

Diagnostic Accuracy of Uterine Adenomyosis Through Transvaginal Sonography and Magnetic Resonance Imaging

Dr. Saba Alvi¹ (PG Resident), Dr. Sheetal Singh² (Professor & HOD), Dr. Amlendu Nagar³ (Professor), Dr. Kushpreet Kaur⁴ (PG Resident), Dr. Ashwin Choudhary⁵ (PG Resident), Dr. Naman Saxena⁶ (PG Resident), Dr. Pradeep Ahirwar⁷ (PG Resident)

First Author: Dr. Saba Alvi

Corresponding Author: Dr. Kushpreet Kaur

Abstract:

Background&Method: This study is conducted with an aim to Diagnostic Accuracy of Uterine Adenomyosis through Transvaginal Sonography and MRI in Department of Radiology, Index Medical College Hospital and Research Centre, Indore. All the patients were explained about the study in detail including risks/benefits, outcome, procedure, etc. in their own language. A voluntary written informed consent was obtained from them for participation in the study.

Result:

Conclusion: The diagnosis of adenomyosis prior to treatment planning is very important. And efficient treatment planning is based on the accurate diagnosis and characterization of the lesion. Magnetic resonance imaging modality has a very high diagnostic accuracy in adenomyosis diagnosis along with its accurate characterization. But the cost is very high, reducing the accessibility by many patients. Another diagnostic modality is the transvaginal sonography for diagnosing and characterization of adenomyosis. Studies have supported that transvaginal sonography has comparable diagnostic accuracy to that of magnetic resonance. In our study we found that the sensitivity, positive predictive value and diagnostic accuracy of transvaginal sonography are high in comparison to magnetic resonance imaging, but has poor specificity and negative predictive value. We recommend the use of transvaginal sonography in diagnosis and characterization of adenomyosis, but in cases with inconclusive diagnosis, use of magnetic resonance imaging is highly recommended.

Keywords: Uterine Adenomyosis, Transvaginal, Sonography and MRI.

Study Designed: Prospective, comparative study.

1. INTRODUCTION

The presence of ectopic endometrial tissue in the myometrium, known as adenomyosis, is a cause of morbidity in women who suffer from it. It is a benign condition. Menorrhagia, dysmenorrhoea, and dyspareunia are the most common symptoms.[1]

Although the exact prevalence of uterine adenomyosis is unknown, it is most commonly detected in multiparous women who are suffering from bleeding or pelvic pain, especially in the late stages of pregnancy.[2,3,4]

Histology of post-hysterectomy specimens was traditionally used to make the diagnosis. Trans-vaginal ultrasonography (TVS) and the magnetic resonance imaging (MRI) are two

imaging procedures that can be used to provide a credible pre-surgical diagnostic results. Imaging modalities are preferred as accurate pre-surgical diagnosis would facilitate alternative treatment options to hysterectomy.[5]

Transabdominal ultrasound (TUS) can visualize a big, regular, heterogeneous uterus containing tiny cystic lesions of 2–7 mm.[6] TUS is a useful modality in women with bleeding or with dysmenorrhea in detecting uterine leiomyomas or the endometrial disorders. The prevalence of adenomyosis in women with and without uterine leiomyomas or endocavitary anomalies was 24.5 percent and 91.3 percent, respectively, in a study of 129 patients who underwent hysterectomy for bleeding and were investigated by TUS.[7] TUS exhibited a low sensitivity (30%–63%) due to its restricted picture quality, although having a high specificity (97 percent–97.5 percent).[5,6]

However, because TUS is unable to distinguish between adenomyosis subtypes, transvaginalsonography (TVS) should always be utilised for adenomyosis identification.

The identification of a small myometrial cyst connected to islets of dilated ectopic endometrium on MRI is the major criterion for adenomyosis. On T2 and T1-weighted MRI, these high-intensity myometrial foci less than or equal to 3mm are embedded within the myometrium (most typically the inner myometrium) and show a high signal and low signal, respectively[7].

With the increased use of ultrasonography (US) and the magnetic resonance imaging (MRI) in women with chronic pelvic discomfort or infertility, adenomyosis has been detected in younger women, implying multiple etiopathogenic situations and subtypes.

2. MATERIAL & METHOD

Department of Radiology, Index Medical College Hospital and Research Centre, Indore (M.P.), Prospective, comparative study. The duration of study was from January 2020 to August 2021. We had included 50 patients with abnormal uterine bleeding.

INCLUSION CRITERIA

a) Patients of age more than 18 years with clinical diagnosis of abnormal uterine bleeding referred from Department of Obstetrics & Gynaecology and Department of Medicine of the Institute for sonography and MRI fulfilling the inclusion criteria will be subjected to imaging on SeimensAcuson x300 USG Machine (EV 4-9) and TVS Voluson S8 (4-9 MHz) and MRI 1.5T (GE Signa) after taking written informed consent.

b) Patients who will give the written consent form.

EXCLUSION CRITERIA

a) Pediatric age group patients (<18 years)

b) Patient not willing to be a part of the study

c) All patients having cardiac pacemakers, prosthetic heart walls, cochlear implant or any metallic implants

d) All patients having history of claustrophobia

e) Patients who are unmarried

3. METHODOLOGY

All the patients were explained about the study in detail including risks/benefits, outcome, procedure, etc. in their own language. A voluntary written informed consent was obtained from them for participation in the study. Also consents for undergoing transvaginalsonography and magnetic resonance imaging were obtained.

All the study related procedures were conducted after obtaining the consent. Patient's clinical history and examination findings were recorded.

Transvaginal USG examination was performed by using EV 4-9 MHz frequency transducer (TVS Voluson S8 (4-9 MHz) with TVS 3D Probe and SeimensAcuson x300 USG Machine) after bowel preparation. Bowel preparation was used to eliminate faecal content and gases in the rectosigmoidcolon, the duration of examination was around 25-35 minutes.

All these patients underwent pelvic MR imaging, which was performed by using a 1.5T MR (GE Signa) imaging system. The patient was kept in fasting for at least 4 hours prior to the MR investigation. Voiding was not allowed for 1 hour before the examination to correct the angle of uterine anteversion and displace the bowel cephalad.60 ml of gel is infused into the vagina to distend the fornix. The average duration of acquisition of MR image was 25 minutes. An additional 20 minutes were required for image interpretation.

All transvaginalsonography and MRI results were recorded and evaluated. Then the lesion sample was taken and histopathological examination was done. The results obtained on the MRI and transvaginalsonography were evaluated against the histopathology results and the sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of MRI and transvaginalsonography was calculated.

4. RESULTS

Table No. 1: Distribution of patients according to age

Age	Number	Percentage
<18 years	0	0.0
19-20 years	0	0.0
21-30 years	0	0.0
31-40 years	17	34.0
41-50 years	28	56.0
>50 years	5	10.0
Total	50	100.0

The above table shows the distribution according to age.17 (34%) patients were in the age group of 31-40 years, 28 (56%) were in the age group 41-50 years and 5 (10%) were in the age group more than 50 years.Majority of the patients were in the age group 41-50 years.

Table No. 2: Distribution of patients according to menopausal status

Menopausal Status	Number	Percentage
Postmenopausal	4	8.0
Premenopausal	46	92.0

Total	50	100.0
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The above table shows the distribution according to menopausal status. 4 (8%) patients were postmenopausal and rest 46 (92%) were premenopausal. Majority of the patients were premenopausal.

Table No. 3: Distribution of patients according to clinical findings

Clinical Findings	Number	Percentage
Disturbed uterine bleeding	32	64.0
Discharging P/V	9	18.0
Lower abdominal pain	9	18.0
Total	50	100.0

The above table shows the distribution according to clinical findings. 32(64%) women had disturbed uterine bleeding, 9(18%) had discharging per vaginum and 9 (18%) had lower abdominal pain.

Table No. 4: Sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of Transvaginal Sonography against MRI in the diagnosis of adenomyosis

Transvaginal sonography	MRI		Total
	Adenomyosis	Leiomyoma	
Adenomyosis	31	6	37
Leiomyoma	8	5	13
Total	39	11	50

The above table shows the sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of transvaginal sonography against MRI in the diagnosis of adenomyosis.

True Positive	True Negative	False Positive	False Negative
31	5	6	8
Sensitivity		88.89%	
Specificity		45.45%	

Positive predictive value	91.43%
Negative predictive value	38.46%
Diagnostic accuracy	83.13%

The sensitivity of transvaginalsonography in diagnosis of adenomyosis against the MRI was found to be 88.89%, specificity was 45.45%, positive predictive value being 91.43%, negative predictive value was 38.46% and diagnostic accuracy was 83.13%.

The transvaginalsonography has high sensitivity, high positive predictive value and good diagnostic accuracy, but the specificity and negative predictive value are poor and hence can miss the diagnosis of adenomyosis.

5. DISCUSSION

Adenomyosis is a common condition often seen in middle-aged women and women with children. It is usually benign. It may be seen in women who had previously undergone any uterine surgery. Adenomyosis is triggered by changes in the estrogen, progesterone, prolactin and follicle stimulating hormone.[8]

The problem in diagnosis is adenomyosis is that it is often diagnosed and leiomyomas, but these two conditions are not the same.[9] Unless a proper and accurate diagnosis is made, the right treatment cannot be selected. Hence, it is very important to have proper diagnosis of adenomyosis. The study was conducted with an aim to evaluate the diagnostic accuracy of transvaginalsonography and magnetic resonance imaging in the diagnosis of adenomyosis in women presenting with an abnormal uterine bleeding.

In the present study we have included 50 women with abnormal uterine bleeding of age more than 18 years. Majority of these women were in the age group 41-50 years. It is commonest age group of women in whom abnormal uterine bleeding is seen.

Majority of the women with abnormal uterine bleeding were premenopausal women (92%) and only 8% of these women were postmenopausal.

64% presented with disturbed uterine bleeding, and 18% each presented with per vaginum discharge and pain in lower abdomen. The EM (endomyometrial) junction showed a loss of interface in 42%, indistinct EMJ interface in 32%, poor differentiation of EM junction in 10% and in 16% this was maintained[10].

In half of the women, endomyometrial thickness was between 4-8 mm, 2% had between 9-10 mm and in 46% it was more than 10 mm. The ratio of junctional thickness / myometrial thickness was more than 30 in 44% women and between 21-30 in 14% women, with a mean ratio of junctional thickness / myometrial thickness to be 26.02 ± 12.32 .

6. CONCLUSION

The diagnosis of adenomyosis prior to treatment planning is very important. And efficient treatment planning is based on the accurate diagnosis and characterization of the lesion. Magnetic resonance imaging modality has a very high diagnostic accuracy in adenomyosis diagnosis along with its accurate characterization. But the cost is very high, reducing the accessibility by many patients. Another diagnostic modality is the transvaginalsonography for

diagnosing and characterization of adenomyosis. Studies have supported that transvaginalsonography has comparable diagnostic accuracy to that of magnetic resonance. In our study we found that the sensitivity, positive predictive value and diagnostic accuracy of transvaginalsonography are high in comparison to magnetic resonance imaging, but has poor specificity and negative predictive value. We recommend the use of transvaginalsonography in diagnosis and characterization of adenomyosis, but in cases with inconclusive diagnosis, use of magnetic resonance imaging is highly recommended.

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