ROLE OF TRANSABDOMINAL ULTRASOUND IN CHARACTERIZATION OF THE OVARIAN MASS

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ABSTRACT

The use of grey-scale ultrasound morphology to characterize a pelvic mass may also be called 'pattern recognition'. The grey-scale ultrasound image provides as much information as that obtained by the surgeon or pathologist when they cut a surgical specimen to see what it looks like inside. Aim of our study is to characterize the ovarian mass by ultrasound. The study was conducted in Department of Radiology and Imaging, College of Medical Sciences, Bharatpur. Patients with suspected ovarian mass in Gynecology OPD were included in our study. A prospective cross-sectional study was conducted on 60 patients in college of medical science, Bharatpur, over the period of one year (from November 2019 to October 2020). Present study showed benign ovarian (90.0%) pathology are the most commonly encountered ovarian mass. Ovarian mass is most common in adult female of age 15-30 years and malignant ovarian mass was most common among the age group of 30-60 years. Among benign pathology of ovary simple follicular cysts are most common (39.0%), followed by hemorrhagic cyst (31.0%), dermoid cyst (17.0%), chocolate cyst (9.0%) and ectopic pregnancy (4.0%). Among the malignant ovarian mass serous cystadenocarcinoma and mucinous cystadenocarcinoma showed similar frequency (33.0% each) and followed by immature teratoma and krukenberg tumor (17.0% each). Ultrasound parameters like size, septal thickness, solid component and spectral doppler (RI ans PI) are very helpful for determination of malignant pathology. In this study the sensitivity and specificity of size parameter is least (40.3% and 60.2%) and highest in solid component and spectral Doppler parameter (PI) being (82.0% and 92.0%). Combined study of grey scaleand spectral Doppler study plays crucial role in characterization of ovarian mass to differentiate between benign and malignant pathology.

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INTRODUCTION

Ovarian mass constitutes common findings encountered in ultrasound examination in adult female. There are multiple spectrum of ovarian mass from functional to malignant. The risk of a woman developing ovarian cancer is 1 in 71.[1] The poor prognosis of ovarian cancer is associated with the advanced stages of the disease at the time of diagnosis.[2-4] Ultrasound plays a vital role in the initial examination of ovarian mass and thus helps in management. There are various imaging modalities for the investigation of ovarian mass ranging from ultrasound, CT, MRI, and PET scan. Ultrasound is being easily available, accessible, and dynamic procedure makes it the first choice of investigation. Combined with the ultrasound parameters, the use of Doppler analysis to see the color flow and characterize the waveform has been used to evaluate neovascularity of ovarian neoplasm.[5] CT, MRI, and PET are helpful in the staging of the ovarian mass, looking for the distant metastasis and the treatment response.

A number of gray-scale sonographic features have been studied for their ability to allow distinction between benign and malignant ovarian masses. Most investigators have found grey scale sonography to be as good as or better than Doppler.[6-8] Further, Ultrasound characterization of lesions as simple cysts, complex cysts, or mixed cystic or solid structures helps narrow the diagnostic possibilities. This study is aimed at evaluating the ovarian mass using transabdominal ultrasound and characterization of morphology that further help in the management of the disease.

MATERIALS AND METHODS

The study was conducted in the Department of Radiology and Imaging, College of Medical Sciences, Bharatpur from November 2019 to October 2020. Patients with clinically suspected ovarian mass in Gynecology OPD who were sent for the ultrasound examination were included in our study. All USG examination were done using Aplio 500 Toshiba Machine with convex array deep probe of frequency 3.5MHz. Parameters used in our study were thickness of the lesion, solid component, septal thickness and spectral Doppler (PI and RI). Each parameter was used separately to differentiate benign versus malignant adnexal mass. Size more than 10cm, solid component, septal thickness more than 3mm, PI<1, and RI<1 were considered malignant lesions. Following surgery, each specimen was sent for

histopathological examination. The diagnosis made with ultrasound findings was then compared with a histopathological report.

Our study was an observational and cross-sectional study and included 60 patients with given inclusion and exclusion criteria. All patients referred from Gynecology Department with suspected ovarian mass with age >15yrs are included in the study. Age <15yrs and pelvic mass arising other than from the ovary were excluded. Data obtained were compiled and analyzed using standard statistical analysis. SPSS 20.0 and Microsoft Excel were used for the data analysis and presentation. Sensitivity and specificity of each parameter were calculated. Ethical consideration: The research protocol was submitted and approved by the ethical review committee of College of Medical Science Teaching Hospital, Bharatpur, Nepal.

RESULTS

A total 60 patients with proven ovarian mass were included in this study. They were divided into three age-groups and the ovarian mass was found more common in the age-groups of 15-30 years and 31-60 years (Table-1).

Table 1: Age distribution of patient (n=60)		
Age Group	**Frequency**	**%**
15-30	25	41.6
31-60	24	40.0
>60	11	18.4

Out of total 60 cases, benign lesions (disease) were detected in 90.0% (54/60) of cases. Among the benign ovarian mass follicular cyst was the most common followed by hemorrhagic cyst and others (Table-2).

Table 2: Distribution of benign lesions (n=54)		
Ovarian Pathology	**Frequency**	**%**
Follicular cyst	21	39.0
Hemorrhagic cyst	17	31.0
Dermoid cyst	9	17.0
Chocolate cyst	5	9.0
Ectopic pregnancy	2	4.0
Total	**54**	-

Out of 60 only 6 (10.0%) of cases showed malignant disease. Of them, serous and mucinous cystadenocarcinoma were common malignant ovarian mass (Table-3). Calculation of sensitivity and specificity of

Table 3: Distribution of malignant ovarian pathology		
Ovarian pathology	Frequency	%
Serous cystadenocarcioma	2	33.0
Mucinous cystadenocarcinoma	2	33.0
Immature teratoma	1	17.0
Krukenberg tumor	1	17.0
Total	6	-

Table 4: Ultrasound parameter		
Ultrasound parameter	Sensitivity	Specificity
Size of cystic mass	40.3	66.2
Septal thickness	78.0	88.0
Solid component	80.0	92.0
Spectral Doppler (RI)	78.0	88.0
Spectral Doppler (PI)	80.0	92.0

different ultrasound parameters showed solid component and spectral Doppler (PI) has highest sensitivity and specificity (Table-4).

DISCUSSION

Ovarian mass is not an uncommon pathology among the adult females. Ultrasonography plays a vital role in the early detection of the ovarian mass and its characterization into benign and malignant pathology that eventually help in the treatment plan. In the present study, the distribution of the ovarian mass in different age group showed highest among the 15-30 years of age and followed by 30-60 years age and least in >60 years age, if we see the malignant mass which was about 10.0% of the total case, the highest number of malignant ovarian mass noted between 30-60 years age group. This is similar to the study done by Jha et al[9] that showed malignant tumor to be more common in 41-50 age group.

In present study majority of cases are benign ovarian mass (90.0%) and only 10.0% are malignant ovarian mass. This is similar to the data from western countries where 75.0-80.0% of ovarian tumors are benign.[10] Jeoung et al[11] study also showed benign tumor is more common in which out of 202 cases 167 (82.7%) were benign tumors. However, most common tumor was mature teratoma followed by serous cystadenoma which contradicts our present study that showed follicular cyst is the most common followed by hemorrhagic cyst and dermoid cyst. A study done by Ueland et al[12] had serous cystadenoma (33.4%) as the most common benign tumor followed by simple cyst (15.9%) which contradicts to ours study.

Among the malignant ovarian mass, the present study showed the most common tumor being serous cystadenocarcinoma and immature teratoma followed by mucinous cystadenocarcinoma and krukenberg tumor. This finding is consistent with a study done by Kaymak et al[13] and Saini et al[14], the most common malignant tumor was serous cystadenocarcinoma in 50.0% and 33.0% respectively. Jeoung et al[11] found mucinous cystadenocarcinoma (45.7%) as the most common malignant tumor which contradicts to ours study.

According to a study done by Kim et al[15] in 2012, the most common epithelial ovarian cancer histologic subtypes in Korean women were serous, mucinous, endometrioid, and clear cell carcinoma, representing 49.5%, 13.9%, 10.4%, and 10.3% of all epithelial ovarian cancer cases respectively. Sensitivity and specificity of the ovarian mass size were low in the present study, 40.3 and 60.2 respectively. In a study done by Yen et al[16] in 2009 from analyzing 174 patients, incidence of malignancy from tumor size >10cm was significantly higher than that from small tumor size (8.77% vs 0.85%).

The sensitivity and specificity of septal thickness in present study were 78 and 88 respectively. Association between septal structure and pathological findings was weak in the study done by Ueland et al.[12] However, present study showed septal thickness was sensitive in detecting malignancy. Sensitivity and specificity of solid component was 80 and 92 respectively. Twenty-four (83.0%) out of 29 complex cyst with solid component were malignant and 5 (17.0%) were benign i.e maximum tumors with solid component were malignant in study done by Ueland et al[12] which is similar to ours study.

The sensitivity and specificity of RI and PI were 78, 88 and 82, 92 respectively. Shah et al[17] found sensitivity, specificity, positive predictive value, and negative predictive value of 93.0%, 93.0%, 93.0% and 93.0% respectively using PI. Similar study was done by Kurjak et al[18] in one thousand postmenopausal women using RI<0.4 and found sensitivity and specificity of 96 and 95 respectively.

Thus, from the given study, we conclude that ultrasound is a very important examination

tool for a female pelvic examination. It can characterize ovarian mass depending on different ultrasound parameters to differentiate the benign from malignant pathology; which further helps surgeons plan operation.

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