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**Dr. Arun Kumar Sandhu**  
Associate Professor,  
Department of Radiodiagnosis,  
Adesh medical college and  
hospital, Ambala, Haryana,  
India

## Comparison of ultrasonographic and MRI findings in patients with ovarian endometriosis

**Dr. Arun Kumar Sandhu**

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### Abstract

**Background:** Endometriosis is a common benign gynecologic disorder, defined by endometrial glands and stroma outside of the endometrial cavity. Hence; the present study was undertaken for comparing the ultrasonographic and MRI findings in patients with ovarian endometriosis.

**Material and methods:** A total of 25 patients with clinical suspicion of ovarian endometriosis were enrolled. Complete demographic and clinical details of all the patients were recorded. All the patients were recalled in the morning and USG was done. USG findings were recorded separately. MRI was also done in all the patients Separate recording of MRI findings was done.

**Results:** On USG examination, Thick walled cyst with lower level echoes, Hyperechoic wall foci, Dependent fluid level and Negative sliding sign for bilateral kissing ovaries was seen in 92 percent, 60 percent, 48 percent and 75 percent of the patients respectively. On MRI examination, T1W Hyperintensity with persistence on T1W fat suppressed sequence, T2 Hypointensity, T2 Shading sign, STIR signal suppression and DWI restriction diffuses with low ADC values was seen in 96 percent, 96 percent, 80 percent, 64 percent and 80 percent of the patients respectively. On comparison, it was seen that MRI was superior to USG in locating Endometriosis at more than two sites and Non-endometriosis diagnosis.

**Conclusion:** From the above results, the authors concluded that for initial screening of the patients, USG is useful but for final pre-surgical check-up, MRI is necessary.

**Keywords:** Magnetic resonance imaging, Ultrasonographic

### Introduction

Endometriosis is a common benign gynecologic disorder, defined by endometrial glands and stroma outside of the endometrial cavity. Endometriosis can be associated with infertility or pain symptoms, including cyclic pelvic pain, dysmenorrhea, dyspareunia, dysuria, and dyschezia. The correlation between lesions and pain symptoms or infertility in endometriosis is poorly understood. There is a wide spectrum of symptom severity, and the stage of endometriosis on laparoscopy correlates poorly with the extent and severity of pain. Some patients with minimal disease have debilitating pain, while other women with severe stage III–IV disease are asymptomatic<sup>[1, 3]</sup>.

The main benefit of an accurate preoperative classification of an adnexal mass as benign or malignant is that patients can be offered the best treatment strategy for their pathology, whether this involves expectant management, laparoscopy or debulking surgery by a gynaecologic oncologist in case of malignancy. It is crucial that the preoperative assessment of an adnexal mass not only discriminates between the benign and malignant nature of a mass, but also correctly identifies the presence of endometriomas and the severity of endometriosis elsewhere in the pelvis<sup>[4, 6]</sup>. Hence; the present study was undertaken for comparing the ultrasonographic and MRI findings in patients with ovarian endometriosis.

### Materials and Methods

The present study was undertaken for comparing the ultrasonographic and MRI findings in patients with ovarian endometriosis. A total of 25 patients with clinical suspicion of ovarian endometriosis were enrolled. Complete demographic and clinical details of all the patients were recorded. All the patients were recalled in the morning and USG was done. USG findings were recorded separately. MRI was also done in all the patients Separate recording of MRI findings was done.

**Corresponding Author:**  
**Dr. Arun Kumar Sandhu**  
Associate Professor,  
Department of Radiodiagnosis,  
Adesh medical college and  
hospital, Ambala, Haryana,  
India

All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software.

**Results**

A total of 25 patients suspected of ovarian endometriosis were enrolled. Mean age of the patients was 35.6 years. Out of 25 patients, housewives comprised of 52 percent of the patients while service class comprised of 20 percent of the patients. On USG assessment, unilateral ovarian endometriosis and bilateral endometriosis were seen in 40 percent and 36 percent of the patients respectively. Ovary + Fallopian tube endometriosis and Ovary + Deep pelvic endometriosis were seen in 16 percent and 8 percent of the patients respectively.

On MRI assessment, Unilateral ovarian, Bilateral ovarian, Ovary + Fallopian tube, Ovary + Deep pelvic and ovarian + superficial peritoneal + Deep pelvic endometriosis was seen in 36 percent, 32 percent, 8 percent, 8 percent and 8 percent of the patients respectively.

Non-endometriosis finding (Hemorrhagic cyst) was seen in 8 percent of the patients. On USG examination, Thick walled cyst with lower level echoes, Hyperechoic wall foci, Dependent fluid level and Negative sliding sign for bilateral kissing ovaries was seen in 92 percent, 60 percent, 48 percent and 75 percent of the patients respectively. On MRI examination, T1W Hyperintensity with persistence on T1W fat suppressed sequence, T2 Hypointensity, T2 Shading sign, STIR signal suppression and DWI restriction diffuses with low ADC values was seen in 96 percent, 96 percent, 80 percent, 64 percent and 80 percent of the patients

respectively.

On comparison, it was seen that MRI was superior to USG in locating Endometriosis at more than two sites and Non-endometriosis diagnosis.

**Table 1:** Endometriosis sites on Ultrasonography

Site	Number of patients	Percentage of patients
Unilateral ovarian	10	40
Bilateral ovarian	9	36
Ovary + Fallopian tube	4	16
Ovary + Deep pelvic	2	8

**Table 2:** Distribution of patients according to endometriosis site on MRI

Site	Number of patients	Percentage of patients
Unilateral ovarian	9	36
Bilateral ovarian	8	32
Ovary + Fallopian tube	2	8
Ovary + Deep pelvic	2	8
Ovarian + Superficial peritoneal + Deep pelvic	2	8
Non-endometriosis finding (Hemorrhagic cyst)	2	8

**Table 3:** USG findings of ovarian endometriosis

USG finding	Number of patients	Percentage of patients
Thick walled cyst with lower level echoes	23	92
Hyperechoic wall foci	15	60
Dependent fluid level	12	48
Negative sliding sign for bilateral kissing ovaries	6 out of 8	75

**Table 4:** MRI findings in ovarian endometriosis

MRI findings	Number of patients	Percentage of patients
T1W Hyperintensity with persistence on T1W fat suppressed sequence	24	96
T2 Hypointensity	24	96
T2 Shading sign	20	80
STIR signal suppression	16	64
DWI restriction diffuses with low ADC values	20	80

**Table 5:** Comparison of ultrasonographic and MRI findings

Site	USG findings		MRI findings	
	Number	Percentage	Number	Percentage
Endometriosis at single site	19	76	17	68
Endometriosis at two sites	6	24	4	16
Endometriosis at more than two sites	0	0	2	8
Non-endometriosis diagnosis	0	0	2	8

**Discussion**

Endometriosis is one of the most challenging gynaecological disorders affecting 10–15% of women in their reproductive years. Symptoms such as dysmenorrhoea, dyspareunia, dyschezia and infertility are caused by infiltrative growth of endometriotic implants involving the ovaries or uterosacral ligaments (USLs), but may also affect the vagina, the rectovaginal space (RVS) or the rectosigmoid in cases of deep infiltrating disease defined as subperitoneal endometriotic infiltration of tissues .5 mm. Considerable diagnostic delay of up to 8 years from presenting symptoms often confers a heavy economic and social price [7, 9]. Hence; the present study was undertaken for comparing the ultrasonographic and MRI findings in patients with ovarian endometriosis.

A total of 25 patients suspected of ovarian endometriosis

were enrolled. Mean age of the patients was 35.6 years. Out of 25 patients, housewives comprised of 52 percent of the patients while service class comprised of 20 percent of the patients. On USG assessment, unilateral ovarian endometriosis and bilateral endometriosis were seen in 40 percent and 36 percent of the patients respectively. Ovary + Fallopian tube endometriosis and Ovary + Deep pelvic endometriosis were seen in 16 percent and 8 percent of the patients respectively. On MRI assessment, Unilateral ovarian, Bilateral ovarian, Ovary + Fallopian tube, Ovary + Deep pelvic and ovarian + superficial peritoneal + Deep pelvic endometriosis was seen in 36 percent, 32 percent, 8 percent, 8 percent and 8 percent of the patients respectively. Non-endometriosis finding (Hemorrhagic cyst) was seen in 8 percent of the patients. Mokdad C *et al.* assessed ovarian tissue loss related to endometrioma cystectomy by 3D-

ultrasonography. They have retrospectively included 15 women with no previous ovarian surgery who benefited from cystectomy of an unilateral endometrioma the diameter of which was superior to 30mm. Cystectomy has been performed using an ovarian tissue-sparing procedure with no incision of the ovarian cortex. Patients underwent ultrasonography at least 9 months after the surgery. Several ovarian parameters, such as the area on longitudinal cross-section, the volume and the antral follicles count (AFC), were measured on both operated and contra lateral ovary, and then were compared using Mann and Whitney test. Operated ovary presented a significant reduction in area (mean reduction  $229.8\text{mm}(2)\pm 47.6$ ;  $P < 0.0001$ ), volume (mean reduction  $5.8\text{cm}(3)\pm 1.16$ ;  $P < 0.0001$ ) and AFC (mean reduction  $5.1\pm 3.8$ ,  $P=0.002$ ). No statistically significant correlation was found between operated ovary volume reduction and preoperative endometrioma diameter. Endometrioma cystectomy leads to significant reduction in ovarian parenchyma volume and AFC, when compared to contra lateral ovary [8].

In the present study, on USG examination, Thick walled cyst with lower level echoes, Hyperechoic wall foci, Dependent fluid level and Negative sliding sign for bilateral kissing ovaries was seen in 92 percent, 60 percent, 48 percent and 75 percent of the patients respectively. On MRI examination, T1W Hyperintensity with persistence on T1W fat suppressed sequence, T2 Hypointensity, T2 Shading sign, STIR signal suppression and DWI restriction diffuses with low ADC values was seen in 96 percent, 96 percent, 80 percent, 64 percent and 80 percent of the patients respectively. On comparison, it was seen that MRI was superior to USG in locating Endometriosis at more than two sites and Non-endometriosis diagnosis. Holland TK *et al.* assessed the accuracy of pre-operative transvaginal ultrasound scanning (TVS) in identifying the specific features of pelvic endometriosis and pelvic adhesions in comparison with laparoscopy. 198 women who underwent preoperative TVS and laparoscopy were included in the final analysis. At laparoscopy 126/198 (63.6%) women had evidence of pelvic endometriosis. 28/126 (22.8%) of them had endometriosis in a single location whilst the remaining 98/126 (77.2%) had endometriosis in two or more locations. Positive likelihood ratios (LR+) for the ultrasound diagnosis of ovarian endometriomas, moderate or severe ovarian adhesions, pouch of Douglas adhesions, and bladder deeply infiltrating endometriosis (DIE), recto-sigmoid colon DIE, rectovaginal DIE, uterovesical fold DIE and uterosacral ligament DIE were  $>10$ , whilst for pelvic side wall DIE and any ovarian adhesions the +LH was 8.421 and 9.81 respectively. The negative likelihood ratio (LR-) was:  $<0.1$  for bladder DIE; 0.1-0.2 for ovarian endometriomas, moderate or severe ovarian adhesions, and pouch of Douglas adhesions; 0.5-1 for rectovaginal, uterovesical fold, pelvic side wall and uterosacral ligament DIE. The accuracy of TVS for the diagnosis of both total number of endometriotic lesions and DIE lesions significantly improved with increasing total number of lesions. Their study has shown that the TVS diagnosis of endometriotic lesion is very specific and false positive results are rare.

### Conclusion

From the above results, the authors concluded that for initial screening of the patients, USG is useful but for final pre-surgical check-up, MRI is necessary.

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