



MRI Findings of Sports Related Knee Injury: A Hospital Based Observational Study

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Abstract

Objectives: Our study was to find the MRI evaluation of cases with sports related knee injuries.

Methods: A detail history and complete assessment were performed to all cases. All patients were examined using a 1.5-T MR (GE HDXT 1.5T MRI System) and dedicated knee coil with sequences.

Results: Data was analyzed by using simple statistical methods with the help of MS-Office software.

Conclusions: Young age groups were commonly associated with sports related knee injuries. More common injury was ACL and combined injuries. Second common injuries were collateral ligaments and meniscus injuries. 100% sensitivity and specificity of MRI was seen in bone, muscles and others knee injuries. Sensitivity and specificity of ACL was 87% and 89% respectively. Hence, MRI is the gold standard investigating modality to diagnose the sports related knee injuries.

Keywords: Knee injury, MRI, Sensitivity, Specificity.

Introduction

MRI is usually an accurate type of complementary examination for knee assessment, but it has high cost.^[1] MRI has high applicability to the knees, in comparison with other joints, and it provides excellent diagnostic capacity for evaluating lesions of different types, such as ligament, meniscal, tendon, bone and chondral injuries.^[2] However, no evidence to suggest that MRI might reduce the number of negative arthroscopic procedures has been demonstrated.^[3] It has been shown that lesion of the anterior meniscal cornu seen on MRI may not any significant clinical presentation, and correlation with the physical examination is recommended.^[4] Heterogenous results regarding the accuracy of physical

examinations on meniscal injuries have been observed because of deficiencies of clinical practice.^[5]

Accurate diagnosing of knee injuries is directly linked to taking the clinical history and making a careful physical examination. Meniscal and ligament injuries of this joint can be evaluated by means of magnetic resonance imaging (MRI) examinations, which provide images showing abnormalities of the morphology that are characterized. The sensitivity of this examination can be raised according to the methods used by radiologists.^[6]

Meniscus injury is one of the most common causes of consultations for knee disorders. Of these, sports injuries are the leading cause with an

incidence of meniscal damage in adults of approximately 9/1000 in men and 4.2/1000 in women^[7]. Traumatic fissures, which occur in a healthy meniscus and in young people, are the most common lesions(68 to 75%), which can be distinguished from microtraumatic fissures in a degenerative meniscus, which is constantly increasing in incidence in “mature” older sportsmen and women^[8,7]. Aim our study was to find the magnetic resonance imaging evaluation of cases with sports related injuries.

Materials and Methods

This present study was conducted in department of Radiodiagnosis, Katihar Medical College, Katihar, Bihar, India during a period from January 2017 to November 2017. Patients who were referred from department of Orthopaedics, Katihar Medical College, for MRI investigations were included for this study. Data was collected with irrespective of sex. Attendants/patients signed an informed consent approved by institutional ethical committee of Katihar Medical College, Katihar, Bihar was sought.

A total of 40 cases with age group 15-30 years of sports related injuries were enrolled in this study. Male and female ratio was 7:3.

Methods: A detail history and complete examinations were performed to all cases of sports related injuries.

Instrumentation: All patients were examined using a 1.5-T MR (GE HDXT 1.5T MRI System) and dedicated knee coil with sequences as Sagittal: PDW (SPIR), Sagittal T1W, T2W, PDFS, Coronal STIR, Coronal T1W, T2W, PDFS Axial, Coronal Sagittal and Axial T1W, T2W.

Statistical Analysis: Data was analyzed by using simple statistical methods with the help of MS-Office software.

Observations

In this present study, we were enrolled a total of 40 cases of sports related knee injury. Age groups were taken 15 to 30 years. Majority of cases 25(62.5%) were in age group of 21-25 years.

Table.1 Age wise distribution of cases with sports related knee injury

Age	No. of cases	Percentage
15-20	7	17.5%
21-25	25	62.5%
26-30	8	20%
Total	40	100%

Table.2 Gender wise distribution

Sex	No. of cases	Percentage
Male	28	70%
Female	12	30%
Total	40	100%

Out of total 40 cases of knee injuries, we were included 28(70%) males and 12(30%) females.

Table.3 MRI findings of cases with knee injury

MRI findings	No. of cases	Percentage
Normal MRI findings	8	20%
Abnormal MRI findings	32	80%
Total	40	100%

In this present study, On Magnetic Resonance Imaging (MRI), we were found that 8(20%) had normal and 32(80%) had abnormal studies.

Table.4 Cases with sports related Knee injuries (N=32).

Knee injuries	No. of cases	Percentage
Meniscus	13	40.62
PCL	8	25
ACL	20	62.5
Collateral	11	34.37
Bone	7	21.87
Muscular	3	9.37
Combined	20	62.5
Total		

In this study, we were seen that majority of cases 20 (62.5%) were ACL and combined injuries and next common injuries were meniscus 13(40.62%) and collateral ligament injuries 11(34.37%).

Table.5. sensitivity and specificity of MRI of knee joint

Injury	Sensitivity (%)	Specificity (%)
Muscles	100	100
PCL	100	100
Meniscus	81	86
Collateral	84	85
Bones	100	100
ACL	87	89
Others	100	100

In this present study, MRI sensitivity of knee joint injuries were ACL 87%, PCL 100%, meniscus 81%, collateral 84%, bones, muscles and others

100%. MRI specificity for knee injuries were ACL 89%, PCL 100%, meniscus 86%, collateral 85%, bones, muscles and others 100%.

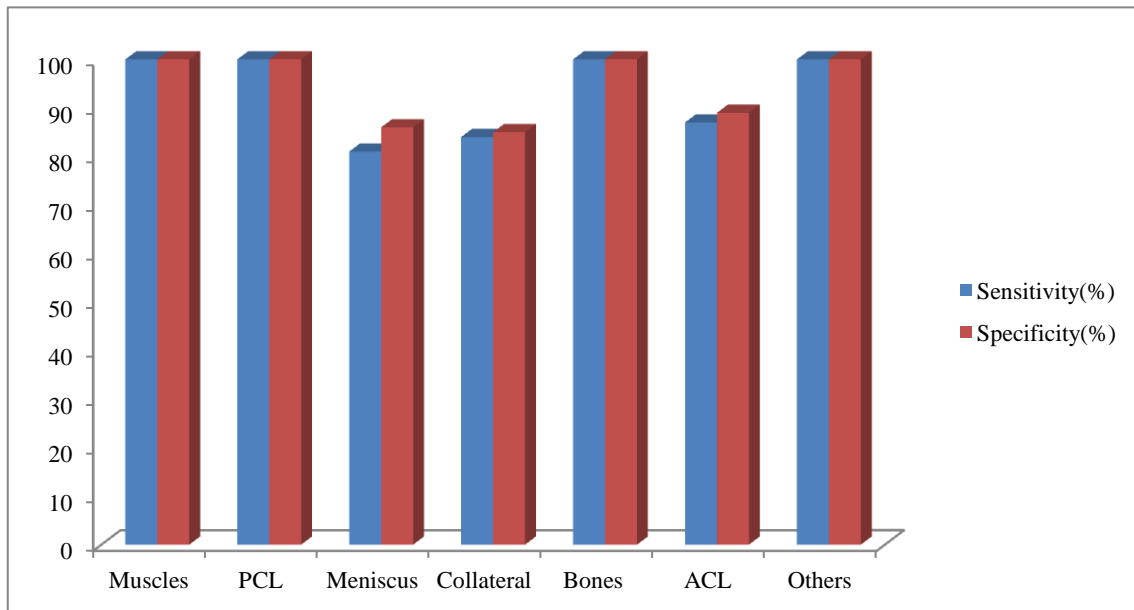


Figure 1 Sensitivity and Specificity of structures of knee joints of sports related injury.

Discussions

Sports-related knee injuries are common, with contact sports and sports involving twisting movements being the most frequent causes. Sports injuries may affect any of the knee structures, including ligaments, menisci, bones, and cartilage and periarticular soft tissues. However, relatively few injuries involve isolated structures, with complex injuries affecting multiple structures being much more common.^[9]

Magnetic resonance imaging (MRI), with its multi-planar capabilities and excellent soft tissue contrast, has established itself as the leading modality for noninvasive evaluation of the sports knee injuries.^[10]

In our present study, majority of sports related injury 25(62.5%) were seen in age group of 21-25 years. Males 28(70%) were commonly injured with knee injury.

Similar study was conducted by Waleed Hetta, et al. (2014). In their study, majority of sports related injuries were seen in age group 20-24 years which was accounted 63.3%.^[11]

Magnetic resonance imaging is regarded as the top imaging and diagnostic tool for the knee joint as a

result of its ability to evaluate a wide range of anatomy and pathology varying from ligamentous injuries to articular cartilage lesions. Imaging of the knee requires excellent contrast, high resolution and the ability to visualize very small structures, all of which can be provided by MR imaging. The development of advanced diagnostic MR imaging tools for the joints is of increased clinical importance as it has been recently shown that musculoskeletal imaging is a rapidly growing field in MR imaging applications.^[12]

In our present study, out of 40 cases of knee injuries 32(80%) had abnormal MRI findings.

Ashwini Sankhe, et al.(2016) were found that all cases of sports related knee injuries were abnormal MRI findings.^[9]

In this present study, majority of cases 20(62.5%) were ACL injuries. Combined injuries were also 20(62.5%). Second more common injuries were meniscal 13(40.62%) and collateral ligament injuries 11(34.37%).

According to Magee et al.^[6] comparison between arthroscopy and MRI presented sensitivity for meniscal injuries of the knee of 89% and demonstrated that signal abnormalities seen on

MRI gave information about morpho-logical alterations of injuries. In their study, the sensitivity and specificity values for MRI and arthroscopy were respectively 70.4% and 50% for meniscal injuries.

Shweta Gimhavanekar, et al.(2016) were studied on knee injuries patients. And they were found that sensitivity and specificity of MRI in diagnosing complete ACL tear were 100% and 89.6% and for partial tear was 100% and 100%, respectively.^[13]

In this present study, sensitivity and specificity of MRI of knee joint for PCL, bone and muscles injury was 100%. Sensitivity of ACL was 87% and specificity 89%.

Sensitivity of collateral ligaments and meniscus was 84% and 81% respectively. Specificity of collateral ligaments and meniscus was 85% and 86% respectively.

The efficacy of MRI in relation to acute knee trauma has not been studied appropriately. In a double blind study, Muhammad et al.^[17] evaluated the clinical efficacy of MRI in cases of acute knee trauma with inconclusive physical examinations, and used arthroscopy as the diagnostic gold standard. The sensitivity and specificity of MRI were 90% and 67%, respectively, for detecting any ACL injuries, 50% and 86% for medial meniscal injuries and 88% and 73% for the lateral meniscus. They therefore suggested that evaluations using MRI should be used to guide the need for surgery when the clinical examination was inconclusive, as in acute knee injuries.^[14]

MRI has revolutionized diagnostic imaging of the knee as this innovative technology allows superior soft tissue details with multiplanar imaging capability that provide accurate evaluation of the intra and extra articular structure of the knee which are demonstrated with other imaging modalities. MRI is accurate, non invasive technique for evaluating the structures of the knee, marrow space, synovium and periarticular soft tissue concerning the knee.^[15,16] It has great capacity in diagnosing meniscal tear and

classifying them into grade and type which would avoid unnecessary arthroscopic examination.^[17]

Conclusions

This present study was concluded that sports related knee injuries were commonly seen in age group 21-25 years. More common injury was ACL and combined injuries. Second common injuries were collateral ligaments and meniscus injuries. 100% sensitivity and specificity of MRI was seen in bone, muscles and others knee injuries. Sensitivity and specificity of ACL was 87% and 89% respectively. Hence, MRI is the gold standard investigating modality to diagnose knee injuries.

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