



MAGNETIC RESONANCE IMAGING PROFILE IN PATIENTS OF AVASCULAR NECROSIS OF THE HIP JOINT

Radio-Diagnosis

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ABSTRACT

Introduction: Avascular necrosis occurs due to interruption of the blood supply to the bone eventually leading to disintegration and collapse. The hip joint is one most commonly affected joint particularly involving the femoral head. **Aims and Objectives:** This study aims to assess the role of MRI in the evaluation of cases of hip joint AVN, to describe its imaging features and determine appropriate staging. **Materials and methods:** A descriptive cross sectional study was performed in 50 patients. MRI hip was performed on SIEMENS ESSENZA 1.5 tesla machine. **Results:** In this study, it was observed that males were most commonly affected (72%). Bilateral involvement was more common (66%). Trauma was the most commonly identified etiological factor. All the patients had focal signal abnormality in the femoral head. **Conclusion:** MRI is superior to any other imaging modality and is therefore helpful in early diagnosis & proper staging of the disease.

KEYWORDS

Avascular necrosis (AVN), hip, Ficat and Arlet classification, osteonecrosis.

INTRODUCTION

Avascular necrosis (AVN) is a condition characterized by the occurrence of bone death secondary to reduction/ stoppage of blood supply to the bone⁽¹⁾. As a result, the affected bone portion disintegrates with subsequent collapse. It is a progressive, multifactorial, debilitating disease which can present with a broad spectrum of clinical manifestations causing limitation of activities of daily living and compromising the quality of life. The femur is one of the most commonly affected bones⁽²⁾.

The causes of AVN of the femur can be broadly divided into two categories: traumatic and non-traumatic⁽³⁾. Magnetic resonance imaging is a sensitive, specific and commonly used tool for the diagnosis and assessment of avascular necrosis of femoral head⁽⁴⁾. Present study was aimed to assess the role of MRI & describe the spectrum of MRI features in the evaluation of clinically suspected cases of AVN.

AIMS AND OBJECTIVES:

AIMS:

This study aims to assess the role of MRI in the evaluation of cases of AVN of hip and to describe the MRI features.

OBJECTIVES:

1. To study the imaging features of avascular necrosis of hip joint.
2. To categorise the patients of AVN of femur on the basis of Ficat and Arlet staging, demographic features and risk factors for AVN.

MATERIALS AND METHODS

Study Design: Descriptive cross-sectional study

Source of data:

Patients visiting the department of Radio-diagnosis at a tertiary healthcare centre.

Participant size: 50

Inclusion and exclusion criteria

Inclusion criteria:

Patient of any age group, of either gender who are a suspected or diagnosed case of AVN of femur presenting to the department of Radio-diagnosis.

Exclusion criteria:

1. Patients who refuse to give consent for the study.
2. Contraindications to MRI study such as cardiac pacemaker, Aneurysmal clips and cochlear implant.
3. Patients who are claustrophobic.

APPARATUS AND MATERIALS

- Study was explained & a written consent was taken for participation.
- MRI hip was performed on SIEMENS ESSENZA 1.5 tesla machine with the help of dedicated surface coil.
- Patients were asked to lie down in a supine position and scanning of both hips was done simultaneously using hip protocol.
- The sequences obtained were T1 and T2 weighted axial, coronal, sagittal and short-tau inversion recovery (STIR), Proton Density Fat Saturation (PDFS).
- Data was collected and compiled using Microsoft Excel. Statistical analysis was done using descriptive statistics.

RESULTS

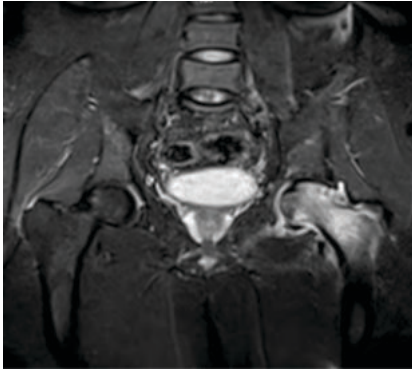
In this study, 50 patients suspected of AVN of the hip joint were studied.

- 1) Mean age was 41.6 +/- 11.3 years.
- 2) Out of these patients, 36 patients (72%) were males and 14 patients (28%) were females.
- 3) Bilateral hip joint involvement was seen in 33 patients (66%) and unilateral involvement was seen in 17 patients (34%).
- 4) Some of the commonly identified risk factors were – Trauma (22 patients -44%), idiopathic (12 patients -24%), diabetes mellitus (8 patients - 16%), excessive alcohol consumption (4 patients -8%), prolonged steroid consumption (3 patients - 6%) and radiation exposure (1 patient -2%)

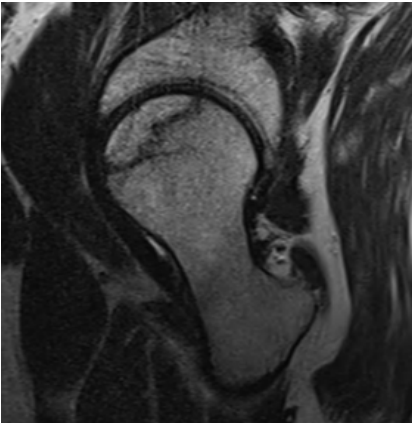
The following MRI features were most commonly observed:

- 1) Focal subchondral signal abnormality- 50 patients (100%)
- 2) Bone marrow edema- 43 patients (86%)
- 3) Joint effusion – 32 patients (64%)
- 4) Subchondral collapse / flattening of head - 22 patients (44%)
- 5) Reduced joint space – 6 patients (12%)

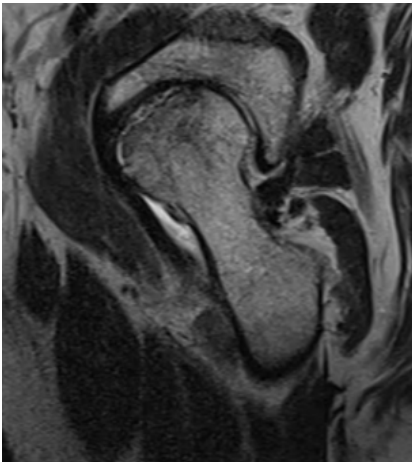
As per the Ficat and Arlet classification of AVN Stage, the percentage of patients in different stages was as follows: Stage 0 – nil (0%), Stage I – 10 patients (20%), Stage II - 13 patients (26 %), Stage III – 22 patients (44%) and Stage IV - 5 patients (10%).



STIR - Hyperintense signal (marrow edema)



T2 Sagittal - Geographic defect



T2 Sagittal - Subchondral collapse

DISCUSSION

In my study, majority of the patients presenting to the Radio-Diagnosis department with males (72%) and bilateral involvement was more common (66%).

Trauma was the most commonly identified risk factor. All the patients on MR imaging showed focal subchondral signal abnormality (100%). The next most common imaging findings were bone marrow edema (86%) followed by hip joint effusion (64%).

Majority of the patients presented for radiological evaluation in Stage III AVN of the hip joint as per Ficat Arlet classification.

CONCLUSION

- 1) MRI provides excellent soft tissue contrast and is highly sensitivity in detecting osteonecrosis of femoral head.
- 2) MRI is very helpful in staging of avascular necrosis.
- 3) MRI is superior to other modalities such as computed tomography and X-rays because it is there is no radiation exposure.

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