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Role of ultrasonography in the diagnosis of adnexal masses

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Abstract

Introduction: Adnexal masses are considered to be one of the most common findings that have been encountered in routine gynaecological examination. And ultrasonography solely stayed as the most commonly implemented imaging modality to identify benign from malignant adnexal masses. The aim of the current study was to determine the accuracy of transvaginal ultrasonography (TVUS) in diagnosis of adnexal masses.

Materials and Methodology: This study was adopted to be conducted as a prospective study where in 56 female patients were included in the study who were containing 60 adnexal masses. The proposed study was rendered to be around 6 months. And all the study participants were provided their informed consent for carrying out and wilful participation in this study. P value less than 0.05 was considered as statistically significant.

Results: Over 47(78%) masses reported in some patients were observed to be benign and 13(22%) were proved to be malignant. The mean age of the patients ranged from 22-65 years and the mean age in those benign group ranged between 42.7 ± 10.2 and those in malignant observed to be 51.2 ± 12.6 and the p – value observed to be ranged less than 0.001.

Conclusion: Ultrasound is recommended to be a very useful highly diagnostic and a reliable modality with good sensitivity.

Keywords: Ultrasound, adnexal mass, benign, malignant, echogenicity

Introduction

An adnexal lesion is defined as ‘the part of an ovary or an adnexal mass that is judged from an assessment of ultrasound images to be inconsistent with normal physiologic function’ as said by International Ovarian Tumour Analysis (IOTA) ^[1]. The most common pathological scenario present in gynaecologic practice are adrenal masses ranging from a small cyst to benign or emerges as a malignant ovarian mass in women of all ages. The etiology of these masses seen are ovarian cysts, tumors, polycystic ovaries, abscesses, and ectopic pregnancy most commonly noted in premenopausal women. The most common cause in menopausal women include fibroid and malignant tumors, and fibromas ^[2]. Around 1-8% of incidence rate of malignant neoplasms are noted in adrenal masses. The fifth most common cause of death in females is due to ovarian cancer ^[3]. During pregnancies the incidence ranges from 1 in 81 females to 1 in 8000 females ^[4]. During gestation the masses are complicated by pain due to the rupture, torsion, labour obstruction or bleeding/infection.

A non-invasive method used for differentiating benign from malignant adnexal masses is ultrasound. Though it helps to suspect malignancy with the help of ultrasound and Colour Doppler findings it doesn't provide a definite diagnosis ^[5].

Doppler ultrasound and two-dimensional ultrasound combination aids in evaluating adnexal lesions to predict malignancy more appropriately by measuring intratumoral blood flow velocity waveforms which calculates the resistive index (RI) ^[6]. Different scoring systems exists for differentiating benign from malignant adnexal masses. They aid in evaluating the cyst wall thickness, presence of solid elements and internal septations within the masses ^[6].

The diagnostic tool should have the ability to differentiate between a benign and malignant lesion since correct and early diagnosis of adnexal mass forms a basic platform for treatment and management plan. The management of adrenal masses is either medically or surgically ^[7]. Laparoscopic observation and histopathological examination serves as a gold standard investigation for the diagnosis of adnexal mass include ^[8].

Because the management is done invasively a simple transvaginal ultrasonography (TVUS) has now become a standard for the initial investigation in suspected cases of adnexal masses [9, 10]. It's been found that a higher incidence of adnexal masses in female population with very limited data in correct and early diagnosis. Hence, the aim of the current study was to determine the accuracy of transvaginal ultrasonography (TVUS) in diagnosis of adnexal masses.

Material and Methods

The study was commenced after obtaining the clearance from the institutional ethical committee. This study was adopted to be conducted as a prospective study where in 56 female patients were included in the study who were containing 60 adnexal masses. The proposed study was rendered to be around 6 months. And all the study participants were provided their informed consent for carrying out and wilful participation in this study.

The inclusion criteria that were followed in this study include those study subjects with a history or having clinical symptoms of an adnexal mass. And those patients with a previous history of bilateral oophorectomy and those patients who were not willing to participate in the study.

All those patients who were selected based on inclusion criteria were allowed to be evaluated by one of the following ultrasonic procedures that include transabdominal ultrasonography, transvaginal ultrasonography or both. The statistical analysis was carried out using SPSS, version 23.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative variables were presented in terms of mean, SD, and range. The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated. P value less than 0.05 was considered as statistically significant.

Results

This study research included 55 female patients with 60 adnexal masses where some patients had exhibited bilateral adnexal masses. Table-1 distributed the number of patients subjected with benign and malignant lesions. And over 47 (78%) masses reported in some patients were observed to be benign and 13 (22%) were proved to be malignant. The mean age of the patients ranged from 22-65 years and the mean age in those benign group ranged between 42.7 ± 10.2 and those in malignant observed to be 51.2 ± 12.6 and the p-value observed to be ranged less than 0.001. And the adnexal masses were identified to be one of the following based on their structure which could be solid, cystic unilocular, cystic multilocular, mixed cystic and solid.

Table-2 elaborated the histopathological concepts of benign and malignant abdominal masses. And the major contributor in the benign lesions group include Endometrium (38%) and in malignant lesion group, mucinous cyst adenoma (35%) observed to be major contributor.

Table-3 demonstrated the findings from the ultrasonography.

Table 1: Distribution of adnexal masses according to their structure

Structure	Benign [n (%)]	Malignant [n (%)]	P-value
Solid	5 (10%)	5 (36%)	<0.001
Cystic unilocular	28 (59%)	0	
Cystic multilocular	11 (24%)	1 (7%)	
Mixed cystic and solid	3 (7%)	7 (57%)	
Total	47 (78%)	13 (22%)	

Table 2: Histopathological results of benign and malignant adnexal lesions

H/P of benign lesion	N (%)	H/P of malignant lesions	N (%)
Endometrioma	17 (38%)	Serous cystadenoma	3 (23%)
Dermoid cyst	3 (6%)	Mucinous cystadenoma	4 (35%)
Tubo-ovarian masses	5 (10%)	Moderately differentiated carcinoma	1 (7%)
Mucinous cystadenoma	7 (14%)	Clear cell carcinoma	1 (7%)
Serous cystadenoma	10 (22%)	Granulosa cell tumour	2 (14%)
Paraovarian cyst	1 (2%)	Ovarian sarcoma	2 (14%)
Hydrosalpinx	4 (8%)	Total	
Total	47 (100%)		13 (100%)

Table 3: Ultrasonography results in correlation with histopathological results of adnexal masses

USG findings	Malignant N (%)	Benign N (%)	Total N (%)
Malignant	10 (22%)	6 (6.6%)	16 (28.6%)
Benign	3 (5)	41 (66.4%)	44 (71.4%)
Total	13 (27%)	47 (73%)	60 (100)

Table 4: Adnexal mass distribution based on echogenicity

Echogenicity	Benign N (%)	Malignant N (%)	P-value
Anechoic	21 (45%)	2 (14%)	<0.001
Hypoechoic	11 (23%)	5 (37%)	
Hyperechoic	7 (18%)	1 (7%)	
Mixed	7 (14%)	6 (43%)	
Total	47 (100)	13 (100)	

Discussion

Due to advancement in the modern technologies, there are various imaging modalities that are available for diagnosing almost all the patients in need particularly those with adnexal masses [11]. But it has been observed that histopathology or biopsy are avidly irreplaceable as these are considered to be the gold standard for diagnosis of adnexal masses. Though the imaging modalities are probably non-invasive since they are able to possibly reduce the time delay and complications in relation with invasive diagnostic techniques [12]. Identifying the difference between benign and malignant ovarian masses is the most common problem that have been encountered majorly by the clinician. Sonography is considered as the first-line imaging modality and proved to be effectively useful for omitting the unnecessary need for surgeries [14, 15]. TVUS are widely used imaging tool for adnexal masses which variably aids in assessing the diagnostic accuracy differentiating between benign and malignant adnexal mass [13]. This study basically comprised of 55 patients with 60 adnexal lesions because some of them showed bilaterality of masses.

The ovarian masses usually be detected by ultrasound in our study, 78% were benign and 22% were malignant based on the results obtained from histopathology results which were in correlation with studies done by Priya *et al.*, and Subash *et al.*, [16, 17]. Among histopathological subtypes in the current study, most common ovarian malignancy was mucinous cyst adenocarcinoma (35%), followed by serous cyst adenocarcinoma (23%), which was similar to other studies [18]. Similarly, among the benign lesions in this study, endometrium (38%) was most common followed by serous

(22%) and mucinous (14%) cyst adenoma, which was comparable to similar previous studies [17, 19]. In this study, most of the benign lesions were unilocular cyst (59%) but the majority of malignant lesions were mixed cystic and solid masses (7%) followed by solid masses (10%) ($p \leq 0.001$). This was in similarity with the results obtained by Abbas *et al.*, [20] who observed that mixed cystic and solid masses represent the majority of ovarian malignancy followed by solid mass.

Regarding the echogenicity of adnexal lesions, our results reported that most benign lesions were cystic anechoic (45%); however, most of malignant lesions included in this study displayed mixed echo pattern (43%) followed by Hypoechoic lesions (37%). This keeps with the results of previous studies [6]. Salem *et al.*, [21] found that the mixed echogenicity was the criteria of the malignant masses.

Conclusion

Ultrasound is recommended to be a very useful highly diagnostic and a reliable modality with good sensitivity. The usage of various distinguishing USG features like echogenicity, inner wall structure, intramural nodule or solid areas, vascularity and presence of ascites aids in making a reasonably true diagnosis between benign and malignant masses.

Conflict of Interest

Not available

Financial Support

Not available

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