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Original Article

Comparative analysis of changes in MR imaging of pre and post intrauterine progesterone implants in adenomyosis cases



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ABSTRACT

Background: Magnetic Resonance Imaging (MRI) plays an important role in the evaluation and management of adenomyosis. In this study, we first diagnosed the adenomyosis on MRI and then we analyzed the MRI changes in the uterus in pre and post intrauterine progesterone implants cases.

Method: All the patients with clinical diagnosis of menorrhagia or dysmenorrhea were screened by Ultrasonography (USG) of the pelvis. Patients with heterogeneous echo texture of the uterus were then evaluated by the MRI of the pelvis. All patients with MRI findings suggestive of adenomyosis formed the study group.

Result: On MRI study 60 patients were diagnosed as adenomyosis, 68.33% had diffuse adenomyosis and 31.66% had focal adenomyosis. 83% of diagnosed adenomyosis cases had high intensity signal foci which were seen in 75% cases of diffuse adenomyosis and 100% cases of focal adenomyosis. 50 diagnosed adenomyosis cases were then reviewed after 03 months, 06 months and 12 months to see for any change in the MRI findings in the post intrauterine implant cases. On follow up MRI after post progesterone intrauterine implant, 50% of the cases showed reduction in the high intensity signals, 10% of the cases showed mild reduction in the junctional zone thickness with no significant change in the uterine size.

Conclusions: It is inferred that MR imaging is not only helpful in diagnosing but also helpful in monitoring the effects of hormonal therapy in adenomyosis.

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Introduction

Adenomyosis is a common gynecologic condition that affects menstruating women. Diagnosis based on clinical findings is usually difficult because of the nonspecific nature of the symptoms and the frequent coexistence of other pelvic diseases.¹ With the advent of high-resolution imaging techniques, like ultrasonography (USG) and Magnetic Resonance Imaging (MRI), accurate diagnosis of adenomyosis is now possible.^{2,3} Trans-abdominal sonography (TAS)/transvaginal sonography (TVS) is commonly used as the initial imaging modality for diagnosing adenomyosis. Improved spatial resolution TVS makes it more accurate in diagnosing adenomyosis.^{2,4}

MRI is an accurate, noninvasive modality for diagnosing adenomyosis and is thought to be more precise than TVS in distinguishing adenomyosis from various pathologies like leiomyoma that may simulate adenomyosis. This is perhaps clinically very relevant for planning appropriate treatment protocol.^{1,3} MRI allows excellent direct visualization and evaluation of zonal architecture of the uterus.⁵⁻⁸

The role of imaging in evaluating patients with suspected adenomyosis is to establish a correct diagnosis, to determine the extent and depth of myometrial penetration and to monitor the evolution of the disease in patients receiving conservative therapy.²

In earlier days, treatment of adenomyosis mainly consisted of hysterectomy. However, off late, conservative mode of treatment like intrauterine progesterone implants have become more popular. Amongst various intrauterine progesterone implants, the only levonorgestrel-releasing intrauterine system (LNG-IUS) that has been approved for general public use is Mirena1 (Schering AG). It is a T-shaped plastic intrauterine device (IUD) that releases levonorgestrel (20 mcg per day) directly into the uterine cavity for 5 years.⁹

Although MRI has been extensively used for the diagnosis of adenomyosis, to the best of our knowledge, literature is scant describing follow up changes in patients of adenomyosis treated with intrauterine progesterone implant. The present study was undertaken to evaluate post progesterone implant MRI changes in cases of adenomyosis.

In this study, we evaluated the MRI findings of suspected cases of adenomyosis and this was then followed by a comparative analysis of changes in the MRI findings in the pre & post intrauterine progesterone implants.

Materials and methods

This is a prospective diagnostic analytical study carried out in the Radiology and Gynecology Departments of a tertiary care teaching hospital. Approval of institutional ethical committee was taken prior to this study. The study period was from Aug 2010 to Aug 2012.

We have calculated the sample size from the previous study by Bragheto et al¹⁰ to assess the difference of 5 mm with alpha of 1% and power of 90% with pre-treatment mean of 17.7 mm (SD = 0.90) and post-treatment mean of 13.1 (SD = 0.8). The minimum required sample size was 4, however we studied 60 patients.

All the patients with clinical diagnosis of menorrhagia or dysmenorrhoea referred to the radiology department by the gynecologists were screened by per abdominal & transvaginal USG of the pelvis. Patients with normal sized uterus or bulky uterus with heterogeneous echo texture of the myometrium were then further evaluated by the MRI of the pelvis. All patients with MRI findings suggestive of diffuse or focal adenomyosis formed the study group.

Exclusion criteria were-

- 1) Patients with normal sized uterus on USG with normal echo texture of the myometrium.
- 2) A maximum junctional zone thickness (JZT) of 10 mm or less on MRI.
- 3) Patients who were claustrophobic
- 4) Patients lost to follow up/operated/expulsion of IUD during the study and follow up period.

Ultrasonography of the pelvis was done on Logic-P5 (Wipro-GE) machine. TAS of the pelvis was done by 2-5 Mega-Hz Convex probe and the TVS was done frequencies of 7-11 Mega Hz.

MRI of the pelvis was done with Magnetom Harmony 1 T (Siemens) machine with CP body array flex coils. Following sequences were taken for all patients: T1 and T2 Weighted axial, coronal and sagittal and T1W FS sagittal. The Imaging parameters were as follows: field of view – 230 to 260; number of acquisitions – 2; matrix size – 256 × 128 or 256 × 192; section thickness – 3-5 mm; and intersection gap of 10-20 mm.

Criteria for MRI diagnosis^{11,12} of adenomyosis included:

- 1) Diffuse or focal widening of the JZ (14 mm or greater) on T2WI.
- 2) Poor definition of junctional zone (JZ) borders or indistinct margins with the myometrium.
- 3) High-signal-intensity (HSI) foci (usually a few millimeters in diameter) within the JZ on T2-and/or T1-weighted images.
- 4) JZ thickness 11-13 mm with poor definition of borders along with HSI foci on T1W and/or T2W

Adenomyosis was diagnosed on MRI when two of first three criteria were met or on the basis of criteria no 4.

All cases diagnosed to have adenomyosis on the basis of MRI findings were referred back to gynecologists for implantation of the LNG-IUS (Mirena1). The final decision for insertion of the IUD in appropriate cases was left to the treating gynecologist.

All patients who had IUD inserted were then followed clinically as well as with MRI after 03, 06 & 12 months respectively. The MRI of the pelvis was done using the same protocol as described above to assess for any change in the size of uterus, JZ thickness, T1 &/or T2 HSI foci in the JZ. The results were then analyzed.

MR images were reviewed by two experienced radiologists and decisions were reached by consensus. The following parameters were assessed on MRI.

- a) Uterus size
- b) JZ thickness on T2W Sagittal scan

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