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Ultrasound & Colour Doppler Evaluation of Ovarian Masses and Correlation With CA-125

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I. Aims & Objectives

- To correlate the findings of ovarian masses on gray scale imaging and colour Doppler study with the CA-125
- To study the role of gray scale imaging in characterization of ovarian masses.
- To study the role of colour Doppler in characterization of ovarian masses.

II. Material & Methods

- The present study was conducted at the department of Radiodiagnosis, MGM Medical College & LSK Hospital, Kishanganj, Bihar, between January 2021 and September 2021.
- According to a fixed protocol, each patient underwent a detailed history, clinical examination, B-Mode and Doppler sonography followed by lab investigations including CA 125 estimation
- Out of the selected 20 patients, 11 (55%) patients were found to have benign disease after final (histopathological) diagnosis while other 9 (45%) patients had malignant disease.
- The maximum no. of cases was found in the age group 40-60 yrs and minimum in up to 20 year age group. The youngest patient was of 16 years.

III. Results

Malignant tumours were more common in 41-60 yrs age group as well as in 20-40 yrs age group

- Only three patients (5%) were unmarried while rest were married. Out of these three, two (66%) had malignant mass.
- Majority of patients of ovarian tumour were multipara, P3 and above patients constitute 70% of these cases.
- Rate of malignancy in ovarian cases was highest in nullipara (66%) and it gradually decreased as the parity increased.
- Majority of malignant cases (62.96%) were premenopausal while benign cases were almost equally distributed in either group.
- Family history was positive in 7.4% cases of malignant tumours.

IV. Discussion

- In the current study, total 20 subjects with ovarian masses were evaluated, in which **11(55%) were benign** lesions and **9(45%) were malignant**.

Diastolic notch as a predictor of malignancy was evaluated in the current study. It was **present in 86% of benign masses and absent in 88% malignant masses**

- Pulsatility index forms an important criterion in colour Doppler study. Malignant neoplasm offered lower resistance to blood flow due to presence of aberrant tumour vessels. In the present study, a pre established cut off criteria of PI < 1.00 and RI < 0.4 was used, as used by **Kurjak et al, (1990)** though **Carter et al, (1994)** used a cut off criteria of PI < 0.8 and RI < 0.6 to optimize the study in terms of sensitivity and specificity [1,2].
- Our study also illustrated the special role of colour Doppler in labelling the solid tumour of ovary as benign, if it did not show any significant vascularity. The definite diagnosis of malignancy in solid tumours was made only after the colour Doppler showing intratumoural vascularity (mainly central) and spectral Doppler showing low resistance velocity waveforms in intratumoural vessels.
- In the present study, **81.48% malignant tumours** presented with **peak systolic velocity more than 15 cm/sec**. In the study by **Khanna et al, (2002)** all the malignant masses showed flow, with PSV>20cm/sec in 51.85% and PSV between 10-20cm/sec in 40.14% malignant tumours [7]. **Fleischer et al, (1995)** too, reported

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- The present study showed the significant increase in the sensitivity, specificity, positive predictive value and negative predictive value in establishing the preoperative diagnosis of adnexal masses/ ovarian masses especially in term of benign and malignant; when using B mode USG in combination with colour and spectral Doppler as compared to B mode USG alone and it is in harmony with other studies **Buy et al, (1996)** and **Taori et al, (2002)** [4, 5].
- By combining gray scale and colour Doppler finding, present study was able to distinguish between benign and malignant tumours with a **sensitivity of 81.48%, specificity of 93.93%.positive predictive value of 91% and negative predictive value of 86.11%**. **Carter et al, (1994)** too, reported the similar results (sensitivity 83% and specificity 95%, positive predictive value of 91% and negative predictive value of 90 %.)
- **Mousavi et al, (2006)** in their study of 101 patients with adnexal masses, found average CA125 level in benign tumours was 29.52 U/ml, whereas in malignant tumours had an average CA- 125 level of 3741 U/ml [8].In this study, a serum value of below 35 Unit/ml was taken as a benign representation while value above this considered as malignant.
- When **serum CA 125** level evaluated as a sole diagnostic method taking reference value of more than 35 U as malignant, in the current study its **sensitivity, specificity, positive predictive value and negative predictive value** in differentiating malignant from benign ovarian tumour was **77%,78.78%,75.00%,81.25%,** respectively. This was significantly less than that of gray scale combined with colour Doppler results. This was in harmony with the study by **Van Calster et al, (2007)** who concluded that Pattern recognition was superior to serum CA 125 for discrimination between benign and malignant adnexal masses [6].

V. Conclusion

- Among all the gynaecologic cancers, ovarian malignancies represent the greatest clinical challenge. Although majority of the ovarian masses are benign, malignancy is always a possibility. Ovarian cancer is the fifth leading cause of cancer death in women, the second most commonly diagnosed gynaecological malignancy but the leading cause of death from these malignancies. In spite of diagnostic and therapeutic advances in the care of women with ovarian cancer, the overall 5-year survival rate has changed little. This high mortality with ovarian cancer lies with the fact that most of the time they present at advance stage as disease has no specific symptoms. So, a reliable, accurate, and highly sensitive diagnostic modality is of significant clinical importance for early detection of ovarian cancer.
- Present study has been done to compare the results of gray scale and colour Doppler imaging with that of CA-125.
- The present study demonstrated significant increase in the sensitivity, specificity, positive predictive value and negative predictive value in establishing the preoperative diagnosis of ovarian masses in terms of benign and malignant nature, when using the B mode USG in combination with colour and spectral Doppler as compared to B mode USG alone.
- Certain USG features are helpful in differentiating between the two. Features suggestive of malignancy on gray scale include ill defined, large, solid masses with thick septations and papillary projections. On colour Doppler study central neovascularity, specific PSV, RI & PI values and absent diastolic notch favor malignancy.
- Adding serum CA125 to the gray scale and colour Doppler findings further increases the sensitivity and negative predictive value.

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