Prospective Study of Ultrasonography and CA-125 with Post Operative HPE Report in Management of Ovarian Cyst in Tertiary Care Hospital

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Abstract: *Background: Ovarian masses are one of the most frequently identified entities in gynaecological practice. Ultrasonography and serum Cancer antigen 125 [Ca-125] levels usually provide sufficient information for a presumptive diagnosis. Post operative HPE report helps in differentiating the ovarian cyst from benign to malignant. Objective: To determine whether serum Ca-125 levels in addition to tumour size and ultrasonography findings and post operative HPE report can help in differentiating benign ovarian cyst from malignant. Methods: A prospective study was conducted in 53 cases diagnosed with ovarian cyst from 1st January 2022 to 1st January 2023 in department of Obstetrics and gynaecology, in a tertiary care hospital. The patients clinical history, Ca-125, ultrasonographic findings and the HPE reports were studied. Results: During the study period, a total of 53 women were surveyed, the mean age group is around 36.4 years, among all the study subjects 13.2% were malignant of which 7.6% women were diagnosed as serous cystadenocarcinoma.7.54% of malignant cases in the study had fallen under ORADS-4, serum CA-125 value is <35U/ml in 7.54% malignant cases. Conclusion: As a standalone modality, serum CA-125 value >35U/ml in predicting ovarian cancer revealed modest diagnostic accuracy, hence there is a need for careful evaluation of serum CA-125 value in the reproductive age group and that of early stage ovarian malignancy whereas ORADS Scoring system is supportive in pre operative evaluation of benign versus malignant ovarian tumours*

Keywords: Ovarian cyst, Ca-125, Histopathological examination report

1. Introduction

Ovarian enlargements, cystic or solid may occur at any age group in women. Functional and inflammatory enlargements of the ovary develop exclusively during the child bearing age grou p. Globally, around 7% of women are diagnosed with ovarian cysts at some point in their life[1]. They may be asymptomatic or produce local discomfort, menstrual disturbances, infertility or in rare cases cause acute symptoms due to complications like Haemorrhage, rupture or torsion.

Ovarian cysts can be of 2 types. Functional and non-functional ovarian cysts. Functional ovarian cysts like follicular cysts and corpus luteum cysts which are small in size (<3mm) and develop as a part of the normal menstrual cycle. Non-functional ovarian cysts are persistent and these are pathological ovarian cysts which include polycystic ovarian syndrome, endometriotic cyst, mucinous cystadenoma, serous cystadenoma, dermoid cyst and para ovarian cyst[7, 8].

Mostly ovarian cysts are asymptomatic and incidentally found during ultrasound. Ovarian cysts in post menopausal women require careful workup and follow up as they may be precursor for ovarian carcinomas, which are usually diagnosed very late as they are asymptomatic in the early stage.

Tissue markers such as Ca-125 is useful mainly in the diagnosis of ovarian tumours[2].

Ca-125 (Carbohydrate Antigen 125) is a mucin type glycoprotein. It is produced by the MUC16 gene and is found on ocular surface, respiratory tract and sections of female genital tract of Mullerian duct origin[4] (Uterus, fallopian tube, upper part of vagina)

Ca-125 is commonly used as a biomarker for epithelial ovarian cancer diagnosis. Its upper limit in healthy individuals is 35U/ml[5]. Apart from ovarian cancers Ca-125 is elevated in carcinoma of endometrium, lung, pancreas, Breast and colorectal cancer. Ca-125 is also elevated in benign conditions like early pregnancy, Hepatitis, cirrhosis, endometriosis and pericarditits[6].

Ca-125 is used to differentiate benign versus malignant pelvic mass such as adnexal masses and ovarian cysts. Non invasive investigations like Ultrasonography and serum Ca-125 levels are mostly used in conjugation for diagnosing a malignant ovarian tumour[3].

Objective

The objective of this study is to determine whether serum Ca-125 levels and ultrasonographic features and post operative HPE report can help in differentiating benign ovarian cyst from malignant tumour.

2. Materials and Methodology

- This is a cross-sectional study done among 53 women at tertiary care hospital, Rajahmundry, East Godavari District from 1st January 2022 to 1st January 2023 with a questionnaire survey covering the socio– demographic factors, knowledge, attitude, and menopausal status.
- All participants were given a full explanation of the methodology and purpose of the study and an assurance of confidentiality.
- The questionnaire was designed based on a literature review and consisted of 5 sections

1) **Socio–Demographic Characteristics**
   a) Age
   b) Occupation
   c) Education
   d) Monthly income
   e) Marriage
   f) Parity
   g) Menopausal status

2) **Clinical History**
   a) Mass per abdomen
   b) Pain abdomen
   c) Menopausal status
   d) Any vaginal discharge
   e) post menopausal bleeding
   f) Past medical history
   g) Family history

3) **Knowledge about Ovarian Cyst**
Aware of Ovarian cancer cancer? (Yes/No)

4) **Knowledge about Serum Ca – 125**
a) Aware of serum Ca-125 levels? (Yes/No)
After collecting data, clinical history of the patient was taken and their ultrasonographic features of the ovarian mass was taken into consideration and the seum Ca-125 levels were evaluated and after the surgery, the post operative HPE report was collected to differentiate the benign ovarian cyst from malignant ovarian tumour.

3. Results

A total of 53 women in a tertiary care hospital near Rajahmundry were studied. During this period patients clinical history and ultrasonographic features of the ovarian cyst and serum Ca-125 levels and post operative HPE reports were analysed to differentiate benign ovarian cysts from malignant cysts

Table 1: Table Depicting age wise Distribution Details

Age in years	No. of women	Percentage
<20	3	5.6%
21 –29	7	13.2%
30– 39	18	33.9%
40– 49	10	18.86%
50– 60	10	18.86%
>60	5	9.4%

Most women in the study belonged to the 30 – 39 years age group (33.9 %) and the mean age group is 36.4 years. Other age-group distributions were 21-29 years (13%), 40-49 years (18%), 50-60years (18.8%) and <20years (5.6%) and in >60 years (9.4%).
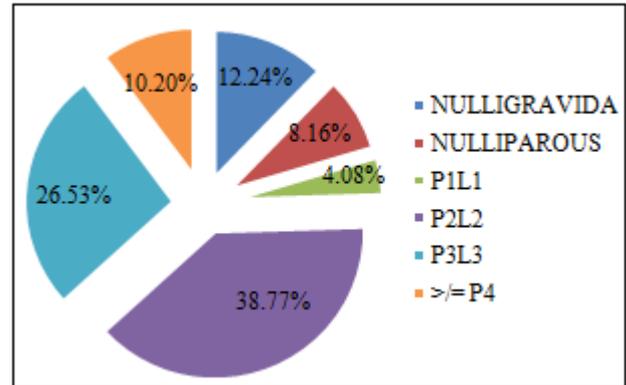

Figure 1: Figure Depicting the Parity in the Study Population

Results related to Parity (P) in our study were 8.16% Nulliparous, 4.08% P1, 38.77% P2, 26.53% P3, 10.20% >P4.

Table 2: Showing Distribution of Age and Menopausal Status:

Menopausal Status	No. of Women	Percentage
Pre Menopause	34	64.1%
Post Menopause	19	35.8%

in this study 64.1% women are pre menopausal AMD 35.8% are post menopausal

Table 3: Showing Distribution of Usage of OC Pills among the Study Group

OC Pills Usage	No. of Women	Percentage
Yes	23	43.34%
No	30	56.60%

in this study 43.4% women had history of usage of oc pills where as in 56.6% cases had no history of usage of OC pills.

Table 4: Showing CA-125 Values in the Study Group

CA-125 (U/ml)	No. of Women	Percentage
<35	45	84.90%
35-200	5	9.43%
>200	3	5.66%

in this study 84.9% women had CA-125 values <35U/ml; 9.43% were between 35-200U/ml; 5.6% women has values >200U/ml.

Table 5: Showing Ultra Sound Features among the Study Group:

USG Feature based on ORADS Score	No. of Women	Percentage
ORADS-1	0	0%
ORADS-2	4	7.54%
ORADS-3	40	75.47%
ORADS-4	7	13.20%
ORADS-5	2	3.77%

in this study majority 75.4% women had ORADS score 3, 13.2% cases had ORADS score 4 where as 7.5% cases had ORADS score 2, but only 3.7% cases had ORADS score 5.

Table 6: Showing Comparison between Age and CA125 Values

Age	<35U/mL	35-200U/mL	>200U/mL
<29years	15%	1.88%	1.88%
30 – 49 years	49.05%	1.88%	1.88%
50 – 60 years	13.20%	3.77%	1.88%
>60 years	7.54%	1.88%	0%

this study showed that 49% of the women were between the age of 30-49 years whereas only 7.54% cases are > 60 years of age.

Table 7: Showing comparison between CA-125 Value and ORADS Scoring System

CA-125	ORADS1	ORADS2	ORADS3	ORADS4	ORADS5
<35U/mL	0%	5.66%	67.92%	9.43%	1.88%
35-200U/mL	0%	1.88%	5.66%	1.88%	0%
>200U/mL	0%	0%	1.88%	1.88%	1.88%

In this study only 1.8% cases had CA-125 value >200U/ml whose ORADS score is 5, where as 67.9% women with ORADS-3 had CA-125 value < 35U/ml.

Table 8: Showing Comparison between CA-125 Values and Post OP HPE Report

CA-125	Benign	Malignant
<35U/mL	77.35%	7.54%
35-200U/mL	7.54%	1.88%
>200U/mL	1.88%	3.77%

In this study 7.5% malignant cases had CA-125 value <35U/ml, 3.7% malignant cases had CA-125 value >200U/ml and 77.3% benign cases had value< 35U/ml, 1.8% benign cases had value >200U/ml.

Table 9-Showing Age Distribution of Ovarian Malignancy

Age (Years)	Benign	Malignant
<40	33.9%	0%
41-50	39.62%	3.7%
51-60	13.20%	9.43%

In this study 9.43% of malignant cases were of age 51-60 years where as 3.7% cases are between the age group of 41-50 years.

Table 10: Showing Comparision of ORADS Scoring System with Post Operative HPE Report:

HPE	ORADS1	ORADS2	ORADS3	ORADS4	ORADS5
Benign	0%	7.54%	71.69%	5.6%	1.88%
Malignant	0%	0%	3.7%	7.54%	1.88%

In this study 71.69% benign cases came under ORADS-3, 1.8% benign cases are under ORDS-5, whereas 3.7% of malignant cases are under ORADS-3, 1.8% malignant cases are under ORADS-5.

4. Discussion

1) The Mean age group in the study population is 36.4 years compared to a study done by Veluswamy Arun- Muthuve et. al. ., which is 44years.
2) Ultrasound or CA-125 when used alone had many limitations (Jacobs et a., 1990; Kawai et al., 2009; Jacob et al., 2011;). Hence we had tried combining these tests together to yield a better diagnostic performance. In this study, we compare CA-125, ultrasound reports and postoperative HPE report in evaluation of ovarian tumours.
3) In our study, Ca-125 in pre menopausal women was not accurate enough to predict malignancy and conditions like hemorrhagic cysts, endometriosis, pelvic inflammatory diseases had false elevation of Ca-125 values. But studies have proven that CA-125 is the tumour marker with highest specificity for epithelial ovarian cancer (Jing et al., 2013)
4) In our study around 77.35% were Benign among the age group of less than 35 years and around 7.54% were malignant among the same age group based on their post operative HPE report.
5) Ultrasound when used individually had the best sensitivity but poor specificity. CA125 when used individually resulted in a number of false positive and false negative malignant ovarian cancers. So in our study we combined the pre operative CA125 values and ultrasound report with post operative HPE report in evaluating benign from malignant ovarian tumours.
6) In this study CA125 values of more than 200 is around 1.88% in the mean age group of 34years and CA125 value less than 35 is about 49.05% in the age group between 30 to 49 years.
7) Five women in the present study had their ovarian masses interpreted as benign (serum CA-125 <35 U/mL) but with the post operative HPE turned out to be malignant. Jacob et al demonstrated that elevated serum CA125 >35U/mL could be detected in approximately 50% of the patients with stage 1 and in more than 90% of those with advanced ovarian diseases.
8) In our study group malignancy rate was around 13.20% out of total 53 cases.
9) ORADS scoring system which was taken pre operatively had helped us in the detection rate of malignant ovarian tumours. (Menon et al., 2010;)
10) In this study, majority (71.69%) of benign ovarian tumours came under ORADS-3 and majority (7.54%) of malignant ovarian tumours came under ORADS-4.
11) Serous cyst adenocarcinoma was observed in 7.54% percent with in the total study population.

5. Conclusion

As stand alone modality, serum CA-125 value >35U/ml in predicting ovarian cancer revealed modest diagnostic accuracy, hence there is a need for careful evaluation of

serum CA-125 value in the reproductive age group and that of early stage ovarian malignancy whereas ORADS Scoring system is supportive in pre operative evaluation of benign versus malignant ovarian tumours.

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