

## Transvaginal Sonographic Diagnosis of Ovarian Endometrioma

AYESHA AZAM KHAN, NAHEED BASHIR, RAZA AKRAM, NABEELA SHAMI, SHAILA ANWAR, SHAHEENA ASIF, LUBNA ABID

### ABSTRACT

**Aim:** To determine the diagnostic performance of specific ultrasound features in discriminating endometriomas from other adnexal masses.

**Study design:** A retrospective study was conducted from Jan 2009 To Jan 2012 in 65 patients coming to Surgimed Infertility Centre, Lahore.

**Methods:** Patients with >25 years of age, infertile women with endometrioma, who underwent laparotomy or laparoscopy were included in the study while patients with pelvic inflammatory disease, ectopic pregnancy were excluded. All patients had prospective evaluation by transvaginal scan. Ultrasonographic criteria for diagnosing endometrioma were round shaped, cystic structure in adnexa, diffuse low level internal echoes, multilocularity, hyperechoic wall foci and wall thickness were noted.

**Results:** Histopathological findings of adnexal mass were endometrioma (n=40), dermoid cyst (n=3), haemorrhagic cyst (n=6), malignancy (n=2) and benign cyst (n=2). Among benign cyst cases of ovarian torsion n=1, broad ligament haematoma n=1, paratubal cyst n=1, hydrosalpinx n=1 and single functional cyst n=7. The results were analyzed statistically it was found that sensitivity of TVS for diagnosing endometrioma was 86% specificity 90%; the positive predictive value 91% and negative predictive value 98%.

**Conclusion:** An adnexal mass with diffuse low level internal echoes and absence of particular neoplastic feature is highly suggestive of endometrioma if multilocularity/hyper echoic wall foci present.

**Keywords:** TVS, endometrioma, adnexal mass

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### INTRODUCTION

Endometriosis is the presence of functional endometrial epithelium and stroma in ectopic position outside the uterus. Endometrioma has a prevalence of 24% among all ovarian cyst. It is debilitating due to associated pain and infertility. It has diverse ultrasonic appearance, ranging from anechoic to echogenic cysts to masses containing multiple septations and solid tissue<sup>1,2</sup>.

Laparoscopy is the gold standard investigation for endometriosis, assessing abdominal and pelvic implants but use can also be used a primary imaging modality in the initial assessment of suspected gynaecologic pathology. Ultrasound is also helpful to demonstrate mass with diffuse low level internal echoes or possibly containing a fluid – fluid or fluid debris level, or a diverse appearance with septations and solid tissue.

### MATERIAL & METHODS

There were total 65 patients selected from a group of infertile patients coming to Surgimed Hospital, Lahore, from January 2009 to January 2012. A

*Department of Obstetrics & Gynaecology, Surgimed Hospital, Lahore*

*Correspondence to Dr. Ayesha Azam Khan, Consultant Gynaecologist Cell: 0300-4281970*

retrospective study was conducted and results evaluated statistically. Patients with >25 yrs of age, infertile women with endometrioma and endometrioma who underwent laprotomy or laparoscopy were included while patients with PID, ectopic pregnancy were excluded from the study.

All patients had preoperative transvaginal scan. The various ultrasound features to diagnose endometrioma were noted which included cystic appearance, low level intend echoes, multilocularity, wall thickness and nodulatory. All patients had laparoscopy or laparotomy. Later comparison was made between ultrasound diagnostic features and histopathology report. All ultrasound features were statistically for their accuracy to diagnose, severity, specificity, - likelihood ratio and + likelihood ratio.

### RESULTS

Out of 65 patients (n=40) patients had confirmed endometrioma on histopathoogy, haemorrhagic cyst (n=3), dermoid malignancy (n=2) severe cyst adenocarcinoma. Whereas n=11 patients had benign problems as functional cyst (n=7), patient with haemorrhagic cyst with ovarian torsion (n=1), broad ligament haematoma (n=1), hydrosalpinx (n=1) and panarubal cyst (n=1).

Table I: Histopathological findings of adnexal mass

Histopathological Findings	=n
Endometrioma	40
Dermoid Cyst	3
Haemorrhagic Cyst	6
Malignancy	2
Benign Cyst	11
Ovarian Torsion	1
Broad Ligament Haematoma	1
Paratubal Cyst	1
Hydrosalpinx	1
Cyst Simple	7

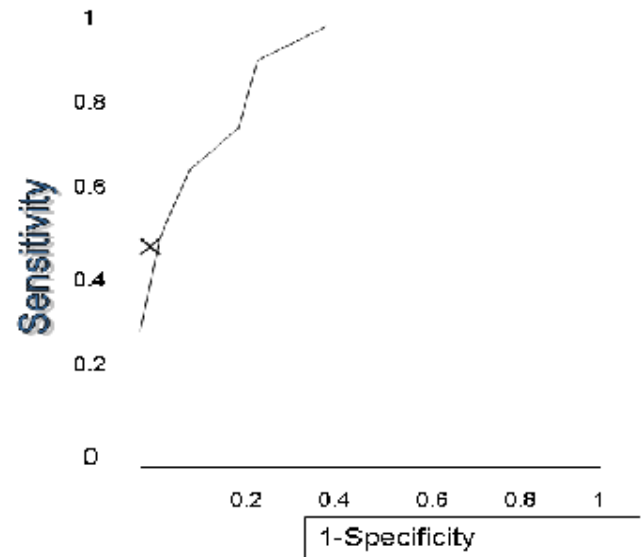
The sensitivity of transvaginal scan for diagnosing endometrioma was 86%, specificity 90%, the possible predictive value 91% and negative predictive value 98%. The diagnostic value of each ultrasound features were evaluated separately. When a comparison was made to histopathology reports and pre operative ultrasound findings. It was noted that the most accurate ultrasound features to diagnose endometrioma 99% accuracy, - likelihood ratio 0.6, +likelihood ratio 48 were presence of low level internal echoes with no wall nodularity.

The accuracy was decreased to 91% when multilocularity was not included with – likelihood ratio 0.4, + likelihood ratio 17, sensitivity 65% and 96%. Similarly cystic finding with internal echoes were 84% accurate for diagnosing endometrioma with 93% sensitivity, 83% specificity+likelihood ratio 0.1+ likelihood ratio 5.

The wall thickness was also noted carefully. As for thick wall accuracy was only 54%, specificity 52%, sensitivity 65%, + likelihood ratio 1, - likelihood ratio 0.7. Whereas for thin wall appearance accuracy was 55%, specificity 56%, sensitivity 48%- likelihood ratio 0.9 and positive likelihood ratio 1.

The accuracy strongly decreases to 31% when the ultrasound feature of cystic appearance was noted alone with 95% sensitivity, specificity 19%, + likelihood ratio 1,- likelihood ratio 0.3 among other cysts.

Graph I: Highest receiver operating characteristic curve for diagnosis of endometrioma by using the ultrasound features



It shows the relationship between specificity and sensitivity. It has a highest receiver operating cause for diagnose endometrioma on basis of various ultrasound features confirming transvaginal scan as a diagnostic tool for endometrioma.

Table II: Diagnostic performance of ultrasound features in discriminating between endometriomas and non endometriomas

US. F.	Endomn=40	Der. n=3	H.Cyst n=6	B.Cyst N=11	Malig n=2	Sen. %	Sp. %	Accur %	-ve L. Ratio	+ve L. Ratio
Cystic Features	38	3	6	11	2	95	19	31	0.3	1
Cyst + thin wall	19	0	4	4	1	48	56	55	0.9	1
Cyst + thick wall	25	0	0	6	1	63	52	54	0.7	1
Cyst. + int. echoe	37	0	5	3	2	93	83	84	0.1	5
L.Level. Echoe	38	0	3	3	0	95	81	83	0.1	5
L.L.E. no neo+ nofib	26	0	2	0	0	65	96	91	0.4	17
L.L.E., no neo, nowall foci	12	0	0	0	0	30	99	88	0.7	32
L.L.E. no leo., wall foci or multilocularity	18	0	0	0	0	45	99	99	0.6	48
L.L.E. no leo., and multilocularity	12	0	0	0	0	30	100	88	0.7	64

**DISCUSSION**

Ultrasound is typically the first investigation requested in patients with clinical findings that may suggest pelvic disease. There is a range in what experts have defined classic endometrioma. Proper

reporting and recording specific ultrasound features help to differentiate various adnexal masses and also serve as important guidelines for patient management<sup>3</sup>.

Various studies have also combined the use of transvaginal scan not only with the plasma CA 125

level but also with other serum tumor marker to achieve the accuracy of diagnosis and differentiating endometrioma from other ovarian tumour<sup>4,5</sup>. Similarly the characteristic blood flow pattern on Doppler study also differentiate endometrioma from malignant ovarian neoplasm<sup>6</sup>.

The results of our study show that over all sensitivity of transvaginal scan for diagnosing endometrioma was 86%, specificity 90%, positive predictive value 91% and negative predictive value 98%. It can be compared with results of Volpi and colleagues<sup>7</sup> whose study showed same transvaginal scan capability to diagnose endometrioma with sensitivity 82%, specificity 97%, + and - predictive value of 94% and 92% respectively.

The presence of low level echoes is a uniform diagnostic for various studies where as thickness and contour of the wall and shape and location differ among the investigations. Understanding the degree to which any particular feature or set of features increases or decreases the likelihood ratio for diagnosis of endometrioma is important because one can use this knowledge to direct the evaluation towards in identifying those features that have the greatest relevance and avoid effort and confusion in characterizing those features that have no relevance.

Alcazar and colleagues (8) found a positive likelihood ratio of 9.8 and negative likelihood of 0.1 in distinguishing 27 endometrioma from 55 other adnexal masses by using "the presence of a round shaped homogenous hypoechoic mass of low level echoes". The same results were comparable with our study as cystic finding with low level echoes had 84% accuracy + likelihood ratio 5 and - likelihood ratio 0.1.

95% endometrioma exhibit low level internal echoes whereas only cystic US feature did not improve diagnostic performance. Wall hyperechoic wall foci yielded a positive likelihood ratio of 6.2. Various studies<sup>9, 10, 11</sup> show haemorrhagic cyst also have low level echoes with no hyperechoic or areas of heterogeneous echogenicity follow up scan helps in making accurate diagnosis which is contrast to our study with 55% accuracy, 48% sensitivity, 56% specificity, + likelihood ratio 1.

Our study showed LLE, multilocularity, thin walls with foci but no nodularity have 99% accuracy, specificity 99%, sensitivity 45%, - likelihood ratio 0.6 and + likelihood ratio 48 which can be easily compared with studies<sup>12,13,14</sup> showing that patients with wall nodularity and focal impedance are predictive of ovarian neoplasm which may benefit from color Doppler ultrasound/ MRI or both for further evaluation and management.

## CONCLUSION

An adnexal mass with diffuse low level internal echoes and absence of particular neoplastic features is highly suggestive of endometrioma if multilocularity or hyper echoic wall foci are present. A patient with a mass with diffuse low level echoes and other ultrasound features may benefit from additional imaging.

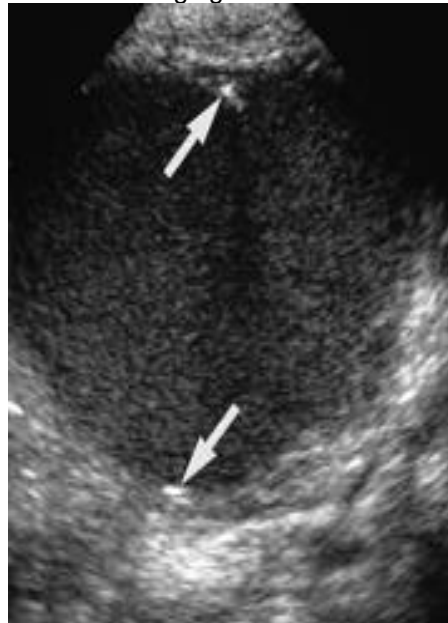


Fig. 1: Endometrioma in a 28 yrs old woman, diffuse low level internal echoes and punctate peripheral echogenic foci



Fig 2: Detailed view of endometrioma in 33 yrs old woman, hyperechoic wall foci (arrow) and low level echoes



Fig 3: Multiloculated endometrioma in 40 yrs old woman, cystic adnexal mass with internal septations (arrow), low level echoes

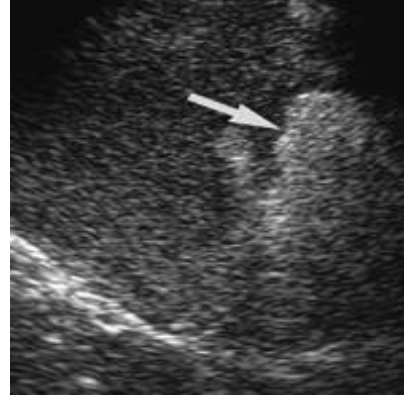


Fig 6: Cystic teratoma R Ovary in 32yrs old woman, arrow regional bright echoes with acoustic shadowing and diffuse low-level internal echoes.

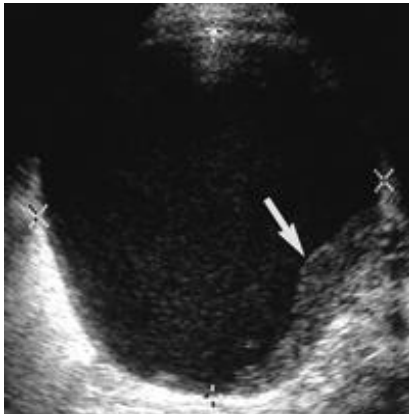


Fig 4: Endometrioma R Ovary in 42 yrs old woman, diffuse low level echoes and focal wall nodularity



Fig. 7: Hemorrhagic cyst R Ovary in 21 yrs old woman, fibrinous strands (arrow) and low level internal echoes.



Fig. 5: Endometrioma L Ovary in 29 yrs old woman, low level echoes and focal wall nodularity (arrow)



Fig 8: Hemorrhagic cyst R Ovary in 38yrs old woman, diffuse low level internal echoes

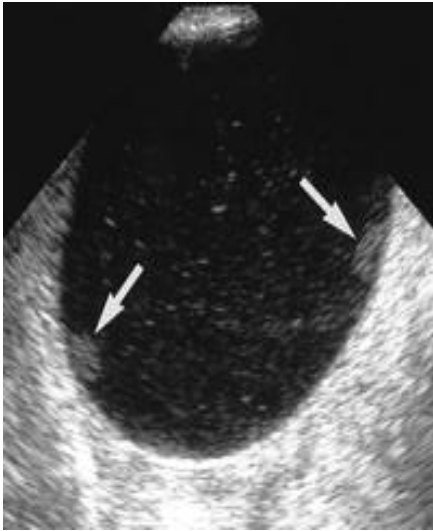


Fig. 9: Left ovarian neoplasm in 38 years old woman, low level echoes and foci of mural nodularity (arrows)

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