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Characterization of Common Knee Joint Diseases using Magnetic Resonance Imaging among Saudi Population

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Abstract: ***Objective**: To characterize common knee joint diseases using Magnetic Resonance Imaging among Saudis population, to find out the most common disease in knee joint ,demonstrate the diagnostic value of MRI in diagnosing presence and absence of this disease and identify whether MRI can lead to accurate diagnoses of Knee joint disease. **Methods**: The study was a retrospective study of MRI finding in common knee joint diseases , A total of 50 patients were investigated by MRI machine across different Hospitals Department of Radiology Jeddah State, Saudi Arabia from September 2018 to December 2018. The problem of the study was increasing in patients suffering from knee joint pain. **Results**: Among 50 patients data was classified and analyzed using excel, and found that meniscus tear is the most common knee joint disease with a prevalence of 30% and 14% for osteoarthritis changes and also found that males (56%) were more affected than females(44%), and the age group of (36-50)and (51-65) were more exposed to knee joint disease. **Conclusion**: MRI scan is a good non-invasive tool and can be used as first line imaging modality for knee joint diseases. The MRI is the modality of choice in diagnosing internal lesions of the knee with high details and showed that meniscus tear had the highest prevalence of the knee pathological change, the result found meniscus tear had higher percentage and found a relation between patient's age and OA changes and Backer Cyst of the knee joint and there is significant relationship between patient gender and incident of knee disease.*

Keywords: knee joint diseases, Magnetic Resonance Imaging, Meniscus tear, *osteoarthritis, Backer Cyst*

1. Introduction

The knee joint is the largest synovial joint in the body, Since in humans the knee supports nearly the whole weight of the body, it is vulnerable to both acute injury and the development of osteoarthritis, and it is one of the most frequently injured regions of the body, and knee lesions can be of both an acute and chronic nature constitutes a major cause of pain and disability of among the athletic and non-athletic population Over the last decade, advances have been made in the treatment of the knee disorders of equal importance have been improved in the diagnosis of these disorders. [1]

Arthroscopy is considered as "the gold standard" for diagnosis of traumatic intra articular knee lesions. However, arthroscopy is an invasive procedure that requires hospitalization and anesthesia, thus presenting all the potential complications of a surgical procedure. Magnetic Resonance Imaging (MRI) has now established itself as fast and non-invasive imaging alternative complementing physical examination in the evaluation of injuries of the knee. MRI with its much better soft tissue contrast remains the main imaging modality of excellence for accurately depicting abnormalities of articular cartilage and soft tissue injuries of tendons, ligaments, and the menisci, Since its introduction in the 1980's Magnetic Resonance Imaging (MRI) has gained in popularity as a diagnostic tool of the musculoskeletal disorders. [2]

2. Methodology

This study was a descriptive and analysis study conducted across different Hospitals Department of Radiology Jeddah city, Saudi Arabia with 50 patients ,28 male and 22 female with different age and abnormal knee joint complain of pain and patient with Abnormalities of knee using seimens 3T MRI machine ,Knee coil one phase and Air plague. 50 patients aged between (5_95) years old, the data were collected by selected 3variables (gender, age and diagnose) using MRI axial, sagittal and coronal view by study show in the table (1) 56% male 44% female that male were affected by pathological change of knee joint more than female. The patient's data and clinical information were obtained all the axial,coronal and sagittal images were done to identify the pathological changes,the radiologist's reports were collected and all this information were analyzed and presented in tables and graphs. All data obtained in the study were documented and analyzed using SPSS program version16.Descriptive statistics, including frequency and percentage were used. T-test was applied to test the significance of differences, p-value of less than 0.05 was considered to be statistically significant.

3. Results

This study intended to review the value of MRI in diagnosing presence and absence of common knee joint diseases.

Table 1: Frequency distribution of patient's gender

Gender	Frequency	Percentage
Male	28	56%
Female	22	44%
Total	25	100%

Table 2: Frequency distribution of patient's age

Range of patients age (in years)	Frequency	Percentage
5-20	2	4%
21-35	9	18%
36-50	18	36%
51-65	17	35%
66-80	3	6%
81-95	1	1%
Total	100	100%

Table (3): Frequency distribution according to inflammatory disease

Disease	Frequency	Percentage
Backer Cyst	4	8%
Bursitis	2	4%
Meniscus tear	15	30%
Cruciate Ligament tear	10	20%
Tendon Rupture	1	2%

Table 4: Frequency distribution according to degenerative disease

Disease	Frequency	Percentage
OA changes	7	14%
CL sprain	3	6%
Chondromalacia Patellae	2	4%
Osteosarcoma	1	2%
Joint effusion	3	6%
Others	2	2%

4. Discussion

This study includes 50 patients aged between (5_95) years old, the data were collected by selected 3variables (gender, age and diagnose) using MRI axial, sagittal and coronal view by ,study show in the table (1) 56% male 44% female that male were affected by pathological change of knee joint more than female This result is justified by the fact that men are more prone to knee problems than women are attributed to hard work and exercise and The results of the examination and the most affected among these ages are the table (2) age group of (36_50) and (51_65) were most affected than other age groups, an group (5_20) had the lowest rate of affection.

The study showed in table (3),(4) that shows Frequency distribution of patients diseases comparison of about 12 disease types and after analyzed show that meniscus tear had higher rate 30% than other diseases ,These results are completely consistent with the study (Jackson, 1998)and (Mandelbaum 1986)in diagnosis of meniscus tear,which to determine pathoanatomical correlations and the efficacy of MRI, 105 patients with preoperative diagnoses of meniscal tears, anterior and posterior cruciate ligament tears, tibial plateau fracture, and patella and quadriceps injuries were imaged.

Results indicated that for the medial meniscus MRI demonstrated a 95.7% sensitivity, 81.8% specificity, 90% accuracy, 88.2% positive predictive value (PPV), and 93.1 % negative predictive value (NPV). Imaging of the lateral meniscus demonstrated a 75% sensitivity, 95% specificity, 91 %accuracy, 80% PPV, and 94% NPV. MRI of the ACL revealed 100% sensitivity, specificity, and accuracy, positive and negative predictive values.

MRI is a noninvasive tool which uses no ionizing radiation and can accurately define and characterize anatomy and path anatomy. This study indicates that MRI in conjunction with clinical evaluation can contribute to treatment decision-making processes and assist in preoperative planning. An algorithm demonstrating the potential clinical use of MRI is presented. (Mandelbaum 1986).

MRI of the knee joint is noninvasive ,safe and good protocol which provide greater details than others modalities like conventional X-ray exams This study proved that the MRI has a sensitivity and high accuracy in the detection of disease and knee problems and these results are agree with the results of previous research (Leonardo CôrtesAntunes 2017) 85% sensitivity for MMT and 70% sensitivity for LMT. MRI showed a greater specificity for the diagnosis of MMT and LMT; the values were 82% and 91%, respectively.

5. Conclusion

MRI scan is an acknowledged non-invasive imaging technique and can be used as first line imaging modality for differentiating brain pathology using this quantification method and its homogeneity in all of the scanning phases. Dilated of ventricle like is high frequency can be reliably differentiated from Ms and lesion using the sequence of MRI. It is also particularly supportive for soft tissue which can be easily overlooked on routine MRI scanning and symptomatic brain pathology is high.

6. Ethical Clearance

Ethical approval has been granted from the hospital as well as the radiology department; that this data will be used for research purpose only and the patient will not be subjected to any harm and his information will not be revealed as well as verbal consent from the patients were taken.

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