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|  | <div>ORIGINAL RESEARCH PAPER</div> <div>TO ASSESS ULTRASONOGRAPHY AND MAGNETIC RESONANCE IMAGING FINDINGS IN EVALUATION OF UTERINE MASSES</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <div>Radio-Diagnosis</div> <div>KEY WORDS: Uterine masses; Ultrasonography; Magnetic resonance imaging; Leiomyoma; Adenomyosis</div> |
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| ABSTRACT                                                                         | <b>Background:</b> Uterine masses comprise a broad spectrum of benign and malignant lesions with variable clinical and imaging appearances. Accurate characterization is important for appropriate management and preoperative planning. Ultrasonography is the first-line imaging modality, whereas magnetic resonance imaging (MRI) provides superior soft-tissue characterization and multiplanar assessment. The present study aimed to assess and compare ultrasonography and MRI in the evaluation of uterine masses and correlate imaging findings with histopathological outcomes. <b>Methods:</b> This hospital-based cross-sectional observational study included 50 female patients with suspected uterine masses who underwent both ultrasonography and MRI. Lesions were assessed for location, morphology, internal characteristics, and extent of involvement. Imaging findings were correlated with histopathological diagnosis. Sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy were calculated. <b>Results:</b> The majority of patients were aged 31–40 years (36.0%), followed by 41–50 years (32.0%). Abnormal uterine bleeding was the commonest clinical indication (52.0%). Fibroid was the most frequent lesion on MRI and histopathology, accounting for 42.0% of cases, followed by adenomyosis. Histopathology showed 88.0% benign and 12.0% malignant lesions. MRI demonstrated higher diagnostic accuracy than USG for fibroid (100.0% vs. 96.0%), adenomyosis (98.0% vs. 92.0%), endometrial polyp (98.0% vs. 94.0%), and endometrial hyperplasia (98.0% vs. 94.0%). For endometrial carcinoma, both modalities demonstrated 98.0% accuracy. <b>Conclusion:</b> Ultrasonography demonstrated high diagnostic performance and remains an appropriate first-line modality for uterine masses. MRI provided superior diagnostic precision for several common uterine and endometrial lesions and offered better lesion characterization. MRI is therefore a valuable complementary modality when sonographic findings are equivocal or detailed preoperative assessment is required. |                                                                                                                                      |
|                                                                                  | <b>INTRODUCTION</b> <p>Uterine masses comprise a broad spectrum of gynecological lesions, ranging from common benign conditions such as leiomyomas to malignant tumors of the uterine corpus. They may occur across different age groups and commonly present with abnormal uterine bleeding, pelvic pain, pressure symptoms, infertility, or anemia, although some are detected incidentally. Leiomyomas are the most common benign uterine masses and account for a substantial proportion of imaging evaluations for uterine pathology [1,2].</p> <p>Accurate characterization is essential because management varies according to the nature, location, extent, and complications of the lesion.</p> <p>Uterine corpus malignancies are of particular clinical importance, representing the second most common gynecological malignancy in India after cervical cancer and an increasing health burden among peri- and postmenopausal women [1,5].</p> <p>The WHO Classification of Tumours categorizes uterine tumors into endometrial epithelial tumors and their precursors, tumor-like lesions, mesenchymal tumors, mixed epithelial and mesenchymal tumors, and miscellaneous tumors [6]. This histopathological diversity necessitates accurate imaging characterization.</p> <p>Ultrasonography is the primary imaging modality for evaluating uterine masses because of its wide availability, low cost, absence of ionizing radiation, and ease of performance [2,7].</p> <p>Transvaginal ultrasonography provides high spatial resolution for uterine and endometrial assessment, while transabdominal imaging complements evaluation of enlarged or bulky uteri [2]. However, ultrasound is operator dependent and may be limited by obesity, bowel gas, poor acoustic windows, and complex lesions [7-10].</p> <p>Magnetic resonance imaging (MRI) provides excellent soft-tissue contrast and multiplanar imaging, allowing detailed assessment of uterine anatomy and lesion characteristics. It is particularly useful for detecting small fibroids, identifying</p>                                                                                  |                                                                                                                                      |
|                                                                                  | <p>degeneration, differentiating benign from suspicious lesions, and assessing myometrial invasion, cervical involvement, and extrauterine extension [11].</p> <p>MRI is generally used as a second-line or problem-solving modality when ultrasound findings are inconclusive or detailed characterization and staging are required. However, higher cost, limited availability, and contraindications in selected patients restrict its routine use [12].</p> <p>Thus, systematic comparison of ultrasonography and MRI is important for evaluating uterine masses. Correlation with histopathological or postoperative findings can further establish diagnostic accuracy.</p> <p>The present study therefore aims to assess ultrasonography and MRI findings in uterine masses, compare their diagnostic performance, and correlate imaging findings with histopathological or postoperative outcomes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                      |
|                                                                                  | <b>MATERIAL AND METHODS</b> <p>This hospital-based cross-sectional observational study was conducted in the Department of Radiodiagnosis, Sri Aurobindo Medical College and Postgraduate Institute, Indore, over 18 months from June 1, 2024, to November 30, 2025. Institutional Research and Ethics Committee approval was obtained before commencement of the study.</p> <p>The study included 50 female patients referred for evaluation of suspected uterine masses. Patients with symptoms suggestive of uterine pathology, including abnormal uterine bleeding, pelvic pain, abdominal distension, infertility, or pressure symptoms, as well as patients with incidentally detected uterine masses, were considered for inclusion. The sample size was based on the average institutional workload of approximately 3-4 patients per month undergoing both ultrasonography and MRI for evaluation of uterine masses during the study period.</p> <b>Eligibility Criteria</b> <p>Patients clinically suspected to have uterine masses who underwent ultrasonography, MRI, and subsequent histopatho-</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                      |
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logical evaluation were included. Patients with incidentally detected uterine masses were also eligible. Patients unwilling to participate, those with contraindications to MRI such as incompatible metallic implants, cardiac pacemakers, or other incompatible medical devices, claustrophobia, and pregnant women in whom contrast-enhanced MRI was contraindicated were excluded.

## METHODOLOGY

A detailed clinical history was obtained, including age, parity, menstrual history, presenting complaints, duration of symptoms, and relevant medical and surgical history. Relevant clinical and laboratory findings were recorded in a pre-structured proforma. All enrolled patients underwent both ultrasonography and MRI as part of their diagnostic evaluation. Histopathological findings were obtained from biopsy or surgical specimens whenever available and were considered the reference standard for imaging-pathology correlation.

### Ultrasonography

Ultrasonography was performed using PHILIPS Affinity 70G, General Electric LOGIQ E9, LOGIQ F8, and Voluson E10 systems. Transabdominal examination was performed with a 4-MHz curvilinear probe after bladder filling, while transvaginal examination was performed with 7.5-15-MHz high-frequency probes after bladder emptying.

The uterus and uterine masses were assessed for size, contour, position, number, location, dimensions, shape, echogenicity, margins, internal architecture, and vascularity. The relationship of the lesion to the endometrium and myometrium, endometrial thickness, adnexal abnormalities, and pelvic free fluid were also documented.

**Magnetic Resonance Imaging:** MRI was performed on Siemens 1.5-T and 3-T systems using standard pelvic protocols. The examination included multiplanar T1-weighted and T2-weighted sequences, short tau inversion recovery, diffusion-weighted imaging, and gradient-echo sequences.

Contrast-enhanced imaging was performed when clinically indicated. MRI assessment included lesion location, size, margins, signal characteristics, internal composition, degenerative changes, myometrial and cervical involvement, parametrial extension, and extrauterine spread. Lymphadenopathy, adnexal involvement, and ascites were also assessed where present.

### Image Interpretation and Histopathological Correlation

Ultrasonography and MRI examinations were independently assessed by experienced radiologists, and relevant imaging findings were recorded systematically.

Imaging diagnoses were correlated with histopathological findings whenever tissue diagnosis was available. Diagnostic performance of both imaging modalities was evaluated using histopathology as the reference standard.

### Statistical Analysis

Data were entered into Microsoft Excel and analyzed using appropriate descriptive and inferential statistical methods. Continuous variables were expressed as mean  $\pm$  standard deviation, whereas categorical variables were summarized as frequencies and percentages.

Associations between categorical variables were assessed using the chi-square test. Sensitivity, specificity, positive predictive value, and negative predictive value were calculated for ultrasonography and MRI using histopathology as the reference standard. A two-sided p-value  $<0.05$  was considered statistically significant.

## RESULTS:

A total of 50 patients with uterine masses were included in the study. The largest proportion of patients belonged to the 31–40 years age group (36.0%), followed by 41–50 years (32.0%).

Abnormal uterine bleeding was the most common clinical indication for imaging (52.0%), followed by abdominal or pelvic pain (26.0%). Fibroid was the most frequently identified uterine lesion on MRI and histopathology, followed by adenomyosis. Overall, histopathological evaluation showed that 44 (88.0%) lesions were benign and 6 (12.0%) were malignant.

**Table 1. Demographic and clinical profile of the study population (n = 50)**

| Variable             | Category                  | n  | %    |
|----------------------|---------------------------|----|------|
| Age (years)          | 21–30                     | 9  | 18.0 |
|                      | 31–40                     | 18 | 36.0 |
|                      | 41–50                     | 16 | 32.0 |
|                      | 51–60                     | 5  | 10.0 |
|                      | $\geq 61$                 | 2  | 4.0  |
| Presenting complaint | Abdominal/pelvic pain     | 13 | 26.0 |
|                      | Infertility               | 4  | 8.0  |
|                      | Irregular menses          | 14 | 28.0 |
|                      | Menorrhagia               | 14 | 28.0 |
|                      | Postmenopausal bleeding   | 5  | 10.0 |
| Clinical indication  | Abnormal uterine bleeding | 28 | 52.0 |
|                      | Abdominal/pelvic pain     | 13 | 26.0 |
|                      | Infertility               | 4  | 8.0  |
|                      | Postmenopausal bleeding   | 5  | 10.0 |

The study population was predominantly composed of women aged 31–50 years. Irregular menses and menorrhagia were the most frequent presenting complaints, while abnormal uterine bleeding constituted the commonest clinical indication for imaging.

**Table 2. Distribution of uterine masses according to ultrasonography, MRI, and histopathology**

| Pathology                          | USG, n (%) | MRI, n (%) | Histopathology, n (%) |
|------------------------------------|------------|------------|-----------------------|
| Fibroid                            | 19 (38.0)  | 21 (42.0)  | 21 (42.0)             |
| Adenomyosis                        | 19 (38.0)  | 16 (32.0)  | 15 (30.0)             |
| Endometrial polyp                  | 4 (8.0)    | 4 (8.0)    | 5 (10.0)              |
| Endometrial hyperplasia            | 5 (10.0)   | 3 (6.0)    | 2 (4.0)               |
| Endometrial carcinoma              | 3 (6.0)    | 4 (8.0)    | 5 (10.0)              |
| Lipoleiomyoma                      | 2 (4.0)    | 2 (4.0)    | 2 (4.0)               |
| ACUM                               | 1 (2.0)    | 1 (2.0)    | 1 (2.0)               |
| Gestational trophoblastic neoplasm | 1 (2.0)    | 1 (2.0)    | 1 (2.0)               |

Fibroid was the most common lesion on MRI and histopathology, accounting for 42.0% of cases. Adenomyosis was the second most frequent lesion.

MRI identified more cases of fibroid and endometrial carcinoma than USG, whereas histopathology demonstrated five cases each of endometrial polyp and endometrial carcinoma.

**Table 3. Morphological and associated imaging characteristics of uterine masses**

| Imaging characteristic | Finding        | n (%)     |
|------------------------|----------------|-----------|
| Lesion location        | Intramural     | 24 (48.0) |
|                        | Submucosal     | 9 (18.0)  |
|                        | Subserosal     | 8 (16.0)  |
|                        | Endometrial    | 8 (16.0)  |
|                        | Other/combined | 1 (2.0)   |
| Internal composition   | Homogeneous    | 21 (42.0) |
|                        | Heterogeneous  | 29 (58.0) |
| Degenerative change    | Present        | 15 (30.0) |
|                        | Absent         | 35 (70.0) |
| Cervical involvement   | Present        | 8 (16.0)  |
|                        | Absent         | 42 (84.0) |
| Adnexal involvement    | Present        | 5 (10.0)  |
|                        | Absent         | 45 (90.0) |
| Lymphadenopathy        | Present        | 6 (12.0)  |
|                        | Absent         | 44 (88.0) |
| Ascites                | Present        | 4 (8.0)   |
|                        | Absent         | 46 (92.0) |

Most lesions showed heterogeneous internal architecture, while intramural location was the most frequent site of involvement.

Associated cervical, adnexal, nodal, and peritoneal findings were identified in a smaller proportion of patients.

Table 4. Final histopathological outcome of uterine masses

| Final outcome | n  | %     |
|---------------|----|-------|
| Benign        | 44 | 88.0  |
| Malignant     | 6  | 12.0  |
| Total         | 50 | 100.0 |

Histopathology confirmed a predominantly benign spectrum of uterine masses, with malignant lesions accounting for 12.0% of the study population.

Table 5. Diagnostic performance of ultrasonography and MRI according to final outcome

| Pathology                          | Modality | Sensitivity (%) | Specificity (%) | PPV (%) | NPV (%) | Accuracy (%) |
|------------------------------------|----------|-----------------|-----------------|---------|---------|--------------|
| Fibroid                            | USG      | 90.5            | 100.0           | 100.0   | 94.0    | 96.0         |
|                                    | MRI      | 100.0           | 100.0           | 100.0   | 100.0   | 100.0        |
| Adenomyosis                        | USG      | 100.0           | 88.6            | 79.0    | 100.0   | 92.0         |
|                                    | MRI      | 100.0           | 97.1            | 94.0    | 100.0   | 98.0         |
| Endometrial polyp                  | USG      | 60.0            | 97.8            | 75.0    | 96.0    | 94.0         |
|                                    | MRI      | 80.0            | 100.0           | 100.0   | 98.0    | 98.0         |
| Endometrial hyperplasia            | USG      | 100.0           | 93.8            | 40.0    | 100.0   | 94.0         |
|                                    | MRI      | 100.0           | 97.9            | 67.0    | 100.0   | 98.0         |
| Endometrial carcinoma              | USG      | 75.0            | 100.0           | 100.0   | 98.0    | 98.0         |
|                                    | MRI      | 80.0            | 100.0           | 100.0   | 98.0    | 98.0         |
| Lipoleiomyoma                      | USG      | 100.0           | 100.0           | 100.0   | 100.0   | 100.0        |
|                                    | MRI      | 100.0           | 100.0           | 100.0   | 100.0   | 100.0        |
| ACUM                               | USG      | 100.0           | 100.0           | 100.0   | 100.0   | 100.0        |
|                                    | MRI      | 100.0           | 100.0           | 100.0   | 100.0   | 100.0        |
| Gestational trophoblastic neoplasm | USG      | 100.0           | 100.0           | 100.0   | 100.0   | 100.0        |
|                                    | MRI      | 100.0           | 100.0           | 100.0   | 100.0   | 100.0        |

MRI showed higher diagnostic accuracy than USG for fibroid, adenomyosis, endometrial polyp, and endometrial hyperplasia. Both modalities demonstrated comparable accuracy for endometrial carcinoma. Perfect diagnostic indices for the rarer lesions should be interpreted in view of their small case numbers.

Table 6. Comparison of USG and MRI diagnostic accuracy for major uterine pathologies

| Pathology                          | USG accuracy (%) | MRI accuracy (%) | Absolute difference (%) |
|------------------------------------|------------------|------------------|-------------------------|
| Fibroid                            | 96.0             | 100.0            | 4.0                     |
| Adenomyosis                        | 92.0             | 98.0             | 6.0                     |
| Endometrial polyp                  | 94.0             | 98.0             | 4.0                     |
| Endometrial hyperplasia            | 94.0             | 98.0             | 4.0                     |
| Endometrial carcinoma              | 98.0             | 98.0             | 0.0                     |
| Lipoleiomyoma                      | 100.0            | 100.0            | 0.0                     |
| ACUM                               | 100.0            | 100.0            | 0.0                     |
| Gestational trophoblastic neoplasm | 100.0            | 100.0            | 0.0                     |

MRI demonstrated higher accuracy for several common uterine lesions, with the greatest difference observed for adenomyosis. For endometrial carcinoma and the uncommon lesions, the diagnostic accuracy of USG and MRI was identical.

Overall, both imaging modalities demonstrated high diagnostic performance in the evaluation of uterine masses. USG provided high sensitivity and specificity for several common lesions and remained useful as the initial imaging modality, whereas MRI demonstrated greater diagnostic precision for adenomyosis, endometrial polyps, and endometrial hyperplasia. Correlation with histopathology further supported the diagnostic value of cross-sectional imaging in characterization of uterine masses.

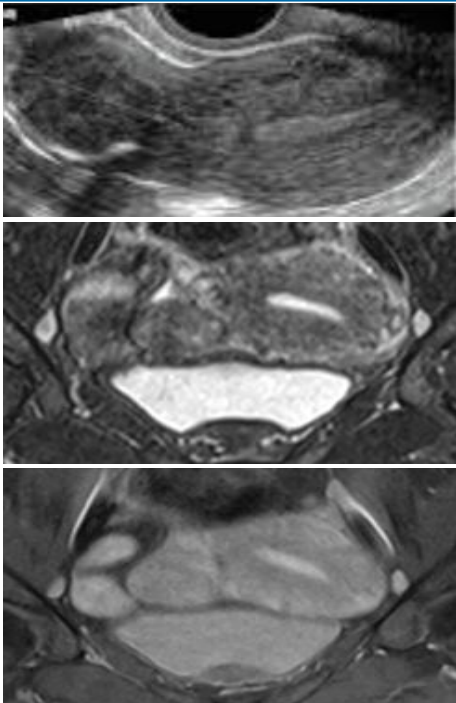


Figure 1: Case 1: Transvaginal ultrasound shows a well circumscribed hypoechoic lesion along the right lateral wall of uterus- suggestive of subserosal fibroid. MRI shows a well circumscribed mildly enhancing lesion along the right lateral wall of uterus- suggestive of subserosal / broad ligament fibroid.

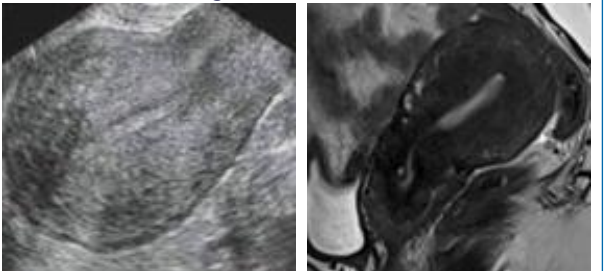
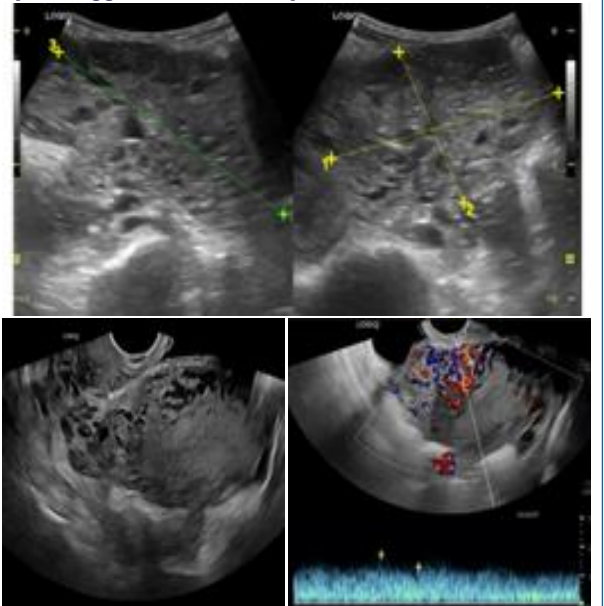
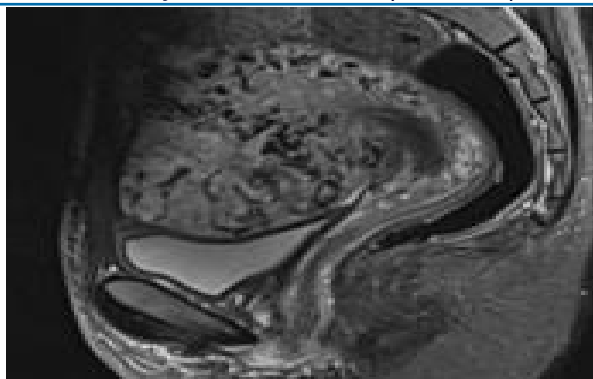


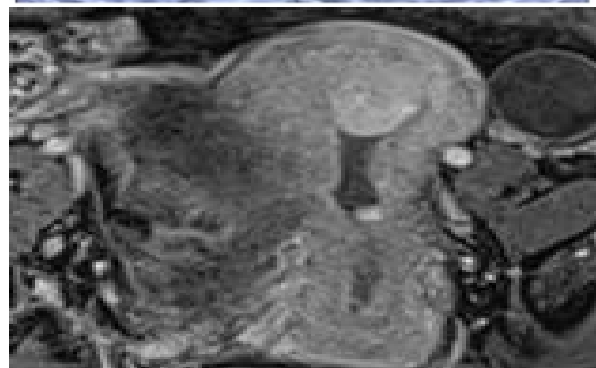
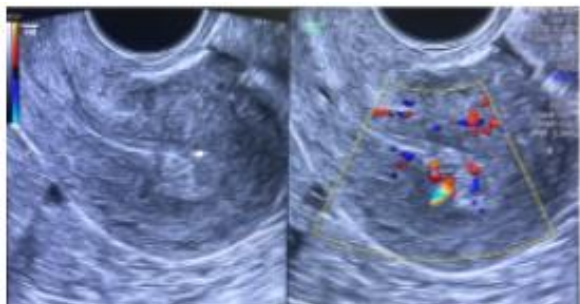
Figure 2: Case 2: Transvaginal ultrasound showing mildly bulky uterus with heterogeneous myometrium-suggestive of adenomyosis. MRI showing mildly bulky uterus with thickened junctional zone and few tiny myometrial cysts- suggestive of adenomyosis.



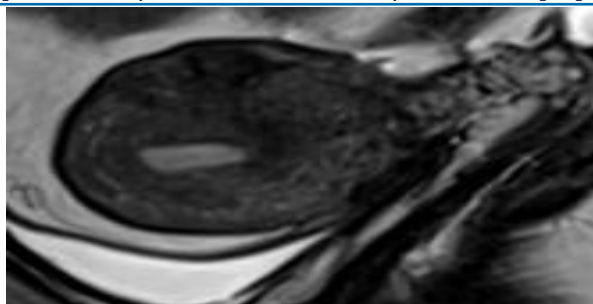
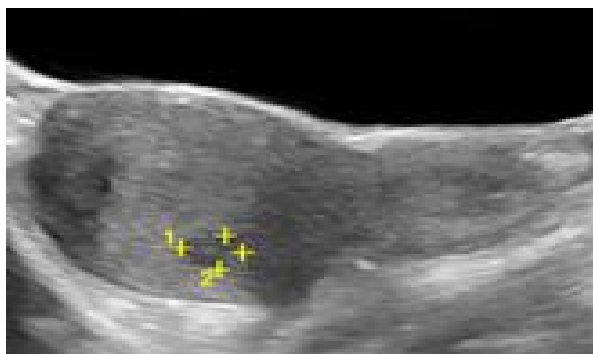


**Figure 3.** Case 3:Transabdominal and transvaginal Ultrasound showing bulky uterus with heterogeneous mass lesion with internal cystic spaces, completely occupying the uterine cavity and showing marked internal vascularity-suggestive of gestational trophoblastic disease/neoplasm.

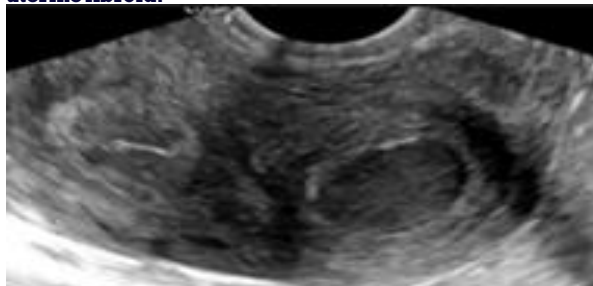
Contrast enhanced MRI showing bulky uterus with heterogeneously enhancing mass lesion with multiple serpiginous flow voids involving entire uterus- suggestive of gestational trophoblastic disease/neoplasm.



**Figure 4:** Case 4:Transvaginal ultrasound showing a well circumscribed echogenic lesion in the endometrial cavity, fed by a vascular pedicle arising from the anterior wall- suggestive of endometrial polyp. Contrast enhanced MRI showing a well circumscribed moderately enhancing lesion in the endometrial cavity- suggestive of endometrial polyp.



**Figure 5:** Case 5:Transabdominal ultrasound showing a well circumscribed hypoechoic lesion in the posterior wall of uterus- suggestive of intramural uterine fibroid. MRI showing a well circumscribed T2 hypointense lesion in the posterior wall of uterus- suggestive of intramural uterine fibroid.

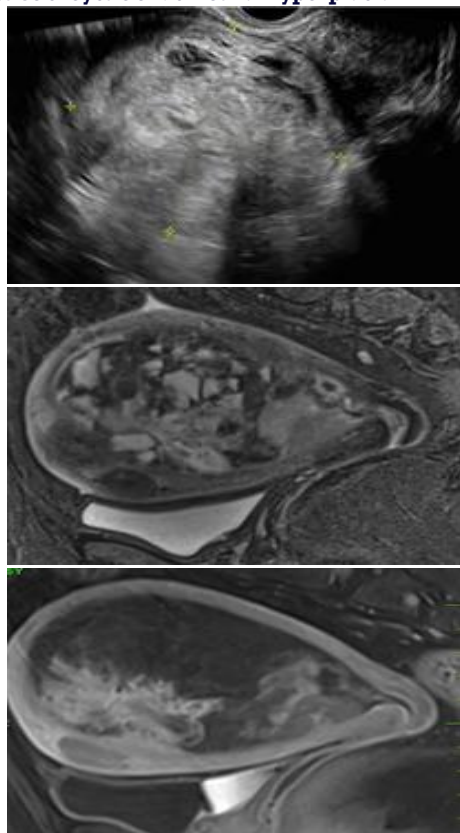


**Case 6:** Transvaginal ultrasound showing an exophytic mass lesion along the left lateral wall of uterus with internal large cystic area showing internal echoes. No obvious communication with the endometrial cavity noted- suggestive of accessory and cavitated uterine mass. MRI showing an exophytic mass lesion along the left lateral wall of uterus with internal large cystic area. No obvious communication with the endometrial cavity noted-suggestive of accessory and cavitated uterine mass.



**Figure 7:** Case 7:Transvaginal ultrasound showing thick-

**ened endometrium with internal cystic spaces- suggestive of cystic endometrial hyperplasia. MRI showing thickened endometrium with internal cystic spaces- suggestive of cystic endometrial hyperplasia.**



**Figure 8: Case 8: Transvaginal ultrasound showing an ill-defined heterogeneous echogenicity lesion in the uterine cavity with disrupted endo-myometrial interface- suggestive of endometrial carcinoma. MRI showing a heterogeneous signal intensity lesion in the uterine cavity with internal areas of cystic degeneration. Internal heterogeneously enhancing areas are also seen- suggestive of endometrial carcinoma.**

## DISCUSSION

The present study evaluated 50 women with uterine masses using ultrasonography and MRI, with imaging findings correlated with histopathology. The majority of patients were in the reproductive and perimenopausal age groups, with 36% belonging to 31–40 years and 32% to 41–50 years. This age distribution is comparable with Reddy TV et al., who reported the highest proportion of pelvic masses in women aged 31–40 years [13], while Azhar MA et al. [14] and Bansal A et al. [15] also observed a predominance of premenopausal women. The predominance in these age groups is consistent with the hormone-dependent nature of common lesions such as leiomyomas and adenomyosis.

Abnormal uterine bleeding was the commonest clinical indication in the present study, accounting for 52% of cases, while irregular menses and menorrhagia were the most frequent presenting complaints. Gao et al. identified abnormal uterine bleeding and pelvic pain as major manifestations of uterine masses [16], while Azhar MA et al. and Sule MM et al. similarly reported bleeding and pelvic pain as common presenting features. [14,16] The high frequency of bleeding in the present study is compatible with the substantial proportion of fibroids, adenomyosis, endometrial polyps, and hyperplasia.

Fibroid was the most common pathology, accounting for 42% of histopathologically confirmed lesions, followed by

adenomyosis at 30%. This pattern agrees with Muthuswamy et al., Shankar MP et al., and Moafak HA et al., who reported leiomyoma as the predominant uterine lesion. [8,17,18] Gao et al. similarly emphasized the high lifetime prevalence of uterine leiomyomas. [1] Histopathology showed that 88% of lesions were benign and 12% malignant, closely corresponding to the benign-malignant distribution reported by Debbarma T et al. [19] The predominance of benign lesions is expected, although accurate identification of malignant disease remains essential for treatment planning.

For fibroids, USG demonstrated 90.5% sensitivity, 100% specificity, and 96% accuracy, whereas MRI achieved 100% for all diagnostic indices. The findings are consistent with Levens et al., Goyal A et al., and Ranjan R et al., who demonstrated superior MRI performance for fibroid detection, localization, lesion burden, and degenerative changes. [20,21,22] Abd-Aljabbar et al. and Moafak HA et al. and likewise reported greater diagnostic accuracy and characterization with MRI than ultrasound. [3,18] Bansal A et al. emphasized the improved lesion mapping provided by MRI, particularly for preoperative planning. [15] The high performance of USG in the present study may reflect the combined use of transabdominal and transvaginal approaches, although MRI remains advantageous for precise mapping and characterization.

Adenomyosis represented the second most common lesion. USG showed 100% sensitivity, 88.6% specificity, and 92% accuracy, whereas MRI maintained 100% sensitivity but increased specificity to 97.1% and accuracy to 98%. Champaneria R et al. reported pooled sensitivity and specificity of 72% and 81% for transvaginal ultrasound and 77% and 89% for MRI, supporting the advantage of MRI in difficult cases. [23] Moafak HA et al. and Kumar Y et al. and also reported superior MRI performance for adenomyosis. [18,24] The higher specificity of MRI in the present study may be related to better visualization of the junctional zone and differentiation of adenomyosis from coexisting leiomyomas. Muthuswamy et al., Bansal A et al. and Shankar MP et al., similarly reported improved MRI characterization of adenomyosis. [8,15,17]

For endometrial polyps, USG achieved 60% sensitivity and 94% accuracy against histopathology, compared with 80% sensitivity and 98% accuracy for MRI. MRI also demonstrated 100% specificity and PPV. These findings are consistent with Abd-Aljabbar et al., Bansal A et al., and Moafak HA et al., who reported better characterization of endometrial lesions with MRI. [3,15,18] The superior tissue contrast and multiplanar capability of MRI facilitate differentiation of focal polyps from surrounding endometrium and other endometrial abnormalities.

For endometrial hyperplasia, USG demonstrated 100% sensitivity, 93.8% specificity, and 94% accuracy, whereas MRI showed 100% sensitivity, 97.9% specificity, and 98% accuracy. The lower PPV of USG reflects false-positive diagnoses and emphasizes the need for further evaluation of suspicious sonographic findings. Gao et al., Azhar MA et al., Bansal A et al. and Shankar MP et al., similarly highlighted the value of MRI for more precise characterization of endometrial pathology. [1,14,15,17]

In endometrial carcinoma, USG showed 75% sensitivity and 98% accuracy, while MRI achieved 80% sensitivity with the same overall accuracy. Although the difference in accuracy was small, MRI offers important advantages for assessing myometrial invasion, cervical involvement, lymphadenopathy, and extrauterine extension. Yadav P et al. reported high MRI accuracy for pelvic masses, while Salman S et al. demonstrated its usefulness in assessing deep myometrial invasion. [25,26] Gao et al. further identified MRI as an important modality for local staging of endometrial carcinoma. [1]

Rare lesions, including lipoleiomyoma, ACUM, and gestational trophoblastic neoplasm, showed perfect diagnostic indices for both modalities in the present study. These findings should be interpreted cautiously because of the very small number of cases. Nevertheless, MRI provides valuable tissue characterization for uncommon and complex uterine lesions, as emphasized by Gao et al. [1]

Despite the clinically relevant findings, the study had certain limitations, including its single-center design and relatively small sample size, particularly for rare and malignant lesions. Interobserver variability was not assessed. Advanced MRI techniques, quantitative parameters, and radiomic analysis were not evaluated. Long-term follow-up and prognostic outcomes were also beyond the scope of the study.

Overall, MRI demonstrated higher diagnostic accuracy than USG for fibroids, adenomyosis, endometrial polyps, and endometrial hyperplasia, while both modalities showed comparable accuracy for endometrial carcinoma and the rare lesions. These findings support the complementary roles of the two modalities. USG remains an appropriate first-line investigation because of its accessibility and cost-effectiveness, whereas MRI provides superior soft-tissue characterization, lesion mapping, and assessment of disease extent when ultrasound is equivocal or detailed preoperative evaluation is required.

## CONCLUSION

Accurate characterization of uterine masses is essential for appropriate management and early detection of malignancy. In this study, benign lesions, particularly fibroids and adenomyosis, predominated. Ultrasonography demonstrated high diagnostic performance and remains an effective first-line modality because of its accessibility and cost-effectiveness. MRI provided superior diagnostic precision, particularly for adenomyosis, endometrial polyps, and hyperplasia, with better specificity and correlation with histopathology. MRI was especially valuable in equivocal, complex, or suspicious lesions by providing superior tissue characterization and assessment of disease extent. Thus, USG and MRI have complementary roles, with MRI serving as an important problem-solving and preoperative imaging modality.

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