



Histopathological Spectrum of Ovarian Tumors at Tertiary Care Hospital – A Three Year Retrospective Study of 45 Cases

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Abstract

Background

The ovaries are paired intra-pelvic adnexal organs of the female reproductive system involved in many important functions of the body. No organ of the body except the ovary gives rise to such a galaxy of neoplasms. Histopathological examination of the biopsy material is the mainstay of diagnosis, which determines the prognosis and behavior of neoplasm.

Material and Methods

This was a retrospective observational study. A total of 45 cases were studied. All the cases of ovarian tumors were studied with respect to age of presentation, clinical symptoms, and morphological classification. Data thus collected were analyzed and compared with other study findings.

Results

A total of 45 ovarian tumor cases were studied. Surface epithelial tumors were the most common ovarian tumor, constituting 53.3%, followed by germ cell tumors at 31.3%, and sex cord-stromal tumors at 15.5%. Among surface epithelial tumors, serous tumors were the most common. Abdominal pain remained the most common clinical presentation.

Conclusion

Ovarian tumors are the second most common neoplasm in the female genital tract following cervical cancer. Though benign tumors are more common than malignant tumors, it is important to detect the tumor at its early stage. Histopathological findings along with immunohistochemistry are helpful in early diagnosis of ovarian tumors.

Keywords:

Ovarian tumors, Surface epithelial tumors, Benign, mature cystic teratoma

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Introduction

The ovaries are paired intra-pelvic adnexal organs of the female reproductive system involved in many important functions of the body. The main function of the ovary is to produce ova to implant after fertilization in the endometrium [1].

The ovary, being a complex organ, has been seen to be involved by a wide variety of neoplasms. No organ of the body except the ovary gives rise to such a galaxy of neoplasms [1]. According to the population-based cancer registries in India, ovarian cancer is

the third leading site of cancer among women, next to cervix and breast cancer, comprising up to 8.7% of cancer in different parts of the country [2].

Women between 65-85 years of age have an ovarian carcinoma incidence rate 2.3 times higher compared to young women. The peak incidence of invasive epithelial ovarian carcinoma is at 50-60 years of age [3]. The overall 5-year survival rate is less than 50% because the vague clinical presentation and lack of specific screening tests make early diagnosis difficult [2].

Thirty percent of ovarian neoplasms in postmenopausal women are malignant, whereas only 7% of ovarian tumors in premenopausal women are malignant [3]. The increased risk of ovarian cancer, particularly of surface epithelial tumors (SETs), is associated with the use of hormone replacement therapy (HRT), tobacco consumption, family history of ovarian cancer and breast cancer, and mutations of BRCA1 and/or BRCA2. The protective factors are the use of oral contraceptive pills (OCPs) and multiparity. They provide protection not only in the general population but also significantly reduce the risk in BRCA1/BRCA2 carriers [4].

The incidence of ovarian carcinoma is greater in high-income countries compared to middle- and low-income countries [5]. The histogenesis of ovarian tumors mainly includes four components, namely surface epithelial, germ cell tumors, sex cord tumors, and specialized ovarian tumors. The WHO classification of ovarian tumors is based on their tissue of origin and reflects the embryogenesis of this complex organ [8]. Tumor markers like serum HCG, serum CA125, serum alpha-fetoprotein, placental alkaline phosphatase, and lactate dehydrogenase, along with newer diagnostic techniques like USG-guided FNAC, ultrasonography, and proper clinical evaluation, are useful tools for early diagnosis [2].

However, histopathological examination of the biopsy material is the mainstay of diagnosis, which determines the prognosis and behavior of neoplasms. Thus, we conducted the present study to analyze the frequency and clinicopathological spectrum of ovarian tumors at a tertiary care hospital in East-Central Gujarat.

Materials and Methods

The present study is a retrospective observational study carried out in the Department of Pathology, GMERS Medical College and Hospital, Gotri, Vadodara. The study included ovarian tumor specimens received from August 2020 to July 2023.

A total of 45 ovarian tumors were studied during this period, received either as unilateral or bilateral lesions or as solitary oophorectomy specimens, or as part of total abdominal hysterectomy. Only specimens of ovarian tumors classified under the WHO classification were included in this study. Normal ovaries and non-neoplastic conditions of the ovary, such as follicular cysts, cystic follicles, surface inclusion cysts, hemorrhagic inclusion cysts, ectopic pregnancy, and endometriosis, were excluded.

All ovarian specimens were received and fixed in 10% formalin on the same day and kept for 24 hours. The specimens were then grossed, with sections taken from the representative area, from the capsule, and the surrounding normal area. In cases of fluid presence, it was sent for cytological analysis. The specimens were processed in the tissue processor, and paraffin blocks were made using Leukhart's mold. Sections were taken with a semi-automated rotary microtome having 3-5 microns thickness, and slides were stained with Hematoxylin & Eosin routine stain.

These slides were then examined under a light microscope for a histopathological diagnosis. The histopathological diagnosis was based on morphologic features, and the tumors were classified according to WHO classification. All collected data were charted in Microsoft Excel, and descriptive analysis like percentage, mean, and median was used in the present study.

This was a retrospective observational study, and no interventions were performed. The study was undertaken after the Institutional Ethics Committee gave its approval.

Results

A total of 45 cases of ovarian tumors were included in the present study. Out of these, 39 (86.6%) were benign tumors and 6 (13.3%) were malignant tumors [Figure 1]. These tumors were classified according to the WHO classification into surface epithelial tumors, germ cell tumors, sex cord-stromal tumors, and metastatic tumors. Surface epithelial tumors were the most common ovarian tumors with 24 cases (53.3%) [Table 1], followed by germ cell tumors with 14 cases (31.1%), and sex cord-stromal tumors with 7 cases (15.5%). There were no metastatic tumors in the present study.

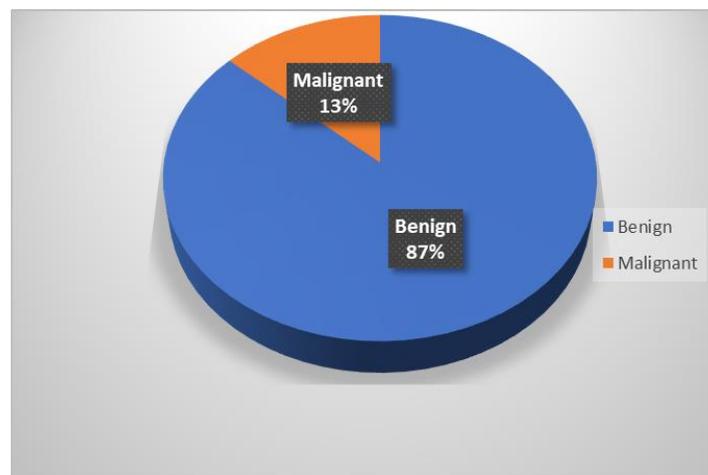


Figure 1: Distribution of Ovarian Tumors

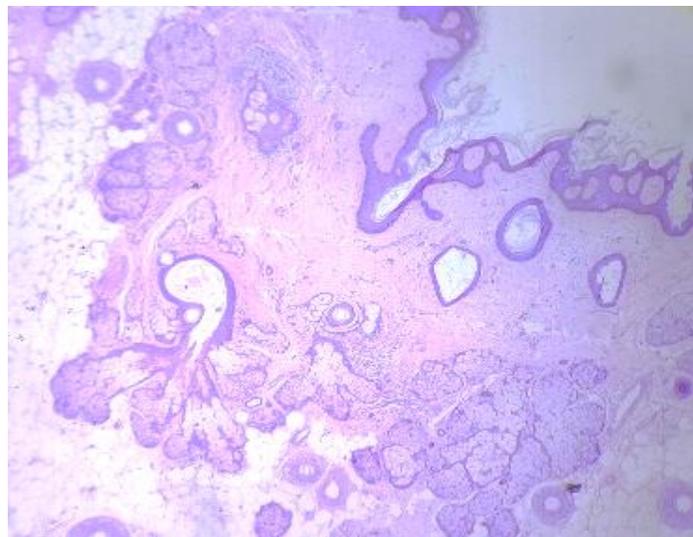


Figure 2: Mature cystic teratoma

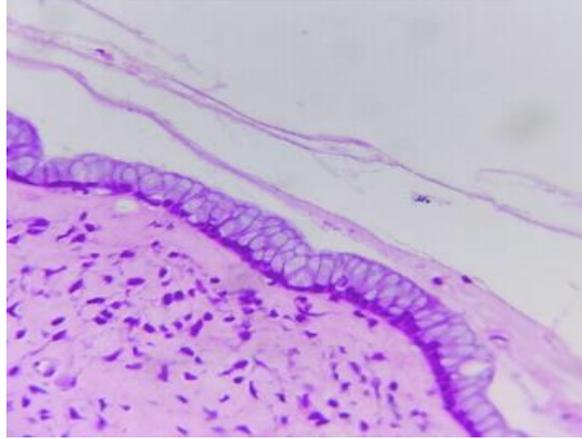


Figure 3: Mucinous cystadenoma

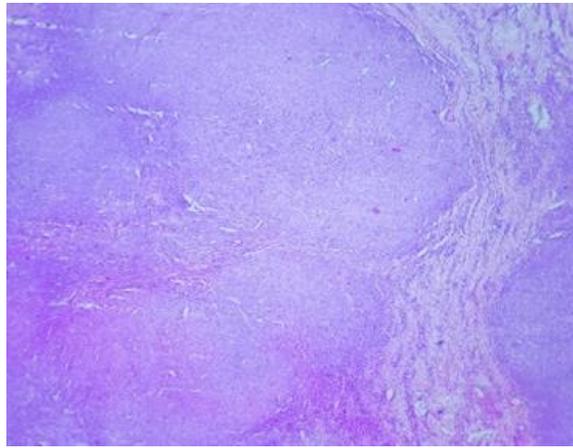


Figure 4: Cellular fibroma

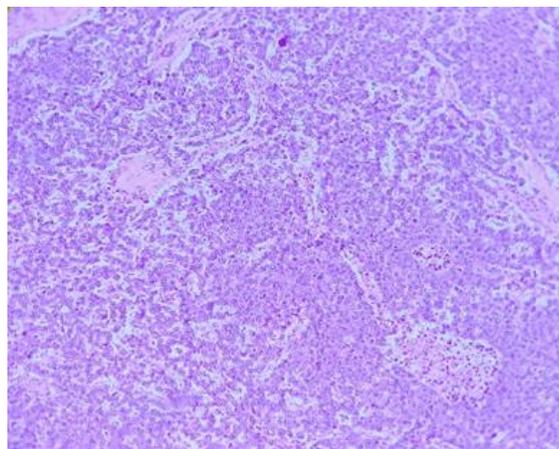


Figure 5: Dysgerminoma

Among surface epithelial tumors, there were 12 cases of serous tumors, 8 cases of mucinous tumors, 1 case each of sero-mucinous adenocarcinoma, mucinous cystadenocarcinoma, sebaceous carcinoma, and clear cell carcinoma. Among germ cell tumors, there were 13 cases of mature cystic teratoma and 1 case of dysgerminoma. Among sex cord-stromal tumors, there were 5 cases of

fibroma, 1 case of thecoma, and 1 case of granulosa cell tumor.

Table 1: Histomorphological spectrum of ovarian tumor according to WHO classification

Type Of Tumor	Number Of Cases	Percentage Of Cases (%)
Surface epithelial tumors (SET)	24	54%
Serous tumors - Benign	12	26.6
Sero-mucinous adenocarcinoma	1	2.2
Mucinous – benign	8	17.7
Mucinous adenocarcinoma	1	2.2
Clear cell carcinoma	1	2.2
Sebaceous carcinoma	1	2.2
Germ cell tumors	14	31%
Mature cystic teratoma	13	28.8
Dysgerminoma	1	2.2
Sex cord-stromal tumors	7	15%
Fibroma	5	11.1
Thecoma	1	2.2
Granulosa cell tumor	1	2.2

Discussion

Ovarian neoplasm has become increasingly important not only because of its large variety of histomorphological patterns but also because it has gradually increased the mortality rate in female genital cancers due to its vague symptoms and diagnosis at advanced stages [2]. Ovaries, along with the endometrium, are subjected to monthly cyclic changes under the influence of hormones. These endocrinal and traumatic changes in ovaries stimulate genetic mutations, leading to neoplastic changes. Ovarian neoplasms account for the most fatal cancer involving the female genital tract. The present study was conducted to study the histomorphological spectrum of ovarian tumors, their frequency, age distribution, and correlation with other studies.

A total of 45 ovarian tumors were received during this three-year duration at GMERS Medical College and Hospital, Gotri, Vadodara. Out of these, 39 (86.6%) were benign tumors and 6 (13.3%) were malignant tumors. Benign tumors were much more common than malignant tumors. Similar results were found in the studies conducted by Sehgal et al. [6], Sharma et al. [1], Pandey et al. [16], and Amita et al. [2]. No borderline ovarian tumors were found in the present study.

These tumors were classified according to WHO classification. The majority of ovarian tumors were surface epithelial tumors (53.3%), followed by germ cell tumors (31.3%) and sex cord-stromal tumors (15.1%), which were in concordance with the studies conducted by Pilli et al. [14], Pandey et al. [16], and Das et al. [17]. No metastatic ovarian tumors were found in this study. The percentage of germ cell tumors and sex cord-stromal tumors was higher compared to studies conducted by Sawant et al. [12], Singh et al. [13], and Pilli et al. [14] [Table 2].

In the present study, the most common surface epithelial tumors were serous cystadenomas (26.6%), followed by mucinous cystadenomas (17.7%), sero-mucinous cystadenomas (2.2%), mucinous adenocarcinomas (2.2%), clear cell carcinomas (2.2%), and sebaceous carcinomas (2.2%). The study conducted by Das et al. [17] yielded similar results, with serous cystadenoma being the most common surface epithelial tumor. Among germ cell tumors, mature cystic teratomas were the most common, which was in concordance with studies done by Amita et al. [2], Sharma et al. [1], Pandey et al. [16], and Sehgal et al. [6].

Table 2: Comparison of various histopathological types of ovarian tumors in other studies

Name of study	Year	Surface epithelial tumors	Germ cell tumors	Sex cord-stromal tumors
Present study	2023	53.3%	31.3%	15.1%
Sawant A, et al.	2017	84.8%	9.1%	6.1%
Singh S, et al.	2016	69.1%	25.8%	4.1%
Pilli, et al.	2002	71%	21%	7%
Pandey, et al.	2023	73.14%	9.25%	7.4%
Das et al. ^[17]	2023	82.6%	12.18%	3.48%

Table 3: Age-wise distribution of ovarian tumors

Age (In Years)	Number Of Cases	Percentage Of Cases (%)
0-10	0	0
11-20	2	4.4
21-30	7	15.5
31-40	9	20
41-50	15	33.3
51-60	4	8.8
61-70	8	17.7
Total	45	100

The percentage of germ cell tumors and sex cord-stromal tumors was higher compared to results from studies conducted by Amita et al. [2], Sharma et al. [1], Pandey et al. [16], and Sehgal et al. [6]. Among sex cord-stromal tumors, fibromas/thecomas were the most common, which was in concordance with the study carried out by Amita et al. [2]. However, these results were contrary to the study conducted by Pandey et al. [16] and Sharma et al. [1].

These variations in results were due to geographical variations, mean age groups under consideration, various environmental factors, and variations in the age of menarche, child-bearing, and menopause in the present study compared to other studies. Among the overall benign ovarian tumors, mature cystic teratomas were the most common, which was contrary to results by Sehgal et al. [6] and Sowmya BU et al. [7].

In the present study, patients most commonly presented with vague abdominal pain (68.8%), followed by an abdominal mass (13.3%) and menorrhagia (6.66%). Other clinical findings included abdominal pain with vomiting (4.44%), dysmenorrhea (4.44%), and bleeding per vaginum (2.22%). These findings were in concordance with the findings by Amita et al. [2] and Khajuria et al. [3].

In the present study, 45 cases ranged from 12 to 70 years of age. The maximum number of patients were from the age group of 41-50 years (13 cases), followed by 8 cases each in the 31-40 years and 61-70 years age groups, and 7 cases in the 21-30 years age group [Table 3]. Malignant conditions of the ovary were found to be more common in the older age group (50-70 years), while benign conditions were more common in younger age groups (20-40 years). Out of 45 cases, only 24 patients had serum CA-125 levels done. Interestingly, one case with normal CA-125 levels turned out to be a case of high-grade serous carcinoma of the ovary. Though serum CA-125 levels help in diagnosis, histopathological findings of the biopsy are the most reliable method to diagnose ovarian tumors.

In some cases, histopathological examination of ovarian tumors alone is not sufficient for diagnosis due to the solid nature of

tumor cells, and thus immunohistochemistry is required for accurate diagnosis in such cases. However, immunohistochemistry was not needed and therefore not included in the present study.

Limitations of the Study:

The present study is a retrospective, descriptive study that mainly emphasized the histopathological examination of ovarian tumor morphology. It excluded radiological findings, immunohistochemistry, genetic studies, and tumor markers in all cases, which help in patient diagnosis and prognosis.

Conclusion

Ovarian tumors present with a wide range of vague clinical symptoms, thus histopathological examination is required for proper diagnosis. In the present study, benign tumors were more common than malignant tumors. Surface epithelial tumors were the most common ovarian tumors, followed by germ cell tumors and sex cord-stromal tumors. Most patients were in the age group of 41-50 years and the most common chief complaint was vague abdominal pain. Amongst all ovarian tumors, mature cystic teratoma was the most common, followed by serous cystadenoma. Ovarian tumors need to be diagnosed at an early stage as they are responsible for a significant number of fatal cases. For early diagnosis, histopathological findings, along with clinical and radiological findings, play a significant role. Early detection of ovarian tumors can improve the morbidity and mortality of patients.

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