Global Journal of Medicine & Public Health

Histopathological Spectrum of Ovarian Tumours in a Tertiary Care Centre of Garhwal Region

Shubhani Singh[1] Deepa Hatwal[2] Swati Pundir[3] Srijan Srivastav[4]*

ABSTRACT

Background

Globally ovarian tumour is one of the leading causes of cancer death among women. The ovarian tumor has varied histogenesis, clinical behavior, and malignant potential.The aims and objectives of the present study is to study the histopathological pattern and age distribution of ovarian neoplasms.

Methods

A total of 68 cases were studied for a period of 3 years in a tertiary care center of Garhwal region. They were reviewed and analyzed for age, histopathological findings, and clinical presentations. The classification was done according to the WHO histologic classification of ovarian tumors,2020.

Results

Of the 68 ovarian tumors studied, 80.80% were benign, 7.35% cases were borderline, and 11.76% cases were malignant. Among the WHO 2020 morphological classification, surface epithelial tumors comprised 60.30%, followed by germ cell tumors (27.94%). Serous cystadenoma (23.52%) was the most typical benign neoplasm, followed by mature cystic teratoma (19.11%). Mucinous cyst adenocarcinoma (2.90%) was the most common malignant neoplasm. Tumors were seen over an age range of 18-78 years, and a maximum number of cases presented in the 2nd to 3rd decade of life. The younger age group primarily presented with benign tumors, whereas malignant tumors were common in the elderly age group.

Conclusions

Surface epithelial tumors were the most common ovarian tumors. Maximum numbers of ovarian tumors were in the age range of 20-39 years.

Keywords: Histopathology, ovary, neoplasms

GJMEDPH 2024; Vol. 13, issue 4 | OPEN ACCESS

4*Corresponding author:Srijan Srivastav, Assistant Professor, Department of Pathology,VCSGGMSR&I, Srinagar Garhwal, Dr.srijansrivastav@gmail.com1.Shubhani Singh,PG Resident (3rd year),Department of Pathology,VCSGGMSR&I, Srinagar Garhwal;2. Deepa Hatwal, Professor & Head (Blood Bank), Department of Pathology,VCSGGMSR&I, Srinagar Garhwal; 3.Swati Pundir,Senior resident, Department of Pathology,VCSGGIMSR, Srinagar

Conflict of Interest—none | Funding—none

INTRODUCTION

Ovarian cancers account for 25% of all malignancies of the female genital tract in the western world.[1] According to Globocan 2020, a total of 103,716 cases of ovarian malignancy were identified in India, with 45,701 new cases. Approximately 32,077 deaths were reported due to ovarian tumors. The prevalence rate is 15.65/100,000 females.[2] Ovaries are unique, paired intrapelvic organs of the female reproductive system that has a broad aspect of clinical presentation.[4] Ovarian tumors are challenging to detect until they are advanced in size or stage. Hence, they are often called as "silent killer".[3,4,5]

Ovarian tumors are not a single entity but a complex-wide spectrum of neoplasms that involves a varied range of histologic patterns arising from epithelial tissues, connective tissues, and specialized hormone-secreting cells to germinal cells.[6,7] They change the effects of different hormones throughout the lifetime of a female and are susceptible to a range of both benign and malignant neoplasms.[8] Ovarian tumors occurring between the ages of 20 and 45 are primarily benign, accounting for 80% of all cases, and only 20% are malignant tumors common in older women between the ages of 40 and 65 with poor prognosis. Multiple risk factors, including obesity, nulliparity, cigarette smoking, and genetic changes, are responsible for the development of ovarian carcinoma.[9,10] Various ovarian tumors' clinical, gross, and radiological features provide important diagnostic clues. They cannot be reliably distinguished from one another solely based on these characteristics; a histopathological examination is necessary and considered the gold standard for diagnosing ovarian neoplasms to initiate appropriate treatment. [11,12]The present study is undertaken to study the histopathological spectrum of ovarian tumors in a tertiary care center, classify them according to the WHO 2020 classification of ovarian tumors, and find the distribution of benign and malignant neoplasms in various age groups in a tertiary care center in the Garhwal region of Uttarakhand.

METHODOLOGY

The retrospective and prospective 3-year study was conducted in the Department of Pathology, Veer Chandra Singh Garhwal Institute of Medical Science & Research, Srinagar Garhwal Uttarakhand, India, from March 2021 to February 2024. Approval from the Institutional Scientific and Ethical Committees was obtained. A total of 68 cases were studied. All the materials, such as blocks and slides available in the department, were analyzed retrospectively. For the prospective study, consecutive oophorectomy specimens were received in 10% formalin from the Department of Obstetrics and Gynaecology with requisition forms having relevant clinical features, age, radiological findings, and provisional diagnosis. At the time of receiving the ovarian specimen, the weighing was obtained. The specimens were allowed to be fixed in 10% buffered formalin for 24–28 hours. After fixation, multiple bits were taken from representative areas of the tumor and the accompanying tissue. Special attention was given to solid areas adjacent to the ovarian surface and papillary projections. Gross photographs of the resected ovarian specimen's external surface and cut surface were taken. They were processed for histopathological examination, and paraffin blocks were made. The blocks were cut at 3–5 µm thickness and stained with hematoxylin and eosin stain. Mounted on a glass slide & seen under a light microscope. The tumors were then classified as per the WHO 2020 classification of ovarian tumors. As the study is focused on the histological characterization of ovarian tumors, immunohistochemistry was not used.

RESULTS

A total of 68 cases of ovarian tumors were observed during the 3-year study period. Abdominal pain was the single most common presenting symptom (24%), and acute abdomen was the least common (2.90%) [Figure 1].

ISSN# 2277-9604

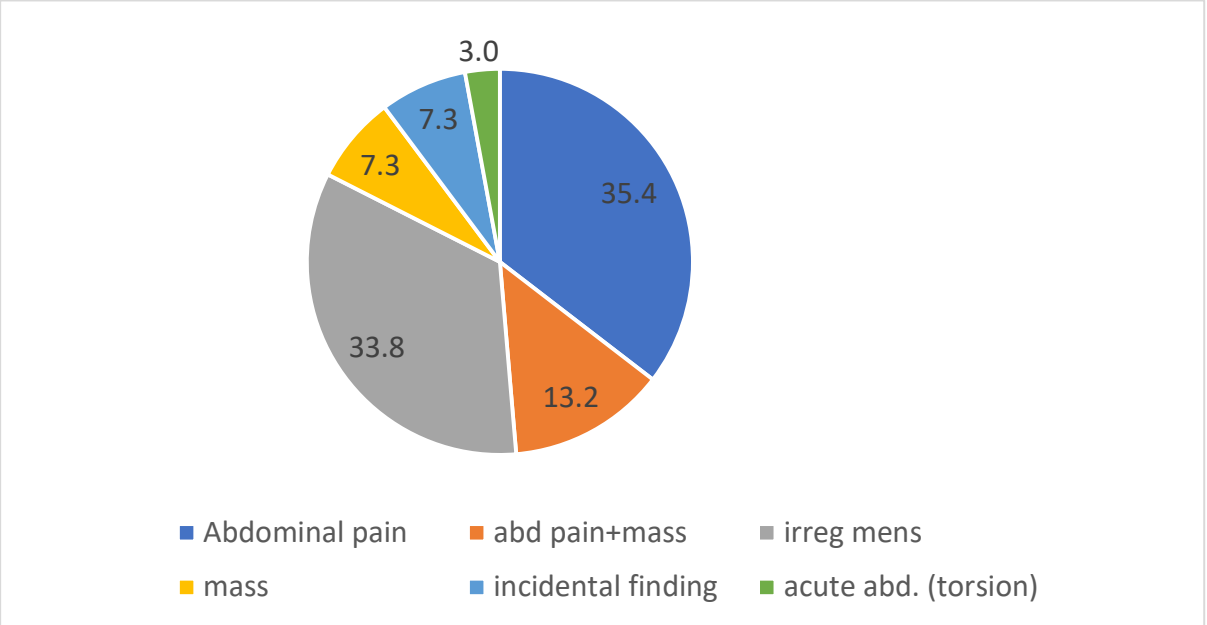

Figure 1: Distribution of ovarian tumors according to a mode of presentation (in percentage)

Out of the total cases, (80.80%) were benign, (7.35%) borderline and (11.76%) were malignant. Right-sided tumors of the ovary were more common (45.6%) than left-sided tumors (41%). While only (12%) of cases were bilateral. Maximum benign neoplasms were grossly cystic in the cut section (57.1% of total lesions), while most malignant neoplasms were solid on the cut section (5.88%). Borderline neoplasms were found to be both solid and cystic on the cut section (4.40%) [Figure 2].

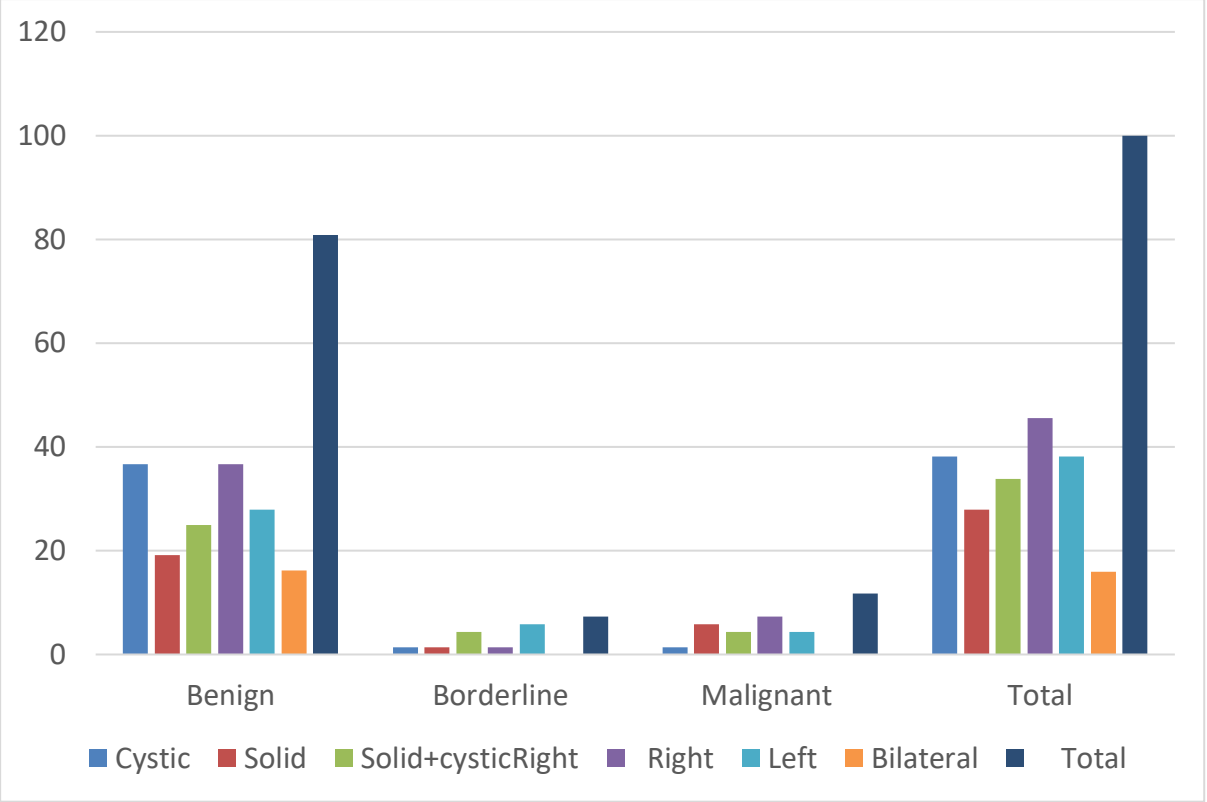

Figure 2: Distribution of ovarian tumors in percentage according to gross appearance and laterality

ISSN# 2277-9604

The Gross of various ovarian tumors is given in Figure 3.

Figure 3 shows (a) a grossly solid ovarian tumor on a cute section with hemorrhagic and cystic degeneration in a case of dysgerminoma and (b) a grossly solid and cystic ovarian mass. On the cut section, the solid area shows pultaceous material with a bunch of hair while the cystic part contains a dense mucinous area. (c) grossly solid ovarian mass with a cut section showing mucinous material. (d) grossly, ovarian mass is partly solid and partly cystic with friable areas, gelatinous changes and areas of hemorrhage and necrosis.

Age distribution among ovarian tumors according to their morphological pattern is shown in Table 1. Among all the tumors, the majority In our study, 57.3% of cases were seen in the 20-39 age group. The youngest patient was 18 years old, and the oldest was 78. The youngest patient had a yolk sac tumor, and the oldest had mucinous cystadenocarcinoma [Figure 3, D]. In the younger age group, benign lesions were more common, whereas malignant tumors were mainly found in those over> 40 [Table 1]. Histologically, surface epithelial tumors were the most common (66.7%), followed by germ cell tumors (23.8%). The most common benign epithelial tumors were serous (42.5%) and the most common malignant epithelial tumor was mucinous cystadenocarcinoma (2.90%) [Figure 5, D]. Of 24 cases of germ cell tumors, benign cystic teratoma was the most common, comprising 17.9%, and 6 cases of sex cord-stromal tumor (8.82%) [Table 1]. We received some rare tumors, which included Collision tumors and benign cystic teratoma with bone marrow elements [Figure 4, B]. Various other tumors included yolk sac tumor, atypical proliferative mucinous cystadenoma, dysgerminoma [Figure 4 – A, C, D], krukenberg's tumor, fibroma, and papillary solid cystadenocarcinoma [Figure 5 – A, B, C].

Table 1: Age wise distribution of ovarian tumours according to WHO 2020 classification of ovarian neoplasms (N = 68 **)**

WHO 2020 category of neoplasm	Subcategory of ovarian neoplasms	0 – 19 years N (%)	20-39 years N (%)	40-59 years N (%)	0>60 years N (%)	Total N (%)
Surface epithelial tumors (n = 41)	Serous cystadenoma		10 (14.70%)	05 (7.35%)	03 (4.41%)	18 (26.47%)
	Serous cystadenofibroma		02 (2.94%)			02 (2.94%)
	Mucinous cystadenoma		09 (13.23%)	01 (1.47%)	01 (1.47%)	11 (16.17%)
	Sero mucinous tumour		01 (1.47%)		01 (1.47%)	02 (2.90%)
	Borderline Mucinous cystadenoma		01 (1.47%)	01 (1.47%)		02 (2.90%)
	Mucinous cystadeno fibroma		02 (2.94%)	01 (1.47%)		03 (4.41%)
	Mucinous cystadenocarcinoma	01 (1.47%)			01 (1.47%)	02 (2.90%)
	Serous Papillary carcinoma		01 (1.47%)			01 (1.47%)
Germ cell tumours (N = 19)	Mature cystic teratoma		11 (16.17%)	05 (7.35%)		16 (23.52%)
	Dysgerminoma		02 (2.94%)			02 (2.94%)
	Yolk sac tumour	01 (1.47%)				01 (1.47%)
Sex cord stromal tumours (N = 06)	Fibroma		03 (4.41%)	02 (2.94%)	01 (1.47%)	06 (8.82%)
Miscellaneous (N = 02)	Krukenberg's tumour		01 (1.47%)			01 (1.47%)
	Collision tumour		01 (1.47%)			01 (1.47%)

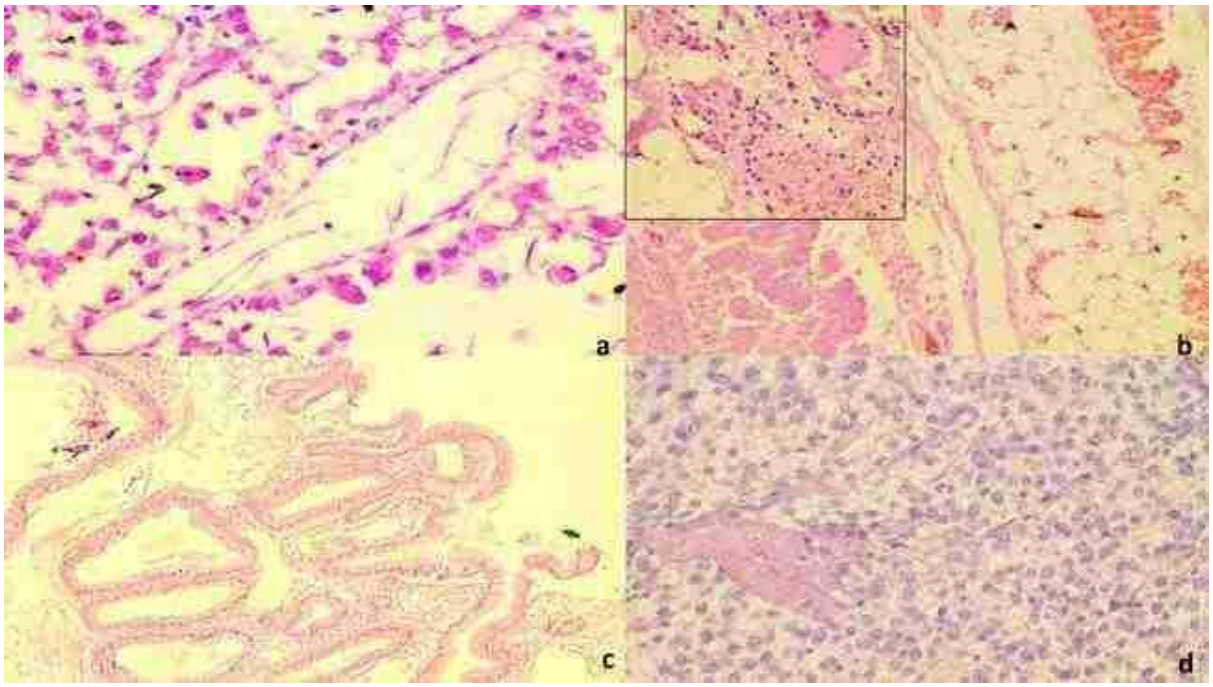

Figure 4 shows (a) tumor cells forming a schiller-duval body in a yolk sac tumor (400X, H, and E (b) muscle tissue, bone marrow, and blood vessels. (100X, H and E) The inset shows marrow elements. (400X, Hand E). (c) Atypical proliferative mucinous tumor showing complex architecture with tufting and mild cytological dysplasia. (400X, H, and E). (d) Nests of uniform polygonal cells with pale cytoplasm in a dysgerminoma. (400x, H and E).

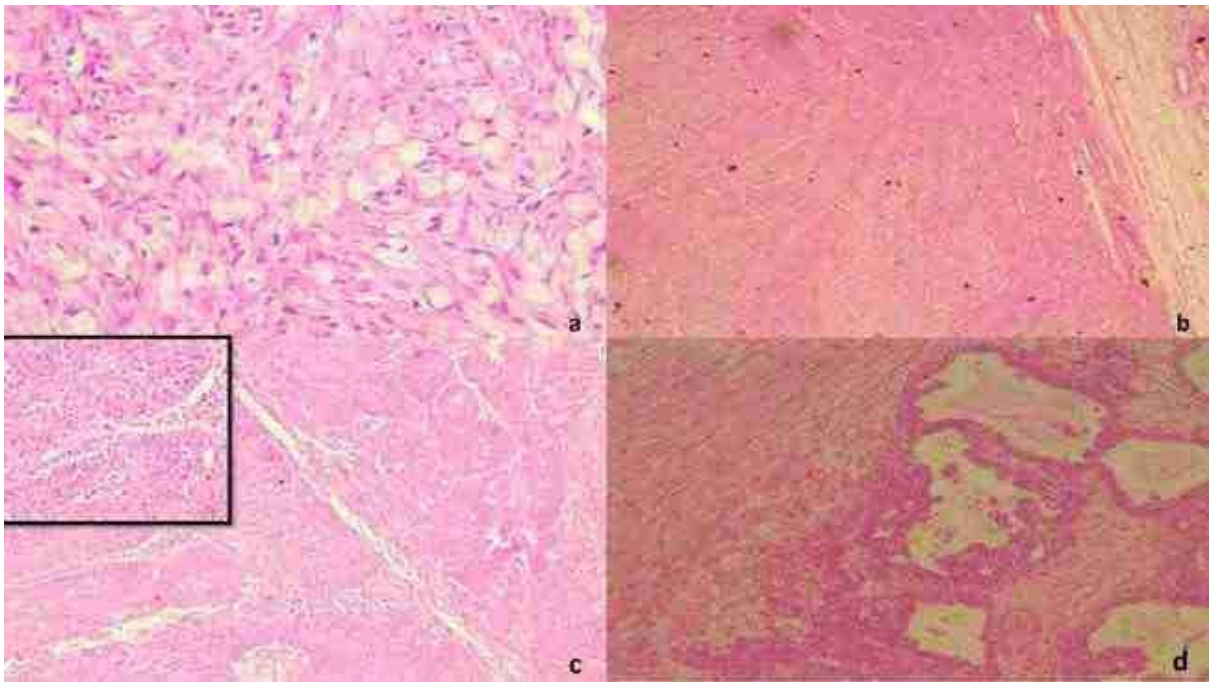

Figure 5 shows (a) numerous signet ring cells embedded in fibroma-like areas (400X, H, and E). (b) a well-circumscribed lesion with bland spindled cells (100X, H, and E). (c)numerous complex papillary structures lined by tumor cells. (100X, H and E) Inset shows pleomorphic tumor cells around a blood vessel (400x, H and E) (d) complex tufting and villous projections with stromal infiltration by pleomorphic tumor epithelial cells. (100x, H and E)

ISSN# 2277-9604

DISCUSSION

Ovarian neoplasms have varied histogenesis, clinical behavior, and malignant potential. They are responsible for a disproportionate number of fatal cancers, 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.[1] The present study was conducted to study the frequency of various histological types of ovarian neoplasms and their age distribution. A total of 68 cases of ovarian tumors in a 3-year period were studied.In the present study, the most common presenting complaint of females with ovarian tumors was abdominal pain & least common was acute abdomen, mostly due to ovarian torsion. Our study concorded well with studies by Sampurna K et al [1], Pandey V et al [2] & Dhende P et al [4] where thre pain in the abdomen was the commonest symptom. However, these findings were in contrast with the study by Mehra et al [9], where mass abdomen was the most common presentation. In our study, the maximum number of cases were in the 2nd & 3rd decade of life. These findings were similar with studies done by Dhende P et al [4], Pachori et al [8], Mehra et al [9] whereas Pandey V et al [2], Sampurna K et al [1] and Phukan A et al [6] reported a higher incidence in 4th to 5th decade of life. In the present study, out of 68 ovarian tumors, the majority of cases (84%) were unilateral, and only (16%) cases were bilateral. The findings in the present study concord well with the survey done by Sampurna Jyothi et al [1], Pandey et al, [2] and Parmar R et al.,[4] where respectively 88%, 77.77 %, and 94.60% of cases were unilateral.In our study, the maximum number of cases were benign followed by malignant and borderline tumours. These findings were similar to the studies done by Sampurna Jyothi et al.[1], Shringi P et al. [3], Dhende P et al.[4] and Phukan A et al [5] where benign tumours were more common. But these results were discordant with study done by Pandey V et al [2] and Swarnalatha P et al [11] where malignant tumours were most common **[Table 2]**.

Table 2: Comparison of percentage incidence of benign, borderline and malignant tumours in different studies and present study.

Authors	Benign (%)	Borderline (%)	Malignant (%)
Sampurna Jyothi et al [1](N=150)	66.0	3.50	30.50
Shringi P et al [3] (N=84)	78.04	19.51	2.44
Phukan A et al [6]	75.0	3.60-	21.4
Pandey V et al[2] (N=108)	40.70	3.70	55.55
Swarnalatha P et al[11] (N = 77)	23.28	3.90	72.72
Present study	80.80	7.35	11.46

The majority of benign lesions in the present study were grossly cystic. And the majority of malignant lesions were both solid and cystic. Our results were in agreement with research done by Sampurna Jyothi et al [1], Dhende PD et al [4] and Yasmeen QS et al, [5] which showed a higher incidence of malignant neoplasm having both solid and cystic and most of the benign lesions were cystic.Out of 68 cases in our study, most of the ovarian tumors were surface epithelial tumors, followed by germ cell tumors. The results are almost comparable with other studies **[Table 3]**. Serous cystadenoma was the most typical benign tumor in our study followed

by mature cystic teratoma, which is similar to studies done by Sampurna K et al, Pandey V et al and Shringi P et al. [1,2,3] However, in the study done by Yasmeen et al [5,] mucinous cystadenoma was the most common surface epithelial tumors followed by serous cystadenoma. Among malignant tumors, Mucinous cystadenocarcinoma was found to be the most common malignant tumor. This finding was unconcordant with most studies, including Sampurna Jyothi et al [1], Pandey v et al [2] and Dhende P et al [3], where serous cystadenocarcinoma was the most common malignant tumor.It is concluded from this study that according to the WHO 2020 classification, ovarian tumors originating from surface epithelium are the most common variant, followed by those originating from the germ cell layer. Serous cystadenoma was the commonest, followed by mature cystic teratoma in benign cases. Borderline mucinous cystadenoma was the most common borderline neoplasm, and mucinous cystadenocarcinoma was the most common malignant tumor. Overall females in the 2nd and 3rd decade of life were commonly affected. Patients commonly presented with pain in the abdomen.

Table 3: Relative percentage of different histological types of ovarian tumours in different studies and present study

Authors	Surface epithelial tumours (%)	Germ cell tumours (%)	Sex cord stromal tumors (%)
Sampurna Jyothi et al [1] (N =200)	79.50	13.50	5
Pandey V et al [2] (N =108)	73.14	9.25	7.40
Shringi P et al [3] (N=84)	73.20	22.0	2.40
Dhende P et al [4] (N=150)	67.30	28	4.0
Present study	60.29	27.94	8.82

CONCLUSION

The ovary is a common site of neoplasia in the female genital tract and usually presents with various clinical-morphological and histological spectra. Benign tumors are far more common than their malignant counterparts, with epithelial tumors being the commonest, followed by germ cell tumors. However, the incidence of malignancy is slowly rising in our center. Hence, categorizing these tumors according to the WHO classification 2020 helps in early and accurate diagnosis and evaluation of the prognosis of ovarian tumors. The histopathological study is the gold standard for diagnosis. Based on the results of this study, early diagnosis is crucial to help decrease morbidity and mortality among these patients. Our observations and results proved to be valuable baseline information regarding the frequency and distribution of ovarian tumors in our setup and will serve as a reference for future studies.

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