conclusion:** By correlating the the clinical examination findings, MRI findings and Arthroscopy, we can conclude that carefully done clinical examination have the better or equal findings in comparison to normal MRI for the diagnosis of meniscal and cruciate ligament injury. When clinical findings are in favour of meniscal injury or cruciate ligament injury with a normal MRI findings should not be considered to deny arthroscopy.

Keywords: Anterior cruciate ligament, Magnetic resonance imaging, NPV and X-rays.

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INTRODUCTION

Anterior cruciate ligament (ACL) and meniscal injuries are one of the most common ligamentous knee injuries related to sports. In the last few years Magnetic resonance imaging (MRI) become an indispensable part for diagnosis of ligamentous injuries of knee. However the extent of ligamentous damage to be assessed for its appropriate management. For Orthopaedic Surgeons, the comparison of the findings of clinical assessment, MRI and subsequent arthroscopic evaluation has always been a challenge.

In recent years, to diagnose ligamentous injuries around knee, dependence and reliance on MRI has increased because of its accuracy and non-invasiveness. Due to increased dependency on MRI often clinical findings are ignored and leads to a neglect in diagnosing ligament injury. Arthroscopy, despite of invasive modality, is still the gold standard procedure for diagnosis of traumatic ligamentous injuries of the knee.

According to some clinician a physical examination and a carefully taken history is the most important and

cost-effective mean of diagnosing anterior cruciate ligament and meniscal tears. Others suggested routine MRI will reduce the number and cost of unnecessary invasive procedures.

In Jharkhand, tribal populations are actively involved in sports activities and ligament injuries around knee are common. but these injuries are often ignored by them due to lack of proper health care facilities in periphery which are expertise in treating knee ligament injuries and they easily fall prey to quacks who makes these injuries more complicated. Moreover treatments of these injuries are costly also due to which people neglect treatment of these injuries. As a result, they present to proper health care facilities very late and there is difficulty in diagnosing and treating these injuries by that time.

Till now no studies have been published on correlating the diagnostic accuracy of clinical examination, MRI and arthroscopy findings in sports related injuries in tribal population.

So my study will correlate the diagnostic accuracy of clinical examination, MRI and Arthroscopic findings in sports related injuries in tribal population of Jharkhand and it was helpful in future.

In today's world of technology and advancement, they often come across ill hazards popping out of it. Road traffic accidents are tremendously increasing in number with increasing incidence of various injuries like ligamentous and meniscal injuries within the knee. Many times, they find patient coming with complaints of knee injury from all age groups, from a pedestrian crossing street to elderly falling on the ground, almost all athletes' experiences knee injury during their lifetimes.

The knee joint has a complex structure due to which it is more susceptible to different types of injuries like fracture, dislocation, and tear in the ligaments, tendons, and cartilage. Because of its physical nature, its vulnerability to external forces, and the functional demands imposed on it, the knee is one of the most commonly injured joints¹

In older times they had limited resources to diagnose and manage cases associated with a knee injury and it was mainly done based on the clinical examination and x-rays. Clinical examinations are used to diagnose knee injuries, with some of them have become standard clinical tests for particular injuries a long time ago²

With the advent of radiological advancements, like MRI and CT scans they can look more clearly inside the joint. Above all, MRI provides the advantage of being a fast, non-invasive, diagnostic tool to look for ligament and menisci injuries. Thus, it minimizes the agony and morbidity faced by the patients, along with the ease in the management with better planning and optimal intervention in time. MRI provides a better understanding to identify the ligament, menisci, synovial injury. MRI diagnosed almost all the ligamentous and meniscus injuries with a great level of confidence³.

Arthroscopic examination of the knee is a more valuable method than diagnosis by MRI and clinical tests for detecting meniscal-cruciate injuries of the knee⁴ Arthroscopy has now become the gold standard in diagnosing knee pathologies.

Aims: An observational study to compare the diagnostic accuracy of clinical examination, MRI and Arthroscopic findings in sports related injuries in tribal population of Jharkhand.

Objectives: To compare the Sensitivity, Specificity, PPV & NPV of clinical examination, MRI and Arthroscopic findings in sports related injuries in tribal population of Jharkhand.

METHODOLOGY

Source of data: The study was conducted on tribal patients of either sex, between 20 - 45 years of age and a history of trauma to either knee and a clinical examination suggestive of Anterior cruciate ligament and/or meniscal injury, has undergone diagnostic arthroscopy during MAY, 2021 to November, 2022 in the Department of Orthopaedics, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand. Ethical approval was taken from Institutional Ethics Committee, RIMS, Ranchi. It is also registered on Clinical Trials Registry- India (CTRI) & registration No is: [CTRI/2022/04/042300](https://www.clinicaltrials.gov/ct2/show/study?term=CTRI/2022/04/042300)

Sample size: We calculated sample size using parameters reported in the study published by **Gupta et al** [59] in this paper the sensitivity of clinical test for ACL injury is 0.88 and specificity is 1, keeping prevalence of disease (p) 0.25, Precision 0.10, alpha: 5%, estimated the sample size is 163. After adjustment of 10% loss to follow up, the sample size is 182.

Here we included total 188 patients who attended orthopaedic OPD and gave consent for our study as well as they went through clinical examination, MRI and arthroscopic surgery for ACL injury or meniscus injury.

Study Type: Observational

Study Design: Prospective, Comparative

Method of collection of data (including sampling procedure if any)

I prospectively selected cases of tribal patients of either sex, between 20 - 45 years of age and a history of trauma to either knee and a clinical examination suggestive of Anterior cruciate ligament and/or meniscal injury (lateral or medial), has undergone through diagnostic Arthroscopy. The patients was chosen with a history of trauma in knee during sports activities and a minimum period of six weeks following injury to knee. a proper history with physical examination, routine MRI and diagnostic arthroscopy was done for all the chosen patients.

Standard protocol and data sheet was prepared for all the patients included in this study. Clinically ACL tear was diagnose using the Lachman test, Anterior Drawer Test and Pivot shift test. McMurry test was used for diagnosing meniscal tear.

Clinical tests: The Lachman test is performed with the patient in the supine position with the knee flexed to about 30 degrees. The clinician should stabilize the distal femur with one hand and, with the other hand, pull the tibia toward themselves. If there is increased anterior translation, then this is a positive test. Again, a comparison to the unaffected side may be helpful.

The McMurray's test is the most common test to detect a tear in the medial or lateral semilunar cartilage. Examiner has to flex the knee and then place a hand on medial side of the knee. Now, externally rotate the leg and bring the knee into extension. If there is a palpable pop / click + it is a positive test and we can correlate it with a medial meniscus tear.(7) Similarly, during internal rotation with extension it will show lateral meniscus injury.

MRI Findings: There are several direct MRI signs that indicate a complete disruption of the ACL. Discontinuity of the ACL fibers seen in any of the three imaging planes is evidence of a complete tear. In the acute setting, the appearance of the disrupted ACL has been described as an edematous mass with increased T2 signal and abnormal morphology. In the subacute setting, the discontinuous ACL fibers demonstrate less of an edematous mass-like appearance and take on a more linear fragmented appearance, while in the chronic setting there may be a complete absence or non-visualization of the ACL fibers. The so-called empty notch sign refers to an MRI finding in which fluid signal rather than normal ACL fibers are seen at the proximal attachment site, usually best depicted on axial T2-weighted images. Finally, an avulsion fracture of the anterior tibial spine may be seen with a distal ACL injury. There are also several indirect MRI signs that may accompany a disruption of the ACL like buckling of the PCL. Two plane imaging of meniscus, both sagittal and coronal is critical in MRI. Short TE (echotime) sequence imaging (proton density or T1-weighted) is most sensitive for detecting meniscal tears, while abnormalities seen on T2-weighted images are very specific. The menisci are composed of fibrocartilage and appear dark on all MRI pulse sequences. On the sagittal images, the peripheral portion of the menisci have been described as demonstrating a "bow-tie" configuration, while more centrally, the meniscus demonstrates a triangular appearance tapering toward the free edge. Both horns of the lateral meniscus are almost similar in size, while the posterior horn of the medial meniscus is nearly twice the size of the anterior horn. Identifying a displaced meniscal fragment requires a thorough knowledge of the normal MRI appearance of the menisci in both the sagittal and coronal imaging planes. Direct signs of a meniscal tear include (1) unequivocal surfacing signal, (2) missing meniscal tissue (in the absence of prior surgery), and (3) displaced meniscal fragment. Several MRI signs have been described with regard to the identification of a bucket handle tear of the menisci. The double PCL sign indicates a buckle-handle tear of the medial

meniscus displaced into the intercondylar notch. The double anterior horn sign indicates a bucket-handle tear of the lateral meniscus that has flipped into the anterior aspect of the lateral compartment of the knee. The absent "bow-tie" sign indicates that a meniscal fragment has been displaced and no longer sits in its normal anatomic position.

Figure 1- Lachman Test for ACL Tear



Figure 2 – MRI showing ACL tear

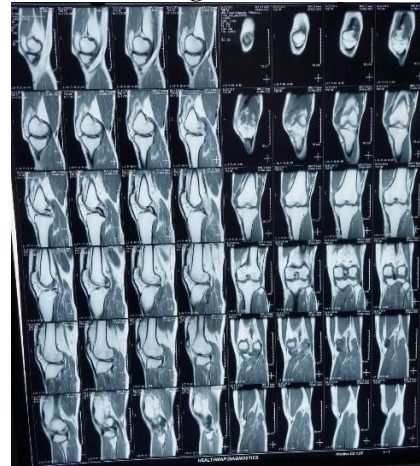
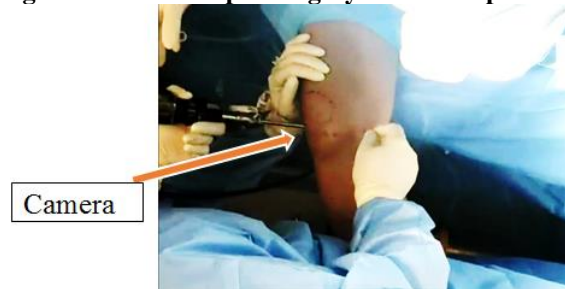


Figure 3- Arthroscopic Surgery in our setup



The comparison was done on the Diagnostic values of Clinical examination and MRI correlating with Arthroscopic findings.

Primary outcome: Sensitivity, Specificity, PPV & NPV of clinical examination, MRI and Arthroscopic findings in sports related injuries in tribal population of Jharkhand.

INCLUSION CRITERIA

1. Patients belongs to Tribals of Jharkhand
2. Patients having history of sports related injuries in either knee
3. Patients willing to give informed consent
4. Patients with age group of 20-45 years

EXCLUSION CRITERIA

1. Patients with any congenital deformity of knee joint
2. Patients with any osseous abnormality or fracture
3. Any Degenerative cause
4. Patients not giving Consent for study

STATISTICS

The data was analyzed using tabulated columns and using SPSS software criteria and final result and outcome was derived accordingly.

RESULTS

The data was analyzed using tabulated columns and using SPSS software criteria and final result and outcome was derived accordingly. In our study, 14 (7.4%) patients were <20 years of age, 135 (71.8%) patients were 21-30 years of age and 39 (20.7%) patients were ≥31 years of age. In our study, 18 (9.6%) patients were Female and 170 (90.4%) patients were male. The ratio of Male : Female is 10: 1. In our study, 131 (69.7%) patients had Left Side and 57 (30.3%) patients had Right Side. In our study, 168 (89.4%) patients had Lachman test Positive and 20 (10.6%) patients had Lachman test Negative. In our study, 71 (37.8%) patients had Positive McMurry’s Test for Medial Meniscus injury. In our study, 66 (35.1%) patients had Medial Meniscus tear in Arthroscopic Findings. In our study, 66 (35.1%) patients had McMurry’s test Positive for Lateral meniscus injury. In our study, 25 (13.3%) patients had Lateral Meniscus in Arthroscopic Findings. In our study, 171 (91.0%) patients had ACL injury in MRI Findings. In our study, 69 (37.7%) patients had Medial Meniscus

tear in MRI Findings. In our study, 48 (25.5%) patients had Lateral Meniscus tear in MRI Findings. In our study, 178 (94.7%) patients had Anterior cruciate Ligament injury in Arthroscopic Findings. In above table showed that the mean Age (mean±s.d.) of patients was 27.0745± 4.3992. According to, Lachman test Sensitivity was: 94.4, Specificity: 100, Positive Predictive Value: 100, Negative Predictive Value: 50 and Accuracy: 94.6%. According to, McMurry’s test for Lateral meniscus injury Vs. Lateral Meniscus in Arthroscopic Findings Sensitivity: 88.0, Specificity: 73.0, Positive Predictive Value: 33.3, Negative Predictive Value: 97.5 and Accuracy: 75.0%. According to, McMurry’s Test for Medial Meniscus injury Vs. Medial Meniscus injury in Arthroscopic Findings Sensitivity: 90.9, Specificity: 91.0, Positive Predictive Value: 84.5, Negative Predictive Value: 94.9 and Accuracy: 90.9%. According to, ACL injury in MRI Findings Vs. Anterior Cruciate ligament injury in Arthroscopic Findings Sensitivity: 95.5, Specificity: 90.0, Positive Predictive Value: 99.4, Negative Predictive Value: 52.9 and Accuracy 95.21%. According to, Medial Meniscus injury in MRI Findings Vs. Lateral Meniscus injury in Arthroscopic Findings Sensitivity: 87.9, Specificity: 91.0, Positive Predictive Value: 84.1, Negative Predictive Value: 93.3 and Accuracy 89.89%. According to, LM (MRI Findings) Vs. Lateral Meniscus Arthroscopic Findings Sensitivity: 76.0, Specificity: 82.2, Positive Predictive Value: 39.6, Negative Predictive Value: 95.7 and Accuracy 81.38%.

Table: 1 Association between Clinical test and MRI findings with Arthroscopic Findings For Anterior Cruciate Ligament (ACL) injury

		ACL tear in arthroscopy		
		Positive	Negative	TOTAL
Lachman test	Positive	168	0	168
	Negative	10	10	20
	TOTAL	178	10	188
MRI findings for ACL injury	Positive	170	1	171
	Negative	8	9	17
	TOTAL	178	10	188

For Clinical test:
Chi-square value: 88.7191; **p-value:** <0.0001
Sensitivity: 94.4
Specificity: 100.0
Positive Predictive Value: 100.0
Negative Predictive Value: 50.0
Accuracy: 94.6%
For MRI findings:

Chi-square value: 84.1632; **p-value:** <0.0001
Odds ratio: 191.2500 (21.5261, 21.5261)
Sensitivity: 95.5
Specificity: 90.0
Positive Predictive Value: 99.4
Negative Predictive Value: 52.9
Accuracy: 95.21%

Table 2: Association between Clinical test and MRI findings with Arthroscopic Findings For Lateral Meniscus injury

		Lateral meniscus injury in Arthroscopy		
		Positive	Negative	TOTAL
Mcmurry’s test for	Positive	22	44	66

Lateral Meniscus	Negative	3	119	122
	TOTAL	25	163	188
MRI findings for Lateral meniscus injury	Positive	19	29	48
	Negative	6	134	140
	TOTAL	25	163	188

For McMurry test:

Chi-square value: 35.4102; **p-value:** <0.0001

Odds ratio: 19.8333 (5.6546, 69.5643)

Sensitivity: 88.0

Specificity: 73.0

Positive Predictive Value: 33.3

Negative Predictive Value: 97.5

Accuracy: 75.0%

For MRI for lateral meniscus

Chi-square value: 39.8459; **p-value:** <0.0001

Odds ratio: 14.6322 (5.3732, 39.8459)

Sensitivity: 76.0

Specificity: 82.2

Positive Predictive Value: 39.6

Negative Predictive Value: 95.7

Accuracy: 81.38%

Table 3: Association between Clinical test and MRI findings with Arthroscopic Findings For Medial Meniscus injury

		Medial Meniscus injury in Arthroscopy		
		Positive	Negative	TOTAL
Mcmurry's test for Medial Meniscus	Positive	60	11	71
	Negative	6	111	117
	TOTAL	66	122	188
MRI findings for Medial meniscus injury	Positive	58	11	69
	Negative	8	111	119
	TOTAL	66	122	188

For Clinical test:

Chi-square value: 122.2103; **p-value:** <0.0001

Odds ratio: 100.9091 (35.5550, 286.3913)

Sensitivity: 90.9

Specificity: 91.0

Positive Predictive Value: 84.5

Negative Predictive Value: 94.9

Accuracy: 90.9%

For MRI findings:

Chi-square value: 114.6583; **p-value:** <0.0001

Odds ratio: 73.1591 (27.8860, 191.9330)

Sensitivity: 87.9

Specificity: 91.0

Positive Predictive Value: 84.1

Negative Predictive Value: 93.3

Accuracy: 89.89%

DISCUSSION

The present study was a Prospective, Comparative Study. This Study was conducted from MAY, 2021 to November, 2022 at Department of Orthopaedics, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand. Total 188 patients were included in this study.

In our study, out of 188 patients, most of the patients [135 (71.8%)] 21-30years of age. **Kompel AJ et al⁵(2018)** the Rio de Janeiro 2016 Summer Olympic Games was a gathering of top athletes at the pinnacle of their careers. In high-level athletes, injuries and repetitive trauma are not infrequent, and imaging evaluation by MRI provides a highly sensitive and specific tool for identifying suspected injuries and

determining their severity. Epidemiologic and general information on sports injuries occurring during recent Olympic Games has been published. These prior studies have shown that knee injuries are very common among Olympic athletes. However, to their knowledge, no detailed evaluation of knee injury classification and knee abnormalities in Olympic athletes has been reported.

Kulkarni OP et al⁶(2018) showed that this study was conducted to compare accuracy of MRI findings taking arthroscopy as standard in knee injuries. All patients attending their hospital with knee injury underwent clinical examination. Out of them 100 patients with knee injury were subjected to clinical examination, MRI and then Arthroscopy. The results were compared and analyzed using various statistical tests. The accuracy, sensitivity and specificity were calculated based on these arthroscopic and MRI findings. The accuracy of clinical diagnosis in their study was 88% for ACL tears and 85% for meniscal tears. Their study proved high sensitivity and specificity and almost high accuracy for ACL injuries of knee joint in comparison to arthroscopy.

It was found that, more number of patients [131 (69.7%)] left side was affected .

Ankit D et al⁷(2019) intra-articular knee injuries are diagnosed using multiple modalities including Magnetic Resonance Imaging (MRI) or arthrography and various clinical tests. However, there is a high incidence of false negative and false positive findings in MRI assessment. The deeper intra articular structures such as the medial meniscus bring about the

high incidence of false positives and false negatives in MRI assessment. The clinical tests also have benefits in diagnosing these injuries but its sensitivity and specificity is also under question. Arthroscopy has quickly become the “gold standard” but diagnostic arthroscopy on its own is rarely done and is only done before a treatment procedure. No regional studies have been done and only a few handful studies done worldwide especially after recent advances in 3 tesla MRI apparatus.

We showed that, 22 patients had lateral meniscus injury out of 66 patients who were clinically diagnosed of Lateral meniscus injury . Similarly 60 had medial Meniscus injury in Arthroscopic Findings out of 71 clinically diagnosed positive medial meniscus injury.

Krakowski P et al ⁸(2019) showed that this study evaluated the diagnostic accuracy of physical examination and magnetic resonance imaging (MRI) in knee injuries. Ninety-six patients at a regional hospital were included in the study. Each participant underwent a physical examination in which menisci and ACL were evaluated. Knee joint MRI was collected from each patient. Physical examination and MRI scans were then compared with knee arthroscopy findings as a golden standard for meniscal and ligamentous lesions. The data were analyzed and specificity and sensitivity were calculated and correlated on receiver operating characteristics (ROC) curves. Knee arthroscopy diagnosed 32 total ACL ruptures, 45 medial meniscus and 17 lateral meniscus lesions. Three patients were diagnosed with bilateral meniscal lesions. The highest sensitivities were the McMurray test (87.5%) for medial meniscus (MM) and the Thessaly test (70%) for lateral meniscus (LM). The most sensitive ACL test was Lachman (84.5%), whereas, the pivot shift and Lelli tests were the most specific (98.5%). MRI was highly sensitive for MM (96%) with specificity of 52%.

We observed that, 69 (36.7%) Medial Meniscus injury in MRI findings among them 58 patients found meniscal injury in arthroscopy. Out of 48 (25.5%) patients who had Lateral Meniscus injury in MRI Findings only 19 patients had lateral meniscal injury in arthroscopy. In clinical examination 168 patients were tested positive had [168 (89.4%)] Anterior cruciate injury in Arthroscopic Findings and among 20 clinically diagnosed negative patients , 10 were having ACL injury in arthroscopy .

In our study, the mean Age of patients was [27.0745± 4.3992].

Singh N et al ⁹(2019) preoperative magnetic resonance imaging (MRI) has internationally been proven to reduce unnecessary knee arthroscopies and assist with surgical planning. This has the advantage of avoiding unnecessary surgery and the associated anaesthetic risk, as well as reducing costs. No data were found in the recently published literature assessing the accuracy of MRI interpretation of knee ligament injury in the public sector locally. This pilot

study aimed to determine the accuracy of MRI in detecting non-osseous knee injury in a resource-limited tertiary-level academic hospital in Pretoria, South Africa, compared to the gold standard arthroscopy findings. This was an exploratory retrospective analysis of 39 patients who had MRI and arthroscopy at Steve Biko Academic Hospital (SBAH). True positive, true negative, false positive and false negative results were extrapolated from findings in both modalities and translated into sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) for each structure.

We found that, Lachman test for ACL injury have a Sensitivity was: 94.4 , Specificity: 100.0, Positive Predictive Value: 100 , Negative Predictive Value: 50 and Accuracy: 94.6%, McMurry’s test for Lateral meniscus was Sensitivity: 88.0, Specificity: 73.0, Positive Predictive Value: 33.3, Negative Predictive Value: 91.5 and Accuracy: 75.0%.

It was found that, the clinical test for medial meniscus injury having Sensitivity: 90.9, Specificity: 91.0, Positive Predictive Value: 84.5, Negative Predictive Value: 94.9 and Accuracy: 90.9% and MRI Findings for medial meniscal injury have sensitivity of Sensitivity: 87.9, Specificity: 91.0, Positive Predictive Value: 84.1, Negative Predictive Value: 93.3 and Accuracy 89.89%.

Hashemi SA et al ¹⁰(2020) observed that many clinical tests and diagnostic studies have been developed to increase the clinician’s ability to accurately diagnose disorders of the knee. Torn menisci or ligamentous structures within the knee cause significant pain and disability and thus require expeditious management. This study was conducted to evaluate the accuracy of clinical examination in comparison with MRI examination and with the help of arthroscopic examination as the gold standard in the diagnosis of meniscal tears. All of the arthroscopic surgery candidates, presenting symptoms of meniscal or cruciate ligament lesions, referring to Namazi and Chamran hospitals, Shiraz, Iran, were included in this study. Clinical examination (including McMurray test, Apley test, and 20 Thessaly test) was performed before the arthroscopy, and the results were recorded in special forms. Magnetic resonance imaging (MRI) results were also added.

Shantanu K et al ¹¹(2021) showed that this study was conducted to compare the accuracy of MRI findings and clinical examination of ligamentous and meniscal injuries of the knee, taking arthroscopy as a standard diagnostic tool in knee injuries. All patients with knee injuries attending the outpatient department or emergency of their hospital underwent clinical examination. Out of them, 60 patients with knee injuries were subjected to clinical examination, MRI, and then arthroscopy. The findings of these diagnostic tools in respect to the anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), and meniscus injuries were validated, compared, and

analyzed using various statistical tools. The accuracy, sensitivity, negative predictive value (NPV), positive predictive value (PPV), and specificity were calculated and an agreement between various tests was established using kappa statistics. The accuracy of clinical examination in their study was 88% for ACL tears, 85% for meniscal tears, and 100% for PCL tears. The kappa measure of agreement between arthroscopy and clinical finding and MRI for ACL was 0.610 and 0.698, respectively, which was statistically significant. Mahadvuni D et al ¹²(2021) found that meniscal or ligamentous injuries of knee joint are common and result in pain, instability and restriction of movement. MRI is used as a screening tool to diagnose or support clinical diagnosis for these injuries prior to offering patients with arthroscopic treatment. However, the sensitivity of MRI for the detection of meniscal injury is not 100%. Arthroscopy of knee joint can be used for both diagnostic and therapeutic purposes. It is regarded as the gold standard among the investigative modalities. Aim of their study was to correlate radiological and arthroscopic findings of meniscal injuries of knee. Cross-sectional study of 20 patients with history of suspected internal derangement of knee, evaluated with MRI (1.5 T) and correlated with arthroscopy in Mamata Academy of Medical Sciences from May 2019 to November 2020. The Sensitivity, PPV, Accuracy of MRI scan in detecting ACL injury in their study were 95%, 100% & 95% respectively. Whereas Sensitivity, specificity, PPV, NPV, Accuracy of MRI scan in detecting medial meniscal injury in their study were 77.7%, 81.8%, 81.8%, 77.7 & 80.0% respectively.

Our study showed that, clinical examination for Lateral Meniscus (Arthroscopic Findings) Sensitivity: 88.0, Specificity: 73.0, Positive Predictive Value: 33.3, Negative Predictive Value: 97.5 and Accuracy 75.0 % and MRI Findings for lateral meniscus injury having Sensitivity: 76.0, Specificity: 82.2, Positive Predictive Value: 39.6, Negative Predictive Value: 95.7 and Accuracy 81.38%.

CONCLUSION

By correlating the the clinical examination findings, MRI findings and Arthroscopy, we can conclude that carefully done clinical examination have the better or equal findings in comparison to normal MRI for the diagnosis of meniscal and cruciate ligament injury. When clinical findings are in favour of meniscal injury or cruciate ligament injury with a normal MRI findings should not be considered to deny arthroscopy. A good clinical evidence/findings for meniscal or cruciate ligament injury should be consider sufficient to do arthroscopic surgery bypassing the need for routine MRI scans and it will be helpful for early treatment and also will be cost effective for the patient.

Limitation

In spite of every sincere effort my study has lacunae.

The notable short comings of this study are:

1. The sample size was small. Only 188 cases are not sufficient for this kind of study.
2. The study has been done in a single center.
3. The study was carried out in a tertiary care hospital, so hospital bias cannot be ruled out.

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