

A Hospital Based Study on Correlation between Transvaginal Sonography and Histopathological Pattern in the Diagnosis of Adenomyosis

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Abstract

Background: Adenomyosis is a common benign disease of the uterus with an incidence of 5-70% in combined surgical and postmortem specimens. It may be diagnosed using transabdominal ultrasonography, transvaginal ultrasonography (TVS), or magnetic resonance imaging.

Aim of the Study: The aim of the study was to study the different transvaginal sonographic criteria for diagnosing adenomyosis and to correlate the most useful criteria with histopathology results in the diagnosis of adenomyosis.

Materials and Methods: A total of 65 patients undergoing hysterectomy were subjected to pre-operative transvaginal sonography using certain criteria for the diagnosis. The criteria for the diagnosis were globular uterine configuration, poor definition of the endometrial-myometrial interface, sub-endometrial echogenic linear striations, myometrial anterior-posterior asymmetry, myometrial cysts, and a heterogeneous myometrial echotexture. The results were compared with the histopathology of the specimen obtained after surgery.

Observations and Results: A total of 65 patients included in the present study who were undergoing hysterectomy were aged between 26 and 68 years with a mean age of 47.45 ± 2.50 . The specimen was positive for adenomyosis in 35.65 (53.84%) hysterectomy specimen and negative for adenomyosis in 30.65 (46.15%). There was statistical significance with all the ultrasound criteria except poor definition of the endometrial-myometrial interface and myometrial cysts correlating with histopathology of adenomyosis (P at 0.806).

Conclusions: TVS is a useful preliminary work tool in the diagnosis of adenomyosis. Globular uterine configuration, sub-endometrial echogenic linear striations, heterogeneous myometrial echotexture, and myometrial anterior-posterior asymmetry were significant criteria in the diagnosis of adenomyosis.

Key words: Adenomyosis, Histopathology, Transvaginal, Ultrasound

INTRODUCTION

Adenomyosis is a common benign disease of the uterus with an incidence of 5–70% in surgical and postmortem specimens combined.^[1,2] It occurs when there is disruption between the normal endometrial basal layer and the myometrium.^[1] The cause may be due to uterine trauma,

pregnancy, postpartum endometritis, or cesarean delivery. The endometrial glands invade the myometrium, resulting in ectopic intramyoemtrial glands associated with adjacent myometrial hypertrophy.^[2] Whereas an adenomyoma is a focal form of adenomyosis and may be difficult to distinguish from uterine leiomyoma on imaging.^[3] The later coexist with adenomyosis in 36-50% of cases.^[1] The incidence of endometrial hyperplasia and carcinoma has also been reported to occur with greater frequency in women with adenomyosis; which may be explained by the hormonal influence.^[4] The diagnosis adenomyosis remains elusive, but the use of sonography and MR imaging help with high sensitivities in high-prevalence populations.^[5-7] Review of literature shows high sensitivities and specificities of 87% and 98%, respectively, with transvaginal sonography

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www.ijss-sn.com

Month of Submission : 09-2017
Month of Peer Review : 10-2017
Month of Acceptance : 10-2017
Month of Publishing : 11-2017

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in the diagnosis of adenomyosis.^[8-10] As the initial imaging is by ultrasonography in the diagnosis of adenomyosis patients, improving the skills of sonography is important to the gynecologists. In this context, the present study is conducted to correlate the transvaginal sonography with histopathological features of adenomyosis. Pre-operative sonography in adenomyosis is also important because the disease is usually overlooked especially in the presence of a fibroid uterus. Management, such as planning for myomectomy for uterine preservation, may be altered if extensive adenomyosis is suspected.

Period of Study

This study period was from July 2004 to June 2007 (3 years).

Institute of Study

Department of OBG, General Hospital attached to Kurnool Medical College, Kurnool, Andhra Pradesh.

MATERIALS AND METHODS

A total of 65 patients attending the Department of OBG, Kurnool Medical College Hospital, Kurnool, Andhra Pradesh, with adenomyosis were included in the study. An Institutional Ethical Committee clearance certificate was obtained, and committee approved consent form was used for the study. This was a prospective cross-sectional study.

Inclusion Criteria

1. Patients undergoing hysterectomy for dysmenorrhea, menometrorrhagia, cervical intraepithelial neoplasias, adnexal masses, genital prolapse, and endometrial hyperplasia or carcinoma of cervix, or uterus.
2. Patients of all age groups were included.

Exclusion Criteria

1. Patients without the indications mentioned above were excluded
2. Patients not giving for the consent were excluded.

The radiologist was blinded as to the indication for hysterectomy. The pathologist was blinded to the clinical diagnosis and ultrasound reports of the patient. The same radiologist and pathologist conducted the study throughout the period. Demographic data were obtained from the patients. A thorough clinical history taking and gynecological examination was done and the data collected. The patients were subjected to transvaginal sonography before proceeding to hysterectomy. A 7-9 MHZ endovaginal probe was used with a GE ultrasound machine. During the procedure, the myometrial echotexture, uterine borders (regular or irregular), uterine size, and the presence of associated abnormalities (associated leiomyoma) were noted. The criteria used were:

1. Globular uterine configuration
2. Poor definition of the endometrial-myometrial interface
3. Sub-endometrial echogenic linear striations
4. Myometrial anterior-posterior asymmetry
5. Myometrial cysts (1–7 mm)
6. Heterogeneous myometrial echotexture.

All the reports given by the radiologist were re-evaluated by the author before proceeding to hysterectomy. Hysterectomy was carried out by the standard textbook descriptions. The surgical specimen was examined for macroscopic appearance (1) enlarged uterus, (2) a globular and/or asymmetrical uterus, (3) a dense, irregularly fasciculated myometrium with small cavities (0.5–10 mm), and (4) uterine size; fundus, anterior, posterior, right, and left maximal uterine wall thickness were measured. The numbers of slides prepared were based on the thickness of the myometrium (4–8 slides). Macroscopically adenomyosis was reported when a circumscribed nodular lesion was noted. Focal adenomyosis (localized adenomyosis) was defined by the presence of adenomyotic lesions restricted to one uterine wall. The criteria used for histopathology diagnosis were (1) presence of endometrial glands and/or tissues within the myometrium, (2) ectopic glands situated 2.5 mm beyond the endometrial-myometrial junction. The results were graded depending on the depth of myometrium involvement as Grades 1 (inner one-third), 2 (two-thirds), and 3 (entire myometrium). Grading was also done depending on the islets of endometrium present in the myometrium: Grade I (1–3 islets), Grade II (4–9 islets), and Grade III (>10 islets). All the data were analyzed using standard statistical methods.

OBSERVATIONS AND RESULTS

A total of 65 patients included in the present study who were undergoing hysterectomy were aged between 26 and 68 years with a mean age of 47.45 ± 2.50 . 37 patients (56.92%) belonged to the age group of 35–55 years followed by the age group 25–35 years with 14 (21.53%) patients. The specimen was positive for adenomyosis in 35/65 (53.84%) hysterectomy specimen and negative for adenomyosis in 30.65 (46.15%). The age groups were compared for these two groups and found to be not significant statistically ($P = 0.331$; with P taken as significant at <0.05), [Table 1]. Similarly, the parity was compared for the two groups and was found to be not significant ($P = 0.190$). Whereas the symptoms of dysmenorrhea ($P = 0.002$), menometrorrhagia ($P = 0.004$), myomas ($P = 0.034$), and menopause ($P = 0.01$) were statistically significant in both the groups [Table 1].

Each criterion of ultrasound pelvis indicating the possible diagnosis of adenomyosis preoperatively were compared with the actual histopathology report of the specimen after hysterectomy and found that there was statistical significance with all the criteria except poor definition of the endometrial-myometrial interface and myometrial cysts (P at 0.806), [Table 2]. Whereas the other criteria were statistically significant in assessing the diagnosis of adenomyosis with $P < 0.05$, [Table 2].

The overall sensitivity of intravaginal ultrasound in the diagnosis of adenomyosis was 69.95%, and specificity was 71.20%.

Table 1: Correlation between clinical symptoms and histopathology reports (n=65)

Observation	Histopathological adenomyosis			
	Yes - 35	No - 30	Mean values	Significance
Age in years - NO				
25–35-14	08	06	23.50±0.45	
35–45-22	12	10	32.75±0.70	0.331
45–55-15	08	07	44.05±1.05	
55–65-11	05	06	51.40±1.10	
65–75-03	02	01	63.30±2.40	
Parity- NO				
0-08	04	04		
1-16	08	08		0.190
2-17	10	07	2.15±0.25	
3-16	09	07	2.50±0.35	
4-08	05	03	3.15±0.60	
Dysmenorrhea	33 (94.28)	09 (30)	-	0.002
Menometrorrhagia	25 (71.42)	12 (40)	-	0.004
Myomas	12 (34.28)	15 (50)	-	0.034
Menopause	03 (8.5)	06 (20)	-	0.01

DISCUSSION

Adenomyosis is a common gynecological disorder in clinical practice. It is overlooked otherwise accounts for 70% of the hysterectomy specimen all over the world. Transvaginal ultrasound (TVS) has been used for the diagnosis of adenomyosis.^[11] The incidence reported in the literature varies from 5% to 70%.^[12] The reported incidence varies widely from 5% to 70%.^[13] Meredith *et al.*^[14] reported the role of TVS in assessing the adenomyosis and they found it was accurate as a diagnostic tool. TVS is a non-invasive procedure and can be adopted as a first line investigative procedure in diagnosis of adenomyosis, but the disadvantage is that it is operator dependent. In this study, the prevalence of adenomyosis among the hysterectomy specimen was 35.65 (53.84%). Bazot *et al.*^[15] in their study comparing trans abdominal and TVS held the sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of TVS were 65%, 97.5%, 92.8%, and 88.8%, respectively. Whereas Reinhold *et al.*^[16] reported a specificity of 86% for TVS. Kepkep *et al.* in their study, mentioned that the sensitivity, specificity, positive (PPV), and negative (NPV) predictive values and accuracy of TVS for the diagnosis of adenomyosis were 80.8%, 61.4%, 55.3%, 84.4%, and 68.6%, respectively. In this study, the sensitivity and specificity were 69.95% and specificity was 71.20%, respectively. The difference in accuracy in various studies is due to the criteria used for the diagnosis of adenomyosis were different. But in most of the studies the most common criteria were heterogeneous myometrial echotexture, and in the present study also it was used. Bromley *et al.*^[13] from their study published the following criteria: 95% with globular uterus,

Table 2: The correlation between ultrasound criteria histopathology of adenomyosis (n=65)

Ultrasound criteria	Histopathology of adenomyosis		
	Positive 35 (%)	Negative 30	P value
Globular uterine configuration			
Yes	18–51.42	08–26.6	0.09
No	17–48.17	22–73.33	
Poor definition of the endometrial-myometrial interface			
Yes	21–60	12–40	0.806
No	14–40	18–60	
Sub-endometrial echogenic linear striations			
Yes	32–91.42	08–26.66	0.045
No	03–08.5	22–73.33	
Myometrial anterior-posterior asymmetry			
Yes	21–60	07–23.33	0.478
No	14–40	23–76.66	
Myometrial cysts >0.99			
Yes	25–71.42	17–56.66	0.806
No	10–28.57	13–43.33	
Heterogeneous myometrial echotexture			
Yes	26–74.28	15–50	0.038
No	09–25.71	15–50	

82% with small myometrial lucent areas, and 82% with an indistinct endometrial stripe. In this study, the same criteria showed incidence of 78.02%, 71.42%, and 91.42%, respectively. Kepkep *et al.*^[17] were of the opinion that a globular appearing uterus, sub-endometrial echogenic linear striations, and myometrial cysts had the highest accuracy for the diagnosis of adenomyosis. In this study, poor definition of the endometrial-myometrial interface and myometrial cysts as the criteria for the diagnosis of adenomyosis was not specific or sensitive and also statistically not significant [Table 2]. There is a debate as to whether magnetic resonance imaging (MRI) is significantly better than TVS in the diagnosis of adenomyosis. Ascher *et al.*^[18] opine that MRI is significantly better than TVU ($P < 0.02$) for diagnosing adenomyosis. However, Reinhold *et al.*^[16] found that TVU was as accurate as MRI in the diagnosis of uterine adenomyosis.

CONCLUSIONS

TVS is a useful preliminary work tool in the diagnosis of adenomyosis. Globular uterine configuration, sub-endometrial echogenic linear striations, heterogeneous myometrial echotexture, and myometrial anterior-posterior asymmetry were significant criteria in the diagnosis of adenomyosis. These criteria yielded better results than poor differentiation between endometrium and myometrium and myometrial cysts.

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How to cite this article: Padmaja P. A Hospital Based Study on Correlation between Transvaginal Sonography and Histopathological Pattern in the Diagnosis of Adenomyosis. *Int J Sci Stud* 2017;5(8):72-75.

Source of Support: Nil, **Conflict of Interest:** None declared.