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COMPARISON OF PREOPERATIVE ULTRASOUND WITH OPERATIVE FINDINGS AND PATHOLOGICAL DIAGNOSIS IN ADNEXAL MASSES

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ABSTRACT

With the advent of high-frequency transvaginal ultrasonography, new opportunities are presented to better define ovarian lesions. The scoring system was useful in distinguishing benign from malignant masses, with a specificity of 83%, sensitivity of 100% and positive and negative predictive values of 37% and 100% respectively The study was conducted on 30 patients with suspected various adnexal masses in a period of 2yrs from 2005-2007. After taking consent, all patients underwent TAS and TVS. Sassone scoring system was applied. All patients later underwent laparotomy. Results of ultrasound were correlated with operative and histopathological findings. Our study show sensitivity of ultrasonographic Sassone scoring system for predicting the adnexal masses- sensitivity-100%, specificity-96%, positive predictive value-75% and negative predictive value-100% Ultrasonography Sassone scoring system for predicting the adnexal masses is more sensitive.

INTRODUCTION

Despite all knowledge in this field, it had not been possible to formulate any specific USG criteria to differentiate benign and malignant tumor. A study on adnexal masses found sensitivity of 83%, specificity of 91%, positive predictive value 83%, and negative predictive value of 91% [1]. Another study on diagnosis of gynecologic pelvic masses by gray scale USG concluded that accuracy rate is approximately 91% in diagnosis of pelvic masses [2]. Another study showed sensitivity 83%, specificity 84%, positive predictive value 83% and negative predictive value 91% in differentiating benign from malignant ovarian lesions [3].

Study on preoperative sonography of malignant ovarian neoplasms proved that sonography was 97% accurate in the detection and 84% accurate in the characterization of ovarian tumor [4].

Another study on sonography of ovarian tumors concluded that risk of malignancy increase with increase in internal echoes [5].

Another study found sensitivity of 82%, specificity 93%, positive predictive value and negative predictive value of 75% and 95% respectively [6]. Another study on adnexal masses found sensitivity of 62%, specificity of 95%, positive predictive value and negative predictive values of 88% and 81% respectively [7]. Study on macroscopic characterization on ovarian tumors and the relation to the histological diagnosis proved that malignancy is associated with papillary excrescence and solid components. Another study found sensitivity of 80%, specificity 92%, positive predictive value of 74%, and negative predictive value of 95% [8].

Another study found sensitivity of 80%, specificity of 87%, positive predictive value-72% and negative predictive value of 91% in differentiation of benign and malignant ovarian tumors [9]. Study on transvaginal sonographic characterization of ovarian disease concluded that sonography has specificity of 83%,

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sensitivity of 100% and positive and negative predictive values of 37 and 100% respectively [10].

Further study by the same group in which histopathological diagnosis was compared with the scoring system built on the ultrasound imaging of the tumor. This scoring system takes into account for the inner wall structure, wall thickness, septa and echogenicity giving a scoring ranging from 4-15. With the advent of high-frequency transvaginal ultrasonography, new opportunities are presented to better define ovarian lesions. The scoring system was useful in distinguishing benign from malignant masses, with a specificity of 83%, sensitivity of 100% and positive and negative predictive values of 37% and 100% respectively [10]. Another study found sensitivity, specificity, and positive predictive value of sonographic score 94%, 87% and 60% [11]. Study on adnexal masses of 250 patients, 209 (83.6%) presented with benign adnexal masses and 4 (16.4%) with malignant masses. Their study showed sensitivity of ultrasonography for predicting adnexal mass 100%, specificity 95.3%, PPV 99.04% and NPV 100%.

METHODOLOGY
Inclusion criteria:
TAS and TVS shall be conducted in
a. Clinically suspected cases of adnexal masses.
b. Incidentally found adnexal masses when patient is undergoing sonography.

Exclusion criteria:
a. Unmarried female patients (since TVS is contraindicated)
b. Pediatric patients (< 15 years)

All 30 eligible patients were properly counseled and gave informed consent before entry into the study. Detailed menstrual, obstetric and medical histories of each patient were taken and general, physical, systemic and gynecological examination was done. Relevant investigations were done according to clinical findings.

All of them were subjected to transabdominal ultrasonography with full bladder technique with 3.5MHz probe and then transvaginal sonogrpahy with empty bladder technique with 6.5MHz.

Initially the patients were evaluated with an abdominal transducer to evaluate potential pathologic conditions outside the focal length of the vaginal transducer.

For transvaginal scan, transducer was prepared for use by first applying standard coupling gel followed by a condom which was again lubricated with coupling gel before insertion. The transducer was introduced into posterior vaginal fornix when uterus was retroverted and into anterior vaginal fornix when it was anteverted.

Complete pelvic survey was performed. Observations included size, shape and echotexture of the adnexal masses in sagittal and transverse planes. Sassone scoring system was applied to differentiate benign and malignant ovarian tumors. This scoring system takes into account for the inner wall structure, wall thickness, septa and echogenicity giving a scoring ranging from 4-15.

The final diagnosis was made by histopathologic examination following total abdominal hysterectomy or biopsy. All pathology reports were reviewed. The findings of sonography were correlated with histologic findings, which were taken as gold standard.

RESULTS
Table 1. Echogenicity-Score

Echogenicity-score	Benign(27)	Malignant(3)
Sonolucent-1	23(85.1%)	0
Low echogenicity-2	-	0
Low echogenicity With echogenic core-3	2(7.4%)	0
Mixed echogenicity-4	1(3.7%)	3(100%)
High echogenicity-5	-	-

85.1% of benign masses were sonolucent. Only 7.4% of benign masses presented with low echogenicity with echogenic core. All malignant masses had mixed echogenicity.

Table 2. Diagnostic Accuracy of USG

USG diagnosis	Histopathological diagnosis		
	Malignant	Benign	Total
Malignant	3	1	4
Benign	-	26	26
Total	3	27	30

Sensitivity -100%; Specificity-97%; Positive predictive value-75%; Negative predictive value-100%

Our study show sensitivity of ultrasonographic Sassone scoring system for predicting the adnexal masses- sensitivity-100%, specificity-96%, positive predictive value-75% and negative predictive value-100%.

Out of total 27 benign cases, ultrasonography labeled 26 cases as benign and missed one case which is actually benign.

Table 3. USG Diagnosis

USG diagnosis	No. of cases	Percentage
Dermoid cyst	1	3.3%
Benign Rt. Ovarian cyst	16	59.7%
B/L ovarian cyst	1	3.3%
Rt. Ovarian complex cyst	7	25.9%
Rt. Hydrosalphinx	1	3.3%
Rt. Ovarian malignancy	3	11.1%
Lt. ovarian malignancy	1	3.3%
Total	30	100

This table shows the various lesions encountered in the study.
Benign ovarian tumors form the majority of cases.

Table 4. Histopathological Diagnosis

Histopathological diagnosis	No. of cases	Percentage
Dermoid cyst	1	3.3%
Serous cystadenoma	16	53.3%
TOA	3	10.0%
Endometriosis	2	6.7%
Mucinous cystadenoma	5	16.7%
Serous cystadenocarcinoma	3	10.0%
Total	30	100

Histopathological examination show majority of lesions were serous cystadenoma.

DISCUSSION

In our study septa was absent in 88.8% of benign masses but none in malignant masses. Thin septa was seen in 11.2% of benign masses. Thick septa was seen in all malignant masses.

Anuradha Khanna et al [12] found out that septa was absent in 68.1% of benign and only 4.7% on malignant masses. Thin septa was seen in 29.6% and thick septa in only 1.1% of benign masses but 2.4% and 73.1% of malignant masses had thin and thick septa respectively. Requard et al also found that majority of masses with thick was malignant and thin septa did not rule out malignancy many malignant tumors had both thin and thick septa.

None of the malignant masses were sonolucent with low echogenicity. All malignant masses had mixed echogenicity but only 3.7% of benign masses showed mixed echogenicity. Anuradha Khanna et al found out that 38.2% and 14.8% cases of benign masses were either sonolucent or with low echogenicity but 46.3%, 39% and 14.6% cases of malignant masses presented with low echogenicity with low echogenic core, mixed echogenicity and high echogenicity respectively.

Moyle et al [5] also found out that risk of malignancy increases with increase in internal echoes. Many investigators have also related echogenic tissue with the tumor with malignancy. In our study, out of total 27 benign cases, Sassone scoring [10] by ultrasonography labeled 26 cases as benign and missed one case which is actually benign. Our study shows sensitivity of ultrasonographic Sassone scoring system, sensitivity-100%, specificity-96%, positive predictive value-75% and negative predictive value-100%.

Sassone et al[10] found sensitivity of 100%, specificity 83%, positive predictive value- 37% and negative predictive value-100% of sonographic scoring system.

Another study by Timor-Tritsch et al found sensitivity, specificity and positive predictive value of sonographic score 94%, 87% and 60% respectively.

Anuradha Khanna et al found sensitivity of ultrasonographic Sassone scoring system for predicting the adnexal masses-100%, specificity 95.3%, positive predictive value 99.04% and negative predictive value 100%.

CONCLUSION

The sensitivity, specificity, positive predictive value and negative predictive value of Sassone sonographic scoring system in comparison to operative and histopathological findings was 100%, 97%, 75% and 100% respectively.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

STATEMENT OF HUMAN AND ANIMAL RIGHTS

All procedures performed in human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

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