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MRI Evaluation of Non-Traumatic Painful Hip Joint

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A B S T R A C T

Objectives: The aim of the study is to evaluate the role of MRI in diagnosis of painful hip joint. Role of MRI in evaluation of painful hip joint and to establish a differential diagnosis of various painful hip joint pathologies on MRI. ***Materials & Methods***: This prospective/retrospective study was carried out on 50 patients over a period of 2 years from 2021 to 2022. Study was carried out using SEIMENS 1.5 Tesla machine in Department of Radiodiagnosis at DR. PSIMS & RF, Gannavaram. ***Conclusion***: MRI is a valuable tool in evaluation of hip disorders as it enables assesment of articular structures, extra articular soft tissues & osseous structure that can be affected in hip disorders.MRI of hip shall be performed out early in patients with persistent pain and negative radiographic findings.

INTRODUCTION

The hip is a stable, major weight bearing joint with significant mobility. It can be involved by numerous pathological conditions like congenital, developmental, infective, arthritic and neoplastic.

Differential diagnosis of hip pain includes causes such as Osteonecrosis (Avascular necrosis of femoral head), osteoarthritis, septic arthritis, tubercular arthritis, femoral-acetabular impingement, transient osteoporosis of the hip, occult or stress fracture, transient synovitis, sacroilitis, malignancy, etc.

Imaging plays a pivotal role in the evaluation of hip pain. Although radiographs provide critical information about the osseous architecture and remain the first line of investigation, they are limited in their capacity to provide a detailed analysis of other key anatomical components and in early detection of pathologies.

MRI is the investigation of choice to assess the bone marrow, acetabularlabrum, cartilage, tendons, muscle and bursa.

PURPOSE OF THE STUDY: The aim of the study is to evaluate the role of MRI in diagnosis of painful hip joint.

OBJECTIVE

Role of MRI in evaluation of painful hip joint and to establish a differential diagnosis of various painful hip joint pathologies on MRI.

STUDY POPULATION

Imaging and clinical data of 50 patients with painful hip from 2021 to 2022 were reviewed retrospectively.

METHOD

MRI was performed using SEIMENS 1.5 Tesla machine in Department of Radiodiagnosis at DR.PSIMS & RF, Gannavaram.

Inclusion Criteria

- This study includespatients presenting with acute or chronic hip pain.

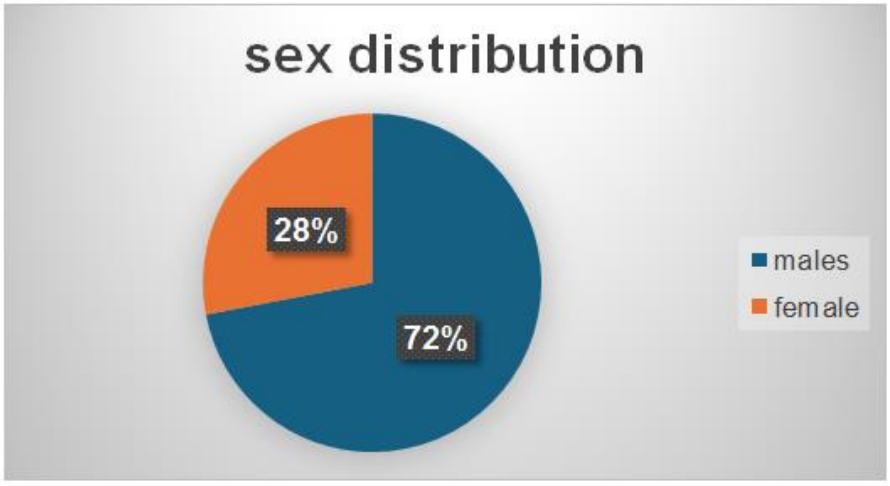
Exclusion Criteria

- Patients with a history of acute trauma to hip.
- Patients with a previous history of hip surgery.
- The patient having a history of claustrophobia.
- Patient has a history of ferromagnetic implants, cardiacpacemakers, cochlear implants, and metallic foreign body in situ.

RESULTS

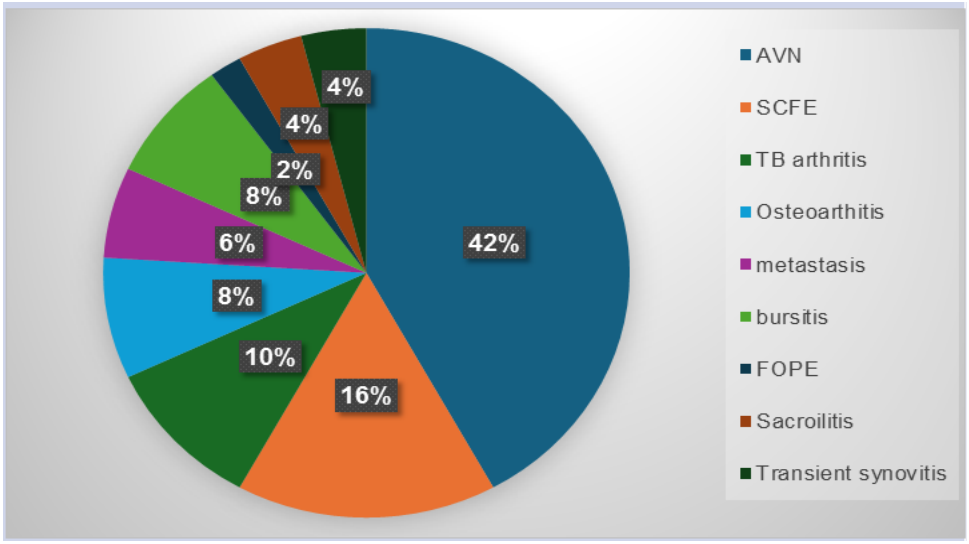
SEX DISTRIBUTION

Out of 50 patients included in our study, 36 (72%) were males and14 (28%) were females.



AGE WISE DISTRIBUTION

Age of the patients ranged from 14 years to 75 years. Highest incidence was seen in the age group 21-40 years of age.



S. No	Pathology	Numberof Patients	Percentage
1.	AVN	21	42%
2.	SCFE	8	16%
3.	TB Arthritis	5	10%
4.	Osteoarthritis	4	8%
5.	Metastasis	3	6%
6.	Bursitis	4	8%
7.	FOPE (focal periphysealedema)	1	2%
8.	Sacroilitis	2	4%
9.	Transient synovitis	2	4%

DISCUSSION

The hip is a primary weight-bearing joint. Absence of known acute trauma, hip pain is a common diagnostic problem with many etiologies. MRI is the most sensitive mean of diagnosing hip pathologies, representing the gold standard of non-invasive diagnostic evaluation.

This study showed maximum number of patients with painful hip joint falling in age group of 21-40 years, male to female ratio 3:1.

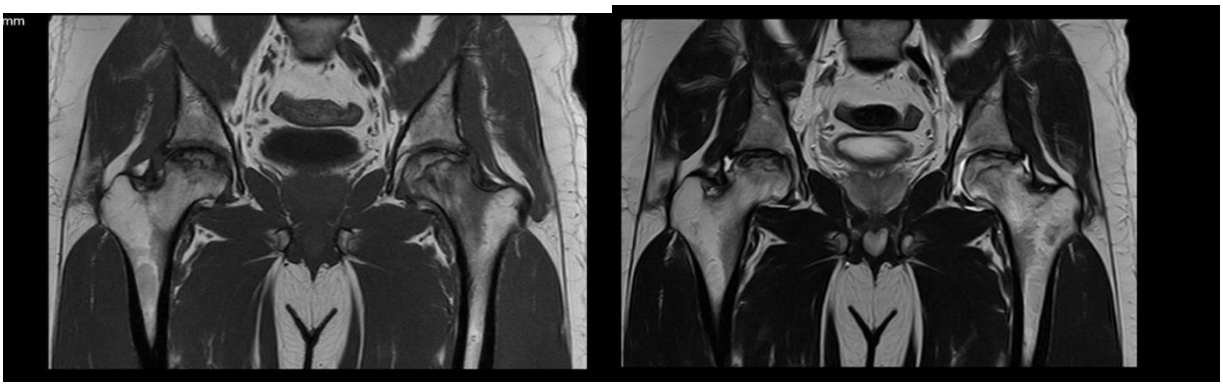
In this study it is observed that most common pathology for non traumatic hip joint pain was due to avascular necrosis.

MRI Findings		Number of Patients
BONE MARROW EDEMA	FEMORAL HEAD	8
	ACETABULUM	6
DOUBLE LINE SIGN		14
SUBCHONDRAL CYSTS	FEMORAL HEAD	12
	ACETABULUM	1
JOINT EFFUSION		14
JOINT SPACE REDUCTION		1
FEMORAL HEAD ALTERED COUNTOUR		10
FEMORAL HEAD FRAGMENTATION WITH COLLAPSE		1

Avascular Necrosis

Among the MRI most common findings were double line sign and femoral head deformity followed by sclerosis and bone marrow edema.

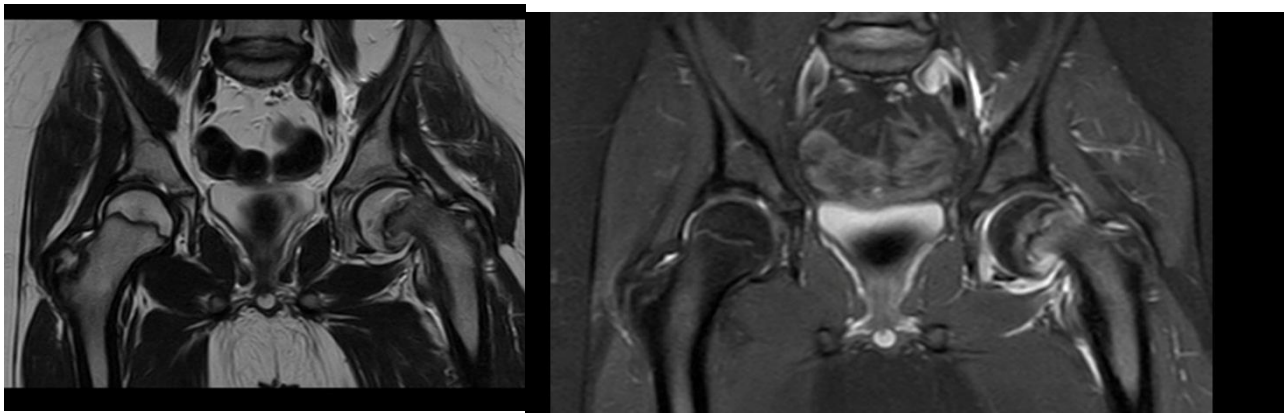
Stage	Findings inMRI	Number of Cases
FICAT ARLET STAGE 1	Edema	2
FICAT ARLET STAGE 2	Geographic defect.	4
FICAT ARLET STAGE 3	Crescent sign and eventually cortical collapse	14
FICAT ARLET STAGE 4	End stage with evidence of secondary degenerative changes.	1



This is a case of bilateral avascular necrosis of femoral heads with FICAT ARLET STAGE IV on right side and STAGE III on left side.

SLIPPED CAPITAL FEMORAL EPIPHYSIS

Out of 50 cases 8 cases were diagnosed with slipped capital femoral epiphysis, the most common MRIfindings of these cases are widening of the epiphysis and irregularity of femoral head growth plate with adjacent marrow edema.



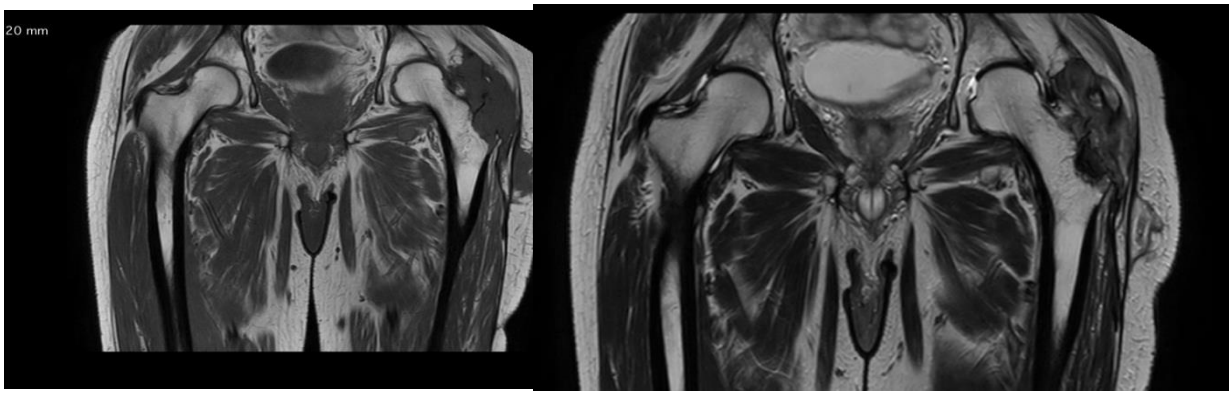
This is a case of T2WI and STIR showing Slipped capital femoral epiphysis of left hip showing widening and irregularity of epiphysis and marrow edema.

TUBERCULOSIS OF HIP JOINT

- Out of 50 cases included in the 5 cases were diagnosed as tuberculosis of hip joint.
- Most common findings are on MRI findings were: bone marrow edema, synovial thickening, and enhancement.

OSTEOARTHRITIS

- In this study 4 cases were diagnosed as osteoarthritis.
- The most common MRI findings in the patients with hip osteoarthritis are articular cartilage thinning, subchondral cysts, osteophytes followed by sclerosis and bone marrow edema.



This is case of osteomyelitis involving left greater trochanter of tubercular etiology with adjacent abscess involving inter, intramuscular and subcutaneous planes of proximal thigh region.

METASTASIS

- In this study 3 were reported with metastasis of hip.
- One of the case showed hypointense signal on T1WI and hyperintense on STIR images largest lesion seen involving right iliac bone which is extending to anterior half of acetabulum. The lesion also showed mild expansion of the bone with large area of marrow infiltration. Adjacentsoft tissue involvement was also noted. Other 2 cases also showed unilateral involvement one of the case showed diffuse involvement of the pelvic bones and other cases showed only involvement of the acetabulum.

BURSITIS

- Out of 50 cases 4 cases were diagnosed with bursitis.
- Most of the cases showed bilateral involvement of subgluteal and trochanteric bursitis.
- One of the case showed bilateral subgluteal with trochanteric bursitis and tendinitis of gluteus medius tendons.

SACROILITIS

- In this study 2 cases were reported as bilateral Sacroilitis.
- MRI findings were sub articular bone marrow edema of both S.I joints. Subarticular erosions were also noted involoving these joints.

FOCAL PERIPHYSEAL EDEMA

- One case out of 50 cases was reportedas focal periphysealedema of hip.
- MRI findings showed bilateral significant marrowedema noted on either side of growth plate of greater trochanter, neck and metaphyseal region of the femur.

TRANSIENT SYNOVITIS OF HIP

- 2 cases were reported as transient synovitis of hip joint.
- MRI findings showed hip joint effusion, synovial thickening and signal alteration in the surrounding soft tissues.

CONCLUSION

MRI is the method of choice in characterizing the various disorders of hip joint and it can point out specific features leading to accurate diagnosis of painful hip joint.

Due to good resolution, improved differentiation of tissue contrast and capacity for multi planar imaging, MRI is diagnostic modality of choice for assessment of hip disorders.

In this study out 50 cases it is obsevered that the most common pathology with non traumatic painful hip joint was avascular necrosis followed by slipped capital femoral epiphysis.The least common pathology was focal periphysealedema of hip.

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