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Original Research Article

Comparison of Ultrasound and MRI Findings in the Evaluation of Pelvic masses/lesions with Histopathological Correlation in Female Patients

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Abstract

Introduction: The first investigation in the evaluation of various abdominopelvic pathologies is usually ultrasound (USG) owing to its wide availability, acceptance, lack of radiation, reproducibility, and real-time and vascular assessment. Whereas, Magnetic resonance imaging (MRI) is useful for the assessment of indeterminate-inconclusive lesions and characterizing tissue.
Aim: Describe ultrasound and MRI features of pelvic mass/lesion and evaluation of the diagnostic accuracy of ultrasound and MRI in the diagnosis of benign and malignant pelvic masses in women.
Design: Cross-sectional study
Material and Methods: The study comprised patients referred to the Department of Radio-Diagnosis, with any complaints of pelvic disease over 20 months. The patient underwent USG pelvis and upon detection of any pelvic lesion, patients were subjected to MRI pelvis in the 1.5T MRI machine. The diagnostic effectiveness of each imaging modality was compared using the final histopathology report.
Results: Data from 100 patients who underwent USG and MRI pelvis were included, out of which 84 underwent histopathological evaluation. The sensitivity and specificity of USG & MRI in the diagnosis of benign adnexal lesions are 90.91%, 92.31% respectively, 100.00 %, and 100.00 % respectively. The sensitivity and Specificity, of USG in diagnosing malignant adnexal lesions are 90.91 %, and 84.62 % respectively. And that of MRI in diagnosing malignant adnexal lesions is 100%, 92.86 %.
Conclusion: In comparison to ultrasound, MRI offers superior sensitivity and specificity in the identification of a variety of pelvic lesions. It is quite reliable for locating a mass's origin, characterizing the tissue, staging, and preoperative planning.

Keywords: MRI Pelvis, Ultrasonography, Leiomyoma, Cystadenoma

1. Introduction

Innumerable benign and malignant lesions can develop in the genitourinary structures of the female pelvis [1]. Due to anatomical limitations in the physical examination and overlapping clinical presentations, reaching a definitive diagnosis is always a daunting endeavor [2]. Correct diagnosis of adnexal masses is critical in determining patient management.

The first investigation in the evaluation of abdominopelvic pathologies is most commonly ultrasound [3]. Its limitations are - characterization, organ of origin, and staging. Hence, MRI pelvis as the imaging modality for assessing indeterminate and inconclusive lesions came into the picture due to greater field of view, contrast resolution, multiplanar imaging capabilities, and tissue characterization [4,5].

2. Material and Method

1. **Study Design**: Cross-sectional study.
2. **Study Area –** Department of Radiodiagnosis
3. **Study Duration -** 20 months.
4. **Sample Source**- Patients were referred to the Department of Radio-Diagnosis, with any

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complaint of gynecological disease or ultrasound findings that met the inclusion criteria.

5. **Sample Size:** 84 cases
6. **Inclusion Criteria**
7. Clinically suspected cases of cervical, uterine, adnexal, and fallopian tube masses.
8. The trial was open to patients of all ages.
9. **Exclusion Criteria:**

- Patients who have undergone treatment for a pelvic mass
- Patients unwilling to undergo imaging.
- Contrast allergy
- Any contraindications for Magnetic resonance imaging (MRI) like pacemaker, aneurysm clip or cochlear implant,
- Claustrophobic Patients

10. Methodology: All patients meeting the inclusion criteria were enrolled after obtaining written consent and ethical clearance from the Institute's ethics committee. A thorough medical history, including the onset and duration of the illness, the patient's family, and previous medical history, were gathered. USG pelvis was performed on the patients who were referred to the Department of Radio-Diagnosis with a complaint or an incidental finding of pelvic disease on clinical examination or by USG meeting inclusion criteria.

11. Ultrasound Technique: All pelvic ultrasounds were performed using the ultrasound machine in our department. Transabdominal pelvic ultrasonography in a supine position was used for all patients. Low and high-frequency probes were used to collect images of patients in the mid-sagittal, parasagittal, and transverse planes. Uterus, cervix, bilateral adnexa as well as the vagina and the urinary bladder, were examined.

12. MRI Technique for Pelvic Evaluation: Imaging was done with a 1.5 Tesla MRI machine available in the department. All scans were acquired in the supine position. The following sequences were used to obtain MRI images:

1) Sagittal T2-TSE sequence (TR/TE 3000/110)
(2) Axial T2-TSE sequence (TR/TE 4000/110)
(3) Axial T1- TSE sequence (TR/TE 450/20) (4) T2 – STIR (TR/TE 4000/110)
(5) Axial T2 Fat-Sat (TR/TE 5403/100) (6) DWI (TR/TE 6000/90)
(7) Axial T1 Fat sat (TR/TE 650/15) (8) T1 Fat sat post-contrast (TR/TE 650/148)
11. Per the format, the USG Pelvis, and MRI Pelvis reporting was completed
12. The patients underwent various surgical procedures, depending on the diagnosis. The final histopathology report was used to compare each imaging modality's findings and diagnosis.

Statistical analysis

Data analyses was performed using IBM SPSS ver.20 software. Frequency distribution and cross-tabulation were performed to prepare the tables. Results are presented as mean ± standard deviation (SD) and median (minimum-maximum). 2x2 contiguity table was prepared and diagnostic accuracy, sensitivity, specificity, NPV, and, PPV were calculated for ultrasound and MRI and expressed as percentages.

3. Results

Our study consisted of 100 subjects, out of which, 84 subjects underwent histopathological evaluation. The remaining 16 subjects were not examined histopathologically and were left out of the study.

The majority of the subjects had ages between 15-49 years (65%), 33% had ages > 50 years and 1.1 % of the participants were < 15 years. 56% of participants were premenopausal women whereas 44% were postmenopausal. Anatomically, the most common location of pelvic mass was myometrium (36% and 32% in MRI and USG respectively), adnexal in 26% by MRI and 29% by USG, Cervix in 26% by MRI, and 25% by USG (table-1).

Among the adnexal lesions, benign lesions constituted nine (37.5%) of all the adnexal lesions on ultrasound and MRI. Whereas the malignant lesions constituted 58.33% of the adnexal lesions on ultrasound and 45.8% on MRI. Based on the final histopathology assessment majority of lesions were benign 58.33% and malignant adnexal masses constituted 41.66% (table-2). The most common Uterine and cervical lesions were uterine fibroid (32%) followed by cervical carcinoma (19%), and chronic cervicitis (seven percent) (table-3).

About 58% of participants had unilateral adnexal mass lesions, and 42% had bilateral lesions. In MRI evaluation of Adnexal mass majority of participants had lesion size of > 10cms (50%), 29% in the five- <10 cm group, and eight percent of patients in > three cm – five cm group (table-4).

The most common findings of pelvic mass content were unilocular in 40% by USG and 37% by MRI, multilocular in 23% by MRI and USG, multilocular + solid component in 20% by MRI, and 23% by USG. Papillary projections/Mural nodules were found in 25% of subjects by USG examination and 20% of subjects by MRI examination while absent in 80% in MRI and 75% in USG examinations (table-5).

The Sensitivity and Specificity of USG for diagnosing Benign adnexal masses were 90.91% and 92.31%, respectively and diagnostic accuracy was 91.67%. The Positive predictive value and negative predictive value of USG were found to be 90.91% and 92.31% respectively (table-6).

The Sensitivity and Specificity of MRI for diagnosing Benign adnexal masses were 100% and 100% respectively with a diagnostic accuracy of 100%. The

Positive predictive value and negative predictive value of MRI were found to be 100% and 100% respectively. The sensitivity and specificity of USG in the diagnosis of malignant adnexal masses were found to be 90.91% and 84.62%, with a diagnostic accuracy of 87.50%. The Positive predictive value and negative predictive value of USG were found to be 83.33% and 91.67% respectively.

The sensitivity and specificity of MRI in the diagnosis of malignant adnexal masses were found to be 100%, 92.86% with a diagnostic accuracy of 95.83%. Positive predictive value and negative predictive value in differentiating MRI from histopathological findings were found to be 90.91% and 100% respectively.

The Sensitivity, Specificity, Positive predictive value, and negative predictive value in differentiating USG from histopathological findings in diagnosing uterine leiomyoma were found to be 88.89%, 97.06%, 96.00%, and 91.67% respectively with a diagnostic accuracy of 93.44% (table-7).

Sensitivity, specificity, positive predictive value, and, negative predictive value in differentiating MRI from histopathological findings in diagnosing uterine leiomyoma were found to be 100.00%, 97.06%, 96.43%, and 100% respectively with a diagnostic accuracy of 98.36%.

The Sensitivity, Specificity, Positive predictive value, and negative predictive value of USG in diagnosing Ca cervix were found to be 84.6%, 93.6%, 78.5%, and 95.6% respectively, with a diagnostic accuracy of 91.67%. The Sensitivity, Specificity, Positive predictive value, and negative predictive value of MRI in diagnosing Ca cervix were found to be 93.75%, 100.00%, 100%, and 97.78% respectively with a diagnostic accuracy of 98.33%.

Table 1. Baseline characteristics of study participants

S. No.	Variable	Category	Frequency (n= 84)	Percentage (%)		
1	Age Distribution	< 15 years	1	1.1		
		15-49 years	55	65		
		>50	28	33		
2	Menopausal Status	Premenopausal	47	56		
		Postmenopausal	37	44		
3	Anatomical Distribution		USG (N)	USG (%)	MRI (N)	MRI (%)
		Cervix	21	25	22	26
		Myometrium	27	32	30	36
		Adnexal	25	29	22	26

The above table shows the baseline characteristic of the study participants with the majority of the study participants in the age group 25-49yrs (65). The majority of the participants are premenopausal (56%). Anatomically myometrium is the most common site of pathology.

[1]Baseline Characteristics of study participants

Table 2. Distribution of participants based on diagnosis on ultrasound and MRI – Adnexal Masses

Lesion	Ultrasound	MRI	Histopathology
Dermoid Cyst	3	3	3
Serous Cystadenoma	3	3	3
Mucinous Cystadenoma	3	3	3
Malignant Tumors	14	11	10
Other Benign Lesions	0	0	2
Normal/ Other	2	4	3

(Note -Other includes –Intraperitoneal collection, Granulomatous Lesion.)

[2]Number of benign and malignant adnexal Lesions

Table 3: Distribution of study participants based on diagnosis on ultrasound and MRI Uterine and Cervical Masses

	USG	MRI	Histopathology
Fibroid	25	28	27
Adenomyosis	0	3	3
Endometrial hyperplasia	0	1	1
Ca Endometrium	6	4	4
Gestational Trophoblastic Disease	1	2	2
Ca Cervix	14	15	16
Bulky cervix (clinically suspicious cervicitis)	7	7	6
Low-grade endometrial sarcoma	0	0	1
Normal/Other	6	1	1

[3]Number of uterine and cervical mass/lesions

Table 4: Distribution of adnexal mass lesion based on laterality and size

S. No			Frequency (N=24)	Percentage
1	Laterality	Unilateral	14	58%
		Bilateral	10	42%
2	Size	≤ 3 cm	1	4
		>3cm - 5cm	2	8.3
		>5- <10 cm	7	29.1
		>10 cm	12	50
		Other	2	8.3

The above table shows that the majority of adnexal lesions are unilateral (58%).
The majority of the subjects had a lesion size ranging > 10cm (50%).

In the size group of 5cm - <10cm had seven (29%) patients, between three and five cm there were two (8.3%) subject.

4 Laterality and size distribution of adnexal Lesions

Table 5: Distribution of adnexal Mass lesion based on Content, Papillary projection/Mural nodule, and septum

S.No	Characteristic		USG(n)	USG %	MRI(n)	MRI %
1	Content	Unilocular	6	25	6	25
		Multilocular	6	25	6	25
		Unilocular + Solid component	3	13	2	8.3
		Multilocular + Solid component	8	33	9	37.5
		Solid	1	4	0	0
2	Papillary projection/Mural Nodule	Present	6	25	8	33
		Absent	18	75	16	66
3	Septum Characteristics	Absent	7	29	5	20.8
		Smooth wall/septations	9	37.5	10	41.6
		Irregular Septation	8	33	9	37.5

5Internal architecture of adnexal lesions

Table 6: Diagnostic performance of MRI and USG in the diagnosis of benign and malignant adnexal lesions in comparison to histological diagnosis

	Statistic	Sensitivity	Specificity	PPV	NPV	Kappa(sig.)
Benign adnexal Lesion - USG	Value	90.91%	92.31%	90.91 %	92.31%	0.706 (<0.001)
	95% CI	58.72% to 99.77%	63.97 % to 99.81 %	60.11 % to 98.52 %	64.78% to 98.74 %	
Benign adnexal Lesion - MRI	Value	100.00%	100.00%	100%	100%	0.710 (<0.001)
	95% CI	71.51% to 100.00%	75.29 % to 100.00 %	-	-	
Malignant adnexal Lesion - USG	Value	90.91%	84.62%	83.33%	91.67%	0.709 (<0.001)
	95% CI	58.72 % to 99.77 %	54.55 % to 98. 08%	57.96 % to 94.77 %	62.59 % to 98.64 %	
Malignant adnexal Lesion - MRI	Value	100.00%	92.86 %	90.91 %	100.00%	0.639 (<0.001)
	95% CI	69.15 % to 100.00%	66.13 % to 99.82%	60.20 % to 98.51 %	-	

6Diagnostic efficacy of USG and MRI in evaluation of benign and malignant lesions

Table 7: Diagnostic performance of MRI and USG in diagnosing uterine and cervical masses in comparison to histological diagnosis

	Statistic	Sensitivity	Specificity	PPV	NPV	Kappa(sig.)
Uterine Leiomyoma- USG	Value	88.89 %	97.06%	96.00%	91.67 %	0.722 (<0.001)
	95% CI	70.84 % to 97.65 %	84.67% to 99.93%	77.60 % to 99.40 %	79.07 % to 96.97 %	
Uterine Leiomyoma- MRI	Value	100%	97.06%	96.43%	100.00%	0.754 (<0.001)
	95% CI	87.23% to 100%	84.67% to 99.93%	79.66% to 99.47%	-	
Carcinoma cervix - USG	Value	84.62%	93.62%	78.57%	95.65%	0.765 (<0.001)
	95% CI	54.55% to 98.08%	82.46% to 98.66%	54.49% to 91.82%	85.98% to 98.75%	
Carcinoma cervix - MRI	Value	93.75%	100.00%	100.00%	97.78%	0.708 (<0.001)
	95% CI	69.77 to 99.84%	91.96% to 100.00%	-	86.98% to 99.66 %	

7Diagnostic efficacy of USG and MRI in the diagnosis of Uterine and cervical lesions

4. Discussion

Our study aimed to evaluate USG and MRI Pelvis findings in the diagnosis of pelvic masses with histopathological correlation in female patients. The findings of the present study are described as under:

In the present study, most of the patients with pelvic masses were of the age group between 15-49 years (65%) followed by 33% of patients who had ages > 50 years. Usmani Y et al, found that 40 out of 74 individuals, or 54% of the lesions, were discovered in subjects between the ages of 30 to 60, which was the most prevalent age range seen [6].

The majority of the patients (56%) were premenopausal women whereas 44% were postmenopausal. The most common anatomical location of pelvic mass in both MRI and USG examination were myometrium (36% and 32% in MRI and USG respectively), followed by adnexal in 26% by MRI and 29% by USG, Cervix in 26% by MRI, and 25% by USG. Overall, the most common pelvic lesions were uterine fibroid (32%) followed by cervical carcinoma (19%), malignant adnexal lesions (11.9%), cystadenoma (seven percent), and chronic cervicitis (seven percent). The present study demonstrates that among the adnexal lesions, most of the lesions were benign (45%): cystadenoma (25%), followed by dermoid cyst (12.5%). Malignant lesions constituted about 41% of the total adnexal lesions.

The most common lesions were cystadenoma / cystadenofibroma contributing 23.4 %, endometriomas (14.8 %), subserosal / broad ligament / intramural leiomyomas with large exophytic component (12.3 %), hemorrhagic cysts (9.8 %), and dermoid cysts (6.1 %), tubo-ovarian masses (8.6%), simple cyst (4.8%), Krukenberg tumor (4.9%), and cystadenocarcinoma (6.1 %), carcinoma cervix with large exophytic component (2.4%) as per the study done by Usmani Y et al [6].

The majority of patients (58%) had unilateral adnexal mass lesions, and 42% had bilateral lesions which correlated with Shaha PR *et al*, right-sided adnexal lesions were 23 out of the total 50, 15 were left adnexal lesions, and eight bilateral**.** The laterality of four lesions that crossed the midline could not be determined due to their large size, and the ovaries could not be seen independently [7].

In MRI evaluation of Adnexal mass majority of patients had lesion size of > 10cms (50%) followed by 29% in the five-<10 cm group and 8.3% of patients in the >three cm – five cm group.

The study showed that benign or malignant behavior of the lesion was related to the size of the lesion i.e., lesions < five cms were more likely to be benign than malignant, and lesions more than 10 cm were more likely to be malignant. Lesions in the size range of >five -10 cm can be benign, borderline, or malignant.

Out of the 24 patients with adnexal lesions 10 were malignant, of which the size of four lesions was < 10 cm, and six lesions had a size more than 10cms. In one patient with poorly differentiated papillary carcinoma on histopathology, the size of the lesion was in the range of >three-five cm. Seven out of 10 lesions, with a diameter of more than 10 cm were detected, four of which were mucinous cystadenoma and three were serous cystadenoma.

Unilocular lesions were found in 40% by USG and 37% by MRI, multilocular in 23% by MRI and USG, multilocular + solid component in 20% by MRI, and 23% by USG. Our study shows that unilocular lesions are more likely to be benign. Whereas solid cystic lesions are more likely to be borderline or malignant. Usmani Y et al [6] noted that on the basis of type of content, solid lesions were 15, benign lesions constituted 86.6% (13) and malignant lesions were two (13.3 %). complex solid cystic lesions were 14, of which five (35.7 %) were benign and nine (64.2 %) were malignant. Cystic lesions were 52, out of which 98.0% (51) were benign and one (1.9 %) was malignant.

The study shows that papillary projections/Mural nodules were found in 25% of subjects by USG examination and 20% of subjects by MRI examination. F. Mascilini *et all* in their study involving ultrasound examination showed that 56% of lesions were benign, of which decidualized endometriomas were 84%, borderline ovarian tumors were 12 (35%) and three (nine percent) were primary invasive tumors [8].

Out of the nine lesions with smooth wall/septation in MRI majority, six (66.6%) were benign cystadenoma, two (22.2%) simple serous cyst, and one (11.1%) granulomatous lesion. All of the lesions with irregular septation on MRI and ultrasound were found to be borderline or malignant lesions on histopathology.

Yashi *et al* noted in ten cases no septations were present in the lesion, of which nine (41%) were benign masses and one (4.5%) of malignant masses [9]. Adnexal mass lesions with thick septation, mural nodule, and intralesional vascularity on ultrasound were indicators of malignancy, according to *Tanusri* Debbarma *et al* [10].

The Sensitivity and Specificity of USG in the diagnosis of benign adnexal masses were 90.91% and 92.31%, respectively with a diagnostic accuracy of 91.67%. The Positive predictive value and negative predictive value of USG were found to be 90.91% and 92.31% respectively.

The Sensitivity and Specificity of MRI for diagnosing Benign adnexal masses were 100% and 100% respectively with a diagnostic accuracy of 100%. The Positive predictive value and negative predictive value of MRI were found to be 100% and 100% respectively. The sensitivity and specificity of USG in the diagnosis of malignant adnexal masses were found to be 90.91% and 84.62%, with a diagnostic accuracy of 87.50%. The Positive predictive value and negative predictive value of USG were found to be 83.33% and 91.67% respectively. According to Usmani Y *et al*, when compared to, histopathological examination; in 37 operated patients with 38 adnexal lesions, the

specificity, and accuracy of USG in identifying malignancy were, 93.7 percent, and 93.7 percent, respectively [6].

The sensitivity and specificity of MRI in the diagnosis of malignant adnexal lesions were found to be 100%, 92.86% with a diagnostic accuracy of 95.83%. Positive predictive value and negative predictive value in differentiating MRI from histopathological findings were found to be 90.91% and 100% respectively.

In a study of 161 subjects, Guerra *et al* [11] discovered that MRI showed a 95 percent accuracy in distinguishing between three malignant and non-malignant lesions. Other authors have reported accuracies ranging from 83 to 94%.

The sensitivity and specificity of MRI for the identification of malignant lesions can reach up to 92 percent and 88 percent, respectively, according to Dodge et al. [12]

M Pourissa *et all* in their study noted that USG had a sensitivity of 71% (CI95%: 53%–89%) for teratoma, the specificity, the positive predictive value (PPV), the negative predictive value (NPV), the positive likelihood ratio (LR+) and the negative likelihood ratio (LR-) are 98%, 94%, 88.5%, 39.4, was 0.29 respectively. And for malignant ovarian tumors, the sensitivity, specificity, PPV, NPV, LR+, and LR- of USG was 70%, 98.5%, 87.5%, 96%, 46.7, and 0.3 respectively [13].

Ultrasound was able to diagnose 25 however histopathology confirmed the total number of fibroids to be 26. Out of 27 fibroids diagnosed by MRI 26 were confirmed by histopathology.

Out of the 60 women who participated in the study comparing histology and USG diagnosis of uterine leiomyoma, three were classified as false negative and one as false-positive, with a diagnostic accuracy of 93.44%. Sensitivity, Specificity, Positive predictive value, and negative predictive value in differentiating USG from histopathological findings were found to be 88.89 %, 97.06%, 96.00%, and 91.67% respectively.

Similarly, out of the 60 patients, one had a wrong false-positive diagnosis on MRI, with a diagnostic accuracy of 98.36 %. Sensitivity, specificity, and positive predictive value were determined to be 100 percent, 97.06 percent, and 96.43 percent, respectively, in distinguishing MRI from histological results.

Shaha PR et al [7], concluded that among the uterine lesions, and uterine fibroids, only 16 (33%) were diagnosed with USG while 22 (46%) were diagnosed by MRI. MRI is an excellent ally in the identification of leiomyomas, with a specificity of 100 percent, accuracy of 97 percent, and sensitivity of 86-92 percent [14].

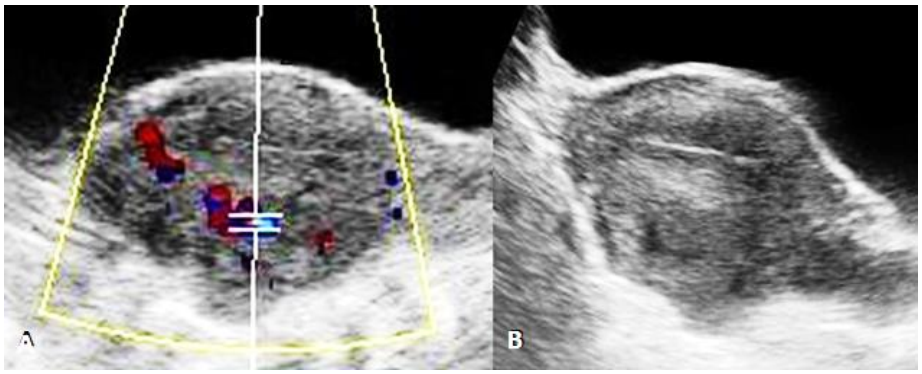

Figure 1 (A)(B) Color doppler and greyscale ultrasound images of the pelvis in a patient presenting with menorrhagia showing ill-defined heterogeneous hypoechoic lesion showing peripheral vascularity on doppler study seen indenting the endometrium anteriorly Intramural Fibroid.

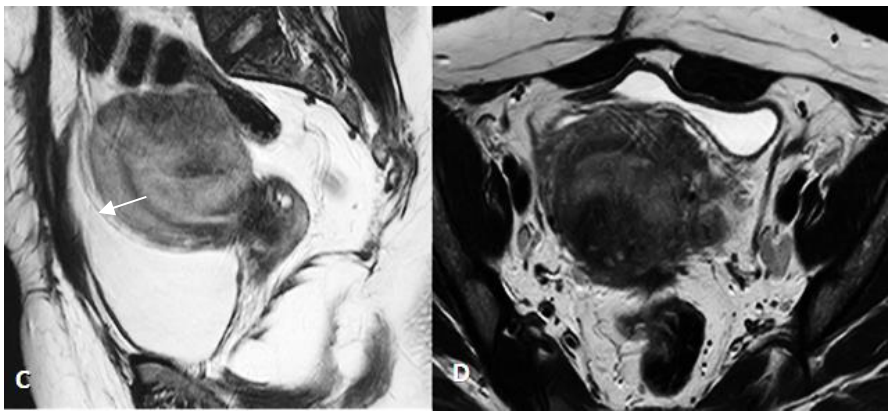

Figure 2 (C) (D)In the same patient MRI-pelvis T2 sagittal & axial image shows a well-defined T2 heterogenous hypointense lesion in the fundal region and posterior myometrium indenting endometrium anteriorly intramural fibroid. HPE proved to be the same.

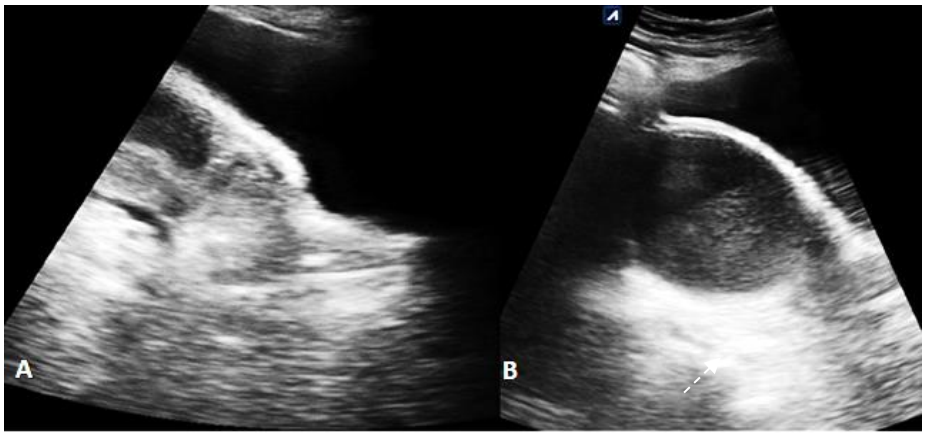

Figure 3 (A)(B) Greyscale ultrasound images of the pelvis showing bulky cervix with a heterogenous hypoechoic mass lesion replacing cervix involving lower uterine segment and upper vagina. An Anechoic collection is noted in the endometrial canal.

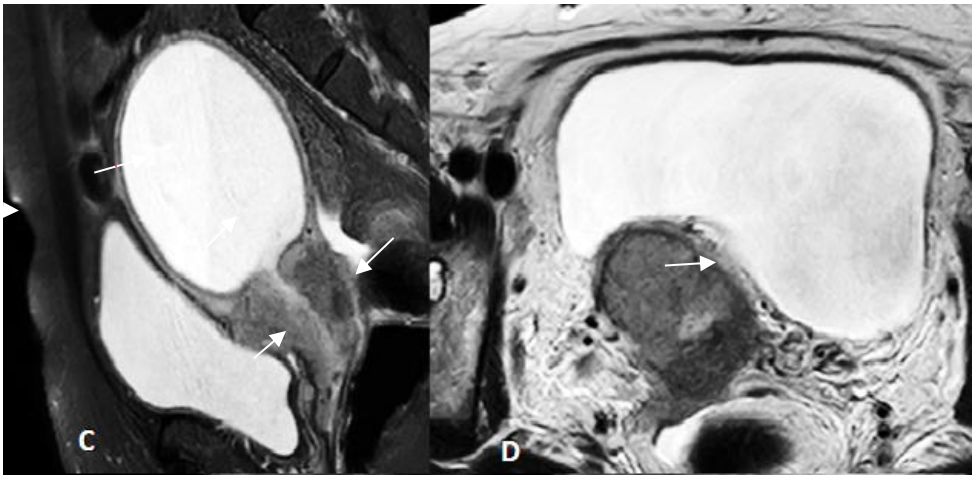

Figure 4 (C) (D) In the same patient MRI-pelvis T2 sagittal and axial image shows bulky cervix with asymmetrical diffuse long segment anterior and posterior lip thickening, causing cervical canal stenosis with endometrial collection (dashed arrow). The fat plane between the urinary bladder posterior wall and anterior wall of the rectum appears preserved. On HPE the lesion was identified as SCC of the cervix.

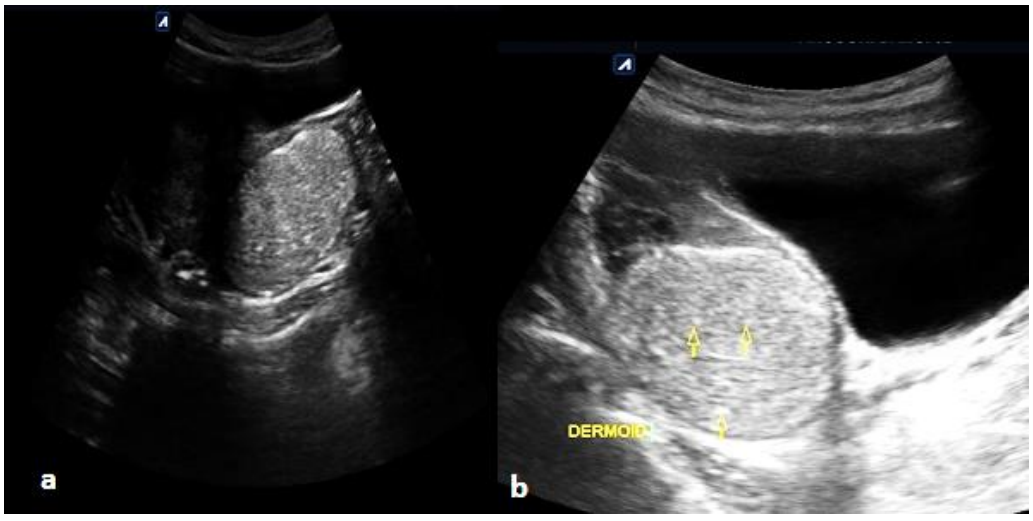

Figure 5 (a) (b)- Greyscale ultrasound of the pelvis shows a well-defined lobulated mixed echogenicity lesion with posterior acoustic enhancement and multiple thin linear echogenic bands representing hair in the cyst cavity(arrow).

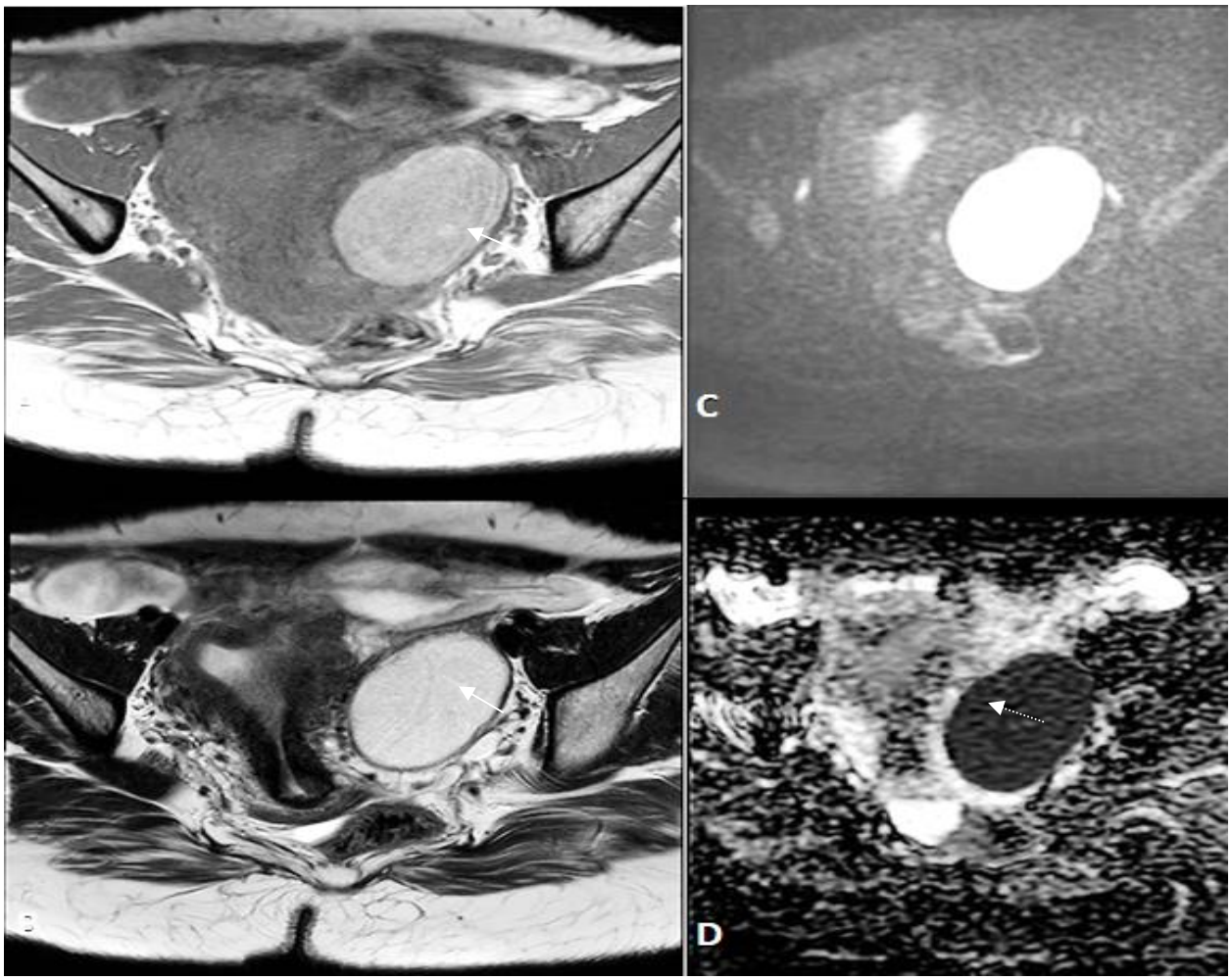

Figure 6 (A) (B) (C) (D)-Well-defined smoothly marginated solid mass lesion noted in the left adnexa. T1/T2 hyperintense (arrow) and showing DWI restriction (dashed arrow). On HPE the lesion was identified as the dermoid cyst.

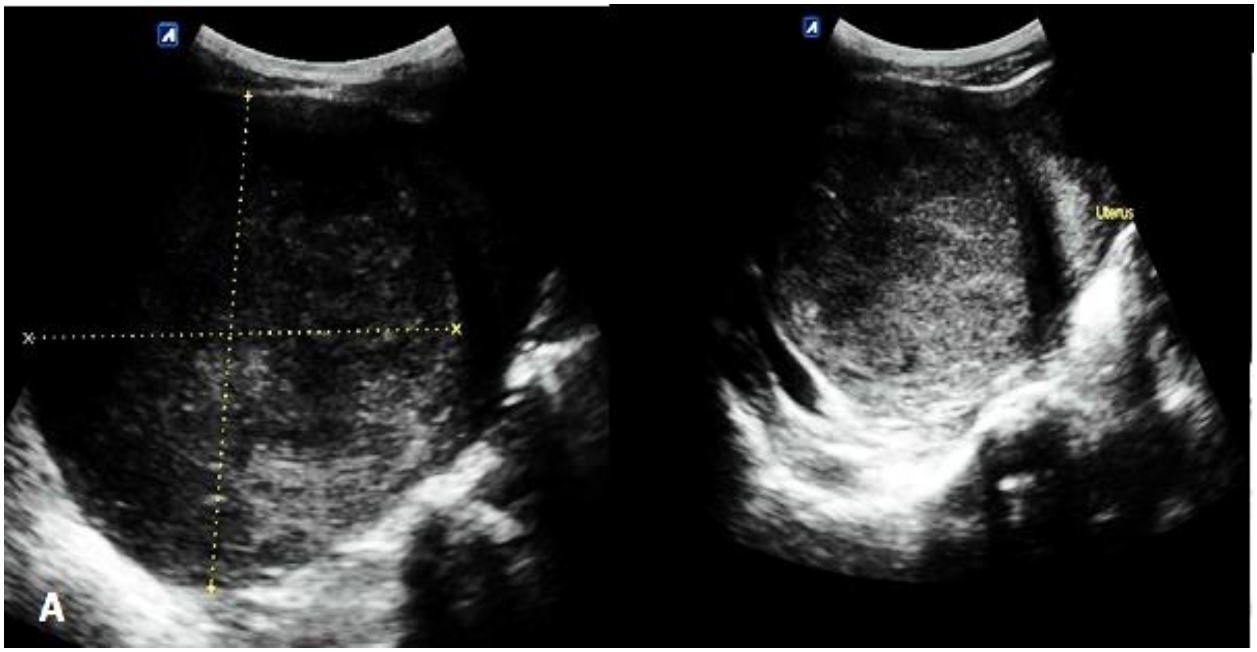

Figure 7(A) Greyscale ultrasound images of the pelvis showing a large heterogenous hypoechoic lesion in the right lateral wall of the uterus suggesting intramural fibroid.

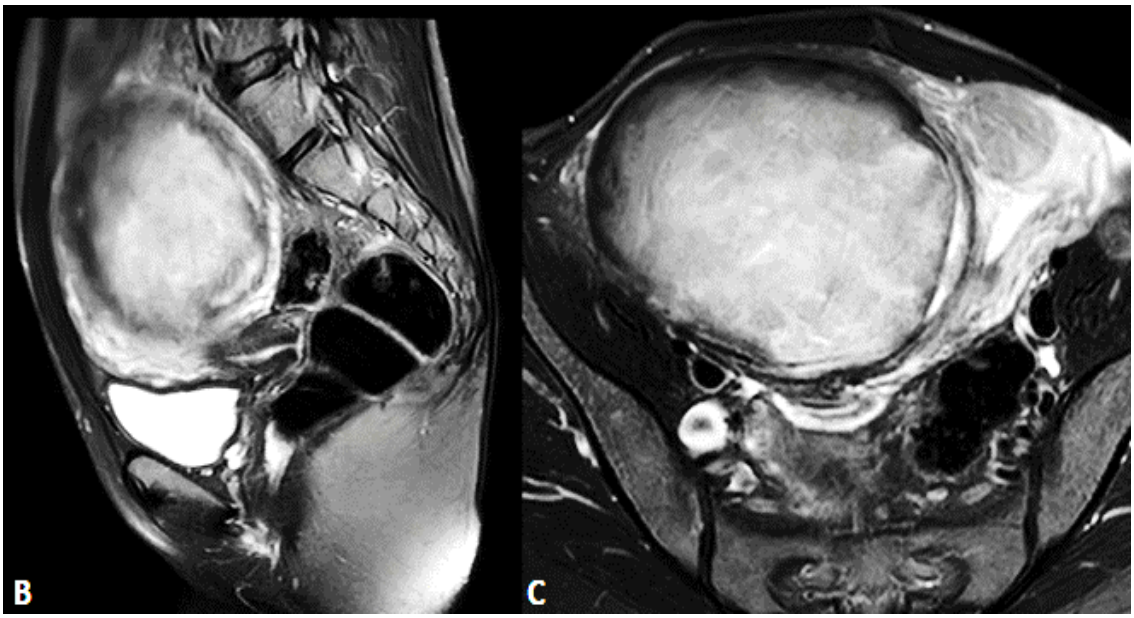

Figure 8 (B)(C) In the same patient a large round well-defined T1 hyperintense & T2 heterogenous hyperintense lesion in the right lateral wall of the uterus. On histopathology, the lesion turned out to be the same.

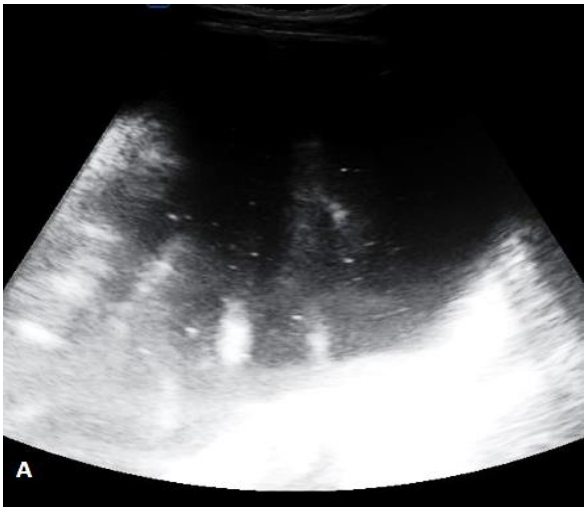

Figure 9 (A)Greyscale ultrasound of the abdomen and pelvis showing a large anechoic cystic lesion.

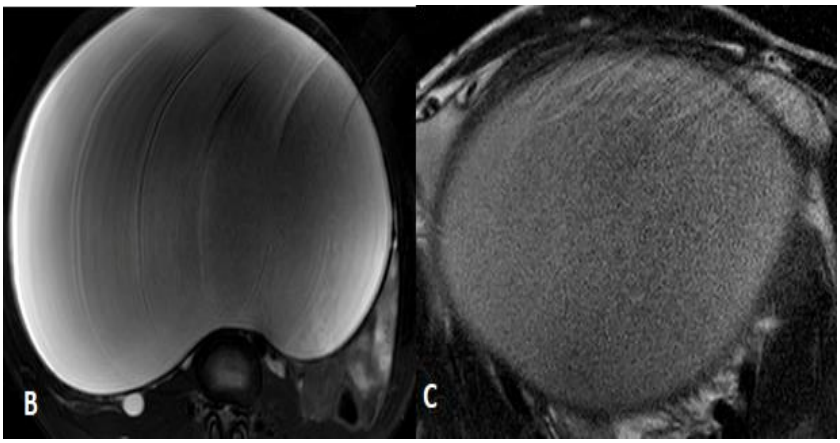

Figure 10 (B)(C) In the same patient, MRI-pelvis T2 axial & T2 axial FAT-SAT images show a large, well-definedT2 hyperintense lesion in the abdominopelvic cavity suggests the possibility of the neoplastic ovarian lesion. On HPE the lesion was identified as mucinous cystadenoma

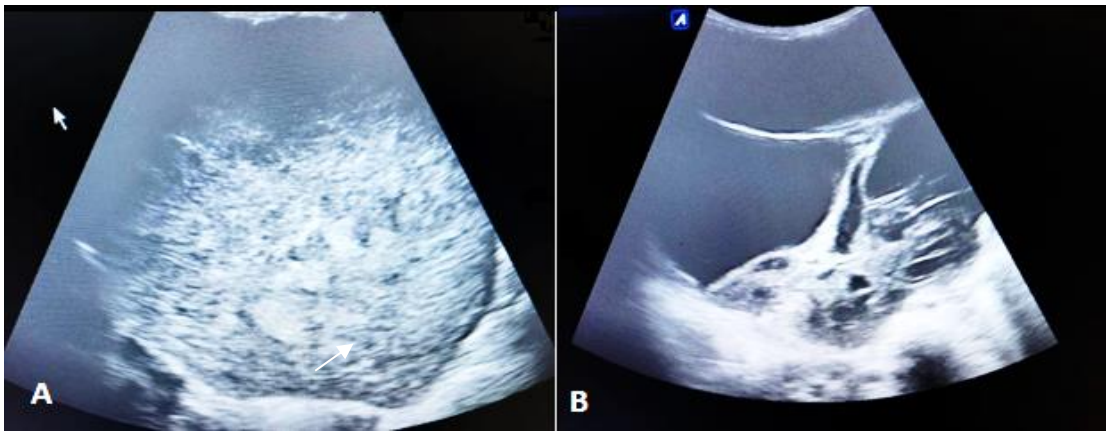

Figure 11(A)(B) USG images showing complex solid cystic pelvic mass with thick septations and few echogenic calcific foci (arrow) in a young female patient.

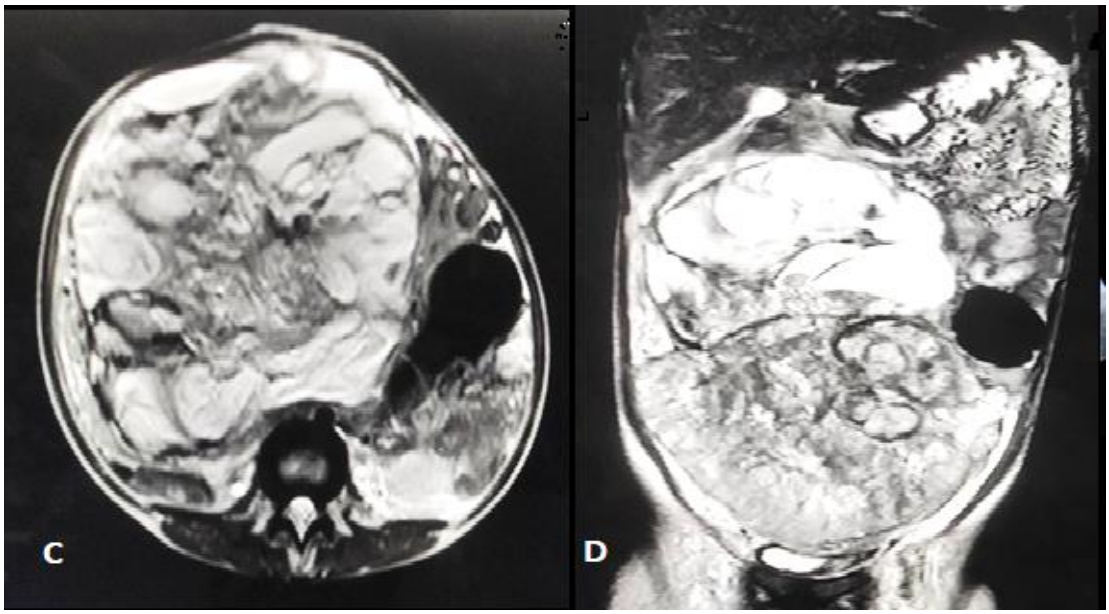

Figure 12 (C& D) T2 axial MR image shows a large lobulated heterogeneous solid mass with intralesional T2 hyperintense cystic component and a few areas of fatty component which got suppressed on STIR sequence (not shown) in the same female patient. On HPE the lesion was identified as a Germ cell tumor.

CA CERVIX

The Sensitivity, Specificity, Positive predictive value, and negative predictive value of USG were found to be 84.6%, 93.6%, 78.5%, and 95.6% respectively. The diagnostic accuracy of MRI in the diagnosis of the Ca cervix was found to be 98.33%. The Sensitivity, Specificity, Positive predictive value, and negative predictive value were found to be 93.75%, 100.00%, 100%, and 97.78% respectively which correlates with the study conducted by Stukan M. *et al.* In their study, comparing the accuracy of ultrasound and MRI for cervical cancer staging, the sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of USG for tumor detection were 93.18%, 83.33 %, 97.62%, 62.50%, 92.00 % respectively and for MRI it was 90.91%, 83.33 %, 97.56%, 55.56 %, 90.00% respectively [15].

Conclusion

For patients presenting with gynecological complaints like vaginal bleeding and discharge, ultrasound is the preliminary imaging modality. MRI has greater specificity and sensitivity in the detection of various pelvic lesions as compared to ultrasound. MRI and ultrasound have near comparable specificity, sensitivity, and diagnostic accuracy in the diagnosis of carcinoma cervix. However, MRI is superior to USG in the assessment of the extent, parametrial invasion, and nodal involvement. Histopathological examination is the gold standard for establishing the diagnosis. Suspicious adnexal masses pose a diagnostic dilemma due to challenges in assessing their site of origin and overlap of their descriptive attributes. Most often, the lesions are benign and can be managed conservatively. However, malignant masses require proper triaging. Undoubtedly, ultrasound is an excellent first-line

imaging modality for pelvic lesions, it does not provide details regarding the extent of the lesions owing to the limited field of view. In such scenarios, MRI provided promising results regarding the extension of the disease and soft tissue characterization.

Following the high diagnostic accuracy and promising results of our study, it is recommended to perform pelvic MR Imaging in female patients for a detailed evaluation of the pelvic masses where the clinical data and ultrasound examination findings are ambiguous to narrow the differentials and initiate appropriate patient management.

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