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Role of MRI in Non-Traumatic Adult Chronic Hip Joint Pain

[1]Dr. Amol Gautam, [2]Dr. Dhanashree More
[1] Professor, Department of Radiodiagnosis Krishna Institute of Medical Sciences, Karad - 415110, Maharashtra
[2] Department of Radiodiagnosis Krishna Institute of Medical Sciences, Karad - 415110, Maharashtra

ABSTRACT

There are different etiologies in hip pain. MRI is the ideal approach for characterizing multiple conditions and for determining the complete severity of osseous, chondral and soft tissue anomalies in the hip joint. The purpose of the study was to determine the predictive utility of MRI in the evaluation of sore hip joints in adults. This study was an observational and Cross sectional study conducted at Department of Radio diagnosis. MRI of the hip has become a important tool in assessing the multiple hip joint pathologies. Total Fifty four patients with clinical history of painful hip joints without trauma were studied by plain radiograph and MRI scan. Fifty four patients with unilateral or bilateral hip pain of adult age groups and both sexes were studied. MRI is a reliable image modality in investigating hip pain. It is a non-invasive, accurate, safe, and effective method for assessing patients with painful hips of different pathologies.

Keywords: Joint pain, Hip, MRI, Radiographs, Trauma

Correspondence:
Amol Gautam
Professor, Department of Radiodiagnosis
Krishna Institute of Medical Sciences
Karad, Maharashtra

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INTRODUCTION

One of the most revolutionary advances in the field of medicine that has essentially changed the face of diagnosis is Magnetic Resonance Imaging (MRI). One of the earliest reported use of musculoskeletal magnetic resonance imaging (MRI) is imaging of the hip. Even though there has been a decade of imaging the hip joint with MRI, its role as an important imaging modality for patients with hip pathology continues to evolve. In the last few years, advantages such as reduced scan time and better image quality have significantly widened the scope of MRI [1]. MRI is a highly specific and sensitive technique for detecting a number of abnormalities involving the hip and surrounding tissues i.e. it helps in evaluation of articular, extra articular and osseous structures which can be affected by hip pathology.

Role of Imaging

Plain radiographs of the hip joint and pelvis are the first line of imaging but have limitation in assessment of soft tissues and intra articular structures However Trauma, arthritis, avascular necrosis, infection and tumor can show subtle radiographic abnormalities. Ultrasound is useful in evaluating pathologies of muscles, tendons, bursa and etc. and helps in guiding diagnostic and therapeutic in terventional procedures. CT is helpful in bone lesion evaluation but lacks soft tissue contrast. CT is considered superior to MRI in bone tumours, because of its ability in characterizing matrix calcifications, and in depicting the anatomy of acute traumatic fractures.

AIM AND OBJECTIVE

AIM OF STUDY

To assess the role of MRI in non-traumatic chronic hip joint pain in adult age group and to help in early detection of clinical suspected cases.

OBJECTIVE OF THE STUDY

To assess the role of MRI in the early evaluation of painful hip joints. To establish a differential diagnosis of various painful hip joint conditions on the MRI. To assess severity and the extent of underlying lesions in the various conditions of painful hip joint. To compare between radiograph and MRI for diagnosing non-traumatic adult chronic painful hip joint conditions.

REVIEW OF LITERATURE

The study by KV Reddy [2] found sacroilitis, neoplasia - primary and metastasis, soft tissue tumour, perthes disease, degenerative disc disease, transient osteoporosis, stress fractures of hip. Of total 85 cases evaluated by MRI a definite diagnosis was suggested in 76 cases. MRI was normal in 9 cases. Out of 36 patients presented with bilateral hip pain. The common conditions presenting as bilateral hip pain were avascular necrosis followed by osteoarthritis, sacroilitis and degenerative lumbar disc disease.

The study by Tushar Kalekar [3] found out of 50 cases 48% cases had avascular necrosis, 20% osteoarthritis, 16% joint effusion, 12% infection and just 4% cases had Perthes's disease. Coleman Beverly G. et al [4] in 1988, studied MRI of 18 patients and proved MRI as the most sensitive imaging modality to diagnose AVN of femoral head, and superior to CT, radionuclide and plain radiographs. They also detailed that majority of radiographically negative AVN turned out to be class A AVN on MRI. Takatori et al [5] in 1992 conducted a study of AVN of femoral head natural history and MRI and stated that hypointense zone traverses middle portion of the femoral head were more at the risk of segmental collapse.

MATERIALS AND METHODS

The study was conducted from November 2016 to November 2018 at the Department of Radio-Diagnosis, Krishna Institute of Medical Sciences, "Deemed to be University", Karad, Maharashtra.

Data Source

Patients presenting with a history of chronic hip pain from adult age group, and referred for MRI examination during the study period, were enrolled.

Inclusion Criteria

- Both sexes
- Patients of adult age group (above 19 year old).
- Non-traumatic clinically suspected cases of chronic hip joint pain: patients with unilateral or bilateral groin, buttock, thigh or knee pain, deformity or limitation of range of hip movement.

Exclusion Criteria

- Patients with history of trauma Patient having claustrophobia.
- Patient having history of metallic implants insertion, cardiac pacemakers and metallic foreign body in situ.
- Patients with previous history of hip surgery.

Data Collection

Once a patient fulfilled the inclusion criteria for this study he / she was administered the predesigned / pretested proforma (Annexure-II). Demographic characteristics of the patients such as age, sex were obtained through an interview.

OBSERVATION AND RESULTS

This study was an observational and Cross sectional study conducted at Department of Radio diagnosis, Krishna Institute of medical sciences and research Centre, Karad, for the duration of two years from November 2016 to November 2018. Total Fifty four patients with clinical history of painful hip joint without trauma were studied by plain radiograph and MRI scan. Fifty four patients with unilateral or bilateral hip pain of adult age groups and both sexes were studied.

Table 1: Distribution by Age

Age Groups	Number	Percentage (%)
19 - 30	13	24.08 %
31 - 50	23	42.59 %
>50	18	33.33 %
Total	54	100 %
Mean = 45.04 , SD = 14.70		

Table 1 shows that most of patients i.e. (42.59%) in our study were from 31 - 50 years of age, followed by more than 50 years (33.33%) and lastly19 - 30 years (24.08%).

Table 2: Gender Distribution

Gender	Number	Percentage (%)
Males	36	66.67%
Females	18	33.33%
Total	54	100%

Table 2 indicated In the present study majority of the patients were males 66.67% and rest (33.33%) were females. The ratio of male: female came out to be 2:1.

Table 3: Symptoms Distribution

Symptoms	Number	Percentage* (%)
Left Hip Pain	24	44.44
Right Hip Pain	19	35.19
Backache	9	16.67
Bilateral Hip Pain	8	14.81
Bilateral Lower Limb Pain with limitation of limb movements	6	11.11
Fever	5	9.2
Swelling	3	5.56
Thigh Pain	1	1.85

*Total is more than 100%, as many patients had more than one symptom

The most common chief complaint in our patients was unilateral hip pains (79.6%) {(Left Hip Pain (44.44%) followed by Right Hip Pain (35.19%)}. Other presenting complaints were Backache (16.67%), Bilateral Hip Pains (14.81%), and Bilateral Lower Limb Pains with limitation of limb movements (11.11%), fever (9.2%), Swelling (5.565) and Pain in the thighs (1.85%). (Table 3)

Table 4: AVN and non-AVN cases

AVN	Number	Percentage (%)
Present	27	50.00 %
Absent	27	50.00 %
Total	54	100 %

In Table No. 4 AVN was seen in half (50%) of the cases.

Table 5: Correlation of Plain Radiographs with MRI

		MRI		
		Normal	Abnormal	Total
Plain Radiograph	Normal	2	11	13
	Abnormal	0	41	41
Total		2	52	54

Sensitivity: 78.8 %	Positive Predictive Value = 100 %
Specificity: 100 %	Negative Predictive Value = 15.3 %

Table No. 5 indicated out of all 54 cases in our study, MR showed abnormality in 52 cases where as plain radiograph was abnormal in 41 patients. All the 41 patients with abnormal plain radiographs had an abnormal MRI study. Only 2 out of 13 patients with normal plain radiograph had a normal MR. Sensitivity of x ray in comparison with MRI was 78.8 % and Specificity was 100%. Therefore, the accuracy of detecting etiology by MRI was 96.2 % as compared to plain radiograph is 75.9 % in our study.

DISCUSSION

This study was an observational and Cross sectional study conducted at Department of Radio diagnosis, Krishna Institute of medical sciences and research Centre, Karad, during a period of two years from November 2016 to November 2018. Total Fifty four patients with clinical history of painful hip joints without trauma were studied by plain radiograph and MRI scan. Fifty four patients with unilateral or bilateral hip pain of adult age groups and both sexes were studied. The hip is a primary weight-bearing joint. Hammer [6] mentioned that in absence of known acute trauma, hip pain is a common diagnostic problem with many etiologies. According to Laslett et al. [7] causes of chronic hip pain include avascular necrosis, transient osteoporosis, inflammation, osteoarthritis, traumatic and neoplasm. MRI is the most sensitive mean of diagnosing AVN, representing the gold standard of non-invasive diagnostic evaluation. It has several advantages, helps in accurate staging of the lesion, it also detects asymptomatic lesions that are undetectable on plain radiographs, thus helping early treatment and better response. It provides multiplanar imaging and excellent soft tissue resolution. Ragab [8] et al studied 34 patients with hip pain using MRI and found similar spectrum of disease conditions prevalent in the population.

Avascular Necrosis

In our study, avascular necrosis (AVN) turned-out to be the most common hip pathology i.e. 27 (50%) with age varying from 19 to 70 years. The most common involved age group was 31 – 50 years, which comprised (48.15 %) of the cases which was similar to Khanna et al[9] and Kamal [10] studies. There was no any association between age groups and presence of pathologies especially Avascular necrosis (p = 0.582) in a current study.

CONCLUSION

MRI of the hip has become important tool in assessing the multiple hip joint pathologies. It is the method of choice in characterizing various hip disorders and assessing Bone marrow edema, cartilage, labrum, synovium, joint effusion, necrosis as well as extensions of the tumors and soft tissue involvement. Due to its multiplanar capabilities and high soft tissue resolution, MRI is the investigation of choice in most of the hip pathologies. The examined lesions were better seen on MRI than X-ray in our study. In addition, MRI seems required in cases of suspected hip disease with persistent symptoms and normal plain radiographs. It is far superior to radiography in all terms (except the cost and when prosthesis causes contradiction for MRI hip).

The use of intravenous gadolinium can be useful in the evaluation of primary musculoskeletal tumours, to detect intraosseous spread within the marrow, and soft-tissue infiltration and inflammatory conditions such as osteomyelitis and septic arthritis. Thus the salient advantages of MRI are, its ability to tissue characterize the lesion, detect bone marrow edema, joint effusion and necrosis accurately, ability to differentiate malignant from benign lesions non-invasively and most importantly lack of ionizing radiation. The findings seen on MRI have been highly correlated with the Histopathological findings. In patients allergic to iodinated contrast media, and in whom CT is contraindicated, MRI proves invaluable. From this study, we conclude that MRI is a reliable image modality in investigating hip pain. It is a non-invasive, accurate, safe, and effective method for assessing patients with painful hips of different pathologies.

CONFLICT OF INTEREST

None

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