

# Evaluation of plain radiography and MRI in diagnosing pathology of hip joints

Jigar Salvi<sup>1</sup>, Archana Salvi<sup>2\*</sup>

<sup>1,2</sup>Associate Professor, Department of Radiology, Gujarat Adani Institute of Medical Science, Bhuj, Kutch, Gujarat, INDIA.

Email: [researchguide86@gmail.com](mailto:researchguide86@gmail.com)

## Abstract

**Background:** high-resolution direct MR imaging of the hip provides the best means for evaluating intra-articular pathology. However, radiography remains important for the diagnosis of subtle bony irregularities associated with femoroacetabular impingement. Hence the aim of the present study was to estimate the role of MRI in early evaluation of painful hip joints with subtle plain radiographic findings **Materials and Methods:** A total of 70 patients are included in the study. Total of 5 different pathologies are included in the study. Such as Avascular necrosis, tuberculosis of hip joint, joint effusion, metastasis of hip joint and osteoarthritis. All the patients were subjected to plain radiographic and MRI diagnosis. **Results:** In our study of 70 cases, 26 cases are diagnosed as AVN, 18 cases showing Joint effusion, 14 cases showing Osteoarthritis, 10 cases as TB Hip, and 2 cases showing Metastatic disease to Hip joint. **Discussion and Conclusion:** Our study proves MRI as gold standard in evaluation of soft tissue and articular cartilage which are having limitations for the detection of pathology on plain radiography.

**Key Word:** Evaluation, X-rays, MRI, Pathology

## \*Address for Correspondence:

Dr. Archana Salvi, Department of Radiology, Gujarat Adani Institute of Medical Science, Bhuj, Kutch, Gujarat, INDIA.

Email: [researchguide86@gmail.com](mailto:researchguide86@gmail.com)

Received Date: 05/08/2018 Revised Date: 13/09/2018 Accepted Date: 20/10/2018

DOI: <https://doi.org/10.26611/1013812>

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Accessed Date:  
23 October 2018

## INTRODUCTION

Accurate evaluation of the hip joint is integral to identifying complex hip abnormalities, aiding in preoperative and prearthroscopic procedure planning, and assessing for postoperative complications. Although the anatomic location of the hip off isocenter of the imaging bore, as well as the sphericity of the femoral head and relatively thin femoral head and acetabular dome articular cartilage, present challenges to assessing the hip joint with the use of MRI, the use of proper pulse sequence protocols can overcome these challenges.<sup>1</sup> The diagnostic role of MR imaging in the evaluation of AVN is evolving. MR imaging is performed to detect AVN in its early

stages, thus allowing early treatment and prevention of subsequent bone destruction. MR imaging has been shown to be the most sensitive modality for imaging AVN. Screening of asymptomatic, high-risk patients may enable early intervention. The principal role of MR imaging is in establishing the diagnosis of AVN in symptomatic patients before radiographic changes become apparently visible.<sup>1,2</sup> MR imaging has played an increasingly important role in the evaluation of the arthritides. The most common form of arthritis in children is juvenile rheumatoid arthritis (JRA). MR imaging is uniquely capable of depicting the soft-tissue abnormalities that occur in JRA, including synovial inflammation, joint effusion, and articular cartilage destruction.<sup>3</sup> MR imaging can be useful in the evaluation of a variety of hip disorders. We believe that attention to the details of MR examination technique and imaging protocol is essential for maximizing the diagnostic potential of MR imaging in the work-up of hip disease. Specific protocols that incorporate surface coil imaging, oblique image acquisition, and alternative pulse sequences are the foundation for successful hip studies.<sup>4</sup> Currently, high-resolution direct MR imaging of the hip provides the best means for evaluating intra-articular pathology. However, radiography remains important for

the diagnosis of subtle bony irregularities associated with femoroacetabular impingement. Hence the aim of the present study was to estimate the role of MRI in early evaluation of painful hip joints with subtle plain radiographic findings.

**MATERIALS AND METHODS**

**Source of Data:** The main source of data for the study is patients from the teaching Hospital. Appropriate MRI sequences and multiplanar imaging was performed for every patient. All patients referred to the department of Radio diagnosis with clinical history of hip pain in a period of 2 years were subjected for the study. The study was mainly based on investigations as Radiology itself is a tool of Investigation. The study involves only humans. Informed consent was taken after explaining about and before any procedure. Ethical clearance was obtained from the Research and Dissertation Committee/ Ethical Committee of the institution for this study.

**Sample size:** 70

**Duration of study:** 2 years

**Data Analysis:** A cross sectional study is performed and the data is analysed by Proportions.

**Inclusion Criteria:** The study includes patients presenting with acute or chronic hip pain and Patients of all age groups and both sexes.

**Exclusion Criteria:**

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

**Technique:** Imaging was done with 1.5 Tesla Philips Achieva Machine using abdominal surface coils and spine coils. The following sequences was selected as required. TIW coronal - TE(18ms) TR(500-700ms) slice thickness (1-3mm) T1W axial - TE(18ms) TR(500-700ms) slice thickness(1-3mm) T2W coronal - TE(100ms) TR(1000-1500ms) slice thickness (1-3mm) T2W axial - TE(100ms) TR(1000-1500ms) slice thickness (1-3mm) STIR coronal - TE(30ms) TR(2700-6000ms) slice thickness (3-5mm) PD sagittal - TE(30ms) TR(2300-6500ms) slice thickness (3-5mm) mFFE axial -TE(9.21ms) TR(500ms) slice thickness(1-3mm)

**RESULTS**

A total of 70 patients were included in the study. Of the total 70 there were 45 males and 25 females. The age range varies from 0 -70 years. Maximum patients were in the age of 31–40 years. Least numbers of patients were in age group of 61–70 years. Total of 5 pathology were included in the study. Maximum numbers of patients that are 26 were suffering of avascular necrosis of femoral head. Least numbers of patients were of metastasis

patients. Out of 70 cases 26 cases are diagnosed as AVN of femoral head. In 26 cases of AVN only 8 cases were detected on X-Ray but, all 26 cases were detected on MRI. 18 cases which were normal on X-Ray proved to have AVN on MRI. A total of 18 cases showed joint effusion pathology. Only 10 cases were detected on x-rays and all 18 cases were found positive on MRI. Widened tear drop distance was seen in X-rays where as on MRI the findings were T2w and ST1R hypersensitivity within the joint space. Out of the total 70 cases, 14 cases showed diagnosis of osteoarthritis. All the cases were diagnosed on x-rays as well as MRI. The difference was of the severity. All the cases on x rays showed stage 1 osteoarthritis whereas on MRI they were stage 2 or 3. A total of 10 cases were diagnosed with the tuberculosis of HIP joint. Only 6 cases were diagnosed on x-ray, where as all the cases were diagnosed positively on MRI. There was also difference in staging on the tuberculosis in x rays and MRI. Least number of cases was found of metastasis. Only 2 cases were diagnosed with metastasis and the both the cases were found positive in x rays as well as MRI. Both the cases did showed osteoblastic metastasis.

**Table 1: Gender distribution in the study**

Gender	Number of patients	%
Male	45	65
Female	25	35
Total	70	100

**Table 2: Age wise distribution**

Age	Number of patients
0 – 10	6
11-20	8
21-30	15
31-40	18
41-50	10
51-60	9
61-70	4
Total	70

**Table 3: Distribution of different pathologies included in the study**

Sr. No.	Pathology	Number
1.	AVN	26
2.	Joint Effusion	18
3.	Osteo Arthritis	14
4.	Tuberculosis	10
5.	Metastasis	2
Total		70

**DISCUSSION**

Plain radiography is a widely established, economical investigation readily available in all kinds of health setups for imaging the hip joint. Whereas MRI is an expensive, not readily available investigation at the level of primary health care centers.<sup>5</sup> However, is the non-invasive gold

investigation in early diagnosis, evaluate the extent of pathological involvement more accurately and narrow down the differential diagnosis.<sup>6</sup> Our study aims at the early detection of the disease before the appearance of signs on radiography or in patients having subtle findings on plain radiography by using MRI that helps the clinician to treat the patient at the early stages to prevent the further progression of disease. In the setting of chronic hip pain, a normal-appearing radiograph, a nonspecific history and clinical findings can be a difficult diagnostic dilemma. MR imaging is a valuable tool in the evaluation of hip disorders because it enables assessment of articular structures, extra-articular soft tissues, and the osseous structures that can be affected by hip disease.<sup>7, 8</sup> MRI is an imaging technique that does not require exposure to radiation. MRI of the hips should be performed early in patients with persistent pain and negative radiography findings.<sup>9</sup> In our study of 70 cases, 26 cases are diagnosed as AVN, 18 cases showing Joint effusion, 14 cases showing Osteoarthritis, 10 cases as TB Hip, and 2 cases showing Metastatic disease to Hip joint.

## CONCLUSION

Our study proves MRI as gold standard in evaluation of soft tissue and articular cartilage which are having limitations for the detection of pathology on plain radiography.

## REFERENCES

1. Berkowitz JL, Potter HG: Advanced MRI techniques for the hip joint: focus on the postoperative hip. *American Journal of Roentgenology* 2017, 209:534-43.
2. Stoica Z, Dumitrescu D, Popescu M, Gheonea I, Gabor M, Bogdan N: Imaging of avascular necrosis of femoral head: familiar methods and newer trends. *Current health sciences journal* 2009, 35:23.
3. Pruunsild C: Juvenile idiopathic arthritis in children in Estonia. 2007.
4. Anderson MW, Kaplan PA, Dussault RG, Degnan GG: Magnetic resonance imaging of the wrist. *Current problems in diagnostic radiology* 1998, 27:189-229.
5. De Backer A, Mortelet K, De Keulenaer B: Picture archiving and communication system—part one: filmless radiology and distance radiology. *JBR-BTR* 2004, 87:234-41.
6. Stange E, Travis S, Vermeire S, Beglinger C, Kupcinkas L, Geboes K, Barakauskiene A, Villanacci V, Von Herbay A, Warren B: European evidence based consensus on the diagnosis and management of Crohn's disease: definitions and diagnosis. *Gut* 2006, 55:i1-i15.
7. Kim Y-J, Jaramillo D, Millis MB, Gray ML, Burstein D: Assessment of early osteoarthritis in hip dysplasia with delayed gadolinium-enhanced magnetic resonance imaging of cartilage. *JBJS* 2003, 85:1987-92.
8. Bird P, Oakley S, Shnier R, Kirkham B: Prospective evaluation of magnetic resonance imaging and physical examination findings in patients with greater trochanteric pain syndrome. *Arthritis and Rheumatism: Official Journal of the American College of Rheumatology* 2001, 44:2138-45.
9. Gotthardt M, Bleeker-Rovers CP, Boerman OC, Oyen WJ: Imaging of inflammation by PET, conventional scintigraphy, and other imaging techniques. *Journal of Nuclear Medicine* 2010, 51:1937-49.

Source of Support: None Declared  
Conflict of Interest: None Declared