



# Ovarian Neoplasms- Histopathological Patterns and Relative Frequencies in an Indian Tertiary Care Hospital

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## ABSTRACT

**Introduction:** Ovarian neoplasms are tumors or cancer of the ovary. These neoplasms can be benign or malignant and are classified according to the tissue of origin, such as the surface epithelium, the stromal endocrine cells, and the totipotent germ cells. Ovarian neoplasms are one of the major causes of gynaecological problems in females and present with marked variation in their histological types. Western and Asian countries show a difference in relative frequency of these lesions. This study was conducted to find out frequency of various histological patterns of ovarian neoplasms received as surgical pathology specimens at Histopathology department, Civil Hospital, Ahmedabad.

**Material and Methods:** The study was conducted on 186 cases of ovarian neoplasms, reported from July 2016 to June 2017.

**Results:** Mean age of the subjects was 35.6 years, ranging from 4 to 80 years. In a total of 186 cases of ovarian masses, 104(55.91%) were non-neoplastic and 82 (44.09%) were neoplastic. Among neoplastic lesions, 80.48% (66/82) were benign and 19.52% (16/82) were malignant. The commonest non-neoplastic lesion was Luteal cyst (43/104) followed by simple serous cyst (25/104). The commonest benign tumor was serous cystadenoma (40/66) followed by dermoid cyst (12/66). The commonest malignant tumour was serous cystadenocarcinoma (5/16) followed by mucinous cystadenocarcinoma(3/16).

**Conclusion:** Non-Neoplastic lesions were more common than neoplastic lesions, while benign tumours outnumbered the malignant ones. The most common benign tumour was serous cystadenoma and malignant was serous cystadenocarcinoma. The most common non-neoplastic lesion was Luteal cyst. Among histological types of ovarian tumours, surface epithelial tumours dominated the other types.

**Key Words:** Luteal cyst, Ovarian tumours, Cystadenocarcinoma, Serous cyst, Dermoid cyst

## INTRODUCTION

The incidence of cancer is increasing in developing countries.[1,2] There are marked differences in distribution of different cancers in different regions of the world. [2, 3] Ovarian cancer is the most frequent cause of death from gynaecological cancers and the fourth most frequent cause of death from cancer in women in Europe, United States[4] and Eastern India.[5] Exact incidence in India is not known, but ovarian cancer is the 4th most common cancer among females of India and continues to present at an advanced age. [6] The lifetime risk of ovarian cancer in women with no family history is 1.6%; with one affected first degree relative is 5%,[7] and 7% with two or more affected first degree

relatives. [8] Ovarian neoplasms are insidious in onset and usually diagnosed at a late stage. They are rare in young age group.[9] They commonly present with abdominal pain, a lump or menstrual irregularities.[10] In addition to biopsy, various diagnostic modalities include transvaginal ultrasonography, MRI, positron emission tomography,[11] and markers like serum CA 125.[8] Diverse histopathologies are common in ovarian lesions. Relative frequency of different ovarian neoplasms is different for western world and Asian countries. For example surface epithelial tumors account for 50.0 – 55.0% of all ovarian tumors and their malignant counterpart for approximately 90.0% of all ovarian cancers in Western world whereas this figure is 46.0 – 50.0% and 70.0 – 75.0% respectively in Japan. Similarly mucinous

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tumors account for 12.0 – 15.0% of all ovarian tumors in Western world. This figure is 20.0 – 23.0% for Japan. Germ cell tumors account for 30.0% of primary ovarian tumors and malignant germ cell tumors account for 3.0% of all ovarian cancers in Western world.[12] Determination of these patterns is important for diagnosis, management and prognosis. This study was conducted to find out the histopathological patterns of ovarian neoplasms received as surgical pathology specimens at Histopathology department, Civil Hospital, Ahmedabad.

## MATERIALS AND METHODS

The study was carried out on 186 patients who had undergone surgical oophorectomy. Samples were analysed in the Pathology department of B.J.M.C., Civil hospital, Ahmedabad. All Histopathological diagnosed cases of ovarian lesions referred to this department during July 2016 to June 2017 were included in this study. These were mostly referred from gynaecology and obstetrics department of Civil Hospital, Ahmedabad, but a few were referred from other hospitals in the vicinity. Patients with abdominal-pelvic masses other than of ovarian tumours diagnosed on histopathology were excluded from the study. The histological characterisation of ovarian neoplasms was done according to the International Classification of Diseases, 9th ed. (ICD9) (WHO Classification, 1995).[13] The acquired data was analysed using the descriptive statistics.

## RESULTS

During the study period from July 2016 to June 2017, one hundred and eighty six consecutive cases of ovarian lesions were selected. Ages of the patients and their histopathology diagnoses were recorded. Patients were divided into eight age groups, with a difference of 10 years in each group. The commonest age group affected was from 21 to 30 years followed by age group from 31 to 40 years. The youngest patient was 4 years old and the oldest was 80 years old. Mean age was 35.6 years (Table 1).

In a total of 186 ovarian lesions, 104 (55.91%) were non-neoplastic and 82 (44.09%) were neoplastic. The neoplastic lesions comprised 66/82 (80.48%) benign and 16/82 (19.52%) malignant tumours (Fig. 1). In non-neoplastic lesions, Luteal cyst was the predominant category (43/104) followed by simple serous cyst (25/104) (Table 2).

The neoplastic tumours were divided in four groups, namely, epithelial tumours, germ cell tumours, sex cord stromal tumours and metastatic tumours. Epithelial tumours were maximum in number (62/ 82; 75.60%), followed by Germ cell tumours (14/82; 17.07%) (Table 3). Frequency pattern of

different classes and subtypes of benign and malignant ovarian neoplasms (n = 82) is shown in table 4.

The commonest histological class is surface epithelial tumours (62/82; 75.60%) followed by germ cell tumours (14/82; 17.07%). Among all the benign lesions (n = 82), serous cyst adenoma is the commonest (40/82), while dermoid cyst is at the second number (14/82).

Frequency pattern of different classes and subtypes of benign and malignant ovarian neoplasms (n = 82) is shown in table 4.

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On the other hand, among all the malignant lesions (n = 16), serous cyst adenocarcinoma is at the top (05/45), followed with a little difference by mucinous cyst adenocarcinoma (03/45) and endometrioid carcinoma (01/45) respectively.

## DISCUSSION

Age range of our subjects was from 4 to 80 years and mean age was 35.6 years. Mean age observed in our study is lower than that observed in few other studies carried out in India. Our study shows the maximum incidence of ovarian masses between 21 and 40 years of age. This differs from the western data where it is between 50 and 70 years[16] but correlates with other studies conducted in India.

In our study non-neoplastic lesions were 55.91% (104/186) and neoplastic lesions were 44.09% (82/186).

Neoplastic lesions contained (66/82) benign and (16/82) malignant lesions.

Study by Tanwani[19] documented 31.4% non-neoplastic lesions, 46.4% benign tumours and 22.2% malignant tumours. Among non-neoplastic lesion, Luteal cyst was most common (43/104) followed by simple serous cysts (25/104) in our study. The pattern of distribution of non-neoplastic lesions is quite variable in other studies. Among the 82 neoplastic lesions in our study, 80.48% were benign and 19.82% were malignant. The higher incidence of benign tumours is also documented in various other studies,[19,21,22] where it is 85%, 78%, 89.7% and 72.73% respectively and ratio of benign to malignant tumours is lower in these studies as compared to our study. No borderline tumor was found in our study. Among the major histological classes, the commonest type of ovarian neoplasm seen in our study was surface epithelial tumours, whether benign or malignant (62/82; 75.60%). Our finding is closer to the observations made in several other studies i.e. 64%, 66% and 70%[7,24,25] respectively.

However, Guppey et al[26] documented a higher incidence of epithelial tumours than in our study i.e. 90%. Germ cell tumours (GCT) in our study were 17.07%. This value is quite high as compared to Western data (370) [4] and data collected from other parts of india (1470)[16] and (27.13%). [7] This difference may be due to variations in sample size but genetic, socioeconomical and environmental factors may also be involved. The frequency of sex – cord – stromal tumours (SCST) in our study was 4.87%. This value is comparable with that of studies carried out in the west (5%)[27]and other parts of india (370).[16] Our study showed that serous tumours (whether benign or malignant) were more common than mucinous tumours (40/67 vs 16/67 cases). This finding correlates with other studies.[28,29]

The studies carried out by Khanum and Rehman[22] and Aziz et al[17] also observed serous cyst-adenomas to be the commonest tumours. The frequency of malignant tumours in our study was highest for serous cyst adenocarcinoma (5/16) followed by mucinous cyst adenocarcinoma (03/ 16). Similar pattern of distribution of malignant tumors are shown by many other studies.[7,20] However, Study conducted by Yasmeen et al shows endometrioid carcinoma to be more prevalent[21]. Germ cell tumours (GCTs) comprise the second largest group in our study in which benign tumours dominated the malignant ones (12/14 vs. 02/14). Among the benign GCTs our study showed the highest incidence of mature teratomas followed by dermoid cysts (08/14and 04/14 respectively).

A study of Thanikasalanm et al[30] conducted in India shows teratomas to be the predominant GCT, whereas study conducted by Ahmad et al[7]in Pakistan documents dermoid cysts to be the commonest GCT. Sex cord stromal tumours (SCSTs) were the least common in our study, next to metastatic tumours (4/82; 4.87%). The incidence of these tumours is variable in other studies.

Zohra[18] found only 1% SCSTs while Tanwani[19] documents 10.1% cases of SCST. Granulosa cell tumours were the commonest SCSTs in our study (2/4) while studies carried out by Yasmeen et al[21] and Ahmad et al[31] mentioned a variable incidence of 28.5% and 5.62% respectively. In conclusion according to this study ovarian tumours are common in age group of 21 to 40 years. Neoplastic lesions are more common than non-neoplastic lesions. Luteal cyst is the commonest nonneoplastic lesion. Among the histological classes of neoplastic lesions, surface epithelial tumours are predominant type, followed by germ cell tumors. The commonest benign tumour is serous cystadenoma and commonest malignant tumour is serous cystadenocarcinoma. This study is institutional – based, therefore the results obtained may or may not reflect the actual histological pattern of ovarian tumours in indian women. Therefore, multicentric study with larger sample size should be carried out.

## CONCLUSION

Non-Neoplastic lesions were more common than neoplastic lesions, while benign tumours outnumbered the malignant ones. The most common benign tumour was serous cystadenoma and malignant was serous cystadenocarcinoma. The most common non-neoplastic lesion was Luteal cyst. Among histological types of ovarian tumours, surface epithelial tumours dominated the other types.

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**Table 1: Age distribution of cases of ovarian mass (n = 186; mean age = 35.6 years).**

Age(years)	No. of Cases	Percentage(%)
1-10	01	0.53
11-20	25	13.44
21-30	57	30.64
31-40	41	22.04
41-50	33	17.74
51-60	22	11.82
61-70	06	3.22
71-80	01	0.53

Total- 186 -100%

**Table 2: Distribution of various types of non-neoplastic ovarian lesions (n = 104).**

Non-neoplastic Lesions	No. of Cases	Percentage
Luteal cysts	43	41.34
Simple serous cyst	25	24.03
Follicular cyst	24	23.07
Endometriosis	9	8.65
Hemorrhagic cyst	3	2.88

Total- 104- 100%

**Table 3: Distribution of various classes of ovarian tumours (n = 82).**

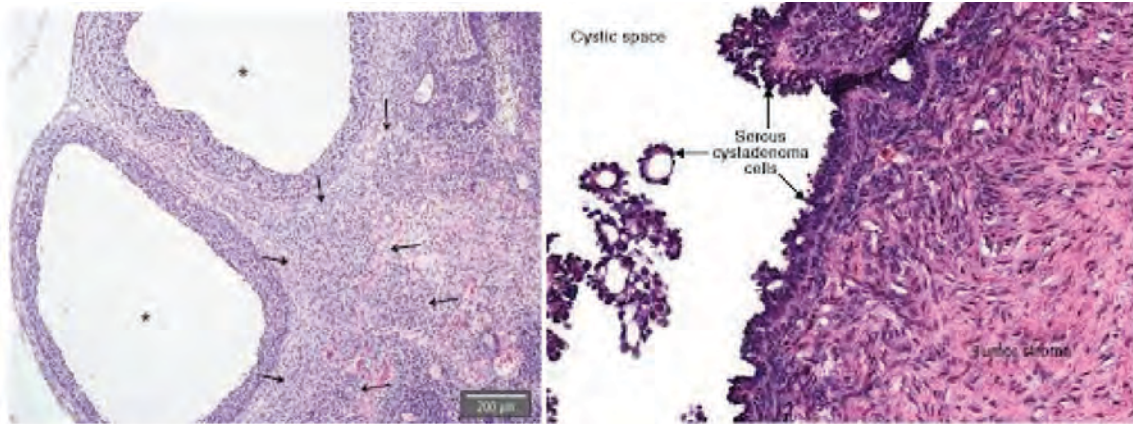
Classes of Ovarian Tumours	No. of Cases	Percentage (%)
Epithelial	62	75.60
Germ cell tumour	14	17.07
Sex cord stromal tumour	4	4.87
Metastatic tumours	2	2.43

Total- 82-100%

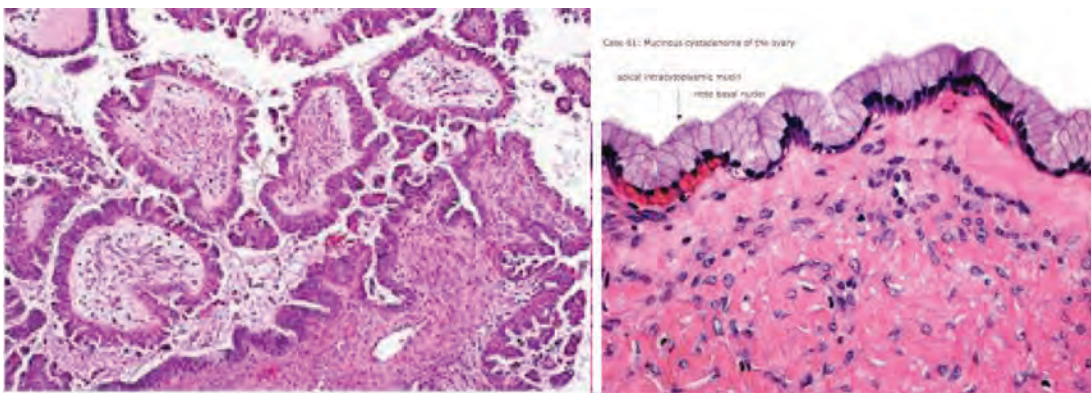
**Table 4: Frequency of different classes of benign and malignant ovarian tumours. (n = 82; No. of cases of each histological type is given in parenthesis).**

Histological Classes of Ovarian Tumours	Benign Tumours (n = 82)	Malignant Tumours (n = 45)	Total	(%)
Surface epithelial Tumour	Serous cystadenoma (40)	Serous cystadenocarcinoma (05)	62	75.60
	Mucinous cystadenoma (13)	Mucinous cystadenocarcinoma (03)		
Germ Cell tumour	Dermoid cyst (04)	Endometrioid carcinoma (01)	14	17.07
	Mature teratoma (08)	Yolk sac tumours (01) Teratocarcinoma (01)		
Sex cord stromal Tumor	Sclerosing stromal tumour (01)	Granulosa cell tumours (02)	04	4.87
		Thecoma(01)		
Metastatic tumour		Krukenberg tumour (02)	02	2.43
<b>Total</b>	<b>66</b>	<b>16</b>	<b>82</b>	<b>100</b>

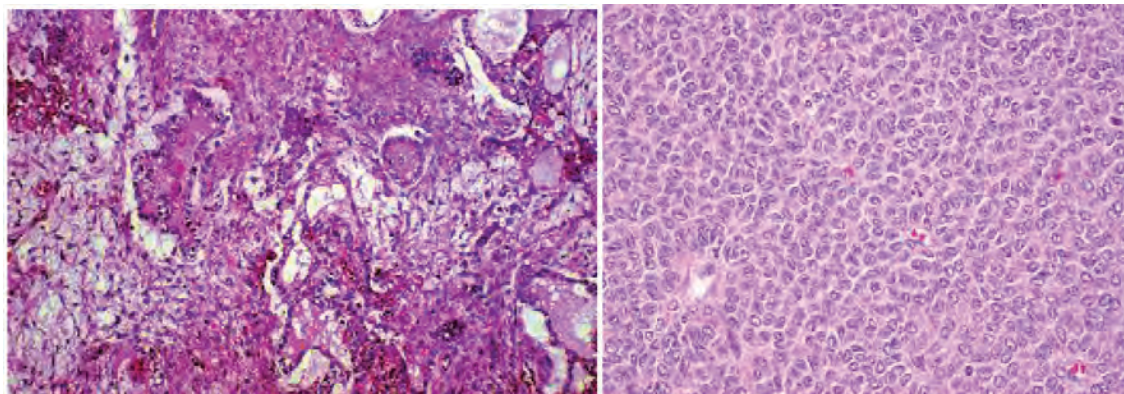




Luteal cyst (H&E stain, 20x) Serous cystadenoma(H&E stain, 20x)



Serous cystadenocarcinoma (H&E stain, 20x) Mucinous cystadenocarcinoma(H&E stain, 20x)



Yolk sac tumour (H&E stain, 20x) Granulosa cell tumor(H&E stain, 20x)