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Histopathological Spectrum of Ovarian Neoplasms in a Tertiary Care Hospital: An Observational Study

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ABSTRACT

Background: Ovarian neoplasms show a wide range of histopathological patterns and remain a major cause of gynecological morbidity and mortality. Accurate histopathological classification is essential for appropriate clinical management and prognostication.
Objectives: To study the histopathological spectrum of ovarian neoplasms in a tertiary care hospital, to determine the relative frequency of benign, borderline, and malignant tumours, and to analyze their age-wise distribution.
Materials and Methods: This hospital-based observational study was conducted in the Department of Pathology, Agartala Government Medical College and Govind Ballabh Pant Hospital, Agartala, from November 2022 to April 2024. A total of 130 surgically resected ovarian tumour specimens were included. Specimens were processed routinely and stained with hematoxylin and eosin. Tumours were classified into surface epithelial, germ cell, and sex cord-stromal tumours, and further categorized as benign, borderline, or malignant. Data was analyzed using descriptive statistics and expressed as frequencies and percentages.
Results: Out of 130 cases, 67 involved the right ovary, 58 the left ovary, and 5 were bilateral. The most affected age group was 41–50 years (28.5%), followed by 31–40 years (24.6%). Surface epithelial tumours constituted the majority (74.6%), followed by germ cell tumours (18.5%) and sex cord-stromal tumours (6.9%). Among surface epithelial tumours, serous tumours were most common, with serous cystadenoma being the predominant benign lesion. Mucinous cystadenocarcinoma was the most common malignant ovarian neoplasm in the present study.
Conclusion: Surface epithelial tumours form the predominant category of ovarian neoplasms, with serous cystadenoma being the most common benign tumour. The peak incidence was observed in the 41–50-year age group. Histopathological examination remains the gold standard for diagnosis and classification of ovarian tumours. Regional studies such as the present one provide valuable baseline data for understanding disease patterns and improving early diagnosis and patient care.

Keywords: Ovarian neoplasm, Surface epithelial tumours, Serous cystadenoma, Mucinous cystadenocarcinoma, Mature cystic teratoma.

INTRODUCTION

Ovarian neoplasms exhibit a wide spectrum of clinical, morphological, and biological behaviour. They represent one of the most important causes of gynaecological morbidity and mortality worldwide. Ovarian cancer ranks among the leading causes of cancer-related deaths in women, primarily due to its insidious onset, lack of specific early symptoms, and late stage at presentation.[1,2]

The ovary is unique in that it gives rise to diverse types of tumours owing to its complex embryological origin and functional anatomy. Ovarian neoplasms arise from three principal components: surface (coelomic) epithelium, germ cells, and sex cord-stromal elements. In addition, metastatic tumours from other primary sites may also involve the ovary.[3,4,5] Based on their histogenesis and biological behaviour, ovarian tumours are broadly classified into benign, borderline, and malignant categories according to the World Health Organization (WHO) classification of tumours of the female reproductive system.[6]

Surface epithelial tumours constitute the largest group of ovarian neoplasms and include serous, mucinous, endometrioid, clear cell, and Brenner tumours.[5,6] Germ cell tumours are more frequently encountered in younger women and comprise entities such as mature cystic teratoma, dysgerminoma, and yolk sac tumour.[4,7] Sex cord-stromal tumours, though relatively less common, are clinically significant due to their potential for hormone production and include granulosa cell tumour, thecoma, and Sertoli–Leydig cell tumour.[4,5] Each of these tumour categories exhibits distinct histopathological features and varying prognostic implications.[5,6]

Histopathological examination remains the gold standard for the definitive diagnosis and classification of ovarian tumours.[5,6] Accurate histological typing is essential not only for establishing the diagnosis but also for guiding appropriate clinical management.[2,6] The relative frequency of various histological subtypes shows considerable geographic and ethnic variation, influenced by factors such as age distribution, reproductive history, and genetic predisposition.[1,7,8]

In developing countries, limited access to screening facilities and advanced diagnostic modalities further contributes to delayed diagnosis and poor outcomes in ovarian malignancies.[9,10,11,12,13] Therefore, studies documenting the histopathological spectrum of ovarian tumours in different regions are valuable for understanding disease patterns and aiding in early recognition and management.[7,14] Such studies also provide baseline data that can be used for future research and healthcare planning.

OBJECTIVES

1. To study the histopathological spectrum of ovarian neoplasms in a tertiary care hospital.
2. To determine the relative frequency of benign, borderline, and malignant ovarian tumours.
3. To analyze the age-wise distribution of ovarian tumours.

MATERIALS & METHODS

Study Design:

This was a hospital-based observational study conducted in the Department of Pathology, Agartala Government Medical College (AGMC & GBPH), Agartala, Tripura.

Study Period:

The study was carried out over a period of one and a half years, from November 2022 to April 2024.

Study Population:

All ovarian tumour specimens received in the Department of Pathology, AGMC & GBPH during the study period were included in the study.

Sample Size:

A total of 130 cases of ovarian tumours were studied.

Inclusion Criteria:

- All surgically resected ovarian tumour specimens received for histopathological examination.
- All primary ovarian neoplasms diagnosed during the study period.

Exclusion Criteria:

- Non-neoplastic ovarian lesions such as functional cysts and inflammatory lesions.
- Autolyzed or inadequately preserved specimens.

Specimen Processing:

All specimens were received in 10% neutral buffered formalin. Gross examination was performed, and relevant features such as size, laterality, external surface, cut surface, and presence of solid or cystic areas were recorded. Representative sections were taken from different areas of the tumour, including solid areas, cyst wall, papillary excrescences, and areas suspicious for malignancy.

The tissues were processed routinely, embedded in paraffin wax, and sections of 3–5 µm thickness were cut and stained with Haematoxylin and Eosin (H&E).

Histopathological Evaluation:

Histopathological diagnosis was made based on microscopic examination of H&E-stained sections. Tumours were categorized into benign, borderline, and malignant groups and further classified into surface epithelial tumours, germ cell tumours, sex cord-stromal tumours, and others.

Data Collection:

Clinical details such as age, presenting complaints, laterality, and tumour size were obtained from pathology requisition forms and hospital records wherever available. Histopathological findings were recorded in a predesigned proforma.

Statistical Analysis

The data were entered into Microsoft Excel and analyzed using appropriate statistical software. Results were expressed as frequencies and percentages. Descriptive statistical analysis was used to determine the distribution of ovarian tumours according to age, histological type, and biological behaviour (benign, borderline, and malignant). The findings were compared with those of other published studies.

RESULT

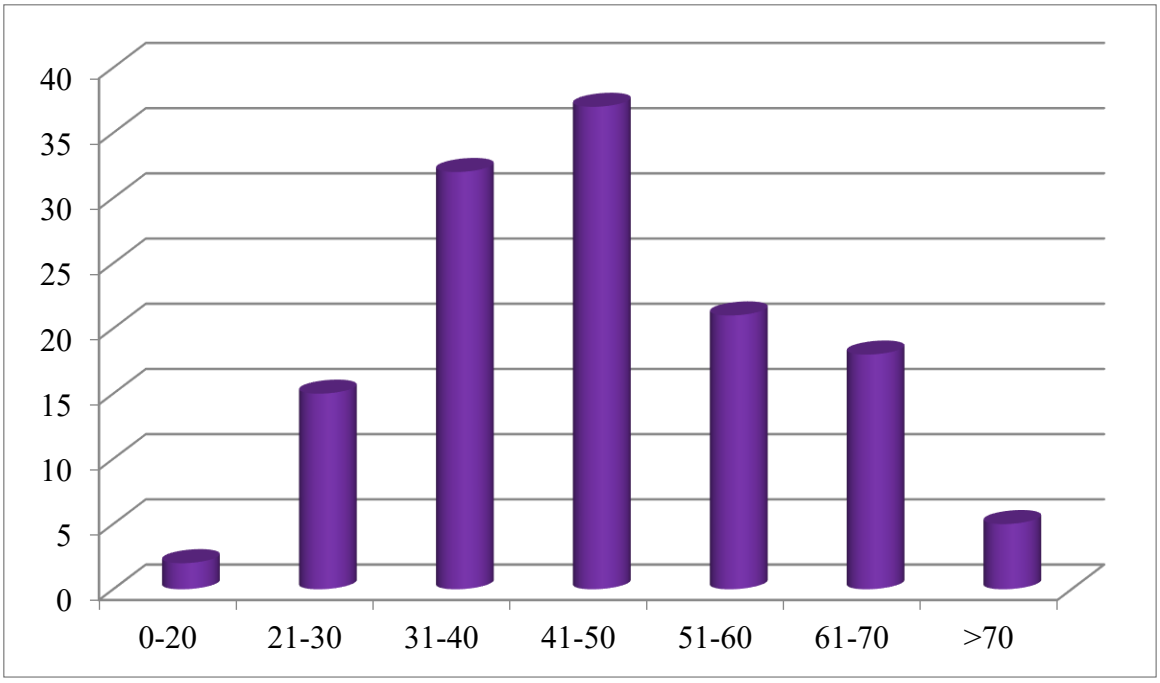
A total of 130 cases were selected, out of which 67 cases were involving right ovary. 58 cases were left ovarian and 5 cases were bilateral ovarian neoplasms.

Pie chart 1: Laterality of ovarian neoplasms

All the cases were distributed into 7 age groups. Most of the cases i.e. 37 cases (28.5%) belonged to the age group 41-50, followed by 32 cases (24.6%) in the age group 31-40, 21 cases (16.2%) in the age groups 51-60, 18 cases (13.9%) in the age group 61-70, 15 cases (11.5%) in the age group 21-30, 5 cases (3.8%) in >70 age group and only 2 cases (1.5%) in the age group 0-20 [Table 1].

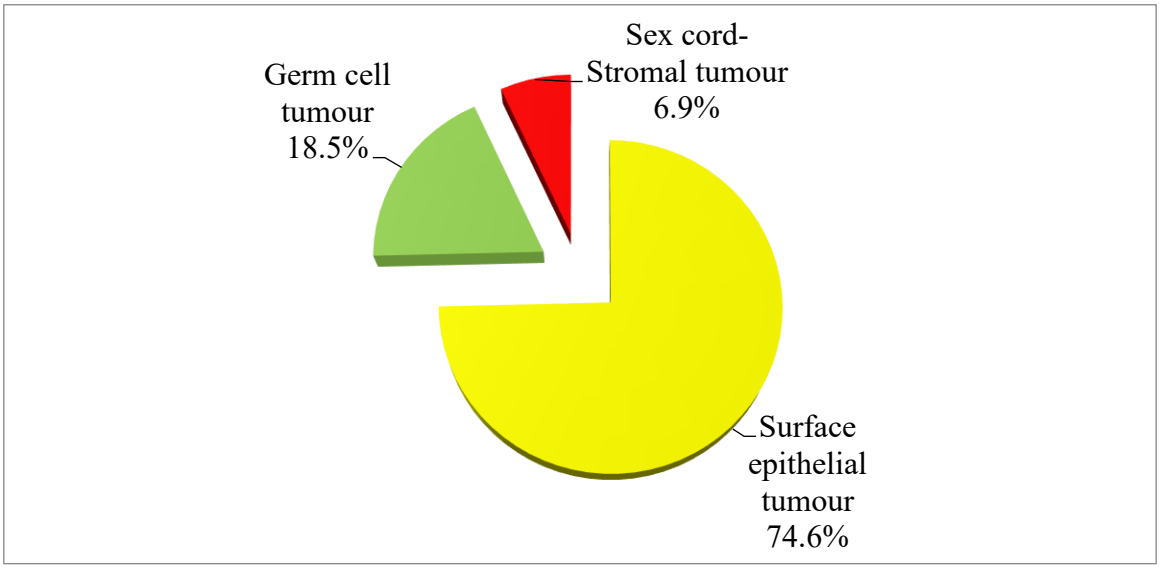
Table 1: Age distribution of all ovarian neoplasm cases

0-20	21-30	31-40	41-50	51-60	61-70	>70	Total
02	15	32	37	21	18	05	130



Bar diagram 1: Age distribution of all ovarian neoplasm cases

After histopathological analysis, out of 130 cases, most of the cases, i.e., 97 cases (74.6%), were of surface epithelial origin. 24 cases (18.5%) were germ cell tumours, and 9 cases (6.9%) were of sex cord-stromal origin.



Pie chart 2: Major category distribution of all ovarian neoplasm cases

On histopathological analysis, out of 97 cases of surface epithelial origin tumours, 52 cases were serous tumours. 42 (43.3%) were serous cystadenomas, 9 cases (9.3%) of serous adenocarcinoma, and 1 case (1.0%) of serous cystadenofibroma. A total of 43 cases were mucinous tumours, 30 (30.9%) cases were mucinous cystadenomas, 10 cases (10.3%) were mucinous adenocarcinoma, and 3 cases (3.1%) were mucinous borderline tumours. Another 2 cases (2.1%) were diagnosed as benign Brenner tumours.

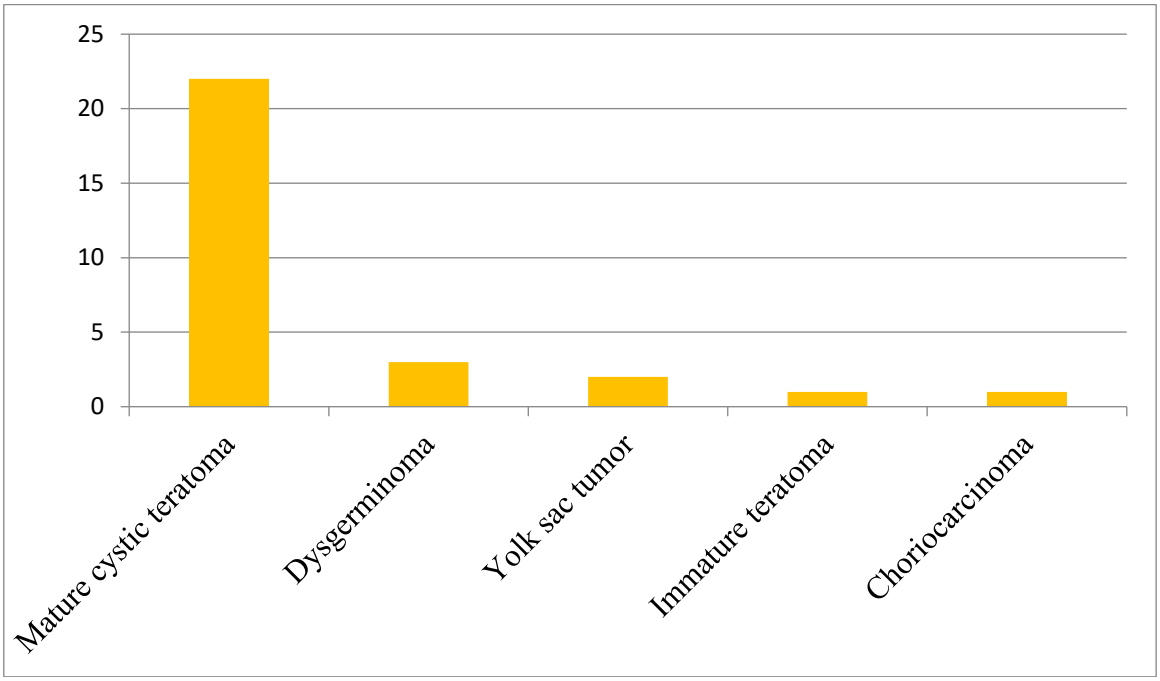
Table 2: Spectrum of surface epithelial tumours

Serous			**Mucinous**			**Brenner**	**Total**
Benign		**Malignant**	**Benign**	**Border line**	**Malignant**	**Benign**	
Cystadenoma	Cystadeno fibroma	Adeno carcinoma	Cystadenoma	Mucinous borderline tumour	Adeno carcinoma	Benign Brenner tumour	
42	01	09	30	03	10	02	97

On histopathological analysis, out of 33 cases of non-epithelial origin tumours, 29 cases were Germ cell tumours, of which 22 cases (66.7%) were benign (mature cystic teratoma), and 7 cases were malignant. 3 cases of Dysgerminoma (9.1%), 2 cases (6.1%) of Yolk sac tumour, 1 case (3.0%) of Immature teratoma, and 1 case (3.0%) of Choriocarcinoma. 4 cases (12.1%) were of sex cord stromal origin, all of them were diagnosed as Granulosa cell tumour.

Table 3: Spectrum of non-epithelial tumours

Germ cell tumours					**Sex-cord stromal tumours**	**Total**
Benign	Malignant				Malignant	
Mature cystic teratoma	Dysgerminoma	Immature teratoma	Choriocarcinoma	Yolk sac tumour	Granulosa cell tumour	
22	03	01	01	02	04	33



Bar diagram 2: Spectrum of Germ cell tumours

Pictures

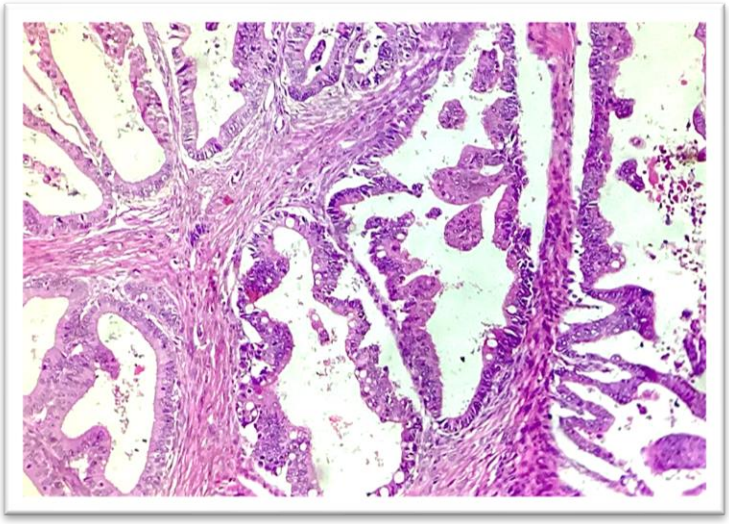


Figure 1: 100x view of H&E-stained histopathology section of Mucinous borderline tumour

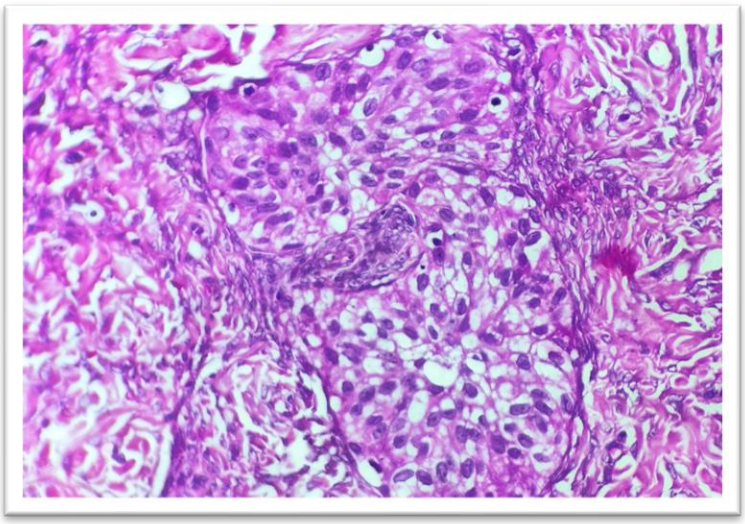


Figure 2: 400x view of H&E-stained histopathology section of benign Brenner tumour

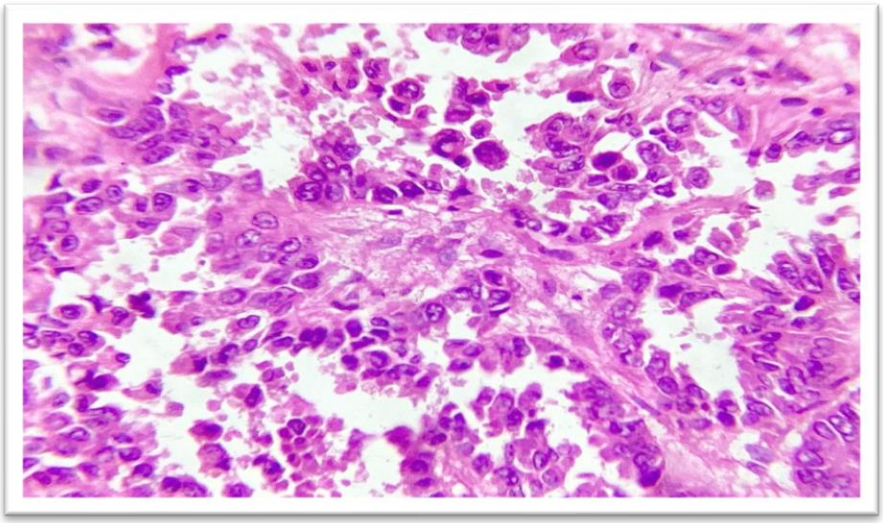


Figure 3: 400x view of H&E-stained histopathology section of serous adenocarcinoma

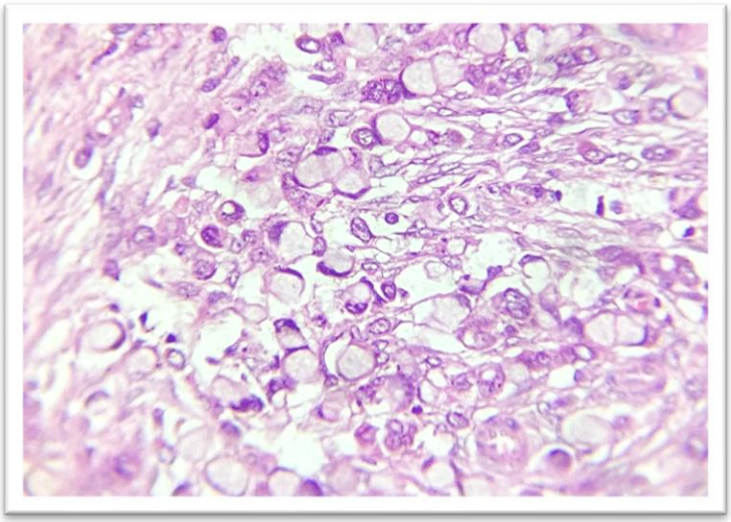


Figure 4: 400x view of H&E-stained histopathology section of mucinous adenocarcinoma

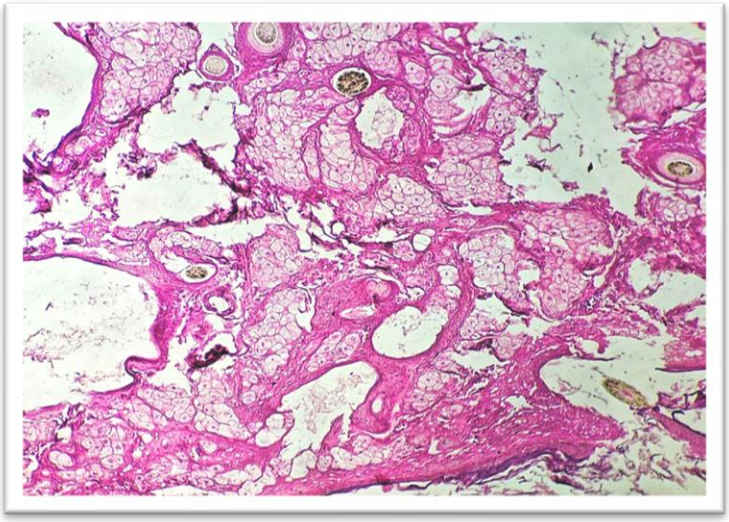


Figure 5: 40x view of H&E-stained histopathology section of mature cystic teratoma

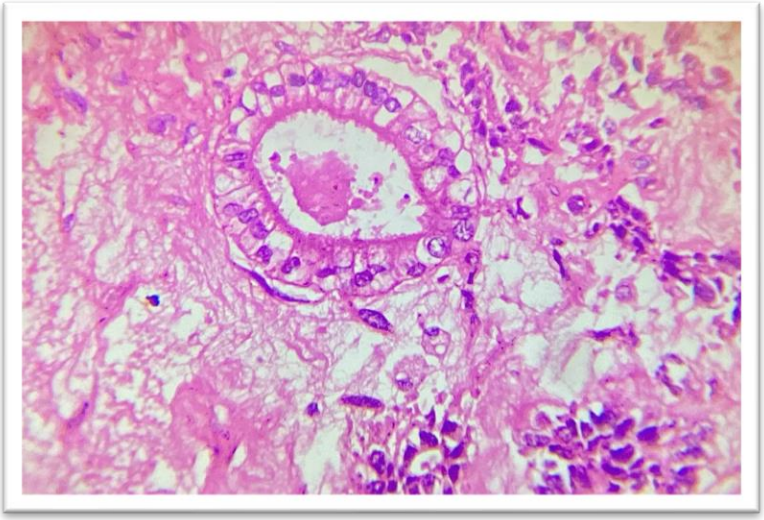


Figure 6: 400x view of H&E-stained histopathology section of Yolk sac tumour

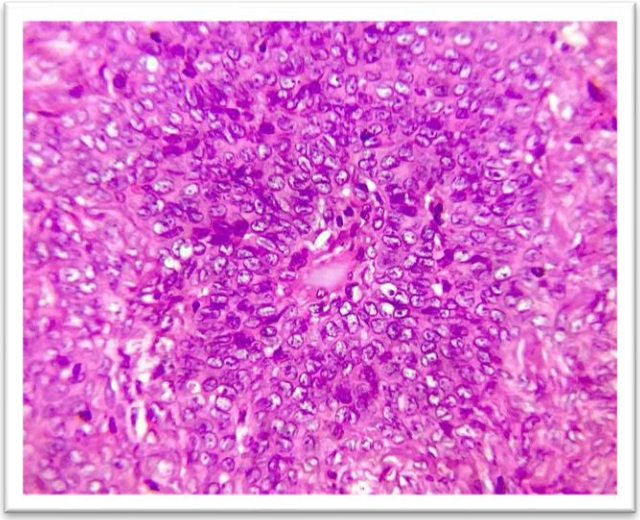


Figure 7: 400x view of H&E-stained histopathology section of Granulosa cell tumour

DISCUSSION

In the present study, the most common age group affected was 41–50 years, which is comparable to the findings of Sharma P et al.[15] However, this differs from the observations of Puri S et al., who reported the most common age group as 50–59 years.[16] Shaik M et al. found the peak incidence in the 36–45 year age group, while Naik S N et al. and Mehdi G et al. reported the most common age group as 30–40 years and 31–40 years, respectively.[17,18,19] Thus, variation in age distribution across studies may be attributed to differences in sample size, population characteristics, and regional factors.

Concerning histogenetic classification, the present study demonstrated that surface epithelial tumours were the most common histological type, followed by germ cell tumours, which is in concordance with the studies conducted by Sharma P et al, Sharma I et al, Shaik M et al, Naik S N et al, Bandopadhyay A et al, Ray S et al and Nagamine K et al.[15,17,18,20,21,22,23] In these studies, serous cystadenoma was consistently reported as the most common benign ovarian tumour.

In the present study, mucinous cystadenocarcinoma was the most common malignant ovarian neoplasm. This finding is similar to that reported by Sharma I et al, but differs from the observations of Sharma P et al, Shaik M et al, Bandopadhyay A et al, Ray S et al, Naik S N et al and Mehdi G et al, who reported serous cystadenocarcinoma as the most common malignant tumour.[15,17,18,19,20,21,22]

Thus, the findings of the present study reaffirm that ovarian tumours show considerable variation in age distribution and malignant subtype across different studies. However, the predominance of surface epithelial tumours and serous cystadenoma as the most common benign tumour remains a consistent observation in most studies.

Limitations

The study was conducted in a single tertiary care centre; therefore, the findings may not be representative of the general population.

As this was a hospital-based observational study, selection bias cannot be completely excluded.

Clinical follow-up and survival data were not included, limiting the correlation of histopathological findings with patient outcomes.

CONCLUSION

The present study highlights the wide histopathological spectrum of ovarian tumours encountered in a tertiary care hospital. Most ovarian tumours were of surface epithelial origin, with serous cystadenoma being the most common benign

tumour. The most commonly affected age group was 41–50 years. Mucinous cystadenocarcinoma was the most common malignant ovarian neoplasm in the present study. Histopathological examination remains the gold standard for accurate diagnosis and classification of ovarian tumours. Knowledge of the relative frequency and age distribution of ovarian tumours is essential for appropriate clinical management and prognostication. Regional studies such as the present one contribute valuable data to existing literature and may aid in early diagnosis and improved patient care.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

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