

Histomorphological spectrum of ovarian tumors - A tertiary care center experience



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ABSTRACT

Background: Ovarian tumors are a heterogeneous group of neoplasms with variable clinical, morphological, and histological features. Ovarian cancer is the leading cause of death in females. **Aims and Objectives:** (1) To study and characterize the ovarian tumors based on gross and histopathological features. (2) To study prevalence and age distribution of various ovarian tumors. (3) To study the clinical features in patients with ovarian tumors. (4) To compare the frequency of benign and malignant neoplasms of the ovary with other studies. **Materials and Methods:** This is a prospective study conducted in Upgraded Department of Pathology, Modern Government maternity hospital, and Osmania General Hospital, Hyderabad, Telangana from March 2018 to February 2021. A total of 200 ovarian tumors were studied. **Results:** Out of 200 ovarian tumors, 132 were benign, seven were borderline and 61 were malignant. The surface epithelial tumors were the most common tumors accounting for 159 cases (79.5%), germ cell tumors were seen in 27 cases (13.5%), sex-cord stromal tumors formed 10 cases (5%), and metastasis in 4 cases (2%). **Conclusion:** Ovary is a common site of tumors in the female genital tract and usually presents with a variety of clinocomorphological and histological features. Benign are the most common, of these surface epithelial tumors are the commonest, affects mainly reproductive age group.

Key words: Germ cell tumors; Histopathology; Ovarian tumors; Surface epithelial tumors

INTRODUCTION

Ovarian cancers account for 25% of the all gynaecological malignancies and 3rd most common cause of death due to malignancies of female genital tract in the western world.¹ In India, ovarian tumors account for 80% of all the gynecological malignancies.² The ovary, after the uterus and cervix, is the second common site for the development of gynecological malignancy and prognosis remains poor.³ The ovarian tumors are not a single entity but a complex-wide spectrum of neoplasms involving a variety of histologic tissues ranging from epithelial tissues, connective tissues, specialized hormone secreting cells to germinal or embryonal cells.⁴ Generally ovarian tumors occur in perimenopausal and post-menopausal women, infrequently in children also. The risk of developing an ovarian malignancy peaks in fifth decade of life. Risk factors for ovarian cancer are much less clear than for

other genital tumors, but nulliparity, family history, and heritable mutation play a role in the tumor development.^{5,6} Women between 40 and 59 years of age who have taken oral contraceptives or undergone tubal ligation have a reduced risk of developing a cancer.^{7,8}

Aims and objectives

To study-clinical presentation, gross and histological characters, and characterize the ovarian tumors based on gross and histopathological features, prevalence, distribution of benign and malignant ovarian neoplasms.

MATERIALS AND METHODS

This is a prospective study conducted in the Upgraded Department of Pathology, Modern Government maternity hospital and Osmania General Hospital, Hyderabad, Telangana from march 2018 to February 2021.

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A total of 200 ovarian tumors were studied. Of these 200 ovarian tumors, 132 were benign, 7 were borderline and 61 were malignant. The gross specimen received were fixed in 10% formalin for 24 h and from every specimen, multiple sections were taken from the representative site for histological examination. The number of blocks varied from four to eight in number. Sections were processed in paraffin, which was cut at five microns thickness. Sections were stained with conventional hematoxylin and eosin stain. The lesions were classified and studied as per the WHO classification of ovarian tumors. As the study is focused on histological characterization of ovarian tumors, Immunohistochemistry was not done in this study.

RESULTS

A total of 200 ovarian tumors were studied. Of these 200 ovarian tumors, 132 were benign, 7 were borderline and 61 were malignant and majority of these tumors seen in parous women (Table 1). Majority of patients (26.5%) presented with pain abdomen and back ache, while 17% presented with mass abdomen, 5% of cases had post menopausal bleeding. Other presentations included amenorrhoea, urinary symptoms, loss of weight and ascites (Table 2). There was a wide size range in ovarian neoplasms in the present study. It ranged from 3x2cm to 30x20cm. Majority of them 89 (44.5%) were in the size range of 6-10cm, followed by 54 (27%) in the size range of 11-19cm. The age range of the tumors diagnosed varied from 13 to 73 years, with a peak incidence in 3rd and 4th decade of life. Maximum benign cases were seen between 41-50 years. Maximum number of malignant tumors were seen between 51-60 years. Youngest patient was 12 years old, oldest was 76 years old. The maximum number of tumors were seen in the 4th decade (Table 3).

In the present study, TAH with BSO was the most common procedure opted in 106 cases (50.3%) followed by unilateral oophorectomy in 78 cases (39%), bilateral oophorectomy in 16 cases (8%). Right sided tumors of ovary 94 (47%) were more common than the left sided tumors 82 (41%). 24 (12%) cases were bilateral out of them 15 were malignant, one borderline and 9 were benign (Table 4).

The majority of tumors (nearly 60%) were cystic and only 8% were solid and rest were solid and cystic. and majority of cystic neoplasms were benign (Table 5).

The tumors were classified according to WHO histologic classification of ovarian tumors and the incidence of different histologic types noted. The surface epithelial tumors were the commonest tumors accounting for 159 cases (79.5%), germ cell tumors were seen in 27 cases (13.5%), sex-cord stromal tumors formed 10 cases (5%) and metastasis in 4 cases (2%) (Table 6).

Surface epithelial tumors

The commonest epithelial tumors were serous 87 cases (43.5%), 60 mucinous (30%), 5 Brenner (2.5%), and 2 Endometrioid tumor (1%) remaining poorly differentiated carcinomas (Table 7).

Three cases of benign Brenner tumor were seen. The largest was seen in a 38 year old female patient and measured 20x15 cm. Grossly, the tumors were solid with smooth, slightly bosselated external surface. The largest tumor showed cystic areas. All of them were unilateral (Figure 1). Microscopically, the nucleus was grooved in some of the cells, giving a coffee bean appearance. Poorly differentiated carcinoma on cut section showed solid consistency and areas of necrosis (Figure 2).



Figure 1: Brenner tumor

Table 1: The age wise distribution of ovarian neoplasms

Age	Benign	Percentage	Borderline	Percentage	Malignant	Percentage
Upto 20	4	2	0	0	1	0.5
21-30	14	7	1	0.5	7	3.5
31-40	29	14.5	0	0	13	6.5
41-50	36	18	1	0.5	13	6.5
51-60	32	16.5	3	1.5	17	8
61-70	15	7.5	2	1	8	4
71-80	2	1	0	0	2	1
Total	132	66	7	3.5	61	30.5

Two cases of endometrioid adenocarcinoma were seen. One is in a 45 year old nulliparous women measuring 11x9 cm, the cut section of which was solid and cystic. Microscopically, the tumor showed areas of necrosis and haemorrhage (Figure 3).

Serous tumors

Serous tumors formed the majority of ovarian neoplasms in the study. There were a total of 87 serous tumors, constituting about 43.5% (Table 8).

All serous tumours >1cms were considered as serous cystadenomas. The serous cystadenoma was the most commonest accounting for 59 cases (29.5%) of all ovarian neoplasms.



Figure 2: Poorly differentiated carcinoma

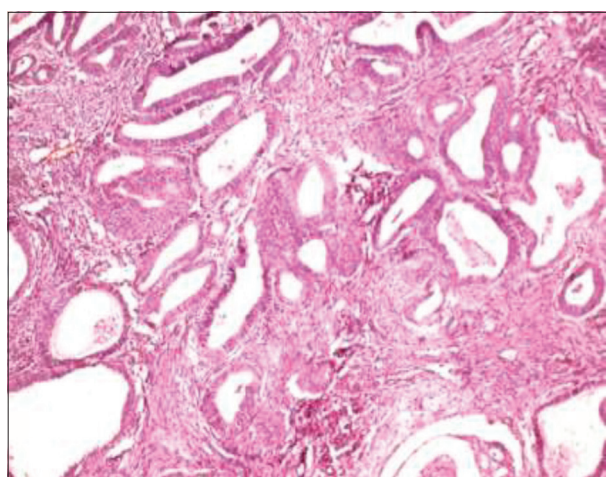


Figure 3: H & E (x10) – Endometrioid carcinoma

The size of the largest benign serous cystadenoma was 20x16 cm and the smallest was 3x3 cm with smooth shiny external surface. Majority of the tumours exuded clear fluid with one case of seromucinous fluid and 3 cases showed features of torsion with prominent dilated veins over the surface. Bilaterality was seen in 2 cases. The largest malignant tumor 10x8 cm in size and its cut section was partly solid and partly cystic (Figure 4). Serous cystadenocarcinoma cases on microscopy were predominantly solid and cystic and showed stratification and nuclear pleomorphism and high mitosis (Figure 5).

Mucinous tumors

These constituted the second most common ovarian neoplasms and included 60 cases (30%) of all ovarian tumors (Table 9).

Grossly, the largest tumor measured 30x20 cm, which was also the largest tumor encountered in the present study. The benign tumors were cystic while borderline and

Table 2: The distribution of tumors in parous women

Types of tumors	Unmarried	Married	
		Nulliparous	Parous
Benign	4	16	113
Borderline	-	-	7
Malignant	2	8	50

Table 3: Clinical presentation of patients

Clinical presentation	Benign	Borderline	Malignant
Mass per abdomen	34	3	27
Associated pain abdomen	47	3	20
Dysfunctional uterine bleeding	5	-	-
Amenorrhea	4	-	2
Postmenopausal bleeding	10	1	9
Urinary symptoms	7	-	-
Loss of weight	4	-	1
Ascites	2	-	8

Table 4: Laterality of specimens

Side of ovary involved	Number of cases	Percentage
Right	94	47
Left	82	41
Bilateral	24	12

Table 5: Consistency of benign, borderline, and malignant tumors in the present study

Consistency	Benign	Borderline	Malignant	Total	Percentage
Cystic	98	5	16	119	59.5
Solid and cystic	29	2	34	65	32.5
Solid	5	-	11	16	8
Total	132	7	61	200	100

Table 6: Number of cases and percentage distribution of various types of ovarian tumours

Types of tumor	Number of cases	Percentage
Surface epithelial tumors	159	79.5
Sex-cord stromal tumors	10	5
Germ cell tumors	27	13.5
Others (metastasis)	4	2
Total	200	100

Table 7: Distribution of surface epithelial tumors

Types of surface epithelial tumors	Number of cases	Percentage
Serous cystadenoma	59	29.5
Serous cystadenofibroma	04	2
Borderline serous tumor	02	1
Serous cystadenocarcinoma	22	11
Mucinous cystadenoma	43	21.5
Borderline mucinous tumor	05	2.5
Mucinous cystadenocarcinoma	12	6
Brenner tumor	05	2.5
Endometrioid tumor	02	1
Poorly differentiated carcinoma	05	2.5
Total	200	100

malignant ones were partly solid and partly cystic containing mucinous fluid. Forty three(43) of all mucinous tumors were benign mucinous cystadenomas comprising highest percentage in this category (21%) with microscopy showing a lining of tall columnar epithelium with apical mucin (Figure 6). Five cases of borderline mucinous were diagnosed in tumor with papillary projections lined by atypical cells up to one- two cell thickness and no stromal invasion was seen. Malignant tumours showed complex papillary pattern with pleomorphic mucious cells. Areas of necrosis and stromal invasion were seen.

Germ cell tumors

Germ cell tumors constituted about 27 cases (13.5%) of all ovarian tumors (Table 10). Dysgerminomas constituted 2.5% of cases which on cutsection grossly showed yellow white ,soft,fleshy areas (Figure 7) and microscopy showed sheets and cords of cells separated by thin fibrous septae which is infiltrates with mature lymphocytes (Figure 8). Endodermal sinus tumors constituted only 0.5% (01 case) of cases in this study and grossly showed solid and cystic areas (Figure 9).



Figure 4: Serous cystadenocarcinoma

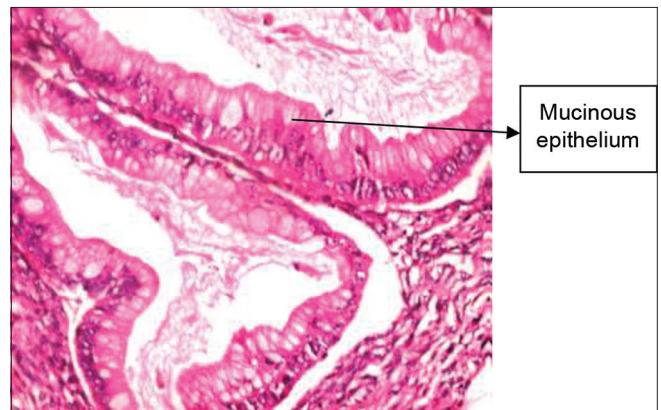


Figure 6: H & E (x40) - Mucinous cystadenoma

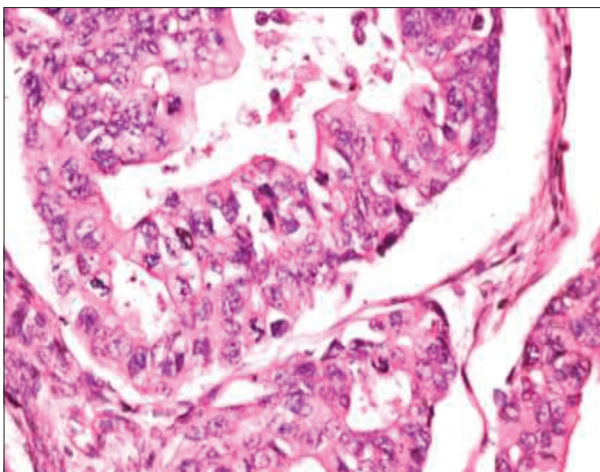


Figure 5: H & E (x40) – Serous cystadenocarcinoma



Figure 7: Dysgerminoma

Table 8: Distribution of serous tumors

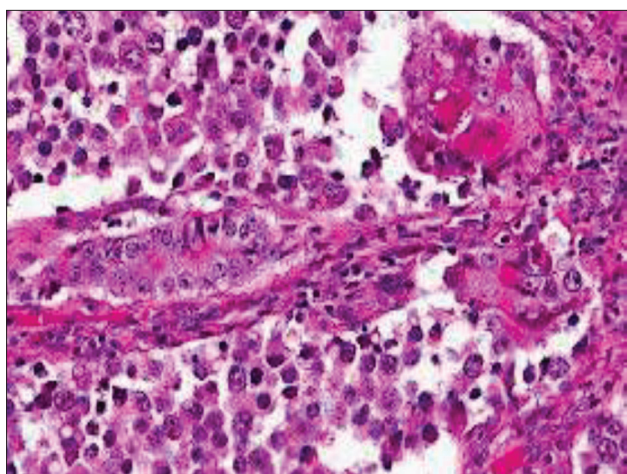
Type	Number of cases	Percentage
Serous cystadenoma	59	34.5
Borderline serous tumor	02	01
Serous cystadenocarcinoma	22	11
Serous cystadenofibroma	04	2
Total	87	43.5

Table 9: Distribution of mucinous tumors

Tumor type	Number of cases	Percentage
Mucinous cystadenoma	43	21.5
Borderline mucinous tumor	05	2.5
Mucinous cystadenocarcinoma	12	6
Total	60	30%

Table 10: Distribution of germ cell tumors

Tumor type	Number of cases	Percentage
Teratoma	21	10.5
Dysgerminoma	05	2.5
Endodermal sinus tumor	01	0.5
Total	27	13.5

**Figure 8:** H & E (x10) – Dysgerminoma**Figure 9:** Endodermal sinus tumor

Sex cord stromal tumors

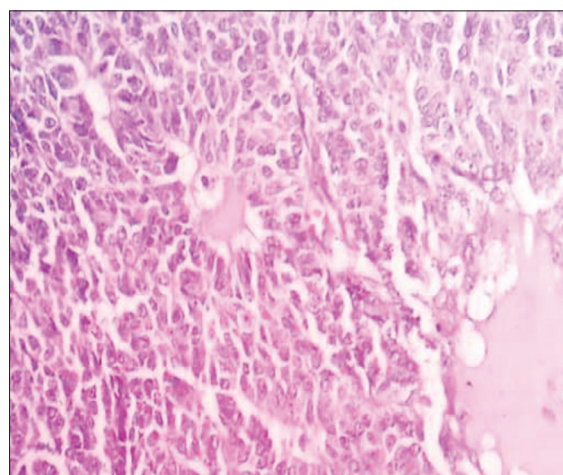
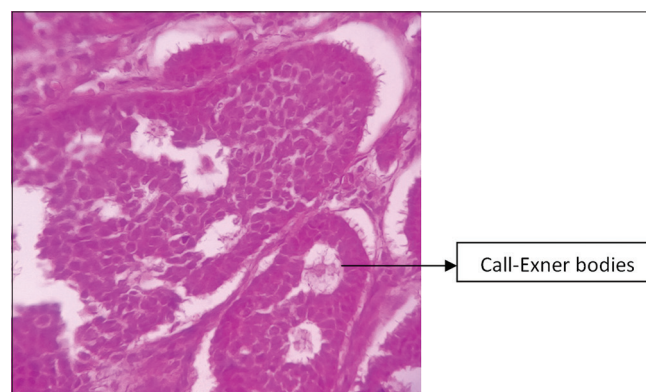
Few cases of sex cord stromal tumors were also studied in this study. The granulosa cell tumor grossly on cut section showed pale yellow colour and microscopy showed cuboidal to polygonal cells in anastomosing cords and sheets along with Call-Exner bodies (Figures 10 and 11).

DISCUSSION

Ovarian neoplasms are one of the most fascinating tumors in women in terms of their histogenesis, clinical behavior, and malignant potentiality. They account for a disproportionate number of fatal cancers, being responsible for almost half of the deaths from cancers of the female genital tract.

Histomorphological evaluation of ovarian tumors forms an integral part of the evaluation of these neoplasms.

In the present study, peak incidence of ovarian tumors is seen in the age group of 51 to 60. This is in contrast to the studies like that done by Verma and Bhatia⁹ and Jha and Karki¹⁰ which the majority of patients were in the 31 to 40 age group.

**Figure 10:** H & E (x10) – Granulosa cell tumor**Figure 11:** H&E (x40) – Granulosa cell tumor

This study results had shown that 66% of patients were benign. This compares well with earlier studies like the one published by Verma and Bhatia⁹ (66.99%), but they observed slightly lower cases than other recent studies like Swamy et al¹¹ who had 71% benign tumors in their series. 30.5% of tumors in this study are malignant. This was comparable to studies like Verma et al⁹ but is much more than Jha et al¹⁰ (16%) and Swamy et al (25%).

The percentage of borderline tumors in this study was 3.5 % which was comparable to the study done by Gupta et al¹² (4.1%).

Most of the benign tumors in this study were unilateral with only 12% cases showing bilateral tumor involvement. This is comparable to findings of study done by Jha et al¹⁰ (93.34% unilateral). In contrast Swamy et al¹¹ reported a bilaterality rate of 29% in benign tumors. In malignant tumors that were noted a bilaterality rate of just 7.5% compared to Swamy et al¹¹ who reported a bilaterality rate of 50% and Jha et al¹⁰ in which 42% of the malignant tumors were bilateral.

Serous cystadenoma comprised 59 cases (29.5%) in this study while Ganga Pilli et al¹³ reported 31.2% and Tyagi et al¹⁴ reported 39.5%.

Sex cord stromal tumors formed 10 (5%) of cases. This finding was similar to a study done by Gupta et al¹² which reported 7.06% of sex cord stromal tumor.

The germ cell tumors accounted for 27 cases (13.01%). This was similar to the study done by Jagadeeshwari et al² (13.2%) and slightly lower than that reported by Tyagi et al¹⁴ (23.58%) Commonest amongst the germ cell tumor was teratoma (21 cases- 10.5%).

There were 4 cases of metastatic tumours which accounted for 2%. Three were from GIT primaries metastasizing to ovary and one from SCC. Gupta et al¹² reported 6.28% while Ganga Pilli et al¹³ reported 0.7% of metastatic tumors.

Limitations of the study

Follow-up of patients was done as it was difficult to trace the cases which came to this hospital from different states with no continuous follow-up and incomplete addresses.

CONCLUSION

Ovarian tumors are one of the most researched topics in gynecological pathology.

Benign are the most common, of these surface epithelial tumors are the commonest, affects mainly reproductive age group. Clinical features are vague and are late manifestations.

Malignant tumors are less common, serous are more prone to going into malignancy. Thus categorizing the ovarian tumors according to histopathological features (WHO) into various types helps to know the clinical presentation, treatment, clinical outcome, and prognosis of the tumors.

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Authors Contribution:


JB- Concept and design of the study, prepared first draft of manuscript, Interpreted the results; reviewed the literature and manuscript preparation; **SK-** Concept, coordination, statistical analysis and interpretation, preparation of manuscript and revision of the manuscript.

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