BENHA MEDICAL JOURNAL bmj

Print ISSN 1110-208X

Online ISSN 2357-0016

Original article

Comparative Study between MRI and Ultrasound in Evaluation of Uterine Lesions

Asmaa Y. Elsaid, Nadia A. Youssef, Hamada M. Khater

Department of diagnostic radiology, Faculty of Medicine Benha University, Egypt.

Corresponding to: Nadia A. Youssef, Department of diagnostic radiology, Faculty of Medicine Benha University, Egypt.

Email:

dr.noody.ali@gmail.com

Received:

Accepted:

Abstract

Background: Uterine pathologies, including adenomyosis, uterine leiomyoma, carcinoma of the uterus, and endometrial lesions, represent some of the most common gynecological conditions. MRI and USG are crucial diagnostic tools in assessing these lesions, but their diagnostic accuracy and reliability vary. This study aimed to compare the diagnostic accuracy of MRI and USG in assessing uterine lesions, with histopathology as the gold standard**. Methods:** Fifty female patients of reproductive age with suspected uterine lesions were included. All patients underwent both USG and MRI, followed by histopathological evaluation. Sensitivity, specificity, and accuracy were calculated for each modality in diagnosing different uterine lesions. **Results**: The mean age of the participants was 46.7 ± 7.0 years. The most common presenting symptoms were bleeding (72%) and pelvi-abdominal pain (26%). USG identified endometrial hyperplasia in 34%, myoma in 28%, adenomyosis in 16%, polyp in 12%, carcinoma in 8%, and no detectable abnormalities in 2% of cases. MRI identified myoma in 32%, adenomyosis in 24%, polyp in 18%, endometrial hyperplasia in 18%, and carcinoma in 8%. The final histopathological diagnosis showed myoma in 30%, adenomyosis in 24%, polyp in 18%, endometrial hyperplasia in 16%, and carcinoma in 12%. The sensitivity of USG was 75%, with a specificity of 95% and an accuracy of 91%, while MRI had a sensitivity of 83%, specificity of 95%, and accuracy of 91% in diagnosing uterine masses, particularly in differentiating malignancy. **Conclusion:** Both MRI and USG are effective in diagnosing uterine masses; however, MRI demonstrates superior sensitivity, particularly in detecting malignancy.

Keywords: Uterine pathologies, MRI, Ultrasonography, Diagnostic accuracy.

Introduction:

The uterine pathologies constitute one of the most common problems among women. The most common of them are adenomyosis, uterine leiomyoma, carcinoma of uterus and cervix and endometrial pathologies including polyp and hyperplasia **(1).**

Uterine growths are tissue enlargements of the female uterus. Uterine growth can be caused by either harmless or dangerous conditions. Growths are sometimes referred to medically as masses or tumors. An example of harmless (benign or non-cancerous) growth, which does not pose a threat, is a polyp of the cervix. Some growths, such as uterine fibroids, are benign, but they can still cause some annoying problems, such as bleeding. Dangerous growths of the uterus include cancerous (malignant) tumors. Endometrial carcinoma is the most common gynecologic malignancy, and cervical carcinoma is the third most common. Uterine leiomyoma is by far the most common benign tumor of the female pelvis **(2, 3).**

Magnetic Resonance Imaging (MRI) and Ultrasonography (USG) appear to be important modalities in diagnosing uterine pathologies. Considering the cost and limited availability, physicians and the general radiologists are mostly in a dilemma in finding the appropriate patients for MRI. MRI appears to be an important modality in diagnosing uterine pathologies with an overall precision rate of 91-93% particularly when contrast techniques are used. MRI with its high resolution, good tissue characterization and multi planar Imaging has the capability to characterize multiple lesions and is becoming the modality of choice to assess the uterine pathologies **(4, 5).**

Another widely used modality for evaluation of pelvic pathologies is USG. The advantages of USG are promptly available, reduced cost, real time assessment, vascular evaluation and its safety and simplicity of the examination. However, the drawbacks with this modality include limited field of view, obscuration of pelvis by bowel gas, less sensitivity in parametrial lesion evaluation and its dependence on the skill expertise of the radiologists. MRI is usually considered as a next step in the evaluation of a lesion after USG. The only drawback of MRI lies in, it not being readily available and expensive compared to USG. It also is not advisable for patients with certain metallic implants and claustrophobic patients **(6).**

The aim of the study was to compare the role of MRI and (Trans abdominal & Trans vaginal) ultrasound in assessment of uterine lesions.

Patients and methods:

Patients:

This study is a cross-sectional carried out on 50 female patients in the

reproductive age with suspected uterine lesions presented to Tahra center after ethical committee approval and obtaining a written consent from all patients. The study was done between January 2022 and December 2024

Inclusion criteria were all females with suspected uterine related gynecological problems, who underwent pelvic US and showed a uterine mass.

Exclusion criteria were patients with contraindication to MRI including pacemaker, claustrophobia, metallic foreign body, aneurysmal clips ,1st trimester pregnancy. Patients with renal insufficiency if contrast study is indicated or patients who were unable to lie still during the MRI scan due to severe pain or other medical conditions were also excluded from the study.

(SPSS Inc., Chicago, Illinois, USA)

Methods:

All studied cases were subjected to the following: Detailed history taking, including [Personal history; name, age, gender and body mass index (BMI), Present history, Past history of any medical condition or previous hospital admission and Family history of similar condition]. **Full clinical examination: General examination including [**General comment on patient conscious and mental state, Jaundice or pallor, Vital signs: pulse, blood pressure, capillary filling time, respiratory rate and temperature]. **Local examination including [**preliminary abdominal examination, as well as a speculum and vaginal examination] **Routine laboratory investigations [**complete blood count (Hb, WBCs, Platelets), random blood sugar, kidney function tests and liver function tests].

Technique: For ultrasound, the bladder was full and in optimal condition when the Transabdominal Ultrasound was conducted, then the bladder was emptied, and the Transvaginal Ultrasound was performed. The patient position lying face-up on an examination table. A warm water-based gel was applied to the area of the body being studied. The transducer is placed on the body and moved back and forth over the area of interest until the desired images are captured. That was done using 5 to 10 MHz transducers.

During both Ultrasound tests, the following uterine parameters were noted: Endometrium – homogenous / in homogeneous, echogenic / hypoechoic in contrast to the myometrium, endometrial thickness – measured from the myometrial – endometrial junction (outer echogenic layer) to the opposite Myo endometrial junction. The presence or absence of endometrial cavity fluid, any mass lesion inside the endometrium, and the characteristics of any mass present are all factors to consider (single or numerous). The myometrium was examined for the presence of any myoma, its location (submucous, intramural, and sub serosal), the number of lesions, their echogenicity, calcification, cystic change within the

lesion, and shadowing. Any cysts in the myometrium, whether single or many, were noted, as well as their location, such as anterior or posterior myometrium.

MR imaging was performed with high field strength 1.5 tesla on Philips Achieva XR, with the patient in supine position. Total study time ranged from 20 to 30 minutes. Lesions detection and characterization were assessed separately for each sequence (unenhanced T1 weighted, proton density weighted and contrast enhanced T1 weighted images) and for combinations of sequences (unenhanced T1 and T2 weighted images, and unenhanced and contrast enhanced T1 weighted images) DWI and ADC. Intravenous injection of contrast agent (Gadolinium dimeglumine) (Gd-DTPA) (Magnavist, Schering AG Berlin, Germany) using a power injector at a dose of (0.1 mmol /kg). The uterine pathologies were broadly classified into four categories namely fibroid, adenomyosis, endometrial pathologies including endometrial carcinoma and cervical malignancies.

The comparison was made between US and MRI for detection of each of pathologies with histopathology as gold standard. In case of fibroids, in patients who were not operated, MRI was considered gold standard and comparison was done between US and MRI for detection of fibroids

Statistical analysis

Analysis is to beperformed using SPSS for windows v20.0, Data to be presented in terms of range, meanand standard deviation (for numeric parametric variables); range, median and inter-quartile range (for numeric non-parametric variables); or number and percentage (for categorical variables). Difference between two independent groups is to be analyzed using independentstudent's t-test as well as the mean difference and its 95% CI (for numeric parametric variables); or chi-squared test as well as the risk ratio and its 95% CI (for categorical variables). Binary logisticregression analysis is to be performed forestimating the association between good/poor response and the measured variables ROC curves are to be constructed for estimating the validity of measuredvariables as predictors of good or poor response validity is to be presented in terms of sensitivity, specificity, positive and negative predictive values and their corresponding 95% Cis significance level is set at 0.05.

Approval code: 12-11-2023

Results:

During this study, 50 patients were eligible and included in the study. Mean and Range of age were 46.7±7.0, 38.0 to 61.0 year, complain duration were 8.0±5.7, 1.0–14.0. Mean of parity were 3.2 (2.0–3.5), 0.0–5.0 s. **Table 1.**

Main presenting complain were Bleeding (72.0%), Pelvi-abdominal pain

(26.0%) and other complains like Irregular periods (14%) and Pelviabdominal mass (10%). According to Ultrasonography diagnosis among the studied cases, Endometrial hyperplasia was the most frequent finding (34.0%), followed by myoma (28.0%), adenomyosis (16.0%), polyp (12.0%), carcinoma (8.0%) and only one case (2.0%) without detectable abnormality. According to MRI diagnosis among the cases studied, myoma was found in 16 patients (32.0%), adenomyosis in 12 patients (24.0%), polyp in 9 patient (18.0%), endometrial hyperplasia in 9 patient (18.0%) and carcinoma in 4 patient (8.0%). According to Final diagnosis (Hysteroscopy and biopsy histopathology) among the studied cases, myoma was the most frequent finding (30.0%), followed, adenomyosis (24.0%), polyp (18.0%), endometrial hyperplasia (16.0%) and carcinoma (12.0%). **Table 2.**

There was a statistically significant difference between US diagnosis and MRI diagnosis regarding overall diagnosis (by histopathology) ($p<0.001$). **Table 3.**

Regarding validity of US in assessment of uterine masses, US showed a Sensitivity of 75%, Specificity of 95% and accuracy of 91% in average in diagnosis of uterine masses but it can differentiate malignancy (diagnosing carcinoma) with only 66% sensitivity. Regarding validity of MRI in assessment of uterine masses, MRI showed a Sensitivity of 75%, Specificity of 95% and accuracy of 91% in average in diagnosis of uterine masses with good differentiation of incidence of malignancy (diagnosing carcinoma) with 83% sensitivity **Table 4.**

TVUS images show Severe endometrial thickening(a) with internal vascularity(b). **Figure1**

Sagittal T2WI (a) shows the tumor (arrow) is bulky and extends into the outer half of the myometrium anteriorly. The outer uterine contour remains smooth. The junctional zone posteriorly is preserved as a thin T2 hypointense line (arrowhead). Sagittal early DCE images (b) show irregular peritumoral enhancement at the advancing front of the tumor (arrow) anteriorly, while the normal junctional zone posteriorly (arrowhead) has a smooth thin enhancement. Sagittal DW image (c) shows marked diffusion restriction of the tumor (arrow). Stage IB endometrial carcinoma with extension to the outer half of the myometrium. **Figure 2**

US images show normal sized uterus and normal cervix, the uterus was shifted to the right. A dilated, fluid / blood filled horn was seen adjacent to the uterus. **Figure 3**

sagittal T2(a), axial T2(b), coronal T2(c), T1 post contrast(d). MRI images showing Well defined lesion inseparable from the right lateral wall of the uterus measuring 4.5x5 cm with internal blood signal showed bright signal in all series with marginal dark signal. Unicornuate

AVF uterus showed normal size and MR signal. Unicornate uterus with non-communicating functional rudimentary horn. **Figure 4**

US shows heterogenous uterine mass lesion at anterior myometrial wall with cystic areas. **Figure 5**

Lower segment anterior wall interstitial well defined mass eliciting iso T1(c), bright T2WI/STIR (a,b), restricted diffusion(e) with rather homogenous post-contrast enhancement.it is seen touching, slightly displacing the endometrial cavity. **Figure 6**

Table 1: Demographic characteristics of the studied cases.

Characteristics		Mean±SD / N	Range / %
Age (years)		46.7±8.4	**38.0–61.0**
Age group	<45	19	**38**
	45-55	15	**30**
	>55	16	**32**
Duration of complain (months)		8.0±5.7	**2.0–13.0**
Parity		**3.2**	**0.0–5.0**

Table 2: Main presenting complaint, Ultrasonography & MRI diagnosis and Final diagnosis (Hysteroscopy and biopsy histopathology) among the studied cases

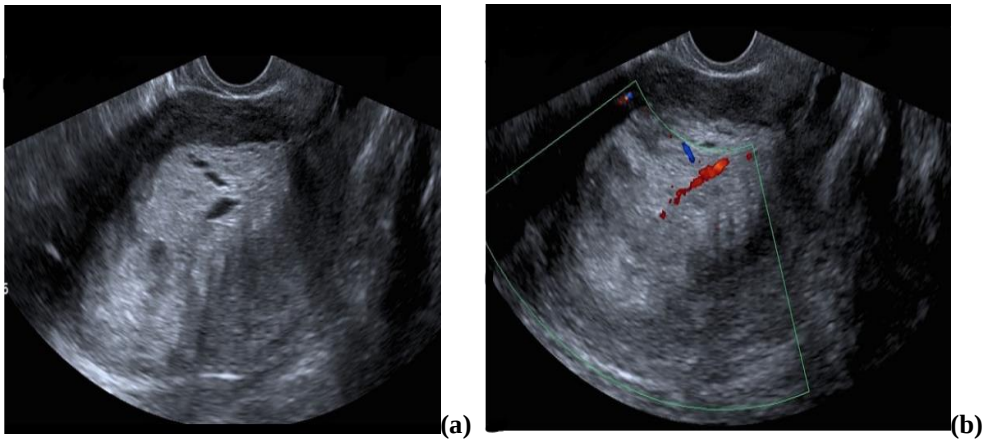
Main presentingcomplaint	N	%
Bleeding	36	**72.0**
Irregular periods	7	**14**
Pelviabdominal pain	13	**26.0**
Pelviabdominal mass	5	**10.0**
Findings		
Myoma	16	**32.0**
Adenomyosis	12	**24.0**
Polyp	9	**18.0**
Hypeplasia	9	**18.0**
Carcinoma	4	**8.0**
Findings		
Myoma	15	**30.0**
Adenomyosis	12	**24.0**
Polyp	9	**18.0**
Hyperplasia	8	**16.0**
Carcinoma	**6**	**12.0**

Table 3: Agreement between US diagnosis and MRI diagnosis regarding overall diagnosis

MRI diagnosis	US diagnosis					
	Myoma	**Adenomyosis**	**Polyp**	**Hypeplasia**	**Carcinoma**	**NAD**
Myoma	14	0	0	1	0	**1**
Adenomyosis	0	8	0	3	0	**0**
Polyp	0	0	6	3	0	**0**
Hypeplasia	0	0	0	9	0	**0**
Carcinoma	0	0	0	1	4	**0**
Kappa	**0.517**		**P-value**		**<0.001***	

Table 4: Validity of MRI and US in diagnosis of uterine lesions

	MRI				
	Sensitivity	**Specificity**	**PPV**	**NPV**	**accuracy**
Myoma	93.3	100	100	97.2	98
Adenomyosis	63	97	87.5	90.5	90
Polyp	66	100	100	93.1	94
Hypeplasia	87	76	41.1	97.0	78
Carcinoma	66	100	100	94.4	95
Average	75.06	94.6	85.72	94.44	91
US					
Myoma	100	97.1	93.75	100	98
Adenomyosis	92.3	100	100	97.4	98
Polyp	100	100	100	100	100
Hypeplasia	100	97.6	88.9	100	98
Carcinoma	83.3	100	100	97.8	98
Average	95.12	98.94	96.53	99.04	98.4



(a) **(b)**

Figure (1): TVUS images show Severe endometrial thickening(a) with internal vascularity(b).

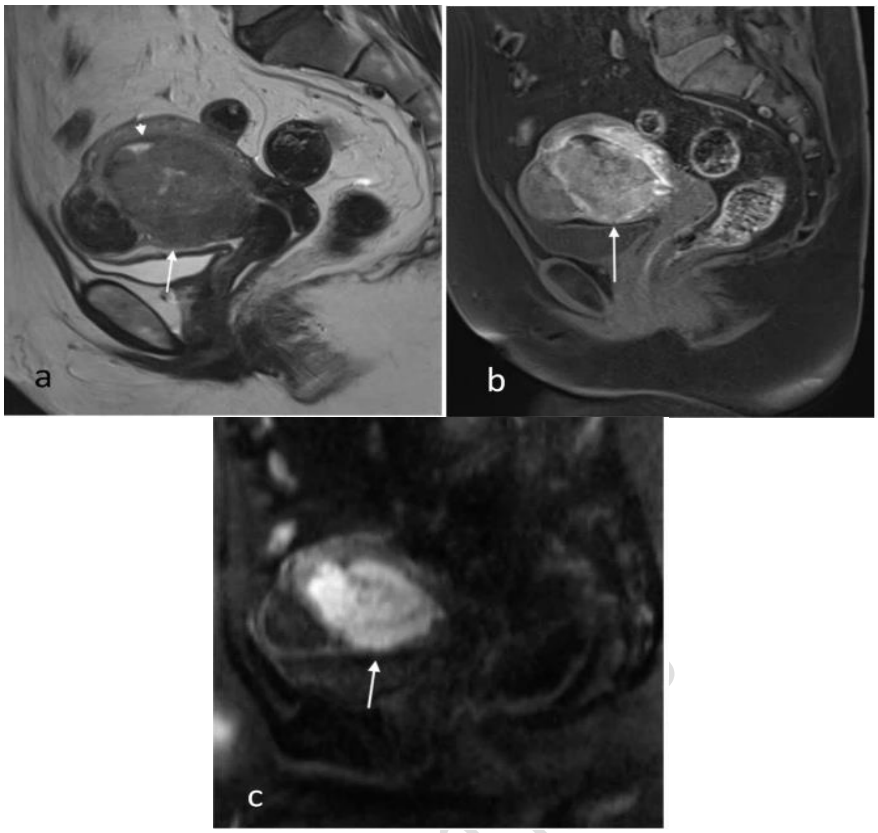


Figure (2): Sagittal T2WI (a) shows the tumor (arrow) is bulky and extends into the outer half of the myometrium anteriorly. The outer uterine contour remains smooth. The junctional zone posteriorly is preserved as a thin T2 hypointense line (arrowhead). Sagittal early DCE images (b) show irregular peritumoral enhancement at the advancing front of the tumor (arrow) anteriorly, while the normal junctional zone posteriorly (arrowhead) has a smooth thin enhancement. Sagittal DW image (c) shows marked diffusion restriction of the tumor (arrow). Stage IB endometrial carcinoma with extension to the outer half of the myometrium.

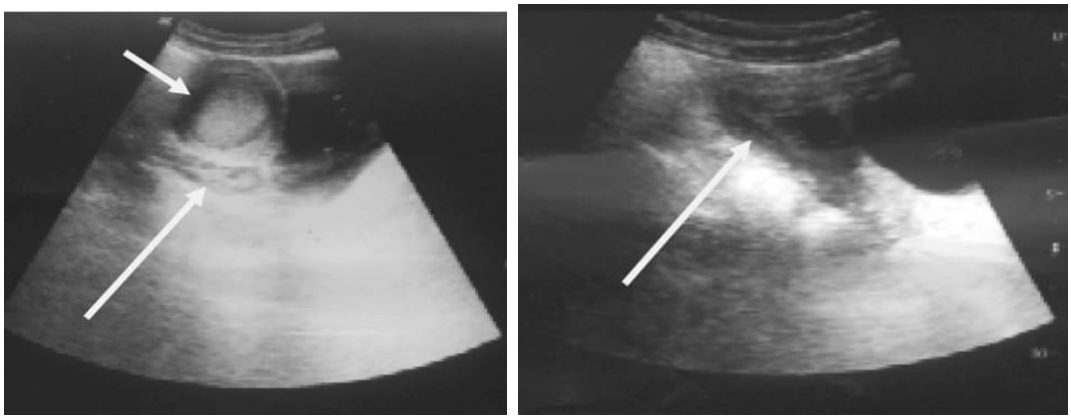


Figure (3): US images show normal sized uterus and normal cervix, the uterus was shifted to the right. A dilated, fluid / blood filled horn was seen adjacent to the uterus.

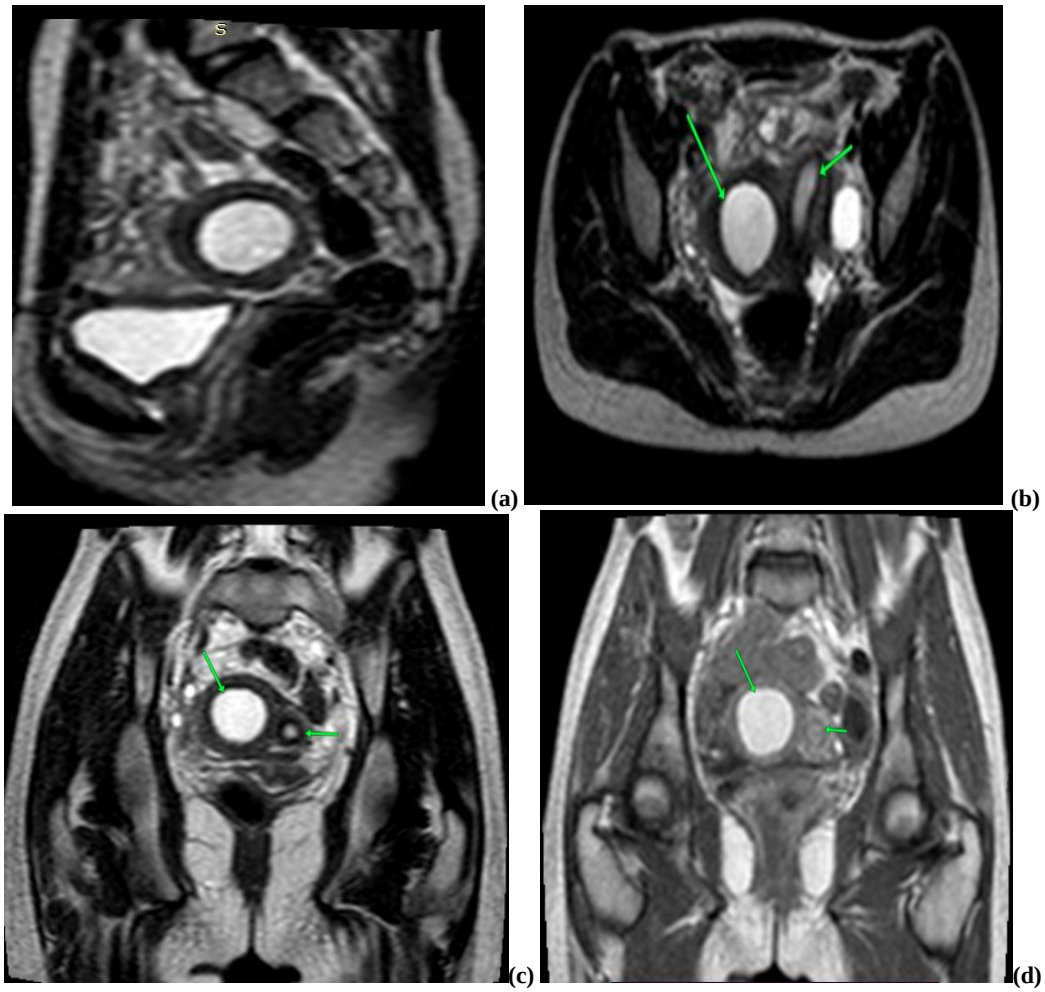


Figure (4): sagittal T2(a), axial T2(b),coronal T2(c),T1 post contrast(d). MRI images showing Well defined lesion inseparable from the right lateral wall of the uterus measuring 4.5x5 cm with internal blood signal showed bright signal in all series with marginal dark signal. Unicornuate AVF uterus showed normal size and MR signal. Unicornuate uterus with non-communicating functional rudimentary horn.

Figure (5): US shows heterogenous uterine mass lesion at anterior myometrial wall with cystic areas.

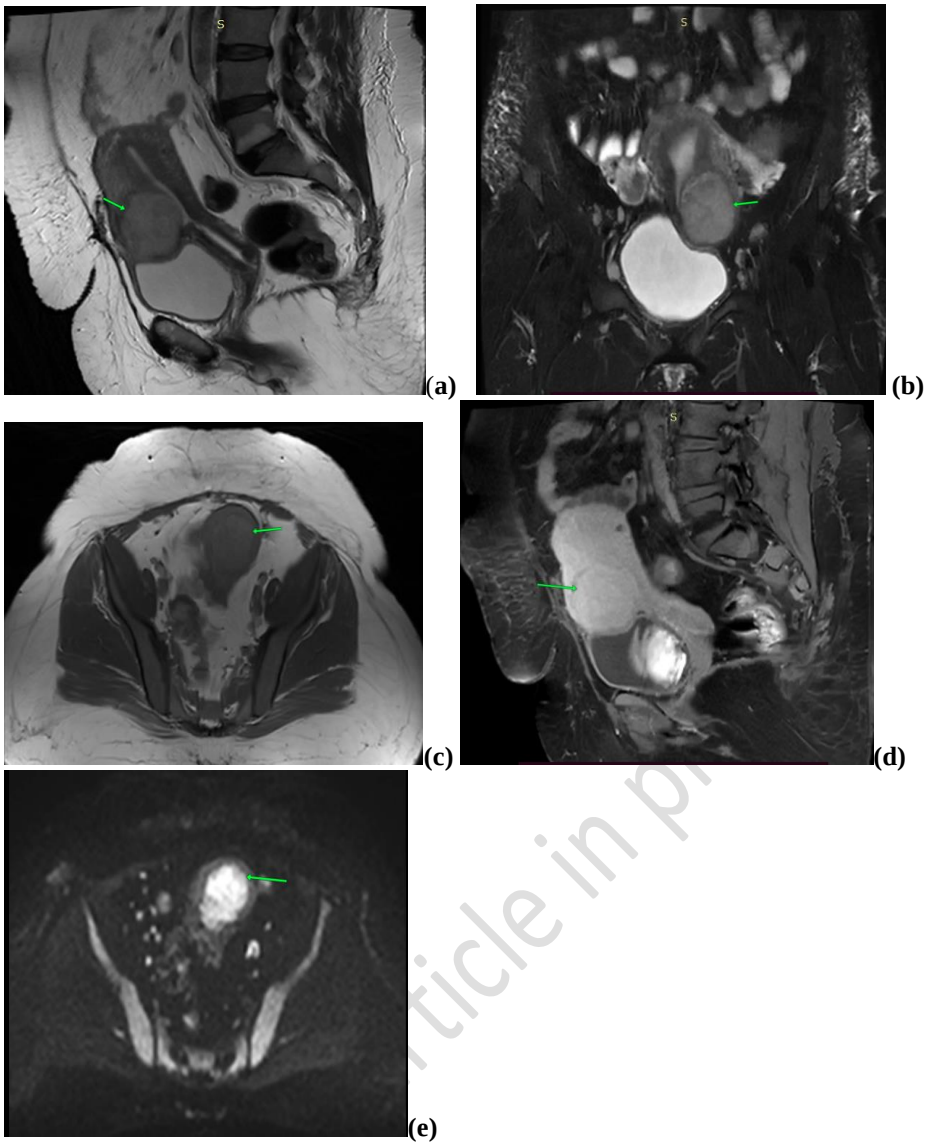


Figure (6): Lower segment anterior wall interstitial well defined mass eliciting iso T1(c), bright T2WI/STIR(a,b), restricted diffusion(e) with rather homogenous post-contrast enhancement.it is seen touching, slightly displacing the endometrial cavity.

Discussion:

This prospective study was conducted on total 50 female patients with uterine mass lesions. Mean and Range of age were 46.7±7.0, 38.0 to 61.0 year, complain duration were8.0±5.7, 1.0–14.0. Mean of parity were 3.2 (2.0–3.5), 0.0–5.0. Main presenting complain were Bleeding (72.0%), Pelvi-abdominal pain (26.0%) and other complains like Irregular periods (14%) and Pelviabdominal mass (10%) According to Ultrasonography diagnosis among the studied cases, Endometrial hyperplasia was the most frequent finding (34.0%), followed by myoma (28.0%), adenomyosis (16.0%), polyp (12.0%),

carcinoma (8.0%) andonly one case (2.0%) without detectable abnormality.

According to MRI diagnosis among the studied cases, myoma was found in 16 patients (32.0%), adenomyosis in 12 patients (24.0%), polyp in 9 patient (18.0%), endometrial hyperplasia in 9 patient (18.0%) and carcinoma in 4 patient (8.0%). According to Final diagnosis (Hysteroscopy and biopsy histopathology) among the studied cases, myoma was themost frequent finding (30.0%), followed, adenomyosis (24.0%), polyp (18.0%), endometrial hyperplasia (16.0%) andcarcinoma (12.0%). There was a statistically significant difference between US diagnosis and MRI diagnosis regarding overall diagnosis (by histopathology) ($p<0.001$)

Regarding validity of US in assessment of uterine masses, US showed a Sensitivity of 75%, Specificity of 95% and accuracy of 91% in average in diagnosis of uterine masses but it can differentiate malignancy (diagnosing carcinoma) with only 66% sensitivity. Regarding validity of MRI in assessment of uterine masses, MRI showed a Sensitivity of 75%, Specificity of 95% and accuracy of 91% in average in diagnosis of uterine masses with good differentiation of incidence of malignancy (diagnosing carcinoma) with 83% sensitivity. Consistent with Abdel Wahab et al., 2022(7), the study found that among the cases examined, Ultrasonography identified Endometrial hyperplasia as the most common finding (32.0%), followed by myoma (28.0%), adenomyosis (16.0%), polyp (12.0%), carcinoma (8.0%), and (4.0%) with no detected abnormalities. Nevertheless, Abdel Wahab et al., 2022(7) found that the most common discovery in the cases they studied using MR evaluation was myoma (28.0%), followed by adenomyosis (24.0%), polyp (5.0%), endometrial hyperplasia (16.0%), and carcinoma (12.0%). Therefore, our findings demonstrated a statistically significant complete concordance between the assessment of uterine lesions using MRI and the final diagnosis made through hysteroscopy and histopathology (7).

In Palmér et al., 2023 (8) who studied Accuracy of transvaginal ultrasound versus MRI in the preoperative Diagnostics of low-grade Endometrial Cancer, two hundred and fifty-nine patients were included. There was a statistically significant difference in specificity assessing deep myometrial invasion between MRI and TVUS (MRI 0.88, TVUS 0.68). There was no difference in sensitivity (MRI 0.73, TVUS 0.68). When assessing cervical stroma infiltration, MRI had a higher specificity (MRI 0.96, TVUS 0.90), but there was no difference in sensitivity (MRI 0.41, TVUS 0.32). These findings are consistent with prior research. Shankar et al. (2019) (9) conducted a prospective study on 92 patients who were referred to the radiology department due to suspected uterine pathologies. All patients with positive or suspicious ultrasound (USG) results underwent magnetic resonance imaging (MRI) examination. The purpose of the study was to compare the effectiveness of MRI and USG in detecting uterine lesions, as well as their ability to differentiate and characterize these lesions using histopathology as the standard for comparison.

According to Shankar et al. (2019) (9), a study found that out of 16 cases of adenomyosis identified through

histopathology, MRI was able to detect 12 cases (75%) as diffuse adenomyosis, two cases as adenomyosis with fibroid uterus, and two cases as focal adenomyosis. However, the USG identified six cases as adenomyosis, six cases as bulky uterus with a varied composition of the uterine muscle tissue, which is suggestive of adenomyosis or leiomyoma, two cases as locally thickened uterine muscle tissue, and two cases as bulky uterus with fibroid. Among the 16 cases, the USG was able to identify adenomyosis in only six cases, while the remaining 10 cases were deemed to have suspicious signs of adenomyosis. Furthermore, four cases that were initially diagnosed as adenomyosis through ultrasonography (USG) were later confirmed to be fibroids through magnetic resonance imaging (MRI).

This study demonstrated a substantial disparity in the diagnosis of adenomyosis using ultrasound (USG) and magnetic resonance imaging (MRI) (p=0.0001). Shankar et al. (2019) (9) found that 96 fibroids were diagnosed using MRI. Of these, 48 were intramural fibroids, 12 were submucosal fibroids, 14 were sub-serosal fibroids, 10 were both submucosal and intramural, and 12 were both sub-serosal and intramural. USG identified a total of 68 fibroids. Among these, 44 were classified as intramural, four as submucosal, 10 as sub-serosal, and eight as both sub-serosal and intramural. Additionally, two lesions were found in locations that were both submucosal and intramural. Furthermore, Shankar et al. (2019) (9) demonstrated that MRI accurately detected all 16 cases of adenomyosis, achieving a sensitivity, specificity, positive predictive value, and negative predictive value of 100%.

Among the 12 patients, four were found to have endometrial carcinoma, two had hyperplasia, and six had polyps based on histopathology. Additionally, two patients were diagnosed with endometrial carcinoma, four with hyperplasia, and six patients with polyps based on magnetic resonance imaging (MRI). The two patients were incorrectly diagnosed with hyperplasia on the magnetic resonance imaging (MRI) scan due to the absence of any indications of myometrial invasion. Among the USG results, six patients exhibited endometrial thickening, four patients had a polyp, and two patients had a polyp that raised suspicion. Among the six patients with thickened endometrium, one exhibited signs of myometrial invasion, indicating the presence of carcinoma. Therefore, there is a strong correlation between ultrasonography (USG) and magnetic resonance imaging (MRI) (p=0.0001) in terms of identifying fibroids. There was no inconsistency or difference when there was only one fibroid present. Nevertheless, in cases where multiple fibroids were present, MRI outperformed USG in accurately identifying the number of fibroids. Therefore, MRI was used as the definitive and most reliable method in cases involving fibroid (9).

Kishan et al. (2021) (10) found that there were a total of 19 malignant lesions identified through histopathology. Among these, 5 were correctly identified as positive on ultrasound (true positive) and 14 were correctly identified as positive on MRI (true positive). Among the 31 confirmed benign lesions identified through histopathology, 29 were correctly identified as negative on ultrasonography (USG) and all 31 were correctly identified as negative on magnetic resonance imaging (MRI). The

study found that ultrasonography had a sensitivity of 26.3%, specificity of 93.5%, positive predictive value (PPV) of 80.3%, negative predictive value (NPV) of 55.9%, and an accuracy of 68%. Similarly, MRI pelvis examination had a sensitivity of 73.6%, specificity of 100%, PPV of ∞ (infinity), NPV of 79.1%, and an accuracy of 90%.

Hameed AM (2017) (11) conducted a comparative analysis between ultrasonography (USG) and magnetic resonance imaging (MRI) in order to determine their effectiveness in detecting fibroids, with pathology results serving as the reference standard. The accuracy of myoma detection using ultrasound (USG) was found to be 73.3%, whereas the detection rate using magnetic resonance imaging (MRI) was significantly higher at 98.1% (p=0.001). The average number of myomas in the United States was 1.62±1.07, as determined by MRI it was 2.14±1.49, and in pathology it was 2.15±1.5. The average diameter of myomas in pathology was 3.49±2.21, while in MRI it was 3.58±2.21.

When it comes to the location of myomas, there is no significant disparity between MRI and pathology. However, there is a significant difference in the localization of myomas between ultrasound (US) and pathology. In our study, the results were consistent with previous findings, indicating that MRI outperformed USG in identifying predominantly submucosal fibroids and small-sized fibroids. Jagannathan et al., (2017) (6) conducted a study to compare the accuracy of MRI, transabdominal, and transvaginal sonography in detecting and characterizing uterine mass lesions. The transvaginal sonography and MRI showed a 96% agreement in detecting myometrial mass lesions. The agreement between transvaginal sonography and MRI in classifying the site of myometrial mass lesions was 67%. In our study, the sensitivity of detecting adenomyosis was found to be 66.7% and 100% for USG and MRI, respectively. In comparison, the sensitivity rates for TAS, TVS, and MRI were 33%, 58%, and 92%,

In Abdul Azhar et al., 2022 study (12), there were 32 patients in their 30s to 40s, 8 in their 40s to 50s, 8 in their 50s to 60s, and 4 in their 60s, with an average age of 42.5 years. Patients were premenopausal to postmenopausal, with 68 percent premenopausal and 33 percent postmenopausal. The patients range in age from 30 to 65 years old. Premenopausal women accounted for 68 percent of the participants. The most prevalent presenting symptom was pain (69 percent), followed by bleeding PV (37 percent), and discharge PV (3 percent) (32 percent). 9.6% of couples struggle with infertility. Dymenorrhea was experienced by 46% of the women. According to their histological diagnostic, patients were separated into five groups. Adenomyosis affected 12 individuals, fibroids affected 24 patients, endometrial cancer affected three patients, cervical cancer affected ten patients, and cervical polyps affected two patients. In 17 of the people, there was adnexal pathology.

Transvaginal ultrasonography (USG) and magnetic resonance imaging (MRI) are more effective in detecting cystic degeneration. Transvaginal ultrasonography (USG) is less efficient than magnetic resonance imaging (MRI) in identifying submucosal lesions. Transvaginal ultrasonography (USG) can be employed as a screening tool to detect

endometrial lesions. Transabdominal ultrasonography is ineffective. T2-weighted and contrast-enhanced T1-weighted MRI sequences are valuable for characterizing lesions. An MRI diagnosis alone cannot suffice to obviate the necessity of an endometrial biopsy in instances of endometrial cancer. MRI can be used to identify myometrial invasion and the extent of lesions in patients with endometrial cancer. MRI is more sensitive than Transvaginal USG and Transabdominal USG in detecting even the smallest Nabothian cysts in cervical lesions.

Cervical polyps are accurately identified. Transvaginal and transabdominal ultrasonography (USG) provide a more precise assessment of the posterior cervix, parametrial invasion, body or vaginal extension, haematometrocolpos, and haematosalphinx compared to MRI, resulting in more accurate staging. Due to the significant variations in surgical techniques for fibroid and adenomyosis, it is recommended to utilize MRI in the preoperative evaluation of all suspected cases of adenomyosis and infertility.

In summary, pelvic MR Imaging is a well-tolerated, noninvasive, and accurate method for detecting uterine mass lesions, with excellent histological correlation. It is superior to transabdominal and transvaginal USG in this regard. Therefore, it serves as an effective imaging tool prior to surgery to evaluate the quantity and dimensions of uterine mass lesions.

This study has some limitations which are worthy to mention; The study was carried out on a small sample size of 70 patients, which may limit the generalizability of the findings to a larger population. The follow-up period was not for a long time, which may not fully assess the casual relationships between rheumatoid arthritis and the observed findings. Limited tools for investigations were used, only ultrasound was used for assessing the inflammation.

Conclusion:

The MRI study facilitated precise identification of lesions and provided additional information about lesions that were already correctly identified by ultrasound, such as the location of origin, degenerative changes in a fibroid, and the size of a malignant mass. MRI exhibits a sensitivity of 100%, making it a superior modality that surpasses the challenges encountered by ultrasound. It enables precise diagnosis by providing detailed characterization of the lesions. When it comes to determining the extent of mass lesions, it is still the preferred investigation method.

References:

1. Malikireddy P, Mukku S, Baja N. Role of ultrasonography, magnetic resonance imaging in evaluation of female pelvic masses with histopathological correlation. Panacea Journal of Medical Sciences. 2023;13:140-4.
2. Shimizu H, Kobayashi H, Shimizu Y, Adachi H. Laparoscopic intervention for solid pelvic tumours in Mayer-Rokitansky-Küster-Hauser syndrome: a case of bilateral uterine adenomyomas of the rudimentary uterus. BMJ Case Rep. 2023;16.
3. Hashad AM, Hassan NE, Elbohoty AE, Bakr OB, Ibrahim IM. 3D Ultrasonography Compared with Magnetic Resonance Imaging for the Diagnosis of Adenomyosis %J The Egyptian Journal of Hospital Medicine. 2017;69:3123-33.
4. Cunningham RK, Horrow MM, Smith RJ, Springer J. Adenomyosis: A Sonographic Diagnosis. Radiographics. 2018;38:1576-89.
5. Jain D, Agrawal D, Patre D. MRI as an imaging tool in abnormal uterine bleeding

among no gravid women. International Journal of Clinical Obstetrics and Gynaecology. 2020;4:111-5.
6. Jagannathan D. Comparison of The Diagnostic Accuracy of Magnetic Resonance Imaging (MRI), Transabdominal Ultrasound (TAS), Transvaginal Ultrasound (TVS) In Characterizing The Uterine Mass Lesions. IOSR Journal of Dental and Medical Sciences. 2017;16:65-74.
7. Wahab R, Mahmoud L, Nassef M, Bassiouny A. MRI Evaluation of Uterine Mass Lesions in Correlation with Transabdominal and Transvaginal Ultrasound. Ain Shams Medical Journal. 2022;73:15-30.
8. Palmér M, Åkesson Å, Marcickiewicz J, Blank E, Hogström L, Torle M, et al. Accuracy of transvaginal ultrasound versus MRI in the PreOperative Diagnostics of low-grade Endometrial Cancer (PODEC) study: a prospective multicentre study. Clinical Radiology. 2023;78:70-9.
9. Shankar MP, Ram Kumar S, Dhar T, Venkateshwaran KN, Balaji R. Role of Magnetic Resonance Imaging in Evaluation of Uterine Pathologies and its Correlation with Ultrasound. Int j anat radiol surg. 2019;8:28-32.
10. Kishan TV, Kumar GP, Reddy TVJIJoR, Imaging D. Role of ultrasonography and magnetic resonance imaging in evaluation of female pelvic masses from reproductive organs with histopathological correlation. 2021;4:30-7.
11. Hameed AMJMMJ. A comparative study of ultrasonography & magnetic resonance imaging with pathological results in diagnosis, localization & measurement of uterine leiomyomas. 2017;4:8-19.
12. Abdul Azhar M. MR Evaluation of Uterine Mass Lesions in Correlation with Transabdominal, Transvaginal Ultrasound Using HPE as a Gold Standard. MedPulse International Journal of Radiology. 2022;21:12-9.

To cite this article: Asmaa Y. Elsaid, Nadia A. Youssef, Hamada M. Khater. Comparative Study between MRI and Ultrasound in Evaluation of Uterine Lesions. BMFJ XXXXX, DOI: 10.21608/bmfj.2025.344381.2286