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Histopathological Study of Spectrum of Ovarian Tumors – A 2 Years Study in a Tertiary Care Institute

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Abstract:
Introduction:*Ovarian tumours are heterogeneous neoplasms with varied clinical, morphological and histological features. Ovarian tumours account for 3% of cancers in females and is the 5th most common form of cancer related death in females.Epithelial tumors comprise about 60% of all ovarian neoplasms and more than 90% of malignant tumors. Tumors derived from the sex cords or ovarian mesenchyme constitute 5% to 12% of all ovarian neoplasms.Ovarian tumors are often difficult to detect until they are advanced in stage or size, as symptoms are vague and insidious and there is no definite screening programme for early detection.*
Aims & Objectives:*To study the incidence, age distribution and diverse histomorphological spectrum of ovarian tumours.*
Materials & Methods:*This Prospective study of 2 years duration comprised of 116 ovarian neoplasms diagnosed in the department of pathology, in a tertiary care institute. After obtaining clinical data from the records and gross examination, tissue samples from representative area were fixed in formalin, routinely processed, embedded in paraffin and stained with Hematoxylin& Eosin. Tumours were classified according to WHO classification (2014). Histochemistry was done whereverrequired.*
Results:*A total of 116 ovarian neoplasms were studied during this period. Majority were benign tumours (91.4%), followed by malignant (6.9%) and borderline tumours (1.7%). Epithelial tumors comprise about 78.4%, followed by Germ cell tumors (15.5%) and Sex cord-stromal tumors 6%. Serous cystadenoma was the commonest benign tumor and Adult granulosa cell tumour was the commonest malignant ovarian tumour.*
Conclusion:*The prognosis and varying therapeutic strategies of ovarian tumours necessitate an accurate pathological evaluation. Histopathological study is still the gold standard in diagnosing most of these tumours*
Keywords: *Ovarian neoplasms, Epithelial tumour, germ cell tumour.*

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I. Introduction

Ovarian tumours are heterogeneous neoplasms with varied clinical, morphological and histological features. Ovarian tumours account for 3% of total cancers in females and is the 5th most common form of cancer related death in females. The poor survival is due to the fact that they do not clinically manifest early and approximately 60-70% of the neoplasms present as either stage 3 or 4 [(1)]. Epithelial tumors comprise about 60% of all ovarian neoplasms and more than 90% of malignant tumours[(2)]. Tumors derived from the sex cords or ovarian mesenchyme constitute 5% to 12% of all ovarian neoplasms. Ovarian tumors are often difficult to detect until they are advanced in stage or size, as symptoms are vague and insidious and there is no definite screening programme for early detection [(3)]. The present study was undertaken to study the incidence, age distribution and diverse histomorphological spectrum of ovarian tumours.

II. Materials And Methods

This prospective study was conducted over a period of 2 years (July 2014 to June 2018) in the department of Pathology, in a tertiary care hospital. This study included all resected ovarian specimens which were clinically diagnosed as ovarian tumours.

Methods:

Detailed clinical history was obtained from case records. Formalin fixed, routinely processed, paraffin embedded sections were stained with Hematoxylin& Eosin. The slides were then examined microscopically in detail and tumours were classified according to the WHO classification of ovarian tumours (2014).

Inclusion criteria:
All clinically diagnosed ovarian tumours which were received.

Exclusion criteria:
Metastatic ovarian tumours and specimens which were not properly fixed.

III. Results

A total of 116 ovarian tumours were studied during this period of them 106 cases were benign (91.4%), 8 cases were malignant (6.9%), remaining 2 cases were borderline. Epithelial tumours were the most common histological type (78.4%), followed by Germ cell tumors (15.5%) and sex cord stromal tumours (6.03%).

Graph no 1: Incidence of histological types of ovarian tumours

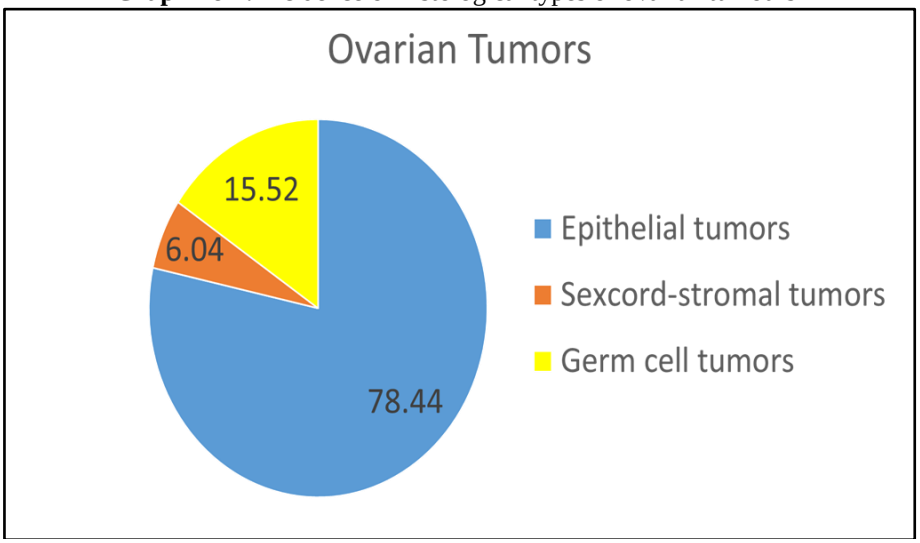

Table no1: Incidence of benign, borderline and malignant tumours among the histological types

Histological Type	Benign	Borderline	Malignant	Total
Epithelial tumours	86(74.1%)	02(1.7%)	03(2.6%)	**91(78.4%)**
Sexcord-Stromal tumours	03(2.6%)	-	04(3.4%)	**07(6.03%)**
Germ cell tumours	17(14.7%)	-	01(0.9%)	**18(15.5%)**
Total	**106 (91.4%)**	**02(1.7%)**	**08(6.9%)**	**116(100%)**

Age distribution:

Majority(32.7%) of the tumours occurred in the 41-50 age group followed by 21-30 age group (26.7%). Youngest patient was 15 years of age and oldest patient was about 70 years. Epithelial tumours had its peak incidence between 41-50 years of age. Sex- cord stromal tumours showed a peak in the 61-70 years of age group, whereas germ cell tumours showed peak in 21-30 years of age group.

Histopathology:

The most common benign tumour was Serous cystadenoma (58.6%) followed by Mucinous cystadenoma (15.5%) and Benign cystic teratoma (13.8%). Adult granulosa cell tumour (3.33%) was the most common malignant tumour followed by serous cystadenocarcinoma (2.5%). Borderline mucinous tumour was the only borderline tumour (1.7%).

Table no2: Histomorphological spectrum of ovarian tumours as per WHO classification(2014).

WHO classification (2014)	No. of cases	Percentage (%)
Epithelial tumours		
A. Serous tumours		
1.Serous cystadenoma	68	58.6%
2.Serous cystadenocarcinoma	3	2.5%
B. Mucinous tumours		

1.Mucinous cystadenoma	18	15.5%
2.Borderline mucinous tumour	2	1.7%
Sex cord stromal tumours		
1.Adult granulosa cell tumour	4	3.33%
2.Fibroma	2	1.7%
3.Thecoma	1	0.86%
Germ cell tumours		
1.Benign cystic teratoma	16	13.8%
2.Monodermal teratoma Carcinoid	1	0.86%
3.Immature teratoma	1	0.86%
Total	116	100%

IV. Discussion

Ovarian tumours are one of the diagnostic challenges due to the fact that they do not clinically manifest early and approximately 60-70% of the neoplasms present as either stage IIIor IV. Thus knowledge of morphology and age-specific characteristics can help refine the diagnosis.

Table no 3: Comparative analysis of cases based on the biological behaviour of tumours

Study	Benign (%)	Borderline(%)	Malignant (%)
Neetha GV et al	70.3%	-	29.7%
Pradhan A et al (6)	79.5%	2.4%	18%
Garg N et al	81.2%	1.2%	17.6%
Present study	91.4%	1.7%	6.9%

In the present study, majority of the tumours were benign (91.4%) followed by malignant tumours (6.9%) and rest were borderline (1.7%). Findings of the present study correlated with the studies by Pradhan A et al and Garg N et al. However, the frequency of malignant tumours was less compared to other studies.

Table no 4: Comparative analysis of age distribution of ovarian tumours

Study	Up to 20yrs	21-30	31-40	41-50	51-60	61-70
Jha R &Kakri S[7]	6.8%	20.5%	26.7%	21.1%	14.3%	10.6%
Garg N et al	7.1%	17.6%	41.2%	22.3%	10.6%	1.2%
Present study	2.6%	26.7%	22.4%	32.8%	12.1%	3.4%

In the present study, the patients age ranged from 15 years to 70 years,where the youngest patient was 15 years old and the oldest was 70 years old. Majority of tumours were in the age group of 21-50, which was concordant with studies by Jha R &Kakri S and Garg N et al.

Table no 5: Comparative analysis of incidence of ovarian tumours based on histological type

Study	Epithelial tumours (%)	Germ cell tumours (%)	Sexcord-stromal Tumours (%)
Neethu GV et al(4)	74.4%	18.2%	7.4%
Garg N et al(1)	70.6%	18.8%	8.2%
Krishna M &Maurya G(5)	77.7%	15.5%	6.1%
Present study	78.4%	15.5%	6.03%

Most of the tumours belonged to Epithelial tumours(78.4%), which was comparable to the results seen by Garg N et al (70.6%), Neethu GV et al [4] (74.4%) and Krishna M &Maurya G (77.7%) . Germ cell tumours and Sexcord-stromal tumours accounted for 15.5% and 6.03% respectively in the present study which was comparable to the results seen by Neethu GV et al (18.2% and 7.4%).

Table no6: Distribution of Epithelial tumours

Histological type	**Benign**	**Borderline**	**Malignant**	**Total**
Serous tumours	68 (74.7%)	-	03 (3.3%)	71(78%)
Mucinous tumours	18 (19.8%)	02 (2.2%)	-	20(22%)
Endometrioid tumours	-	-	-	-
Clear cell tumours	-	-	-	-
Brenner tumours	-	-	-	-
Total	-	-	-	**91 (100%)**

In the present study, majority of epithelial tumours were benign (94.5%) followed by malignant epithelial tumours (3.3%)and the remaining were borderline (2.2%). In the present study maximum number of epithelial tumours were noted in 31-50 years age group. All the malignant tumours were seen above 40 years of age. The results correlated with the studies done by Jha R &Kakri S and Garg N et al. Among the histological types of epithelial tumours, serous tumours (78%) were the most common, followed by Mucinous tumours (22%). No other histological types of epithelial tumours was present in this study.

Table no7: Distribution of Germ cell tumours

Histologic type	No of cases
Dysgerminoma	-
Yolk sac tumour	-
Embryonal carcinoma	-
Non-gestational choriocarcinoma	-
Mature teratoma (benign cystic teratoma)	16 (88.8%)
Immature teratoma	01 (5.6%)
Monodermalteratoma Carcinoid	01 (5.6%)
Mixed germ cell tumour	-
Total	18 (100%)

In the present study, majority of the GCT were benign (94.4%) and include Mature cystic Teratoma and MonodermalTeratoma Carcinoid (Fig 1-5). Malignant tumour includes Immature Teratoma (5.6%). Germ cell tumours were more common below 30 years. These findings were consistent with the studies of Jha R &Kakri S and Garg N et al.

Fig no1: A case of Benign cystic Teratomawith solid area

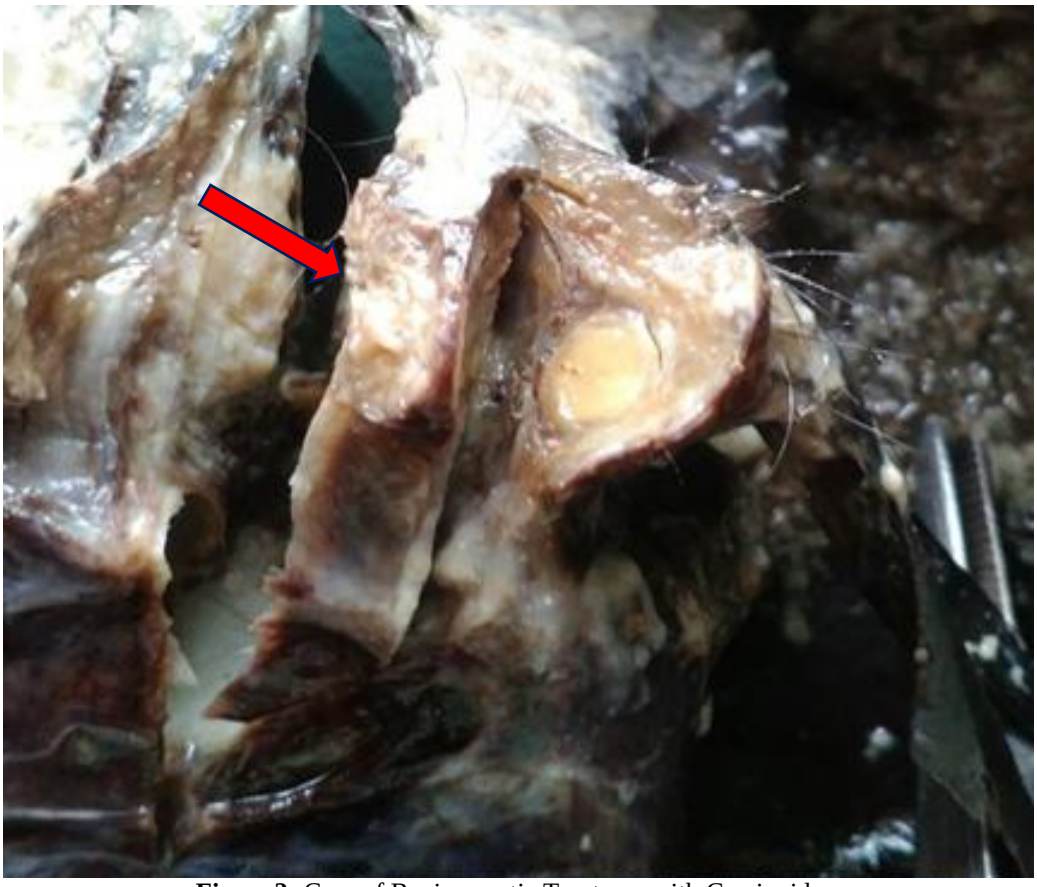

Fig no 2: Case of Benign cystic Teratoma with Carcinoid.

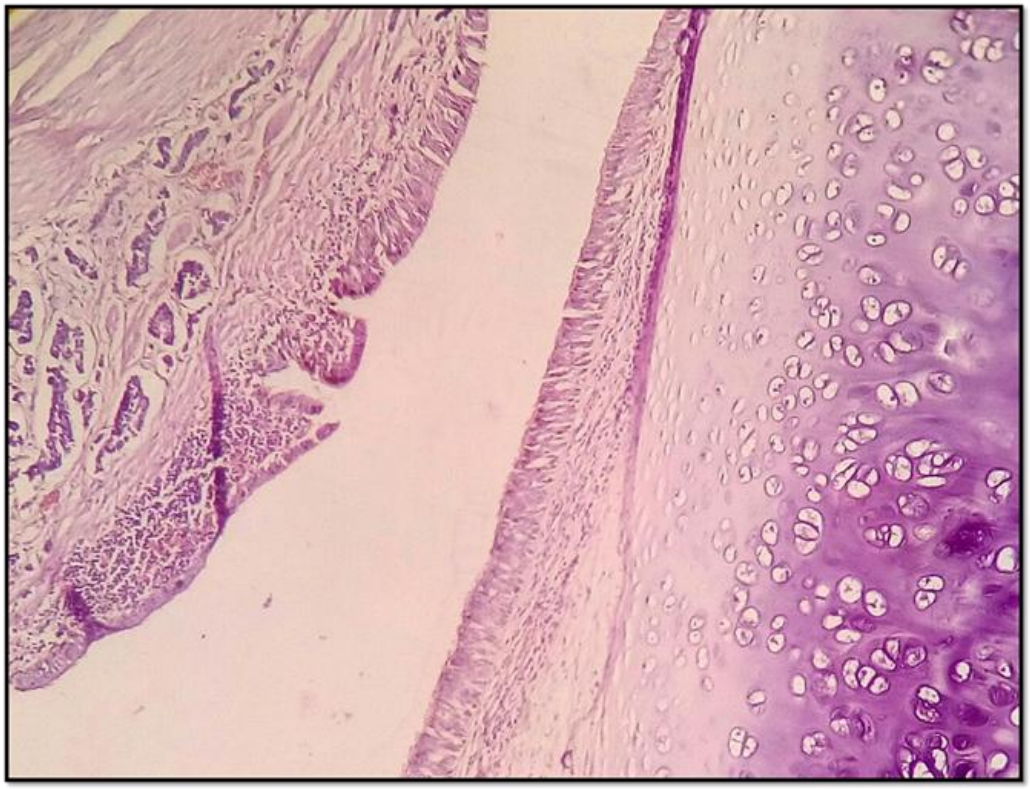

Fig no 3: Microscopy of Benign cystic Teratoma showing mature elements

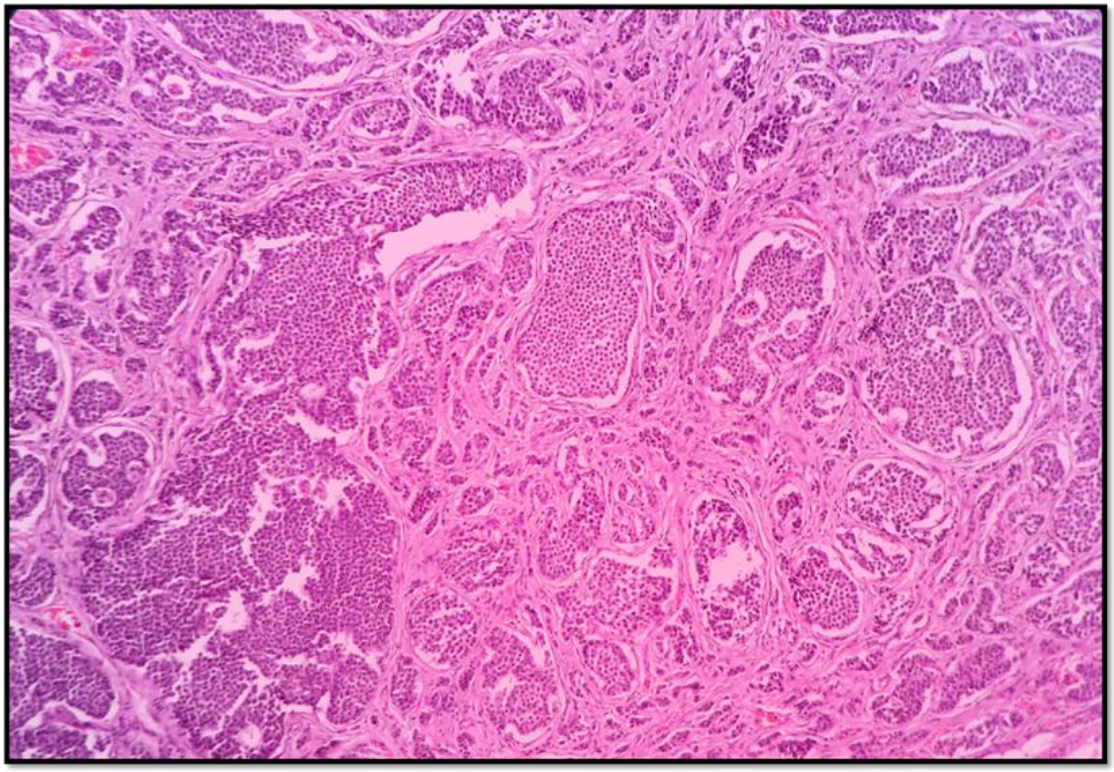

Fig no 4: Microscopy of Monodermal Teratoma with Carcinoid

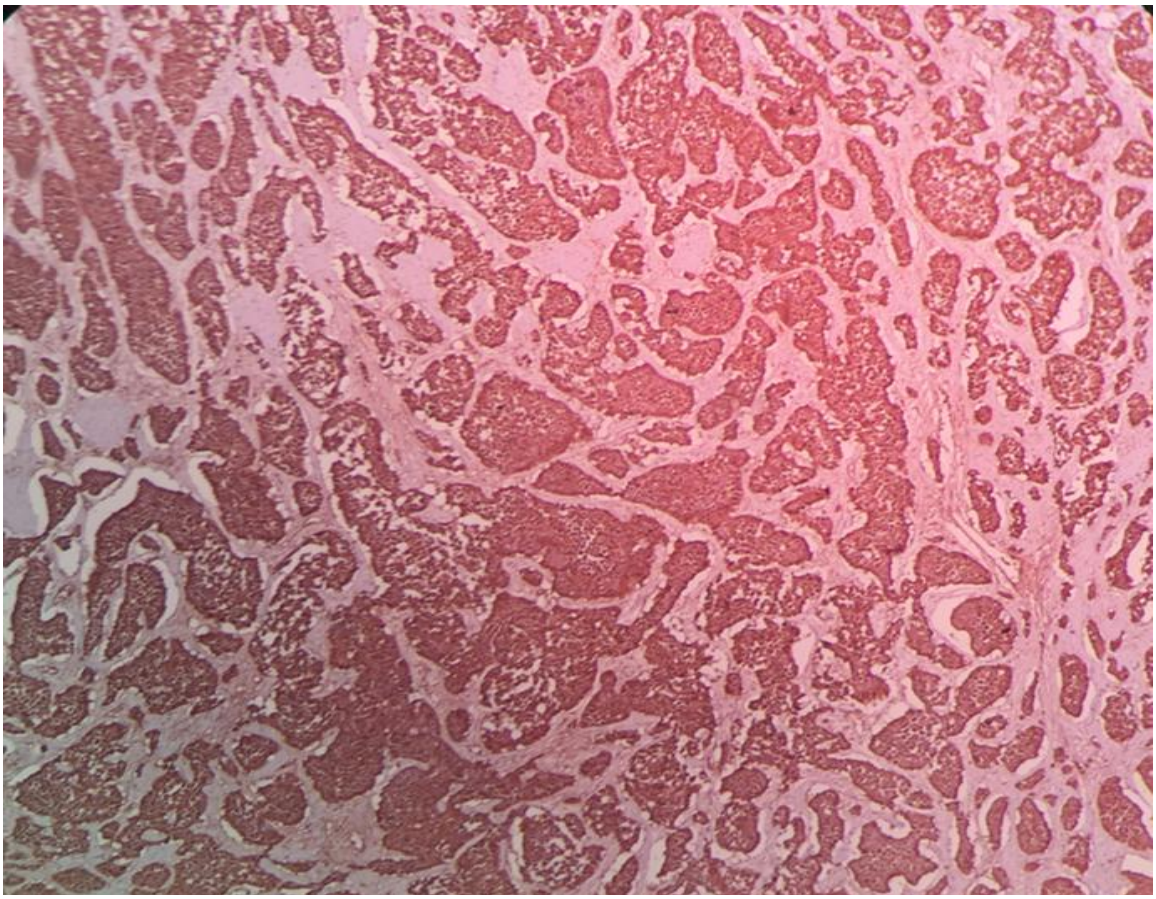

Fig no 5: Immunohistochemistry of Monodermal Teratoma Carcinoid showing Chromogranin Positivity.

Table no8: Distribution of Sexcord-stromal tumours

Histologic type	No. of cases(%)
Pure stromal tumors	
Fibroma	02(28.6%)
Thecoma	01(14.3%)
Pure sex cord tumors	
Adult granulosa cell tumors	04 (57.1%)
Mixed sex cord stromal tumors	-
Total	07 (100%)

In the present study, majority of Sexcord stromal tumours were malignant (57.1%) and the results were similar to the findings of Rao KN et al[8] and Garg N et al. Adult granulosa cell tumour constituted 3.5% of all ovarian tumours.

V. Conclusion

From the present study we can conclude that benign ovarian tumours are more common than the malignant ones. Most common age group affected is 41-50 years. Most common benign tumour is Serous cystadenoma. Most common malignant tumour is Adult granulosa cell tumour. A rare case of Benign cystic teratoma with neuroendocrine differentiation (Carcinoid) has been reported. The prognosis and varying therapeutic strategies of ovarian tumours necessitate an accurate pathological evaluation.

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