Clinicopathological perspective on ovarian neoplasms in tertiary care hospital, Vijayapura

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Abstract: *Background and Objective*: Ovarian neoplasms are amongst the most common diseases affecting women in India which requires surgical remedy. This study aims to study prevalence of various ovarian neoplasms along with its correlation with various risk factors such as age, parity, distribution etc. The ultimate objective is to have a better understanding of these diseases and their risk factors resulting in effective prevention, better prognosis and ultimately a better life quality. *Methods*: This study was retrospective and prospective from January 2016 to December 2018. It was conducted on 106 patients who were diagnosed of ovarian cancers. Complete patient history was collected and analysed. Histopathological examination of the specimen was done and correlated with clinical records. *Results*: Ovarian neoplasms were most common in age group of 31 to 40 years. Benign neoplasms were much more common than malignant and borderline lesions. Surface epithelial tumors were much more common than germ cell tumors and sex cord stromal tumors. Most common presenting symptom was abdominal pain. Most of the lesions were cystic in consistency and were unilateral. *Conclusion*: Ovarian neoplasms are significant health concerns among middle aged women. Higher incidence is seen in nulliparous patients. Decreased incidence is seen in women with higher parity, lactation and oral contraceptive usage. Better understanding of risk factors helps in prevention of various ovarian cancers.

Keywords: Ovarian cancer, risk factors, Surface Epithelial Tumour, Incidence, Germ cell tumors.

Introduction

Ovarian cancer is the 6th most common cancer seen in women throughout the world and is the 7th leading cause of deaths due to cancer. Geographical variation of incidence is seen greatly. It is more common in Western nations compared to developing countries. In India, its incidence is nearly half of that of Europe where an incidence rate of 13.92 per 100,000 females is seen [1]. However its incidence in developing countries is on rise due to westernization of diet and lifestyles as well as sociodemographic factors [2]. Risk factors include family history of disease with an increase in risk from 3 to 7 times depending on the number of affected first degree relatives [3]. Another risk factor is parity. Parous females have 30-60% lesser chance of developing ovarian neoplasms. Each pregnancy lowers risk by 15%. Similarly lactation also reduces the risk for ovarian cancers. The underlying cause is decrease in number of ovulatory cycles [3]. Consequently, early age of menarche and late age of menopause increases the risk. Oral contraceptives usage for 5 years reduces risk of

ovarian cancers by 20% [3]. Cigarette smoking increases risk for mucinous carcinoma [2]. Primary ovarian neoplasms are divided into three types depending on site of origin. Epithelial tumors which arises from surface epithelium; sex cord stromal tumors which develops from ovarian stroma and sex cords ; and germ cell tumors arising from germ cells [4].

Epithelial tumors consists of 60% of all ovarian cancers. They may comprise 90% of all malignant neoplasms. They are further subclassified into serous tumors, mucinous tumors, endometrioid tumors, clear cell tumors, transitional cell tumors and epithelial-stromal neoplasms. Out of these most common variant is serous tumor accounting for about 30% of all ovarian neoplasms [4]. Common sex cord stromal tumors include granulosa tumors, fibromas, thecomas, and Sertoli Leydig cell tumor [5]. Germ cell tumors are more common than sex cord stromal tumors and include teratomas,

dysgerminomas, yolk sac tumors and mixed germ cell tumors [5].

Material and Methods

The present study was prospective and retrospective study which was undertaken to study the clinicopathological study of gallbladder diseases in tertiary care hospital. The study period was from January 2016 to December 2018. The study population consisted of patients who were clinically suspected of ovarian neoplasms and underwent hysterectomy or oophorectomy on basis of clinical and radiological evidence. Patients who were already diagnosed with ovarian neoplasms histopathologically with their case history and specimen intact were also included. Patients were mainly from Al Ameen Medical College and Hospital, Vijayapura and District Hospital, Vijayapura. 106 patients were included in the study.

Details about the patients such as age, presenting sign and symptoms were collected from their records. Freshly removed specimens were fixed in 10% buffered neutral formalin in well labelled containers for 24 hours. After fixation, grossing was done. Details of the patient was duly matched on specimen container and requisition form. External morphology was noted. Sections were taken from specimen and completely processed. Slides were prepared and stained with H&E

stains. Data were analyzed using SPSS software v.23.0 for windows, Microsoft Office 2007 and Microsoft Excel 2007. The initial measures of each group were compared with the final measures of the study period and comparison between the groups was done.

Inclusion criteria:
- Ovarian neoplasms were considered
- For retrospective cases, patients with their complete case history preserved.
- For retrospective cases, patients with their specimens preserved in the department.

Exclusion criteria:
- Non neoplastic lesions of ovary were not included.
- Autolysed specimens.
- For retrospective cases, patients were excluded if their case history and specimens were unavailable.

Results

Out of 106 cases, maximum number of patients were seen in 31 to 40 years age group (29 patients making up 27.36%) (Table 1). This was followed by 21 patients (19.81%) in 21 to 30 years age group and 19 patients (17.92%) in 41 to 50 years age group. Only few patients were seen in extremes of ages.

Table-1: Diagnosis - Agewise distribution of cases									
	11-20	21-30	31-40	41-50	51-60	61-70	>70	Total	%
Surface Epithelial Tumors									
Serous Cystadenoma	2	9	17	4	4	3	3	42	39.62
Serous Borderline Tumor	0	0	0	0	0	1	0	1	0.94
Serous Adenocarcinoma	0	0	0	1	1	1	0	3	2.83
Mucinous Cystadenoma	1	6	7	8	6	1	1	30	28.30
Mucinous Borderline Tumor	0	0	0	0	1	0	0	1	0.94
Mucinous Adenocarcinoma	0	0	0	0	0	1	0	1	0.94
Germ Cell Tumors									
Mature Teratoma	0	2	4	3	2	1	0	12	11.32
Immature Teratoma	3	0	0	0	0	0	0	3	2.83
Dysgerminoma	1	0	0	0	0	0	0	1	0.94
Yolk Sac Tumors	1	2	0	0	0	0	0	3	2.83
Sex Cord Stromal Tumors									
Granulosa Cell Tumor	0	1	0	1	1	0	0	3	2.83
Fibroma	0	0	1	1	0	0	0	2	1.89
Thecoma	0	0	0	1	1	0	0	2	1.89
Sertoli Leydig Tumor	0	1	0	0	0	0	0	1	0.94
Metastatic Tumors	0	0	0	0	1	0	0	1	0.94
Total	8	21	29	19	17	8	4	106	100.00
%	7.55	19.81	27.36	17.92	16.04	7.55	3.77	100.00	

Out of 106, the maximum number of cases were diagnosed as serous cystadenoma (Figure 1), which were 42 in number (39.62%). It was most commonly seen in 31 to 40 years age group with 17 cases. (Table 1) It was followed by 9 cases in 21 to 30 years age group. Mucinous cystadenoma was diagnosed in 30 patients with prevalence of 28.30%. It was most commonly seen in 41 to 50 years age group with 8 cases followed closely by 7 cases in 31 to 40 years age group and 6 cases each in 21 to 30 and 51 to 60 years age group.

Fig-1: Serous Cystadenoma - Cyst lined by a single layer of columnar cells seen. (H&E – 100X)
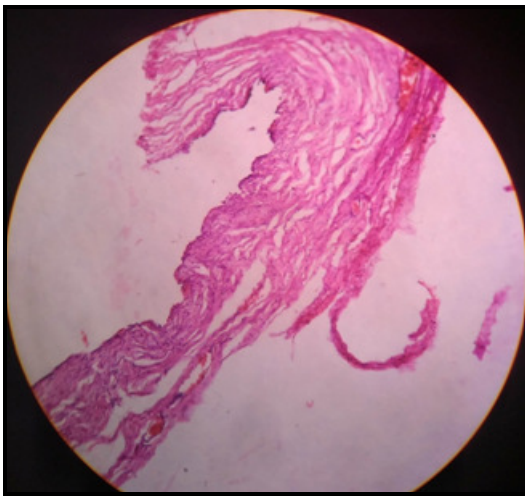

Fig-2: Mature Teratoma (H& E – 100X)

One cases each of serous borderline tumor and mucinous borderline tumors were seen. 3 cases of serous adenocarcinoma were seen in older age

groups. One case of mucinous adenocarcinoma was also seen. Most common germ cell tumor to be encountered in the study was mature teratoma seen in 12 patients (11.32%) (Figure 2). Most common age group was 31 to 40 years. Immature teratoma and yolk sac tumor were seen in 3 patients each, mostly in younger age groups. (Figure 3) Dysgerminoma was seen in one patient. Three cases of granulosa cell tumor – adult type (Figure 4,5) were observed followed by 2 cases each of fibroma and thecoma. Only one case of Sertoli Leydig cell tumor was seen.

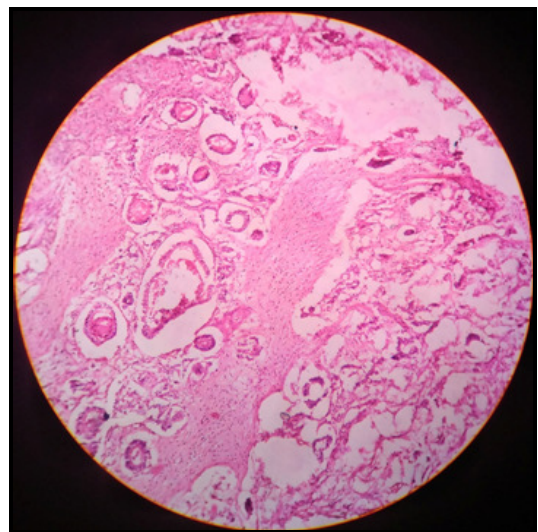**Fig-3:** Yolk sac tumors showing Schiller Duval bodies. (H&E – 400X)

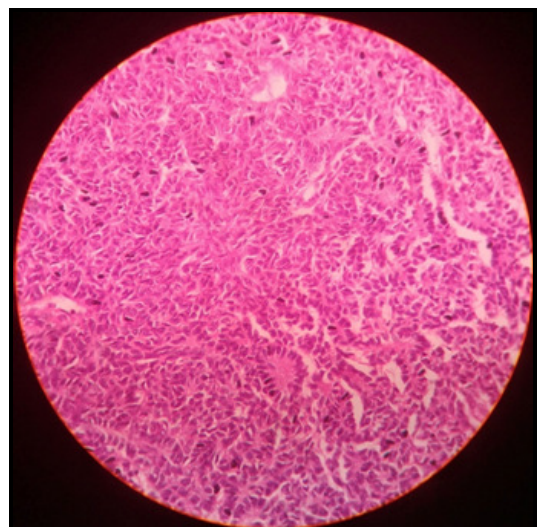**Fig-4:** Granulosa cell tumor with numerous call-exner bodies. (H&E – 400X)

Fig-5: Reconstructed hysterectomy specimen diagnosed as granulosa cell tumor

Most common presenting symptom was abdominal pain and tenderness elicited in 44 patients out of 106 (41.51%) (Table 2). This was followed by abdominal mass seen in 18 patients (16.98%). Gastrointestinal symptoms were also seen in 12 patients (11.32%) such as nausea, vomiting, indigestion, difficulty in eating, feeling of fullness and altered bowel habits. Urinary symptoms seen were changes in urine frequency, urine urgency, etc. Menstrual abnormalities were also seen in some patients.

Table-2: Symptom wise distribution of cases

Symptoms	Number	%
Abdominal Pain	44	41.51%
Abdominal Mass	18	16.98%
Other GI Symptoms	12	11.32%
Urinary Symptoms	8	7.55%
Amenorrhea	6	5.66%
Menorrhagia	9	8.49%
Polymenorrhagia	8	7.55%
Post Menopausal Bleeding	7	6.60%

Table-3: Type wise distribution of cases

Types	Number	%
Surface Epithelial Tumors	78	73.58%
Germ Cell Tumors	19	17.92%
Sex Cord Stromal Tumors	8	7.55%
Metastatic Tumors	1	0.94%
Total	106	100.00%

Histopathological examination of the specimen showed surface epithelial tumors in 78 out of 106 cases (73.58%) (Table 3). This was followed in number by 17.92% germ cell tumor cases and 7.55% sex cord stromal cases.

A total of 88 out of 106 cases were benign in nature making upto 83.02% of all cases. This was followed by 16 malignant cases (15.09%) and 2 borderline cases (1.89%). Maximum percentage of malignant cases were seen in nulliparous cases (8 out of 16 cases, 50%). Maximum number of benign cases were seen in multiparous patients (60 out of 88, 68.18%). Out of all cases, 29.25% patients were nulliparous and 65.09% patients were multiparous. Lesions were unilateral in 83.02% cases, affecting mainly left ovary in 44.34% cases. Rest 38.68% cases were seen in right ovary. Only 16.98% cases were seen bilaterally affecting 18 patients. Majority of lesions had cystic consistency. 72 out of 106 cases (67.92%) fell under this category. This was followed by 26 cases (24.53%) with solid and cystic areas. Tumors with only solid areas were 8 in number (7.55%).

Discussion

Out of 106 cases, maximum frequency of patients seen were in the age group 31 to 40 years with 27.36% patients. This was comparable to works of Sumanlatha et al [6] which also showed most common age group to be 31 to 40 years with 24.84% patients. Similar findings were obtained by Patel et al [7] who also reported 31 to 40 years as the most common age group for ovarian neoplasms with 34% patients. Garg et al [8] too reported similar findings, however 41.2% patients were recorded in the similar age group. Abdominal pain was the most common clinical presentation found in this study.

This was in complete concordance with the works of Patel et al [7] which reported 48.8% patients to have complains of abdominal pain. Works of Chanu et al [9] and Kant et al [10] showed abdominal pain to be most common complain, however reported lesser fraction of patients with 29.7% and 39.4% respectively. On contrary, works of Yogambal et al [11] showed 66.9% patients to be affected with abdominal pain. Other complains were also comparable to other studies.

Table-4: Comparison of nature of malignancy with other studies			
Study	**Benign**	**Borderline**	**Malignant**
Mohapatro et al [12]	61.5%	5.2%	33.3%
Yogambal et al [11]	78.6%	0.7%	20.6%
Yarlagadda et al [13]	59.0%	7.0%	34.0%
Agarwal et al [14]	78.3%	3.3%	18.4%
Pachori et al [15]	72.3%	2.5%	25.2%
Modi et al [16]	84.5%	2.1%	13.4%
Garg et al [8]	81.2%	1.2%	17.6%
Khan et al [17]	78.9%	1.1%	20.0%
Patel et al [7]	93.2%	0.6%	6.2%
Chanu et al [9]	84.1%	4.0%	10.9%
Present Study	83.0%	1.9%	15.1%

The number of cases showing benign features was 83.0% which was quite comparable to the studies of Chanu et al [9], Modi et al [16] and Garg et al [8] showing 84.1%, 84.5% and 81.2% cases respectively. The number of borderline cases were near to Modi et al [16] with 2.1% cases and Pachori et al [15] with 2.5% cases. The frequency of malignant cases were similar to the works of Modi et al [16] and Garg et al [8] with 13.4% and 17.6% respectively. Table 4 shows comparison with other works.

Table-5: Comparison of histological types of ovarian neoplasm with other studies					
Histological Types	**Yarlagadda et al [13]**	**Modi et al [16]**	**Garg et al [8]**	**Khan et al [17]**	**Present Study**
Surface Epithelial Tumors	74%	76.29%	70.59%	72.63%	73.58%
Germ Cell Tumors	18%	17.53%	18.82%	23.16%	17.92%
Sex Cord Stromal Tumors	6%	6.19%	8.24%	4.21%	7.55%
Metastatic Tumors	2%	0.00%	2.35%	0.00%	0.94%

The present study showed 73.58% surface epithelial tumors which was very close to findings of Yarlagadda et al [13] and Khan et al [17], with findings of 74% and 72.63% respectively. Germ cell tumor frequency was obtained as 17.92% was also close to that of other studies such as Yarlagadda et al [13] with 18% and Modi et al [16] with 17.53%. Incidence of sex cord stromal tumors as found in the study was 7.55% was closer to the findings of Garg et al [8] with 8.24%.

Out of 106 cases, 6 patients were unmarried with only one of those being affected by malignancy. 8 out of 31 nulliparous women were suffering from malignant disease. Making up 25.81% which was nearer to the findings of Mohapatro et al [12] with 10 out of 32 malignant patients being nulliparous (31.25%). The total number of nulliparous patients were 31 out of 106 (29.25%) which was close to the findings of Yarlagadda et al [13]. The number of multiparous patients were 69 making up 65.09% which was nearer to findings of Kant et al [10] (66.9%). Most of the lesions affected ovaries unilaterally, such cases being 83.02% in number. This was similar to findings of Chanu et al [9] with 81.2% unilateral cases. However, our study showed a majority of left ovary being affected (44.34% cases compared to right ovary with 38.68% cases), while Chanu et al [9] showed a preponderance of right ovary (42.6% cases compared to left ovary with 38.6% cases). Other studies such as Patel et al [7] and Kant et al [10] also showed more number of

patients with lesions in left ovary alone. There were a total of 18 cases (16.98%) with bilateral involvement of ovary. Most of the ovaries had a cystic consistency with 67.92% of the cases falling under such categories. This was very similar to the findings of Patel et al [7] with 68.5% of such cases.

Serous cystadenoma was seen in 39.62% cases which was comparable to the findings of Modi et al [16] with 40.21% cases and Pachori et al [15] with 36.36% cases. According to Modi et al [16], most common age group to be found in such patients was reported to be 31 to 40 years which also coincided with the study. According to Yarlagadda et al [13] total number of serous cases was 40% which was comparable to our result of 43.39%. Mucinous cystadenoma was seen in 28.30% cases. This result was comparable to the studies done by Modi et al [16] with 21.65% cases. That also found out the most common affected age group to be 31 to 40 years which was similar to that of our study.

Similarly, serous cystadenocarcinoma and mucinous cystadenocarcinoma were reported with incidence of 2.83% and 0.94% respectively. Agarwal et al [14] findings of mucinous cystadenocarcinoma were quite nearer with 1.9% cases. Mature teratoma were seen in 11.32% cases. This was compared with findings of Garg et al [8] with 14.12% of all cases. Modi et al [16] reported a slightly higher incidence with 16.49% cases mostly occurring in 41 to 50 years age group compared with our 31 to 40 years age group to be the most commonly affected. Immature teratoma was seen in 2.83% cases compared to 1.57% cases according to the findings of Mondal et al [18]. Dysgerminoma was seen in 0.94% cases which was slightly lower

than findings of Saha et al [19] with 1.24% cases and Pachori et al [15] with 2.48% cases. Agarwal et al [14] reported a yet lower finding of 0.65% cases. Yolk sac tumors were seen with a rate of 2.83% in our study, which was compared to works of Pachori et al [15] with a rate of 1.24%. Granulosa cell tumor were seen in 3 cases with a rate of 2.83% which was quite near to the findings of Mondal et al [18] with 2.51% and Modi et al [16] with 3.09%. Fibroma was seen in 1.89% cases in this study which could be comparable to works of Modi et al [16] and Mondal et al [18] with a rate of 2.06% and 1.57% respectively. Sertoli Leydig tumor was found to be 1.15% in study of Mondal et al [18] compared to 0.94% in this study.

Conclusion

In this study, 106 cases were taken up and analysed on the basis of clinicopathological and histomorphological parameters. 31 to 40 years was found to be most commonly affected age group for ovarian neoplasms. Abdominal pain was the most common presenting symptom followed by menstrual irregularities. Benign tumors were much more common than malignant tumors.

Benign tumors presented more in younger age groups while malignant tumors were slightly more common in older patients. Our study showed a lower rate of malignant tumors than other studies. This could be a result of regional variation. Surface epithelial tumors were found to be most common followed by germ cell tumors. Further studies should be done to identify various risk factors and their role on the prognosis of diseases.

References

1. Shanmughapriya S, Senthilkumar G, Arun S, Das BC, Natarajaseenivasan K. Risk factors for epithelial ovarian carcinoma in India: a case control study in low-incidence population. *International Journal of Cancer Research.* 2016; 12(1):61-68.
2. Kim SI, Lim MC, Lim J, Won YJ, Seo SS, Kang S, Park SY. Incidence of epithelial ovarian cancer according to histologic subtypes in Korea, 1999 to 2012. *Journal of Gynecologic Oncology.* 2015; 27(1): 75-e5.
3. Reid BM, Permuth JB, Sellers TA. Epidemiology of ovarian cancer: a review. *Cancer Biology & Medicine.* 2017; 14(1):9.
4. Zaloudek CJ, Garg K. Tumors Of The Female Genital Tract Part A-Ovary, Fallopian Tube, And Broad And Round Ligaments.In: CDM Fletcher (ed) Diagnostic Histopathology Of Tumors, 4th Ed. *Philadelphia : Elsevier,* 2013: 658-761.

5.   Kumar, Abbas, Aster. Robbins and Cotran Pathological Basis of Disease. 9th ed. *Philadelphia: Saunders,* 2015; 991-1042.

6.   Sumanlatha GR, Sumalatha K, Ramanakumari P et al. A prospective and retrospective study of ovarian tumours. *Int J Curr Microbiol App Sci,* 2016; 5(7):741-750.

7.   Patel AS, Patel JM, Shah KJ. Ovarian tumors-Incidence and histopathological spectrum in tertiary care center, Valsad. *IAIM,* 2018; 5(2):84-93.

8.   Garg N, Anand AS, Annigeri C. Study of histomorphological spectrum of ovarian tumours. *Natural history.* 2017; 5:6.

9.   Chanu SM, Dey B, Raphael V, Panda S, Khonglah Y. Clinicopathological profile of ovarian cysts in a tertiary care hospital. *Int J Reprod Contracept Obstet Gynecol.* 2017; 6:4642-4645.

10. Kant RH, Rather S, Rashid S. Clinical and histopathological profile of patients with ovarian cyst presenting in a tertiary care hospital of Kashmir, India. *Int J Reprod Contracept Obstet Gynecol.* 2016; 5(8):2696-2700.

11. Yogambal M, Arunalatha P, Chandramouleeswari K, Palaniappan V. Ovarian tumours-Incidence and distribution in a tertiary referral center in south India. *IOSR-JDMS.* 2014; 13(2):74-80.

12. Mohapatro M, Dash D, Rao ES. A study on clinicopathological spectrum of ovarian tumours in a tertiary care centre. *J. Evid. Based Med. Healthc.* 2017; 4(37):2223-2230.

13. Yarlagadda KB, Rayi NR. A three year retrospective study of ovarian neoplasms with special emphasis on surface epithelial tumours. *J. Evid. Based Med. Healthc.* 2016; 3(57):2941-2946.

14. Agarwal D, Kaur S, Agarwal R, Gathwal M. Histopathological Analysis of Neoplastic Lesions of the Ovary: A 5-Year Retrospective Study at Tertiary Health Care Centre. *International Journal of Contemporary Medical Research*, 2018; 5(5):E14-E17.

15. Pachori G, Meena US, Sunaria RK, Pachori P, Jethani N, Bayla T. Histopathological study of ovarian tumors in Ajmer region. *International Journal of Medical Science and Public Health.* 2016; 5(7):1400-1404.

16. Modi D, Rathod GB, Delwadia KN, Goswami HM. Histopathological pattern of neoplastic ovarian lesions. *IAIM.* 2016; 3(1):51-57.

17. Khan MA, Afzal S, Saeed H, Usman H, Ali R, Khan MZ, Mumtaz A, Ramazan N, Fatima A, Haider J, Latif A. Frequency of Ovarian Tumors According to WHO Histological Classification and Their Association to Age at Diagnosis. *Annals of King Edward Medical University.* 2017; 23(2): 206-213.

18. Mondal SK, Banyopadhyay R, Nag DR, Roychowdhury S, Mondal PK, Sinha SK. Histologic pattern, bilaterality and clinical evaluation of 957 ovarian neoplasms: A 10-year study in a tertiary hospital of eastern India. *Journal of Cancer research and Therapeutics.* 2011; 7(4):433.

19. Saha M, Banerjee A, Datta A. Histological patterns of Ovarian neoplasms–A five year experience in North-East India. *International Journal of Medical and Dental Sciences.* 2018; 7(1):1576-1581.

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