ORIGINAL RESEARCH PAPER

Pathology

CORRELATION OF SERUM CA-125 WITH CLINICOPATHOLOGICAL FINDINGS IN OVARIAN TUMOURS.

KEY WORDS: CA-125, tumours, Ovarian tumours

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ABSTRACT

Introduction- Although it is a small organ, the ovary has been said to have a vast capacity for differentiation and to be the source of a wide range of tumours. According to data from the Indian Cancer Registry, ovarian cancer accounts for up to 8.7% of all cancer cases in various regions of the nation. Numerous tumour indicators can help with diagnosis, prognosis, and early recurrence prediction, CA-125 is considered to be the most reliable marker. Present study was done to correlate serum CA-125 with clinicopathological findings in ovarian tumours. **Methods-** The present retrospective and prospective study was conducted over a period of one and half year. The study was carried out after obtaining clearance from the institutional ethics committee. Total 58 cases were obtained over a period of one and half year which met the inclusion and exclusion criteria. Comprehensive clinical, pathological, radiological imaging and histological examinations were used to make the diagnosis of ovarian tumours. **Results-** In the present study, age range of patients with ovarian tumour was seen more commonly in 4th to 5th decade of life. In present study, majority were epithelial tumours (74.1%), followed by germ cell tumours (12.1%), sex cord/stromal tumours (6.9%) and non-neoplastic lesions (6.9%). There was significant correlation found between malignant potential and CA-125 status. Out of 35 women with CA-125 score of ≥35 IU /ml, 26 had malignant lesions on histopathology. The sensitivity of CA-125 in predicting malignant lesions as compared to histopathology was 74.20% with 85.70% specificity. **Conclusion-** According to the study's findings, CA-125, the most thoroughly researched molecule, appears to be the most promising biomarker for predicting the likelihood that a patient would develop ovarian cancer.

INTRODUCTION-

The ovaries are paired female reproductive organs that are situated at the back of the wide ligaments on either side of the uterus[1]. Although it is a small organ, the ovary has been said to have a vast capacity for differentiation and to be the source of a wide range of tumours[2]. Ovarian tumour subtypes vary in terms of risk factors, precursor lesions, pattern of dissemination, natural history, and response to therapy. In reality, they are distinct diseases that share ovarian mass as a symptom. In Indian women, ovarian tumours are the third most common cancer after uterine and cervical cancers[3]. According to data from the Indian Cancer Registry, ovarian cancer accounts for up to 8.7% of all cancer cases in various regions of the nation[4].In the third to fifth decade of life, benign ovarian tumours account for 80% of cases, while malignant tumours are more prevalent in the fourth to sixth decades[5]. From puberty until menopause, the ovary's complex structure, distinctive physiology and ongoing endocrine and traumatic stresses give rise to a variety of cell types, each of which is prone to tumorigenesis[6]. Surface, coelomic or germinal epithelium covers ovary.

The majority of initial ovarian tumours come from one of these structures. Therefore, depending on the origin of the cell, such as originating from epithelial tissue, germ cells, or connective tissue, the histiogenesis of ovarian tumours cover a diverse spectrum of neoplasms[7]. Regardless of where they originate, ovarian tumours are typically difficult to detect until they are progressed or enormous in size since they are intra-abdominal organs. This is mostly because they lack symptoms or have ambiguous symptoms[8]. Compared to other genital malignancies, the risk factors for ovarian cancer are less well understood, despite the fact that nulliparity, genetic abnormalities and family history are thought to be the main risk factors[9]. Because of the declining fertility rate and rising usage of ovulation induction medications, there is a chance that the incidence of ovarian tumours in developing nations will rise[10]. Histopathology still remains the cornerstone in detecting and typing of distinct forms of ovarian tumours and thus plays a crucial role in targeted therapy and prognostication. Cytology and newer approaches in imaging and genetics have their own limits[11]. Numerous tumour indicators can help with diagnosis, prognosis and early recurrence prediction. Cancer antigen 125 (CA-125), Carcinoembryonic antigen (CEA), alpha fetoprotein (AFP) and beta human chorionic gonadotrophin (ß-HCG) are significant cancer markers. When it comes to the diagnosis and prognosis of epithelial ovarian malignancies, CA-125 is considered the most reliable[12]. Since its discovery, routine therapy of patients with advanced ovarian cancer now includes assessment of the serum level of the CA-125 antigen. Currently, CA-125 concentrations of less than 35 IU/ml are considered normal. Elevated levels were identified in more than 90% of patients with advanced stage ovarian cancer but only in 50% of patients with stage I disease when patients were stratified by disease stage. Additionally, serous tumours rather than mucinous tumours are more strongly related with increased CA-125 values. Patients with ovarian cancer can utilise their serum level of CA-125 to track their response to chemotherapy, relapses and disease progression[13]. Therefore, it seems reasonable to research if CA-125 could be useful for ovarian cancer prognosis. Present observational study was planned to correlate serum CA-125 levels with histopathological findings of ovarian tumours.

AIM-

To study age wise incidence along with correlation of serum CA-125 with histopathogical findings of ovarian tumours.

OBJECTIVES-

1. To study incidence of different ovarian tumours.
2. To study age distribution among ovarian tumours.
3. To correlate findings of serum CA-125 with histopathology.

MATERIAL AND METHODS-

The present retrospective and prospective study was conducted over a period of one and half year. The study was

carried out after obtaining clearance from the Institutional Ethics Committee. Out of total 58 patients, the details of 38 patients (one year data) were collected prospectively and the details of remaining 20 patients were collected retrospectively from the records. Patient information was collected in a pretested, structured proforma. Comprehensive clinical, pathological, radiological imaging and histological examinations were used to make the diagnosis of ovarian tumours. All patients had their preoperative CA-125 serum levels taken. The received specimens were routinely processed after being fixed in 10% buffered formalin. Four microns thick sections were cut from blocks. Following H&E staining, these sections were categorised in accordance with the WHO classification for ovarian neoplasms. An additional portion was removed for immunohistochemistry study. Using a Dako antibody, these slides were stained for CA-125. Brown membranous and cytoplasmic staining were signs of positive staining. A modified histoscore approach based on staining intensity & the percentage of positive tumour cells was used to semi-quantitatively score the immunostaining. Each stained section was quantified as-

- 0 = negative or < 5 % positivity of tumour cells
- 1+ = mild positivity in 5 – 30 % of isolated tumour cells.
- 2+ = moderate positivity in 30 – 80 % of tumour cells
- 3+ = intense positivity in > 80 % of tumour cells.

The histopathological findings were correlated with the serum levels & tissue expression of CA-125. Data was collected and entered simultaneously in statistical package for social sciences (SPSS) version 23 and coded appropriately. Descriptive statistics were calculated to summarize the sample characteristics in terms of frequency and percentage. Analytical and inferential analysis was applied between dependent variable and other independent variables. Significance was set at standard 0.05.

Inclusion Criteria:
All patients clinically suspected of ovarian tumours and had their CA-125 estimated.

Exclusion Criteria:
Patients who came for follow up post operatively.

RESULTS AND OBSERVATIONS-
In the present study, age range of patients with ovarian tumour was seen more commonly in 4th to 5th decade of life. Mean age of presentation was 45±8 years. In present study, majority were epithelial tumours (74.1%), followed by germ cell tumours (12.1%), sex cord/stromal tumours (6.9%) and non-neoplastic lesions (6.9%). Among epithelial tumours, majority were serous cystadenocarcinoma (27.9%), followed by serous cystadenoma (20.9%) and mucinous cystadenoma (14%). Among sex cord tumours, majority were fibroma (50%), followed by granulosa cell tumour and fibrothecoma (25%). Dermoid cyst (42.9%) were the common type of germ cell tumour, followed by dysgerminoma, yolk sac tumours and immature teratoma. In age group of more than 40 years, majority of them had epithelial tumours (68.4%), followed by germ cell tumours (15.8%), non-neoplastic lesions (10.5%) and sex cord tumours (5.3%). In age group of less than 40 years, majority had epithelial tumours (85%), followed by sex cord tumours (10%) and germ cell tumour (5%). In age group of less than 40 years, none of them had non-neoplastic cyst.

Histological findings and distribution of ovarian mass among each of the three categories of patients, i.e, Benign, Borderline and Malignant: In present study, half of the tumours had malignant potential, 46.6% were benign and 3.4% were borderline. While among Malignant cases, majority of the cases were serous cystadenocarcinoma, followed by Mucinous cystadenocarcinoma. Among all benign tumours, majority were dermoid cyst, fibroma followed by serous cystadenoma and mucinous cystadenoma in this study. Borderline cases constituted only 2 cases, which included Borderline serous tumour and Teratoma with borderline epithelial tumour. In majority of the study subjects, lesions were unilateral involving right ovary (46.6%), while 24.1% had bilateral involvement.

Various clinical symptoms of the patients were listed and lump in abdomen (32.8%) was the most common symptom followed by abdominal pain (29.3%). Other listed symptoms were vague abdominal discomfort, menstrual disturbances, GI complains, urinary complains and leucorrhoea.

Majority of the study participants had CA-125 of ≥ 35 IU/ml (67.2%). In this study, 66.07% of patients with ovarian mass presented with high CA-125 levels of greater than 35 IU/ml. Out of these, 50% were malignant. Among the benign cases, the mean value of serum CA-125 levels were reported to be 68 ± 138(IU/ml). Among the borderline cases, the mean value of serum CA-125 levels were 133±33 (IU/ml). Among the malignant cases, the mean value of serum CA-125 levels were 418±386 (IU/ml). There was a significant correlation between malignant potential and nature of tumour ($p<0.05$). According to the distribution of patient's mean value of CA-125 and histological findings of malignant potential, highest mean concentration of serum CA-125 levels were seen in immature teratoma (13,16) followed by Dysgerminoma (1034), while lowest concentration of serum CA-125 level was observed in Dermoid cyst and Fibroma. Majority of the malignant lesions (71.8%) had CA-125 ≥35 IU/ml and benign lesions (94.7%) had CA-125 <35 IU/ml. Also there was significant correlation found between malignant potential and CA-125 status. Out of 35 women with CA125 score of ≥35 IU /ml, 26 had malignant lesions on histopathology, while 9 women had benign lesions. The sensitivity of CA-125 in predicting malignant lesions as compared to histopathology was 74.20% with 85.70% specificity.

DISCUSSION-
Because there are no reliable screening measures, ovarian cancer has the worst prognosis among all gynaecological cancers. For optimal care, preoperative diagnosis of the benign and malignant nature of an ovarian mass using methodologies is essential.

Age Group-
In present study, majority of the study participants were in the age group of 41-50 years, with mean age of 45±8 years. In accordance with our findings, Nalini et al[14] also reported that majority of the study participants were in the age group of 40-49 years, with mean age of 42 years. In a study done by Priya et al[15], age distribution of participants ranged from 11 to 73 years with a mean age of 42 years and majority of the study participants were in the reproductive age group. Anurag et al[16] in their study reported ovarian tumours more commonly in 3rd to 4th decade of life. Mean age of presentation was 42.69±14.55 years.

Nature Of The Tumour-
In present study, majority were epithelial tumours followed by germ cell tumour, sex cord tumours and non-neoplastic lesions. Vrunda Choudhary et al[17] in their study reported majority were epithelial tumours followed by germ cell tumours and sex cord stromal tumours which is in line with our findings. Sudha V et al[18] also reported 64% were epithelial tumours, 26% were germ cell tumours and sex cord tumours were 8.6%. Similar results were reported by Shivaji D et al[19]. Similar results were reported by Bhagyalakshi et al[20] and Nalini et al[14]. The majority of epithelial tumours were serous cystadenomas, followed by mucinous cystadenoma. The most common type of sex cord tumour was fibroma, followed by granulosa cell tumour. The most frequent type of germ cell tumour was dermoid cyst, followed by a dysgerminoma. Sudha V et al[18] reported, commonest epithelial tumour was serous cystadenoma and commonest germ cell tumour was

benign cystic teratoma. Pramila Jain et al[21] in their study reported, serous cystadenoma was most common surface epithelial tumour.

Laterality-

In majority of the study subjects, lesions were unilateral involving right ovary (46.6%), 24.1% had bilateral involvement. Anurag Prakash et al[16], in their study also reported that 70% of study participants had unilateral mass. Sudha V et al[18], in their study reported Left sided tumours of ovary(51.08%) were more common than right sided tumours (43.47%) and 5.4% cases were bilateral. When a tumour is bilateral, it implies spread to the opposite ovary as part of its extension throughout the pelvis and abdomen, as is the case in more severe cases.

Presenting Symptoms-

The ovarian tumour's manifestation varied in the current study. Others had acute stomach pain and were either asymptomatic or had an ultrasound that accidentally revealed their condition. Our hospital is a tertiary care facility located in a rural location and the majority of our patients had low socioeconomic position and had low levels of education, so the worst part of many instances was late presentation. In present study, various symptoms of the patients were listed and lump in abdomen (32.8%) was the most common symptom followed by abdominal pain (29.3%). These findings were similar to a study conducted by Nalini et al[14] who reported abdominal mass to be the most common presentation, present in 58.9% of cases. However Vrunda Choudhary et al[17] in their study reported pain abdomen as the most common symptom followed by lump in abdomen and menstrual irregularities. Sudha V et al[18] also reported 35% of the patients complained of dull aching lower abdominal pain, 27% complained of abdominal mass and 6% of the patients gave history of menstrual disturbance like menorrhagea.

Malignancy Potential-

In present study, half of the tumours had malignant potential, 46.6% were benign and 3.4% were borderline. Similar to our findings, Das et al[22], in their study reported majority (66%) of the tumours to be malignant, 32% to be benign and 2% to be borderline. In contrast to our findings, Vrunda Choudhary et al[17]in their study reported incidence of benign tumours as 70.8%. Varsha et al[23] reported 63.33% as benign, 30% as malignant and only 2 cases as borderline. In present study, higher percentage of malignant tumours were reported, possibly due to referral of cases as this is a tertiary care centre.

Among cases of malignancy, serous cystadenocarcinoma predominated, followed by mucinous cystadenocarcinoma. In this study, dermoid cysts, fibromas, and benign serous cystadenoma made up the majority of the benign tumours. There were only two borderline cases, a borderline serous tumour and a teratoma with a borderline epithelial tumour.

Similar to our findings, Varsha et al[23] also reported that among benign cases, majority were serous cystadenoma followed by mucinous cyst adenoma. Among malignant cases, most common was serous cystadenocarcinoma followed by mucinous cystadenocarcinoma. Borderline cases constitute only 2 cases, which include Borderline Serous tumour and Teratoma with borderline epithelial tumour. Anurag et al[16] in their study reported that according to histology findings, there were 52 individuals evaluated, and 69.3% of those cases were malignant. The majority were serous cystadenocarcinomas. There were 26.9% benign tumours. Serous cystadenoma was the most prevalent benign tumour, followed by mucinous cystadenoma and fibroma, all of which had an equal frequency of 5.77 % each. Only 3.8% of cases were borderline. These findings are in line with ours. 83.01% of the 141 tumours studied in the study by Nalini et al[14] were benign, 4.9% were borderline, and 12.1% were malignant. The most frequent benign lesion was serous cystadenoma, listed in sequence. Serous Cystadenocarcinoma represented the majority of the total number of malignant cases.

Age Group And Nature Of Tumour-

In present study, majority of the benign tumours were in the age group of 31-40 years, however majority of the malignant cases were in the age group of 41-50 years. All the borderline cases were found in age group of 51-60 years. In a study conducted by Bhagyalakshmi et al[20], authors reported that peak incidence of benign, malignant and borderline tumours were in the age group of 21-40 years, 41-50 years and 31-50 years respectively. These findings are in line with our study. Jalpa Desai et al[24], also reported that most of the benign tumours were observed in the age group of 31-40yr, and most of the malignant tumour cases were common in elderly (>40 years) age group. Parmila Jain et al[21] in her study also reported similar findings.

Serum CA-125-

In present study, majority of the study participants had CA-125 of ≥35 IU/ml (67.2%). Varsha et al[23] in their study reported CA-125 of ≥ 35 IU/ml was reported in 56.67% of study participants which is in accordance with our results. In this study, patients with ovarian masses made up 66.07% of those who had high CA-125 levels, which were greater than 35 IU/ml. Of these, 50% were malignant. The mean value of serum CA-125 levels among the benign patients was reported to be 68 ± 138 (IU/ml). The mean serum CA-125 level for borderline cases was 133 ± 33 (IU/ml). The mean serum CA-125 levels in the cancer cases were 418 ± 386 (IU/ml). Anurag et al[16] in their study reported similar results, Malignant cases had a high mean CA-125 serum value of 572.45 (IU/ml). The mean serum CA-125 concentration for two borderline cases was 101.37 (IU/ml). The median value of serum CA 125 in the benign category was 47.09 (IU/ml).In present study, significant correlation was found between malignant potential and CA-125 status. This is similar to the study done by Anurag et al[16]and Varsha et al[23] who also found significant association between malignant potential and serum CA-125. In present study, out of 35 women with CA-125 score of ≥35 IU/ml, 26 had malignant lesions on histopathology. 9 cases having elevated serum CA-125 did not reveal tissue expression of CA-125. The sensitivity of CA-125 in predicting malignant lesions as compared to histopathology was 74.20% with 85.70% specificity. PPV and NPV was 96% and 66% respectively. Anurag et al[16] in their study reported, 34 of the 39 women with a CA-125 value of more than 35 IU/ml who underwent histology had malignant lesions, while just five had benign lesions. Comparing CA-125's ability to predict malignant lesions to histology, it had a sensitivity of 87.18% and a specificity of 81.82%. Das et al[22] in their study reported, 19 (38%) of the 50 cases had high CA-125 levels. 14 out of those 19 cases demonstrated positive tissue expression, while 5 cases displayed negative tissue expression. Overall sensitivity of serum CA-125 level to tissue expression was 100% and the specificity is 86% with positive and negative predictive value of 74% and 100% respectively. Compairing CA-125 and Mallignancy potential with clinical sign and symptom such as pain in abdomen and lump in abdomen, no significant association was found.

SUMMARY AND CONCLUSION-

According to the study's findings, CA-125, the most thoroughly researched molecule, appears to be the most promising biomarker for predicting the likelihood that a patient would develop ovarian cancer. Our institute's database of ovarian tumours included a broad histological spectrum. Surface epithelial tumours made up higher proportions than was previously described in the literature, although the frequency distribution of the tumours was similar to studies in the literature. In our study, serous cystadenocarcinoma was the most prevalent type of tumour. The peak age at occurrence for malignant tumours was

higher and was consistent with literature. Younger ages had occurrence of benign tumours. Most of the patients had an abdominal lump when they first arrived. The correlation between malignant potential and CA-125 level was found to be substantially significant (higher than 35). In comparison to histology, the serum CA-125 level had a 74% sensitivity and 85% specificity for predicting malignant tumours. Patients with high serum CA-125 levels are beneficial in clinical practice and have good accuracy in predicting malignant tumours.

Funding- No funding sources.

Limitations-
The study reflects the findings of a specific geographical area. A big multi-centric study is necessary because this hospital-based study was conducted with a small number of patients and may not accurately reflect the trend in general population.

Conflicts of Interest- No potential conflict of interest relevant to this article was reported.

Ethical Approval- Approved.

Acknowledgement-
The authors recognise the invaluable assistance provided by the scholars whose publications are mentioned and included in the manuscript's references. The authors are also appreciative to the authors, editors, and publishers of all the papers, journals, and books that were used to review and debate the literature for this work.

Result (Tabular and Graphical representation)

Table-1 Age wise distribution of study participants

Age Group	Count	Column N %
18 - 30 years	2	3.4%
31 - 40 years	18	31.0%
41 - 50 years	21	36.2%
51 - 60 years	17	29.3%

Fig-1 Age wise distribution of study participants

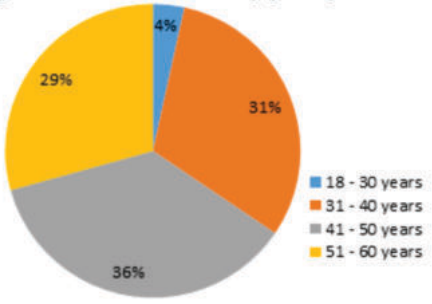


Table-2 Distribution of type of tumours

Type of Tumour	Count	Column N %
Epithelial Tumour	43	74.1%
Sex Cord/ Stromal Tumours	4	6.9%
Germ Cell Tumour	7	12.1%
Non-Neoplastic Cyst	4	6.9%

Fig-2 Distribution of type of tumours

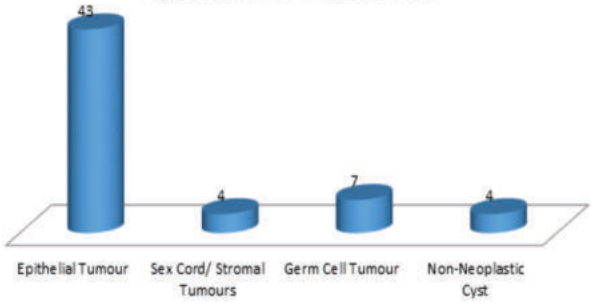


Table-3 Distribution of type of tumours

Epithelial Tumours	Count	Column N %
Serous Cystadenoma	9	20.9%
Serous Cystadenocarcinoma	12	27.9%
Mucinous Cystadenoma	6	14.0%
Mucinous Cystadenoma carcinoma	6	14.0%
Endometroid Adenocarcinoma	3	7.0%
Clear Cell Tumours	2	4.7%
Brenner's Tumours	2	4.7%
Epithelial Stromal Tumours	1	2.3%
Borderline Serous Tumour	1	2.3%
Teratoma with epithelial tumour	1	2.3%

Fig-3 Distribution of type of Epithelial tumours

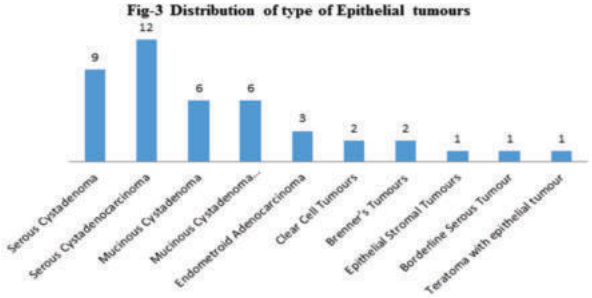


Table-4 Distribution of type of Sex Cord tumours

Sex Cord Tumours	Count	Column N %
Granulosa Cell Tumour	1	25.0%
Fibroma	2	50.0%
Fibrothecoma	1	25.0%

Fig-4 Distribution of type of Sex Cord tumours

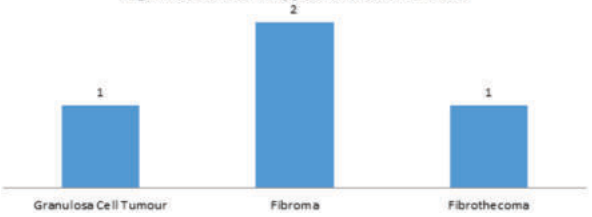


Table-5 Distribution of type of Germ Cell tumours

Germ Cell Tumour	Count	Column N %
Dysgerminoma	2	28.6%
Dermoid Cyst	3	42.9%
Yolk Sac Tumour	1	14.3%
Immature Teratoma	1	14.3%

Fig-5 Distribution of type of Germ Cell tumours

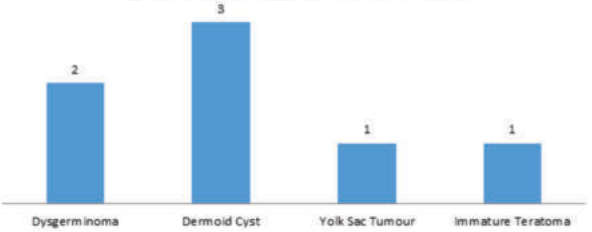


Table-6 Distribution of malignant potential

Malignant Potential	Count	Column N %
Benign	27	46.6%
Borderline	2	3.4%
Malignant	29	50.0%

Fig-6 Distribution of malignant potential

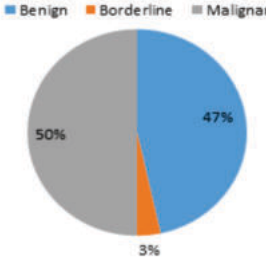


Table-7 Distribution of involvement of ovary

Ovary Involved	Count	Column N %
Right	27	46.6%
Left	17	29.3%
Both	14	24.1%

Fig-7 Distribution of involvement of ovary

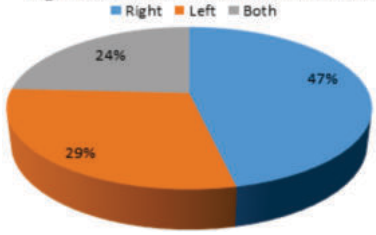


Table-8 Distribution of clinical features among study participants

Clinical Features	Count	Column N %
Asymptomatic	2	3.4%
Pain in Abdomen	17	29.3%
Lump in Abdomen	19	32.8%
Vague Abdominal Discomfort	4	6.9%
Menstrual Disturbance	9	15.5%
Gastrointestinal Complaints	3	5.2%
Urinary Complaints	3	5.2%
Leucorrhoea	1	1.7%

Fig-8 Distribution of clinical features among study participants

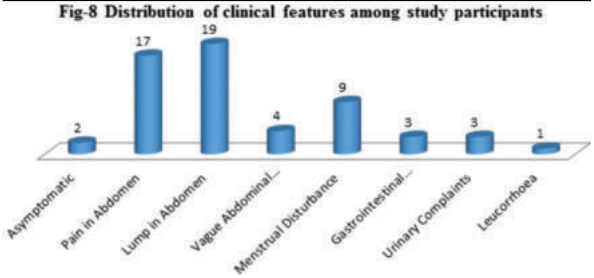


Table-9 Distribution of patients with Type of tumour and Age group

Type of Tumour	Age Group			
	< 40 years		> 40 years	
	Count	Column N %	Count	Column N %
Epithelial Tumour	17	85.0%	26	68.4%
Sex Cord/ Stromal Tumours	2	10.0%	2	5.3%
Germ Cell Tumour	1	5.0%	6	15.8%
Non-Neoplastic Cyst	0	0.0%	4	10.5%

Fig-9 Distribution of patients with Type of tumour and Age group

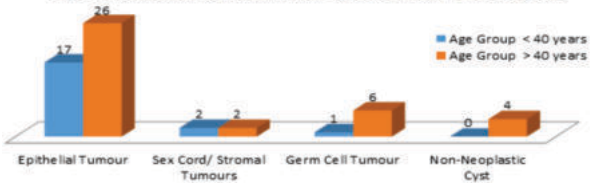


Table-10 Distribution of patients with Type of tumour and malignant potential

Type of Tumour	Malignant Potential						$\chi 2$ value	P Value
	Benign		Borderline		Malignant			
	Count	Column N %	Count	Column N %	Count	Column N %		
Epithelial Tumour	17	63.0%	2	100.0 %	24	82.8%	7.185	0.30
Sex Cord/ Stromal Tumours	3	11.1%	0	0.0%	1	3.4%		
Germ Cell Tumour	3	11.1%	0	0.0%	4	13.8%		
Non-Neoplastic Cyst	4	14.8%	0	0.0%	0	0.0%		

Fig-10 Distribution of patients with Type of tumour and malignant potential

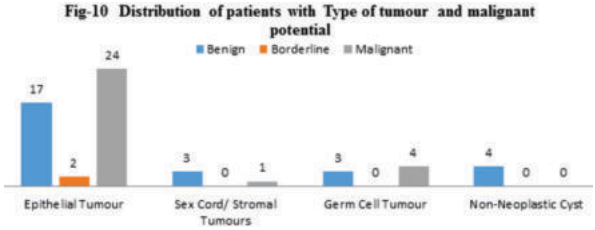
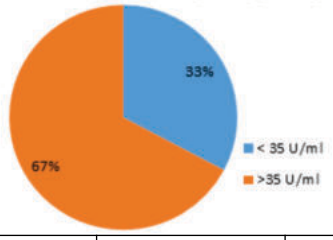


Table-11 Distribution of CA-125 among study participants

CA-125 Status	Count	Column N %
< 35 U/ml	19	32.8%
35 - 100 U/ml	11	19.0%
100 - 500 U/ml	19	32.8%
> 500 U/ml	9	15.5%

Fig-11 Distribution of CA-125 among study participants



CA125 Status	Count	Column N %
< 35 U/ml	19	32.8%
>35 U/ml	39	67.2%

Table-12 Distribution of Type of tumour according to CA-125

Type of Tumour	Ca125 Status				$\chi 2$ value	p Value
	< 35 U/ml		>35 U/ml			
	Count	Column N %	Count	Column N %		
Epithelial Tumour	9	47.4%	34	87.2%	14.506	0.00*
Sex Cord/ Stromal Tumours	3	15.8%	1	2.6%		
Germ Cell Tumour	3	15.8%	4	10.3%		
Non-Neoplastic Cyst	4	21.1%	0	0.0%		

Fig-12 Distribution of Type of tumour according to CA-125

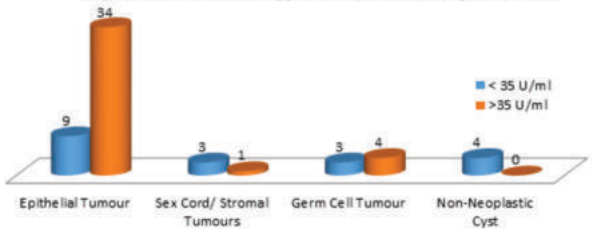


Table-13 Distribution of Mallignant potential according to CA-125 status.

Malignant Potential	CA-125 Status				$\chi 2$ value	p Value
	< 35 U/ml		>35 U/ml			
	Count	Column N %	Count	Column N %		
Benign	18	94.7%	9	23.1%	26.368	0.00*
Borderline	0	0.0%	2	5.1%		
Malignant	1	5.3%	28	71.8%		

Fig-13 Distribution of Mallignant potential according to CA-125 status.

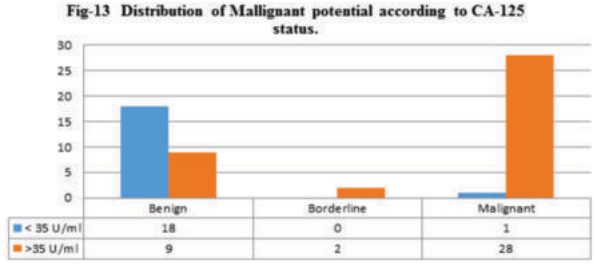


Table 14 : Showing prediction of malignant tumour according to serum CA- 125 level

Malignant Potential	CA-125 Status		Total
	> 35 U/ml	<35 U/ml	
Yes	28 (True positive)	1(False negative)	29
NO	9(False positive)	18(True negative)	27
Total	37	19	56

Sensitivity	75.6%
Specificity	94.7%
PPV	96.5%
NPV	66.60%

Table 15- Correlation between malignant potential and Serum CA- 125Value

Malignant Potential	n	CA-125 Status				
		Mean	Standard Deviation	Median	Range	p value
Benign	27	68	138	30	05-717	0.00*
Borderline	2	133	33	133	110-156	
Malignant	29	418	386	235	16-1316	

Table 16 : Distribution of patients frequency according to types of Histological findings and mean CA-125 status.

Histological Findings		Frequency		Ca125 Status	
		n	Percentage	Mean	Standard Deviation
Benign	Serous Cystadenoma	9	15.50%	146	224
	Mucinous Cystadenoma	6	10.30%	31	30
	Brenner's Tumours	2	3.40%	58	49
	Fibroma	2	3.40%	19	20
	Fibrothecoma	1	1.70%	25	
	Dermoid Cyst	3	5.20%	19	11
	Non-Neoplastic Lesion	4	6.90%	21	12
Borderline	Borderline Serous Tumour	1	1.70%	156	
	Teratoma with epithelial tumour	1	1.70%	110	
Malignant	Serous Cystadenocarcinoma	12	20.70%	442	313
	Mucinous Cystadenoma carcinoma	6	10.30%	139	97
	Endometroid Adenocarcinoma	3	5.20%	525	501
	Clear Cell Tumours	2	3.40%	167	97
	Epithelial Stromal Tumours	1	1.70%	58	
	Granulosa Cell Tumour	1	1.70%	182	
	Dysgerminoma	2	3.40%	1034	185
	Yolk Sac Tumour	1	1.70%	450	
	Immature Teratoma	1	1.70%	1316	
Total		58	100.00%		

Table 17 : Association between CA-125 status and Clinical sign and symptoms

		Ca125 Status				χ^2 value	p Value
		< 35 U/ml		>35 U/ml			
		Count	Column N %	Count	Column N %		
Pain in Abdomen	Present	2	10.5%	15	38.5%	4.812	.088*
	Absent	17	89.5%	24	61.5%		
Lump in Abdomen	Present	7	36.8%	12	30.8%	.214	.644
	Absent	12	63.2%	27	69.2%		

Table 18 : Association between Mallignant potential and Clinical sign and symptoms

		Mallignant Potential				χ^2 value	p Value
		Yes		No			
		Count	Column N %	Count	Column N %		
Pain in Abdomen	Present	9	31.0%	8	27.6%	.083	.773
	Absent	20	69.0%	21	72.4%		
Lump in Abdomen	Present	10	34.5%	9	31.0%	.078	.780
	Absent	19	65.5%	20	69.0%		

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