

Ultrasonographic Evaluation of Pelvic Masses and Its Correlation with Histopathology in a Teaching Hospital in Telangana, India

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ABSTRACT

BACKGROUND

Ultrasonography (USG) is the diagnostic test of choice in evaluating pelvic masses. Because of considerable overlap in the morphologic pattern of different pelvic masses, diagnosis should be correlated with histopathological findings. We wanted to do an ultrasonographic evaluation of pelvic masses and study its correlation with histopathology in a teaching hospital.

METHODS

This is a prospective study done among 40 cases subjected to USG at Department of Radiology, Hyderabad, Telangana, over a period of seven months. The USG findings were noted and were correlated with the final histopathological findings. The sensitivity and specificity of ultrasound for malignancy were 75 % and 88.8 % respectively.

RESULTS

In the present study ovarian masses were most frequent (67.5 %), followed by uterine (25 %) and adnexal masses (7.5 %). Majority of the benign pelvic masses (67 %) were seen in the age group of 31 – 40 years while malignant pelvic masses (15 %) were more common in the age group of 51 – 60 years.

CONCLUSIONS

Ultrasonography is the first choice imaging technique to investigate pelvic masses in women. Of all gynaecological pelvic masses, ovarian masses are the commonest. Sonography has good sensitivity and specificity and is very effective in diagnosis of gynaecological masses and it correlates well with the final histopathological diagnosis.

KEYWORDS

Ultrasonography, Pelvic Masses, Ovarian Masses, Histopathology

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BACKGROUND

Ultrasonography (US) is the most commonly used primary imaging modality to identify and characterise adnexal masses.^{1,2}

Correct identification and characterisation of adnexal masses is important to determine which patient need surgery, type of surgery to be planned and whether a surgical subspecialist is needed or not.³ Gynaecologic pelvic masses are an important group of diseases affecting mainly young people of all age groups. The prevalence of adnexal lesions in asymptomatic women is 0.17 percent to 5.9 percent in the general population and 7.1 percent to 12 percent in symptomatic women.⁴ Ultrasonographic examination for the assessment of pelvic masses, typically offers clinically relevant criteria. The presence or lack of a suspected pelvic mass can be confirmed by pelvic sonography. The diagnosis of ovarian tumours is based on a tumour marker called CA-125, clinical evaluation, ultrasound and serum measurements, and is collectively referred to as a triple diagnostic process.⁵

The most common cause of death from gynaecological malignancy is ovarian cancer and is the fifth most common cause of death from cancer in women.⁶

Although transabdominal US is useful for larger masses or those in the pelvis positioned superiorly or laterally, most adnexal diseases are optimally visualised by transvaginal US. US observations in real-time lead to enhanced characterisation⁷ and indicate value in video clip recording. For pelvic US, two-dimensional US is most widely used, although in today's times, three-dimensional US is used with increasing frequency. Gynaecologic pelvic masses are apparent solid areas or septum and can have additional Doppler US. Contrast material enhanced US remains an investigational technique.⁸ We wanted to study ultrasonographic evaluation of pelvic masses and its correlation with histopathology.

METHODS

This was a clinical and hospital based observational study done in the Department of Radiology and Obstetrics and Gynaecology at, Telangana, for a period of eight months from January 2020 to August 2020. Ethical consent and written informed consent were obtained from the all the cases included in the study.

Inclusion Criteria

- Patients willing to participate in the study.
- Only female patients were included.
- Age range from 20 years to 60 years.
- Patients with diagnosed pelvic masses following USG.

Exclusion Criteria

- Patients not willing to participate in the study.
- Age less than 20 years and more than 70 years.
- Males with pelvic masses were excluded.

- Pregnant women.
- Those patients who were lost in follow-up.
- Patients with ectopic pregnancy.

Collection of Data

There were 40 cases with pelvic masses and they constituted the study cases. The study protocol was explained to the patients. A detailed clinical history was obtained and general and systemic examination were done. Routine investigations such as complete blood picture, routine urine analysis, random blood sugar test was done.

The patients were then sent to the Department of Radiology where ultrasonography of pelvic masses was performed with a high-resolution ultrasound instrument (GE machine) equipped with a 5 – 12-MHz linear probe. Patients were advised to come with a fully distended urinary bladder. Ultrasound scanning was carried out with the patient in both transverse and longitudinal planes in supine position. Evaluation was limited to transabdominal sonography of the pelvis and was performed with empty bladder, wherever required.

Morphological characterisation of mass was done based upon the visualisation of inner wall structure, wall thickness, septae and solid part echogenicity. The USG findings were noted and were correlated with the final histopathological findings.

Statistical Analysis

For statistical analysis Microsoft 2012 version was used and data was analysed using the Microsoft Excel. Percentages and ratios were calculated.

RESULTS

Sl. No.	Ovarian Masses	No. of Cases	Percentage (%)
1	Simple cyst ovary	04	14.8 %
2	Haemorrhagic cyst	03	11.1 %
3	Benign serous cystadenomas	12	44.4 %
4	Benign mucinous cystadenomas	02	7.4 %
5	Serous cystadenocarcinoma	01	3.7 %
6	Mucinous cystadenocarcinoma	01	3.7 %
7	Benign cystic teratoma	02	7.4 %
8	Fibroma	01	3.7 %
9	Metastases	01	3.7 %
Total		27	100 %

Table 1. Histological Distribution of Ovarian Masses

Sl. No.	Uterine Masses	No. of Cases	Percentage (%)
1	Leiomyoma	07	70 %
2	Endometrial carcinoma	02	20 %
3	Carcinoma cervix	01	10 %
Total		10	100 %

Table 2. Uterine Masses

In the present study ovarian masses were most frequent followed by uterine and adnexal masses. Majority of the cases i.e., 65 % (26 / 40) were demonstrated within the age range of 31 – 40 years. Among non-neoplastic lesions, simple cyst of ovary and haemorrhagica cyst were common. Among benign lesions, benign serous cystadenoma of ovary was the commonest. There were two cases of dermoid cyst of ovary. (Figure 2) There was one case of serous

cystadenocarcinoma of ovary. (Figure 3). Leiomyoma of the uterus was the commonest mass, and it was seen in the 30-to-40-year age group and majority were intramural leiomyomas. Two (20 %) cases of endometrial carcinoma were seen in 51-60-year age group and one case of carcinoma cervix (10 %) was seen in a 58-year-old patient.

Sl. No.	USG Findings Pelvic Lesions	Ovarian Masses (N = 27)	Uterine Masses (N = 10)	Non-Ovarian Adnexal Masses (N = 03)	Total (N = 40)
1	Margins	Well defined 24 (60 %) Ill defined 03 (7.5 %)	07 (17.5%) 03 (7.5 %)	03 (7.5 %)	32 (80 %) 08 (20 %)
2	Consistency	Solid 03 (7.5 %) Cystic 21(52.5%) Both solid and cystic 03 (7.5 %)	10 (25%) - -	01 (2.5 %) 02 (5 %) -	14 (35 %) 23 (55 %) 03 (7.5%)
3	Echogenicity	Hypoechoic 24 (60 %) Hyperechoic 03 (7.5 %)	07 (17.5%) 03 (7.5 %)	03 (7.5 %) -	34 (85 %) 06 (15 %)
4	Presence of calcification	01 (2.5 %)	-	-	01 (2.5%)
5	Necrosis	03 (7.5 %)	-	-	03 (7.5%)

Table 3. USG Findings in Pelvic Lesions

Ovarian Masses

Non-neoplastic ovarian lesions constituted 7 out of 27 cases, 04 were simple cyst and 03 were haemorrhagic cysts. On ultrasound, simple cyst and haemorrhagic cysts were seen as cystic lesions with dependent debris. All benign and non-neoplastic lesions were having well defined margins and hypoechoic areas. Excision was done and sent for histopathologic examination (HPE).

Histopathology

9 cases were reported as serous cystadenoma ovary and 02 cases were of simple cyst and one case was papillary serous cystadenocarcinoma of ovary. After USG three malignant cases were having ill-defined margins, hyperechoic and necrotic areas. Calcification was noted in one malignant case. One case was reported as papillary serous cystadenocarcinoma of the ovary, a case of mucinous cystadenoma of the ovary and Krukenberg tumour was seen. Two cases were reported as benign cystic teratoma and had well defined margins and hypoechoic areas. Excision was done and sent for histopathological examination. One case was reported as dermoid cyst and the other was immature teratoma.

Uterine Masses

Seven benign masses (leiomyoma) were having well defined margins and hypoechoic areas and all were solid in nature. Excision was done and sent for histopathologic examination. All were reported as leiomyomas on HPE. The three cases of suspected malignancy following USG were having ill-defined margins and hyperechoic areas which on HPE proved to be two cases of endometrial carcinoma and one cases of carcinoma cervix.

Non-Ovarian Adnexal Masses

There were three cases of non-ovarian adnexal lesions with 2 (66.6 %) being fallopian tubal abscesses and 1 (33.3 %) being a case of endometriosis. Three masses were having well defined margins and hypoechoic areas, two cases were cystic in nature and one case was solid in nature. On excision and histopathological examination, two were reported as tubal abscess and one was reported as endometriosis.

True negatives – 6 cases.

True positives – 5 cases

False positives - 3 cases

False negatives - 1 case

The sensitivity and specificity of ultrasound for malignancy were 75 % and 88.8 % respectively. The positive predictive value (PPV) and negative predictive value (NPV) of USG were 75 % and 88.8 % respectively. In the ovarian lesions, majority of benign lesions were without septae that is 10 cases (50 %). Thin septae (≤ 3 mm) were seen in 06 (30 %) benign cases and 02 (10 %) malignant cases. Thick septae (> 3 mm) were seen in 01 (5 %) benign case and 01 (5 %) malignant case.



Figure 1.
Thin-Walled Anechoic Cyst at Left Ovary Measuring 43 x 33 mm



Figure 2.
Posterior Wall Intramural Fibroid Measuring 47 x 45 mm

DISCUSSION

Evaluation of female pelvic masses is a challenging task for a radiologist as there change to are wide range of lesions and differential diagnosis that is possible in the pelvic location. Various imaging modalities are available for assessment of these masses, like USG, computed tomography (CT scan) and magnetic resonance imaging (MRI). Ultrasound is simplest modality and it more easily available than the latter two.

Comparative Studies Based on Sample Size

In present study, USG scan was performed in 40 females presenting with pelvic masses. In the study by Guha et al.⁹ USG scan was performed in 50 female patients who presented with history, symptoms, and signs of a pelvic mass. Gupta K.P. et al.¹⁰ evaluated about 50 cases of pelvic

masses and Satoskar P.¹¹ studied 70 patients in a similar study.

Comparative Studies Based on Age Distribution

In the present study, majority of the benign pelvic masses (67 %) were seen in age group of 31 - 40 years while malignant pelvic masses (15 %) were more common in the higher age group of 51 - 60 years.

Yashi et al.¹² in their study observed that the youngest patient in their study was 2 years old male and the eldest was 82 years old female, the mean age (SD) was 38.9 (17.91) years. They observed that most of the benign pelvic masses (50 %) were seen in age group of 20 - 39 years while malignant pelvic masses (50 %) were more common in age group of 60 and above. In the study by Gupta K.P. et al.¹⁰ they reported about 50 cases of pelvic masses and found that benign lesions were seen in patients between 3rd and 5th decades, whereas malignant lesions were usually found in patients between 5th and 7th decades. Guha et al.⁹ in a similar study had patients with age range of 10 to 70 years. Majority of the patients were in the age group of 31 to 40 years with mean age of 33.8 years. The minimum number was in the age group of 10 - 20 and 61 - 70 years.

In Satoskar P et al.¹¹ study, 49 of 67 patients (73 %) were in the reproductive age group (20 - 40 years), while 10 (16 %) were menopausal. In Sharma H et al.¹³ study, total of 50 patients in the age group of 15 - 45 years were evaluated. Maximum number of ovarian masses (N = 20, 40 %) were seen in age group of 25 - 34 years. The uterine masses did not show any significant age predilection. However, all the malignant uterine masses were seen in higher age group (35 to 45 years).

Comparative Studies Based on Clinical Features

In our study, the most common chief complaint was pain in pelvic cavity and heaviness in the pelvic cavity (75 %). Menstrual irregularities were present in 25 % patients. In Guha B et al.⁹ study, the most common chief complaint of patients was pain in pelvic cavity 21 (42 %) followed by pain and palpable mass 10 (20 %).

Comparative Studies Based on Organ of Origin

In the present study, ovarian masses were most frequent (67.5 %), followed by uterine masses (25 %) and adnexal masses (7.5 %). Guha B et al.⁹ reported 14 (28 %) as having ovarian pathologies and 21 (42 %) as having uterine pathologies. Eleven patients presented with localised collection into the fallopian tube pathologies. Gupta K.P. et al.¹⁰ also observed majority of the lesions were ovarian in origin 46 %, followed by uterine origin 32 %, cervix 8 % and endometrial cavity 8 %, pelvic abscess 4 %, and fallopian tube origin 2 %.

Sharma H et al.¹³ in their study observed ovarian masses to be most frequent (66 %), followed by uterine (22 %) and

then adnexal masses (12 %). Our findings compare well with the observations of the above authors.

Yashi et al.¹² in their study observed that benign masses on USG were mostly cystic (43.7 %) or predominantly cystic (37.5 %). Malignant group (33 %) showed that overall, the most common mass was predominantly solid and cystic mass. They also observed that the difference among benign and malignant masses regarding consistency of masses was insignificant (P > 0.05) on USG.

Comparative Studies	Sensitivity	Specificity	Positive Predictive Value (PPV)	Negative Predictive Value (NPV)
Gupta K.P. et al. ¹⁰	85 %	53.3 %	54.8 %	84.2 %
Yashi et al. ¹²	70 %	80 %	53.8 %	88.8
Stein et al. ¹⁴	98 %	62 %	50 %	99 %
Present study	75 %	88.8 %	75 %	88.8 %

Table 4. Comparison of Sensitivity and Specificity in the Present Study with Those of Other Studies

In the present study the sensitivity and specificity of ultrasound for malignancy were 75 % and 88.8 % respectively. Gupta et al.¹⁰ Yashi et al.¹² and Stein et al.¹⁴ reported similar values and our findings correlate well with those of the above authors.

CONCLUSIONS

Ultrasonography is the first choice of imaging technique to investigate pelvic masses in women. Of all gynaecological pelvic masses, ovarian masses are the commonest. Sonography has good sensitivity and specificity and is very effective in the diagnosis of gynaecological masses and it correlates well with the final histopathological diagnosis.

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