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An Observational Analysis Of Painful Knee Joint Using MRI Of Patients Attending Radiology Department In Rajendra Institute Of Medical Sciences (Rims), Ranchi, Jharkhand.

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Abstract–
Background Pain *in knee joint is one of the commonest problems which involves both male and females, also affecting their relatives due to its high morbidity. The cause of knee pain involves a plethora of etiologies ranging from bony trauma to meniscal tear . Often it is hard to detect the exact etiology by physical examination and clinical tests (anterior/posterior drawer tests). A diagnostic aid which can visualize the pathology with clarity and is non invasive in nature without any serious side effects is highly needed . MRI has added advantage of being nonionizing, having multiplanar capability with high spatial resolution for soft tissue, marrow changes and intraosseous pathology. The present study was undertaken to establish the definitive cause and pathology within the knee joint and its various compartments .**Methodology** All eligible patients coming to Radiology Department of Rajendra Institute of Medical Sciences, Ranchi for evaluation of knee pain were included in this study starting from March 2017 till Dec 2017 in the hospital . Data collected thus analyzed using MS Office excel and presented using percentages, mean and standard deviation. **Results** A total of 100 Participants were evaluated out of which 67 were males and rest were females . Most were in the age group of 20-50 (73%) with a mean age 26.67. Anterior Cruciate ligament was torn partially in 60% of the cases as visualized in MRI . Out of the 92% of Anterior Cruciate Ligament injury, most were associated with medial menisci tear (56%) . Rest of ligamental injury involved posterior cruciate ligament. **Conclusions** MRI gives a very clear picture of the knee joint and its pathology and is helpful in arriving at definitive diagnosis . If used judiciously it can be cost effective and extremely helpful for resource limited state like Jharkhand.*

Pain in knee joints are problematic not only to the patient but also to their relatives due to the debilitating nature of the pathology. Many a times mere physical or clinical examination is not enough. (1) Available estimates support the prevalence rate of Knee pain close to 19% (2) . Diagnosing knee pain with accuracy is often challenging to most clinicians due to its varied differential diagnosis. (3) These factors hamper the treatment to a great extent, these requires an imaging or diagnostic tool which is noninvasive yet accurate . (4) Magnetic Resonance Imaging has proven its efficacy to satisfy the needs as desired tool for detailed study of painful Knee joint, over the time since its discovery. Evidence suggest high sensitivity and specificity of MRI in diagnosing articular pathology.(5,6) It has been demonstrated how MRI despite being expensive is still cost effective if used wisely, gives a accurate and early diagnosis thereby decreasing delay in treatment and morbidity (7,8)
Jharkhand being a relatively new state is not having enough MRI centers across the state. Evidence regarding the use of MRI in diagnosing Knee pain is nonexistent. In light of the limited resource of MRI and prevalence of Knee pain it is imperative to understand about what are the added advantages of MRI over other diagnostic modalities. What are the different findings with MRI in painful knee joint ? – bony, ligamentous and meniscal injuries along with infections. In view of these questions the present study was undertaken in patients attending Radiology department with pain in knee undergoing MRI with an aim to analyze the findings of the imaging done on these patients.

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I. Methodology

This was a cross sectional analytical study done in hospital setting from March 2017 to Dec 2017. After ethical clearance for this study a pre tested semi-structured questionnaire was used to collect data for all eligible candidates who came in the radiology department for MRI evaluation with the complain of Knee pain.

An informed consent was obtained by all participants. A total of 100 cases were evaluated. Available 1.5 Tesla MRI in the department was used and results were analysed by using T1 and T2 weighted images in axial,saggital and coronal planes along with Proton density images , T2 fatsat images and postcontrast images as and when required.

Inclusion Criterion - All patients of more than 20 years of age having acute or chronic knee pain and willing to participate in the study were included in this study.

Exclusion Criterion - All unwilling patients, patients who had any problems in undergoing MRI, history of Claustrophobia, having any ferromagnetic metallic implants or surgical clips were excluded.
Data compiled was thus collected on MS Office excel sheet and analysis was done using standard measure of central tendency like mean ,standard deviation and expressed in percentages.

II. Results

Out of 100 participants 67 were males rest females. We analyzed the findings of the study participants on their age group (Table1) We found majority being from physically active age group of 20-50 years . The mean age was 26.67 ± 9.36 .

Age in years	Numbers	Percentage (%)
20-≤30	26	26 %
>30-≤40	20	20 %
>40-≤50	27	27 %
>50-≤60	15	15 %
>60-≤70	5	5 %
>70-≤80	7	7 %
>80		0 %
Total	100	100%

Mean Age = 26.67
Standard Deviation = 9.36

Table 1. Distribution of Participants according to Age

MRI was able to comprehensively decipher the injury alongwith subtle morphological abnormality (ligaments, menisci ,bone and bone marrow) in all evaluated cases. On analyzing the MRI findings we found injuries to anterior cruciate ligament most common among the ligamentous injury. Injuries were more common in the right side. A tear of partial type was the commonest 60%. Regarding the location of the tear it was found the tibial attachment was more common 53%. (Table 2)

We were also able to detect the medial menisci and lateral meniscal pathologies and their relationship regarding the anterior horn & posterior horns. As shown in Table 2 in 92% anterior cruciate ligament (ACL) were seen to have tear. Those patients with ACL tear also showed meniscal injury. We found medial menisci to be more commonly involved (56%) than lateral menisci .(Table 3) We found involvement of posterior horn more than anterior horns. (Table3)

Finding	Number of Patients	Percentage
Side		
Left	32	32%
Right	68	68%
Anterior Cruciate Ligament Tear (grade)		
No Tear (grade 0)	8	8%
Partial (grade 1 and 2)	60	60%
Complete (grade 3)	32	32%
Location of Tear		
Attachment with Tibia	53	53%
Attachment with Femur	17	17%
Attachment with Mid Substance	22	22%

Table 2 Anterior Cruciate Ligament Involvement in MRI finding.

Finding	Medial Menisci (Total N=49)	Lateral Menisci (Total N=43)
	Number of Patients (%)	Number of Patients (%)
Anterior Horn	10(20.48%)	9(20.94%)
Posterior Horn	39(79.52%)	34(79.10%)

Table 3. Involvement of Menisci as visualized on MRI.

III. Discussion

As stated earlier a multitude of etiologies for the pain in knee complicates its accurate diagnosis clinically. For better accuracy many a times invasive procedures like arthroscopy etc. are sought which is not completely without risk .(9) Other imaging modalities like radiography may give a clear picture of bony pathology but pose the risk of radiation hazards with poor delineation of soft tissue and ligaments. .

Similarly Computerized tomography (CT scan) can delineate bony pathology better but with poor spatial resolution of soft tissue lesion. In experienced hands Musculoskeletal Ultrasonography (USG) can give a clear picture of the soft tissues involved, however intraarticular pathologies are difficult to image.

Magnetic Resonance Imaging (MRI) has the best visualization of all above stated modalities with the added advantage of being nonionizing, multiplanar capability, high spatial resolution for soft tissue, marrow changes and intraosseous pathology, it enhances the accuracy of the diagnosis and thus helps in early diagnosis and treatment.(4, 5,8) . MRI and its use in diagnosing soft tissue lesions has been documented profusely (9,10,11,12,13,14,15) .

In our study we found meniscal injury to be more common in medial side and involvement of anterior cruciate ligament more common in relatively younger age group. These findings are similar to the findings quoted by others.(16,17,18,19) All these evidences point out to increased incidence of medial menisci injury in young adults presenting with knee pain . Other evidences also point out to incidence of medial meniscal injury to be the main contributor in knee pain .(20)

IV. Conclusion

With our small sample size we can safely say that MRI is useful in providing a multiplanar high resolution image of knee joint and its compartment, thereby helping in arriving at an early and accurate diagnosis. Judicious use of MRI is mandated in arriving at early and accurate diagnosis in cases of painful Knee joint. With judicious use it can be highly cost effective in a resource limited state like Jharkhand.

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