Technical Accuracy and Efficiency of Magnetic Resonance Imaging in Evaluation of Uterine Masses in Comparison with Ultrasound

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Abstract

Aim of the Study: comparing accuracy, sensitivity and specificity of the magnetic resonance imaging and ultrasound in differentiating and characterizing of uterine masses.

Patients and Method: A prospectively studied has been conducted on 41 female patients with suspected uterine masses. They were subjected to ultrasound and magnetic resonance imaging (MRI) examination. Comparison has been performed between modalities to detect and characterize all masses. Statistical parameters that include the specificity, sensitivity, accuracy and positive and negative predictive value have been estimated for the two modalities in all of the uterine masses.

Results: Among 41 female patients, majority were diagnosed as leiomyoma 28 (68%), cervical cancer 1 (2%), adenomyosis 7 (17%), endometrial polyp 2 (5%), endometrial carcinoma 2 (5%) and normal 1 patient (2%). Totally 3 (i.e. 7%) patients have been found malignant while 37 (i.e. 93%) have been found benign. For detection of myometrial mass (leiomyoma), the sensitivity between the ultrasound and MRI is 100%, accuracy was (ultrasound: 92% and MRI: 100%). In the classification of myometrial mass (i.e. leiomyoma) site, sensitivity between the ultrasound and MRI has been 21% and 92% respectively and specificity was (ultrasound: 0 and MRI: 100%). All intramural and subserosal lesions are seen in MRI. For picking up degeneration within the leiomyoma MRI are more useful. There have been considerable differences in the diagnosis of the adenomyosis by the MRI in comparison with ultrasound with sensitivity was (MRI: 100% and ultrasound: 71%), and specificity for both was 100%, whereas accuracy was 75% for ultrasound and 100% for MRI. In the detection of the endometrial carcinoma, the MRI has achieved 100% sensitivity and 50% specificity whereas ultrasound had zero sensitivity and specificity was 50%. Among two cases of endometrial polyp, one patient is diagnosed correctly by ultrasound & MRI, the sensitivity for both was 50% and accuracy was (ultrasound: 50% and MRI: 75%). MRI and ultrasound was correctly diagnosis of one patient with cervical cancer with sensitivity and accuracy 100%.

Keywords: *Uterine masses, USG, MRI, leiomyoma, adenomyosis, endometrial carcinoma.*

Introduction

Ultrasound has been defined as one of the commonly utilized modalities to evaluate the female pelvic pathology cases. The ultrasound benefits are prompt availability, decreased costs as well as the simplicity of the examination and safety. None-the-less, the disadvantages of that modality include the limited view field, pelvis obscuration by the bowel gases and the fact that it depends upon the radiologist's skill expertise [1, 2]. Some problems with ultrasound imaging are that the diagnostic images sometimes cannot be obtained because of the size of the patient, or because the ultrasound beam cannot traverse the areas of air-filled or bone in such cases, the cross-sectional imaging with CT or MRI can be used instead [3]. MRI has been considered

as one of the valuable modalities in the diagnosis of the uterine pathologies with a general rate of precision that ranges between 91% and 93% in particular, in the case of using the contrast methods [4]. The MRI with the multi planar and high resolution imaging is capable of the characterization of several lesions and becomes the chosen modality for the assessment of uterine pathology cases [5]. Typically, the MRI has been taken under consideration as the following step to evaluate a lesion following the ultrasound. The sole MRI disadvantage is represented in the fact that it's not being available readily and costly in comparison with the ultrasound. Moreover, it isn't desirable for the claustrophobic patients as well as the patients that have specific metallic implants [6]. Typically, it is an important difference between the ultrasound and the MRI taking under consideration the investigation costs [7]. Amongst reproductive age group between 15% and 20% of adult females have been considered to be having uterus lesions [8]. In the present study, the through evaluations of the uterine mass lesion cases based on the location, number, size, as well as other measurement types, the degenerative changes in lesions, the lesion extent has been carried out with the use of the ultrasound and associated to the MRI. The final diagnoses by the imaging have been compared to the histopathology findings. The fundamental objective of this study has been comparing the ultrasound with the MRI in detecting the uterine masses and comparing the ultrasound with the MRI in the uterine lesion characterization and differentiation.

Patients and Method

A prospective study has been performed on 41 female patients that have been referred to the Oncology Teaching Hospital and Institute of X-ray/ Medical Baghdad City, with the suspected uterine pathology cases. This research has been performed following the getting of the approval from the institutions and following the procurement of the agreement from patients. This research has been carried out between Sept. 2020 and Jan. 2021. Every patient has been subjected to the ultrasound examination. These patients that had suspicious or positive findings in ultrasound have been subjected to the MRI screening. Ultrasound imaging was performed using Mindray DC-50 machine. Ultrasound has been performed with the use of a probe (3.5-5MHz). The parameters below have been noticed in the ultrasound examinations, which include the uterus contour and size, the endometrial thickness, the lesions in the myometrium and the endometrial cavity. The MRI has been carried out with the use of the 1.5 Tesla Siemens Magnetome Avanto. The sequences below have been performed in the MRI have been listed in (Table.1). Besides ultrasound results, the thickness of the junctional zone has been measured with the use of the MRI. Extent of mass was noted in case of cervical cancer and myometrial invasion level has been noted in the cases of endometrial carcinoma. The uterine masses have been generally classified to many categories, which are adenomyosis, leiomyoma, endometrial pathologies that include the endometrial carcinoma, polyp and cervical malignancies. Comparison has been conducted between the MRI and the ultrasound for detecting each mass with the findings of the histopathology. The statistical parameters, which include the specificity, sensitivity, positive, accuracy and negative predictive values have been estimated for the two modalities in every one of the uterine masses.

Criteria of the Inclusion: every patient has been referred to radiology department with the clinically suspected lesions of the uterus and has been discovered to be having uterine masses in the ultrasound have been included in this study.

Criteria of the Exclusion: the patients that have not been subjected to either the ultrasound or MRI, patients with Claustrophobia, patient with the MR incompatible implants or devices, and patients who refusing participate in the study.

Table.1: The MRI sequences used for female pelvic examination were:

Sequences	Plane	Repetition time (TR)	Echo time (TE)	FOV	No. of slices	Slice thickness	Matrix size
T1 weighted	Axial	550	20	260	22	5	256X256
T1 weighted	Sagittal	584	21	270	22	5	256X256

Cont... **Table.1: The MRI sequences used for female pelvic examination were:**

T2 weighted	Axial	1400	89	308	22	5	256X256
T2 weighted	Sagittal	1400	93	300	22	5	256X256
T2 weighted	Coronal	1400	95	250	22	5	256X256
T2 weighted (STIR)	Axial	1400	91	308	22	5	256X256
T1 post contrast	Axial	550	20	260	22	5	256X256
T1 post contrast	Sagittal	584	21	270	22	5	256X256

Results

41 female patients have been included in the study age group ranging between 30 and 79 years. Among 41 study participants, most of which have been in age group 40-49 years -18 patients (43.9%) and followed by 50-59 years -10 patients (24.4%), 30-39 years -8 patients (19.5), 60-69 years -4 patients (9.7) and one patient over 70 year. the majority have been in the pre-menopausal periods 28 (i.e. 68.3%) and the rest have been in post-menopausal periods 13 (i.e. 31.7%). Amongst those, 6 (14.4%) were suffering from pain, 9 (22.0%) were suffering from pain and bleeding, 24 (58.5%) of them have been suffering from the abnormal bleedings, 1(2.4%) suffered with pain and vaginal discharge and 1 (2.4%) were suffering with pain, bleeding and vaginal discharge (Figure.1). But the common presentations were pain and bleeding. Among 41 patients, majority were diagnosed with leiomyoma 28 (68%), 1 (2%) were diagnosed with cervical cancer, 7 (17%) had adenomyosis, 2 (5%) had endometrial polyp and 2 (5%) had endometrial carcinoma. Totally 37 (93%) of the patients have been found benign, while 3 (7%) patients have been found malignant. The specificity and sensitivity have been computed for every one of the modalities in every one of the subgroups and compared. First in detecting the myometrial mass (i.e. the leiomyoma) (Figure.2); in the case of the comparison of the ultrasound with the MRI in the myometrial mass (i.e. the leiomyoma) detection, sensitivity was for both 100%, accuracy was (ultrasound: 92% and MRI: 100%), specificity was (ultrasound: 76% and MRI: 100%), low specificity of ultrasound this because 3 patient were diagnosed positive on ultrasound whereas had negative diagnosis on histopathological findings whereas all leiomyoma cases were correctly diagnosed by MRI are shown in (Table.2).

In classifying sites of leiomyoma, the sensitivity was (ultrasound: 21% and MRI: 92%), specificity were (ultrasound: 76% and MRI: 100%). This is because all intramural and subserosal lesion detection is seen in MRI whereas ultrasound misdiagnosed in most location of leiomyoma cases. Among 41 cases, 7 adenomyosis cases that have been found, the MRI has been capable of detecting 7 (i.e.17%), 2 as focal adenomyosis and 5 as diffuse adenomyosis. in contrast, the ultrasound has only been capable of detecting five as adenomyosis five as bulky uterus with the heterogeneous myometrium positive for adenomyosis and two were suspicious diagnosed were leiomyoma. Two cases diagnosed by the MRI as focal adenomyosis turned out to be leiomyoma in ultrasound. Which explains the fact that there has been a considerable difference in the diagnosis of the adenomyosis by the MRI and the ultrasound, Among 7 adenomyosis cases; the MRI has been capable of detecting all the cases with specificity, sensitivity, positive, negative predictive values and accuracy were 100%. In contrast, the ultrasound has only been positive in five of the cases, in ultrasound the sensitivity has been 71%, PPV 100%, specificity 100%, accuracy 75% and NPV 33% are shown in (Table.3). Out of 41 patients the two patients were diagnosed endometrial polyp on histopathology diagnosis, one patient correctly diagnosed by the MRI and ultrasound while one case had negative diagnosis on ultrasound and MRI whereas this case was positive on the histopathology findings, sensitivity (ultrasound: 50% and MRI: 50%), specificity (ultrasound: 50% and MRI: 100%). Among 41 patients, ultrasound detected one patient with endometrial carcinoma as positive

diagnosis whereas this case had negative diagnosis on histopathology findings. Ultrasound incorrect diagnose in two cases with endometrial carcinoma. MRI detected 3 patient with endometrial carcinoma, two cases was correctly diagnosed by MRI, one patient was positive on MRI to suggest endometrial carcinoma while this case had negative on histopathology findings, MRI with sensitivity 100%, specificity 50% and accuracy 75% whereas sensitivity of ultrasound was zero and accuracy was (ultrasound: 25% and MRI: 75%) are shown in (Table.4). Two patients that misdiagnosed on ultrasound had the thickened endometrium, none-the-less, had no invasion features for suggesting the malignancy on the ultrasound. Out of 41 samples, one patient of cervical cancer has been diagnosed correctly by the MRI and the ultrasound with sensitivity, specificity, PPV, NPV and accuracy 100%.

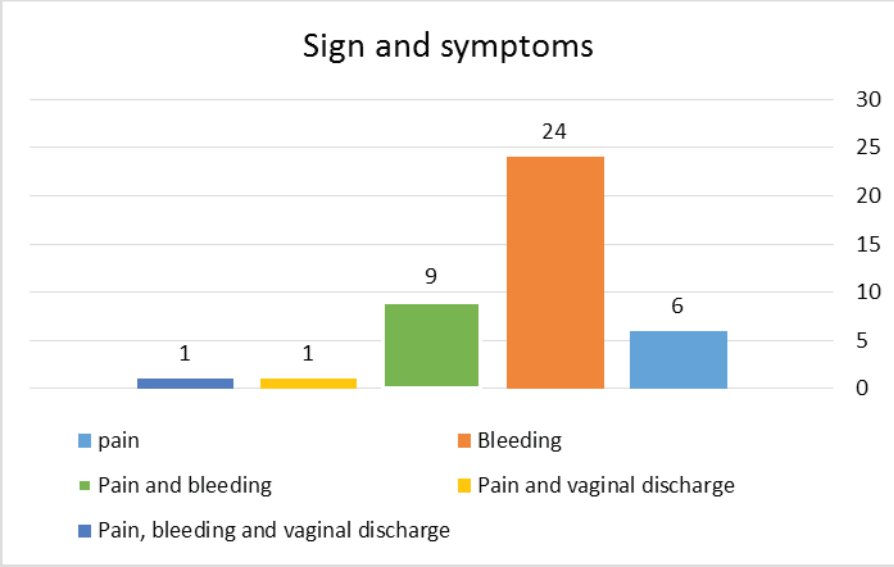

Figure.1: Distribution of patients in relation to their signs and symptoms.

Table.2: Comparison between ultrasound and MRI to determine leiomyoma.

Device efficiency to determine leiomyoma		HP findings						Sensitivity	Specificity	PPV	NPV	Accuracy
		Positive		Negative		Total						
		N	%	N	%	N	%					
Ultrasound	Positive	28	100	3	32.1	31	75.6	100%	76%	90%	100%	92%
	Negative	0	0	10	76.9	10	24.4					
Total		28	100	13	100	41	100					
MRI	Positive	28	100	0	0	28	68.3	100%	100%	100%	100%	100%
	Negative	0	0	13	100	13	31.7					
Total		28	100	13	100	41	100					

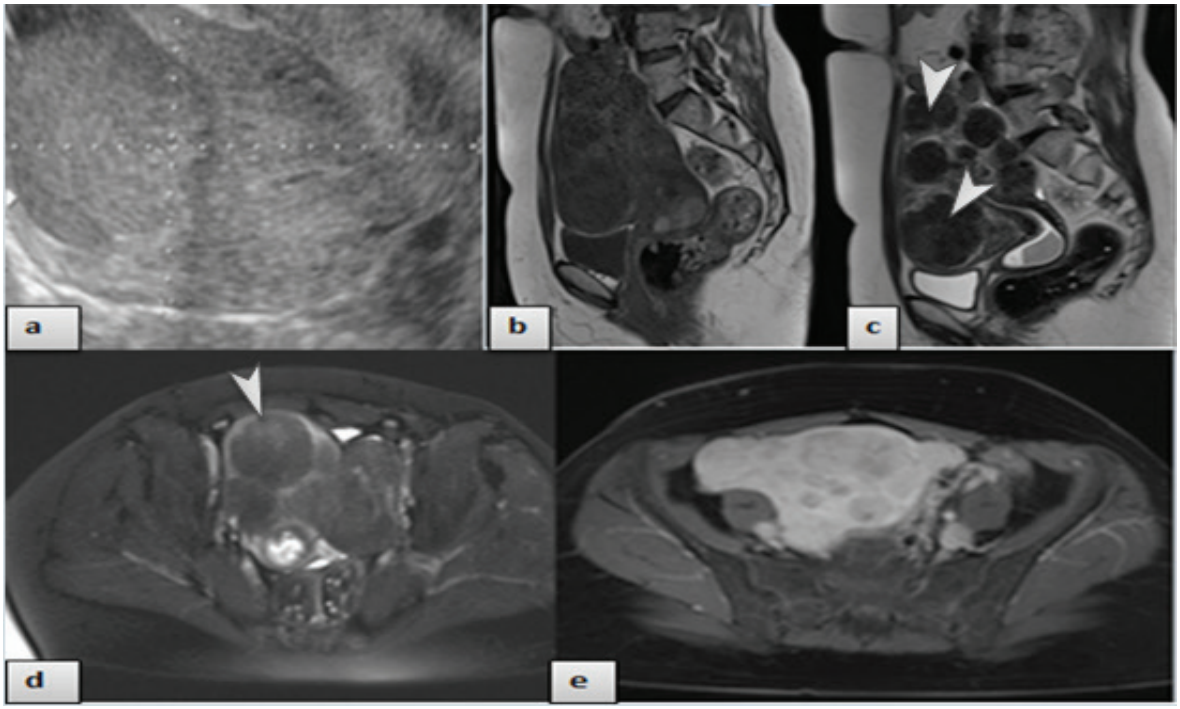

Figure.2: A 44-year women with leiomyoma: a) Sagittal ultrasound show intramural leiomyoma, b) MRI T1WI show isointense of leiomyoma, c) T2WI, d) T2 STIR, multiple uterine leiomyomas, shows multiple well-defined hypointense masses, some of which have a characteristic thin hyperintense rim (arrowhead). d) T1 post contrast, demonstrates hypoenhancement of mass post contrast.

Table.3: Comparison between ultrasound and MRI modalities to determine adenomyosis.

Device efficiency to determine adenomyosis		HP findings						Sensitivity	Specificity	PPV	NPV	Accuracy
		Positive		Negative		Total						
		N	%	N	%	N	%					
Ultrasound	Positive	5	71.4	0	0	5	62.5	71%	100%	100%	33%	75%
	Negative	2	28.6	1	100	3	37.5					
Total		7	100	1	100	8	100					
MRI	Positive	7	100	0	0	7	87.5	100%	100%	100%	100%	100%
	Negative	0	0	1	100	1	12.5					
Total		7	100	1	100	8	100					

Table.4: Comparison between ultrasound and MRI modalities to determine endometrial carcinoma.

Device efficiency to determine endometrial carcinoma		HP findings						Sensitivity	Specificity	PPV	NPV	Accuracy
		Positive		Negative		Total						
		N	%	N	%	N	%					
Ultrasound	Positive	0	0	1	50	1	25	0	50%	0	33 %	25%
	Negative	2	100	1	50	3	75					
Total		2	100	2	100	4	100					
MRI	Positive	2	100	1	50	3	75	100%	50%	66 %	100 %	75%
	Negative	0	0	1	50	1	25					
Total		2	100	2	100	4	100					

Discussion

Most of the cases in our study have been in the group of the reproductive ages. This is because of benign uterine masses are more frequently seen in that age group [9]. The Ultrasound and the MRI have been performed in 41 female patients that have been come to the Radiology Department with the clinically suspected lesions of the uterus. All the patients in our study have been sub grouped to five categories, according to the underlying pathology: 1) leiomyoma: 28 patients; 2) adenomyosis: 7 patients; 3) Cervical cancer: 1 patient; 4) endometrial polyp: 2 patients; 5) endometrial carcinoma: 2 patients. The specificity and sensitivity have been computed for every one of the methods in every one of the subgroups and has been compared. First in detection of myometrial mass (leiomyoma), sets of data are derived by comparing two modalities in each. Among 28 leiomyoma cases, depending on final histopathology findings, when comparing ultrasound and MRI in detection of leiomyoma the sensitivity for both was 100% whereas specificity was (ultrasound:76%, MRI: 100%). On ultrasound detects 31 leiomyoma cases, 28 of them were positive diagnosis whereas three cases had incorrect diagnosis is reported of leiomyoma reducing of ultrasound specificity. MRI was detects all leiomyoma cases as positive diagnosis. MRI more accurate than ultrasound in detection of leiomyoma with accuracy (MRI: 100%, ultrasound: 92%). This observation is very well correspond with the study carried out by Aubel S, Wozney P, Edwards RP on the clinical usefulness of MRI in diagnosing uterine masses which shows that magnetic resonance imaging provided important, more precise, clinical management information than ultrasounds [10].

Some studies have also shown a result similar to our research, the study done by Hansen ES, Dueholm M, et al, that the presence of leiomyoma was detected with the same high level of accuracy by both modalities (ultrasonography: sensitivity, 99%; specificity, 91%, and MRI: sensitivity, 99%; specificity, 86%;). Ultrasonography is as efficient as magnetic resonance imaging in evaluating leiomyoma presence, although the above study also stated that magnetic resonance imaging is way best than ultrasound for exact mapping especially in large and multiple leiomyoma as was found by the present study [11].

Dudiak CM and his associates have conducted a research on eleven female patients with leiomyomas and

compared the MRI with ultrasound [12]. Among 9 patients that have undergone the MRI and ultrasound, accuracy was (94%) and sensitivity was (85%) of MRI has been considerably superior to the ultrasound (accuracy 87% and sensitivity 69%). The specificity of those methods was not considerably different; therefore, they have concluded that the magnetic resonance imaging is a better choice than the ultrasound and HSG in the pre-operative localizations. This study above agrees with the findings of our study, MRI was more accurate than ultrasound in detection of leiomyoma with accuracy (MRI: 100%, ultrasound: 92%).

The results of study done by Eric D. Levens, MD, PhD, Wendy Blocker, et al, were contradictory to the our study, they noted that the sensitivity of MRI was twice as high as in the ultrasound to leiomyoma detection (MRI 80%; ultrasound: 40%). However, the positive predictive value for MRI and ultrasound was comparable when leiomyoma were identified. This observation suggests that MRI is regarded as the better modality for detection in clinical research of leiomyoma, especially given its higher ability to detect smaller lesions. This study above does not agrees with our results, which demonstrates the same sensitivity between ultrasound and MRI to the detection of leiomyoma (MRI: 100%; ultrasound: 100%), the positive predictive value was (MRI: 100%; ultrasound: 90%) [13].

It is best to locate the lesion site and the number of lesions with MRI. It gives the surgeon a visual image. Depending on final histopathology findings, intramural leiomyoma were 13 cases. On MRI, 14 leiomyoma intramural were detected, 13 of which were correctly diagnosed and one case misdiagnosed in MRI. On ultrasound, 17 intramural leiomyoma have been detected, 6 of which have been diagnosed correctly, and 11 cases have been misdiagnosed. Out of 4 submucosal, only 3 cases were found to be correctly diagnosed with MRI and 1 case misdiagnosed, while the ultrasound in all 4 cases was correctly diagnosed. Among nine intramural and subserosal leiomyoma, all 9 cases have been diagnosed correctly by MRI. Only three cases were correctly identified using ultrasound, while the remaining six were misdiagnosed in ultrasound. On MRI and ultrasound, two cases of submucosal and intramural had been correctly diagnosed. Ultrasound misdiagnosed five subserosal cases, four of which were intramural and one of which was both intramural and subserosal on MRI. The sensitivity was (MRI: 92% and ultrasound: 21%), specificity was (ultrasound: 0 and MRI: 100%). When it comes to detecting the sites of a leiomyoma, MRI is more precise than ultrasound with accuracy 93%. This results of our study correlates with results of study done by Shankar M P S, Kumar S R, Dhar T, Venkateshwaran K N, Balaji R, stating that to characterize, localize and detect the number of uterine masses, MRI has been found to be more precise in comparison to ultrasound. [14]

All cases of adenomyosis were correctly diagnosed with MRI in our study; MRI had 100% diagnostic sensitivity and specificity. On ultrasound, out of seven cases, the right adenomyosis diagnosis was observed in only five patients, while an erroneous diagnosis was recorded in 2 patients with leiomyoma, which reduces ultrasound sensitivity (71%) and explains why an important difference is made when diagnosing adenomyosis by ultrasonic and MRI.

In this study, ultrasound sensitivity was 71% for adenomyosis diagnosis; specificity was 100% and accuracy was 75%. Our findings contrast those of Siedler et al. that demonstrate high ultrasonic accuracy: in a retrospective ultrasound analysis, Siedler recorded 63 and 97% respectively of sensitivity and specificity levels [15]. The low sensitivity achieved in our sample may be explained by a misdiagnosed ultrasound in two cases.

Maghadam, et al. [16] are a retrospective chart analysis study that indicates MRI and pathology are similar for 12 of the 31 women with adenomyosis, and that MRI has a high specificity (91%) and low sensitivity (38%) for adenomyosis diagnosis, with positive and negative predictive adenomyosis MRI values respectively of 52% and 85%, with 80% accuracy. This study above not agrees with our results, the sensitivity, accuracy, PPV, NPV, and specificity of MRI were 100%. All adenomyoses were properly diagnosed with MRI.

Byun JY et al have performed a study on 45 cases in which 30 patients (i.e. 66.6%) had a diffuse adenomyosis and 15 (i.e. 33.30%) had the focal adenomyoma [17]. The Junctional Zone (JZ) in the diffuse adenomyosis was varying between 7mm and 37mm in the T2 weighted image. The High-signal-intensity foci have been noticed on the T2-weighted images only in 9 of the cases and on T1- as well as T2-weighted images in 3 of the patients.

The foci of the high signal intensity have been noted in every focal adenomyosis case, either on the T2-weighted images only (4 cases) or on both T1- and T2-weighted images (i.e. 11 of the patients). In comparison to our study, 7 cases, 5 of them have been diagnosed of the diffuse adenomyosis and 2 of the focal adenomyosis. The thickness of the Junctional zone varied between 13mm and 25mm. In the present study amongst 7 adenomyosis patients, high signal intensity foci have been observed on the T2-weighted images and isointense signal on T1 weighted images.

Ascher SM et al study on twenty women undergoes ultrasound and MRI. 17 had adenomyosis. 15/17 cases correctly diagnosed in MRI. One false positive and 2 false negative diagnosis was made in MRI. With ultrasound 9/17 cases was correctly diagnosed. One false positive and 8 false negative and reported most frequent causes of false negative diagnosis with ultrasound is misinterpretation of adenomyosis as leiomyomas [18]. In comparison with our study results, all cases of adenomyosis were correctly diagnosed by MRI. Only 5 out of 7 cases were diagnosed correctly as adenomyosis in ultrasound. Two cases has misdiagnosed of adenomyosis as leiomyoma on ultrasound.

Our study was not agrees with a study by Reinhold C et al. in which 25/29 cases were diagnosed as positive for adenomyosis on ultrasound with 86% sensitivity, 86% specificity, 71% PPV and 94% NPV [19]. In our sample, in which 5/7 cases were diagnosed as positive for adenomyosis in ultrasound with sensitivity 71%, specificity 100%, positive predictive value 100% and 33% negative predictive value were diagnosed.

In our study, MRI is more effective to detect endometrial polyp than ultrasound, MRI and ultrasound sensitivity was 50%, specificity was (MRI: 100%, ultrasound: 50%), precision was (MRI: 75%, ultrasound: 50%). Study done by Torre, R., De Felice, et al, sonographic evaluation of endometrial polyps, analysis of endometrial polyps, sensitivity, specificity, PPV, NPV were 91% 90%, 86%, 90% respectively [20]. This research does not agree with our findings, ultrasound sensitivity, specificity, PPV, NPV 50% this is because only one case of two cases of endometrial polyp in our sample is correct diagnosed on ultrasound.

In detecting endometrial carcinoma in our study, MRI is 100% sensitive but specificity is 50%. The reduction in specificity is because one case considered as endometrial carcinoma was endometrial polyp by histopathology in our study, whereas ultrasound is zero sensitive but specificity is 50%, ultrasound detected one patient with endometrial carcinoma as positive diagnosis whereas this case had negative diagnosis on histopathology findings, ultrasound had misdiagnosed in two cases as one case consider leiomyoma and another case consider endometrial polyp while these two cases turned out to be endometrial carcinoma by histopathology.

Yamashita and associates have researched the myometrial invasion evaluations by the endometrial carcinoma [21]. The myometrial invasion Classification has been performed according to contrast enhanced MRIs amongst forty patients in addition to the ultrasound. Comparisons have been performed among the accuracies of the ultrasound, unenhanced T-2 weighted and contrast enhanced T-1 weighted imaging and has been discovered that the contrast enhanced T1 weighted MRI has been considerably better. In comparison with results in our study, 2 patients of endometrial carcinoma correct diagnosed in MRI, but who had myometrial invasion in T2 weighted image and well define on contrast enhanced T1 is significantly superior to T2 weighted image. MRI sensitivity 100% and accuracy 75%; whereas ultrasound findings of two patients were misdiagnosed (ultrasound sensitivity was zero and accuracy 25%). In our study, MRI is better and more precise than ultrasound in evaluation of endometrial carcinoma. MRI specificity was 50% this is because one patient where MRI diagnosed as an endometrial carcinoma was actually an endometrial polyp according to the histopathology. This results from the fact that there have not been any myometrial invasions noted on that patient. Also, there have not been any myometrial invasions observed in the T2 weighted image nor the contrast imaging.

In the detection of cervical cancer in this study, ultrasound and MRI were correctly diagnosed in only one patient with 100% sensitivity and accuracy. Shweel MA and its associates conducted experiments on 30 patients to evaluate the diagnostic accuracy of cervical cancer and its similarities with histopathology in order to infer that cervical cancer stage by MRI is symmetrical

to histopathology stage [22]. In comparison to our study, MRI detect malignant large cervical mass is seen measuring about 9 cm, it appreciate hypoin-isointense on T2 weighted images with heterogonous enhancement post contrast. The mass is seen no evidence of parametrial invasion with not invading the low signal cervical stroma, it is seen extending to the uterus corpus with evidence of inner myometrial invasion and protruding through the upper part of vagina. MRI has high accuracy in detection of cervical cancer.

Conclusion

For the characterization, localization and evaluation of the number of the benign as well as the malignant mass lesions in the female pelvic pathologies, the MRI has been found more accurate and often as a gold standard compared with the ultrasound. In the leiomyoma cases in assisting their location and number, the MRI appeared better than the ultrasound. In the adenomyosis cases, the MRI appeared to have higher accuracy for diagnoses, where the ultrasound has been considered indeterminate in the visualization of junctional zone. In the endometrial polyp cases, MRI is more efficient than ultrasound. In the endometrial carcinomas, the MRI may be utilized as one of the best screening tools as the ultrasound has been discovered to have lower sensitivity and lower specificity, the MRI has been discovered as crucial in the determination of the myometrial invasion. The extents of the cervical cancer as well as its invasions on the neighboring organs have been discovered to be better in the MRI in comparison with the ultrasound. Ultimately, it has been concluded that the ultrasound does not have the same levels of the sensitivity and the specificity compared with the MRI however, it can be considered as a very good tool of screening in evaluations and further management due to the fact that inexpensive and consumes less time. The MRI is accordingly a more accurate pre-operative modality of the imaging for the diagnosis and differentiation of distinct features of a variety of the uterine masses.

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Conflict of Interest: None to declare.

Ethical Clearance: "All experimental protocols were approved under the Department of Radiology Technologies and all experiments were carried out in accordance with approved guidelines".

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