ORIGINAL ARTICLE

Adenomyosis or Fibroid? Making the Right Diagnosis

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Abstract

Background: Differentiating adenomyomas from fibroids may be challenging at times when we use routine morphological criteria. Using Doppler in addition to routine B mode ultrasound can help in differentiating adenomyomas from fibroid uterus.

Materials and methods: This is a prospective study done on patients diagnosed with fibroid or adenomyosis who were planned for hysterectomy. Routine ultrasound with Power Doppler was done for all patients and the blood flow impedance between the two was compared.

Results: There was a significant difference between the blood flow in adenomyosis and fibroid. Fibroids had peripherally distributed vascularity with low impedance and adenomyosis had intralesional vascularity with high resistance flow.

Conclusion: Use of Doppler in addition to morphological features on routine ultrasound helps to differentiate the uterine lesions like fibroid and adenomyosis.

Keywords: Adenomyosis, Fibroid, Impedence indices, Power Doppler, Prospective observation study.

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Introduction

Adenomyosis is a benign condition of the uterus wherein there is active endometrial tissue within the myometrial stroma. It may be diffuse or focal. More often it is diffuse. Diagnosis of diffuse adenomyosis by ultrasound is simple and easy, whereas the diagnosis of focal adenomyosis is more challenging as it can be easily confused with fibroid. The vascularity of adenomyosis is typically translesional and vessels can be seen crossing through the substance of the lesion. It becomes important to differentiate the two conditions especially in patients with subfertility since the treatment for the two is different. Subfertility caused by fibroid can be easily corrected by myomectomy whereas in adenomyosis medical management gives better results. It also helps in counselling the patient and planning treatment.

The aim of this study is to determine the role of power Doppler in differentiating fibroids from adenomyosis.

Materials and Methods

This was a prospective observational study done in the Department of Obstetrics and Gynaecology, Mahatma Gandhi Medical College and Research Institute, Sri Balaji Vidyapeeth University, Puducherry, from March 2020 to April 2021. This study included all patients diagnosed with fibroids or adenomyosis who were planned for hysterectomy. Patients who had received hormonal treatment in the past 2 months, patients with other coexisting pelvic pathology, postmenopausal women, and those who had both fibroid and adenomyosis were excluded from the study.

A thorough history was taken and examination was done. Transvaginal ultrasound was done for all patients by a single clinician using LOGIC P5 ultrasound machine with constant Doppler settings. A routine B mode ultrasound was done followed by a power Doppler. General pattern of vascularity was noted. Resistive index (RI) and pulsatility index (PI) were calculated by placing the Doppler gate at the area of maximum vascularity within or at the periphery of the lesion. Both the uterine arteries, PI and RI, were also measured and the average of the two was taken. Following this the lesion was labelled as fibroid or adenomyosis. All patients who were planned for hysterectomy underwent abdominal/vaginal hysterectomy depending on the department protocol. All specimens were sent for histopathology. Then the final histopathology report was compared with the ultrasound diagnosis. Mann-Whitney *U* test was done to compare the continuous variables between the two groups. Categorical values were tested with Fisher's exact test. A *p*-value of <0.05 was taken as statistically significant.

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Results

A total of 68 patients who were diagnosed to have either fibroid/adenomyosis underwent hysterectomy. Six of these patients were diagnosed to have both adenomyosis and fibroid. Hence, they were excluded from the study. Statistical analysis was done for the remaining 62 patients. On histopathology 39 patients had fibroid and 23 had adenomyosis.

The mean age of the patients with adenomyosis was 44.2 ± 3.76 years and that of fibroids was 45 ± 3.08 years. Most of the women were multiparous 55 (88.71%). The commonest symptoms presented by both the groups were heavy menstrual bleeding 79.4% (31) in fibroid and 86.9% (20) in adenomyosis. Dysmenorrhea was another common complaint in both the groups: 71.7 % (28) in fibroid and 82.6 % (19) in adenomyosis. Abdominal mass was the complaint only by patients diagnosed with fibroid 17.94% (7).

Ultrasound diagnosis by Doppler was correct in 16 (69.56%) of patients with adenomyosis and 34 (87.18%) of patients with fibroid as confirmed by histopathology. There were 5 (12.8%) patients who were diagnosed to have adenomyosis when they actually had a fibroid. Similarly, 7 (30.43%) of the patients with adenomyosis were wrongly diagnosed to have fibroid. Thus, ultrasound with Doppler resulted in a sensitivity of 69.56%, specificity of 87.1%, positive predictive value (PPV) of 76.1% and a negative predictive value (NPV) of 82.92% for adenomyosis, and 87.1% sensitivity, 69.56% specificity, 82.92% PPV, and 76.1% NPV for fibroid. Among patients with fibroids peripheral vascularity was seen in 33 (84.62%) patients. There were six false negatives and five false positives. Intralesional vascularity was seen in 18 (78.26%) of the patients with adenomyosis. There were five false negatives and six false positives (Table 1).

The Doppler indices of the vessels in and around the lesion (RI, PI) showed significantly reduced values in a fibroid as compared to higher values in case of an adenomyosis. Leiomyoma had a mean PI of 0.97 ± 0.22 as compared to adenomyosis with a mean PI of 1.32 ± 0.28. The *p*-value was 0.000 which is statistically significant. Similarly, the mean RI for fibroid was 0.60 ± 0.17 as compared to 0.83 ± 0.16 for adenomyosis. This difference was also statistically significant, the *p*-value being 0.000 (Figs 1 and 2).

The uterine artery indices (RI and PI) in fibroid and adenomyosis did not show any statistical difference (*p*-value 0.44).

Discussion

Adenomyosis is seen in parous women in the third or fourth decade of life with progressive dysmenorrhea as the major symptom. Other symptoms are heavy menstrual bleeding, dyspareunia, and chronic pelvic pain. Diagnosis of adenomyosis is mainly based on B mode ultrasound to look for characteristic features like diffuse enlargement of the uterus with heterogenous myometrial echoes and an indistinct junctional zone. There may be presence of hypoechoic myometrial cysts. Doppler ultrasound shows vessels running through the lesion unlike in fibroid where it is mostly seen at the periphery of the lesion.[1]

Table 1: Doppler flow pattern and indices of fibroid and adenomyosis

	Adenomyosis (23)	*Fibroid (39)*	*p value*
Vascular location			
Peripheral (*n*%)	5 (21.74%)	33 (84.62%)	0.000[a]
Central (*n*%)	18 (78.26%)	6 (15.38%)	0.000[a]
Uterine artery Doppler indices			
PI (mean ± SD)	1.67 ± 0.15	1.68 ± 0.14	0.749
RI (mean ± SD)	0.82 ± 0.14	0.77 ± 0.18	0.440
Doppler indices of vessels around the lesion			
PI (mean ± SD)	1.32 ± 0.28	0.97 ± 0.22	0.000[a]
RI (mean ± SD)	0.83 ± 0.16	0.60 ± 0.17	0.000[a]

[a]*p* value <0.05 significant

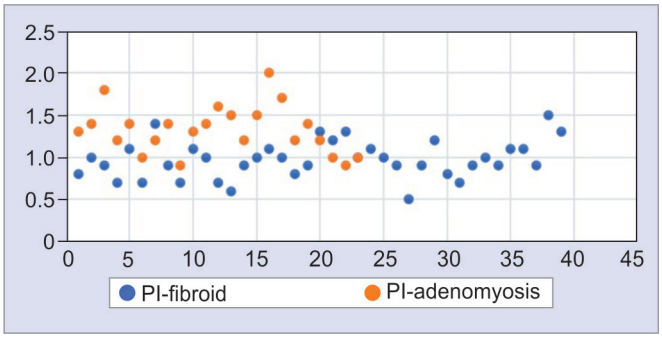

Fig. 1: Pulsatility index of vascularity around the lesion

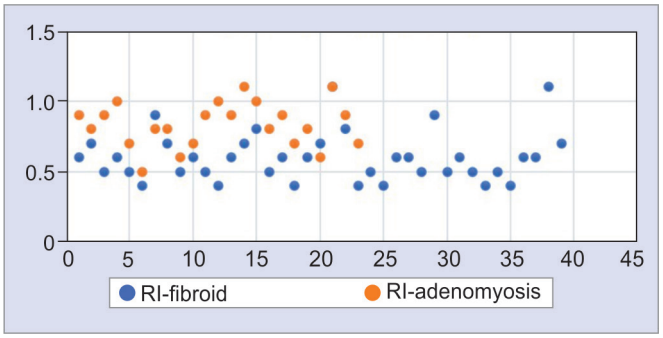

Fig. 2: Resistive index of vascularity around the lesion

Fibroids present on ultrasound as hypoechoic (most common)/hyperechoic (long standing/degenerated) lesions localized within the uterine myometrium and on power Doppler vascularity are seen more on the periphery of the lesion. The vascularity reduces toward the center of the fibroid.

The present study shows that the use of Doppler impedance indices along with the above ultrasonography findings improves the diagnostic accuracy of detecting and differentiating adenomyomas from fibroid. When comparing conventional color Doppler with power Doppler, power Doppler is more sensitive in detecting the blood flow changes within the vessels as it is not susceptible to aliasing.

Adenomyomas are typically associated with an increased RI and PI values in the vessels present in and around the lesion. Our study showed that using a cut-off of PI >1.2, the sensitivity, specificity, PPV, and NPV were 78.26, 82.05, 72, and 86.49%, respectively. Whereas in a study done by Bozkurt et al. showed a sensitivity of 70.8%, specificity of 62.1%, PPV of 40.4%, and a NPV of 85.4% for a cut-off of >1.2.[2] The difference in the values in both studies may be due to diagnostic dilemmas because of the presence of co-existing other pathologies like endometriosis, pelvic inflammatory disease, and fibroid which may alter the blood supply.

Intralesional vascularity running through and through the lesion was another criterion more specific to adenomyosis. A study done by Chiang et al. showed that this parameter had sensitivity, specificity, PPV, and NPV of 88, 93, 91, and 91%, respectively.[3] But we found a sensitivity of 78.26%, specificity of 84.62%, PPV of 75%, and a NPV of 86.84%.

Elkattan et al. studied patients who were scheduled for hysterectomy.[4] They used ultrasound to diagnose fibroids and adenomyosis. They found that there was a significant difference in the vascular flow in these lesions. Peripheral vascularity was seen in 76.8% of myomas and a scattered pattern was seen in 68.5% of adenomyosis. The *p*-value being significant (0.000). These results were similar to our study. We found a significantly different pattern of vascularity in adenomyosis as compared to fibroids. Around 78.26% of patients had intralesional vascularity whereas only 13.16% of patients with fibroid had intralesional vascularity.

In addition to the pattern of vascularity the impedance indices were also different in fibroids and adenomyosis. Sharma et al. study showed high velocity flow in fibroid (PI <1.2 and RI <0.7) and a high resistance flow in adenomyosis (PI >1.2 and RI >0.7).[5] Our study also had similar findings.

A study done by Chiang et al. also showed that measuring the PI of arteries within or around the uterine lesions had a better accuracy than diagnosis with morphological criteria alone.[3] Using a PI of >1.17 in intratumoral arteries resulted in improved detection rates.

In our study the uterine arteries PI and RI were also studied. There was no significant difference between the uterine arteries PI and RI of adenomyosis and fibroid. This finding is similar to the study done by Elkattan et al. where uterine arteries PI and RI were not significantly different between adenomyosis and fibroid.[4]

In a study done by Sladkevicus et al. the mean uterine artery PI was <1. They concluded that uterine myomas increases the blood flow velocity in uterine arteries.[6,7] But this was not seen in our study. Our study showed mean uterine artery PI to be 1.69 ± 0.14 which was not significantly different from that seen in adenomyosis.

Therefore from our study we see that in fibroids, there is increased peripheral vascularity with high velocity flow, and in adenomyosis, there is more of intralesional vessels with increased resistance to flow. There is no significant difference in the uterine artery flow between fibroid and adenomyosis.

Conclusion

A combination of power Doppler (blood flow pattern and impedance indices) and morphological parameters by B mode ultrasound can accurately differentiate adenomyosis and fibroids when compared to morphological criteria alone. Doppler indices are more objective and reproducible than appearance of vessels.

Ethical Approval

The study was approved by the Institutional Ethics Committee.

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