Histopathological Spectrum of Ovarian Tumors

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Abstract

Background: Ovaries can develop a wide spectrum of tumors including varied histological patterns, from epithelial tissue to specialized germinal and embryonal cells that release hormones, due to their intricate and unique nature as organs. Ovarian cancer is the fifth most common cancer among women and the second most common gynecologic malignancy. It is the most common cause of death from cancer of the female genital tract. Ovarian cancers account for about 25% of malignant tumors of the female genital tract and 4% of all female cancers. After the cervix, the ovary is the organ in the female genital system most frequently afflicted by cancer in India. Two thirds of ovarian tumors are surface epithelial tumors, but 90% of ovarian malignancies are malignant forms.

Material and Method: This descriptive study was conducted by the Department of Pathology. This study includes the 100 ovarian tumor specimens that were sent to the hospital's Department of Pathology for histological examination. Specimens that were frequently brought into the pathology department were used in a study. They got permission rather frequently. The tissue portion being studied was provided at no additional expense to the patient. Patient privacy was protected throughout the whole trial. To make new slides from the paraffin-embedded blocks and stain them for H and E, standard procedures were followed. In preserved gross specimens from the pathology department, gross findings were searched for. Age and laterality were taken from the histopathology record section of the test requisition forms.

Results: Out of the 100 ovarian diseases cases that were examined, 60 of them were non-neoplastic, while the other 40 were cancerous. Eighty out of the hundred tumors, or 90.6%, were found to be present between the third and sixth decade. Merely 10% of tumors were observed in those under 20 years old and those beyond 60 years old. Of the malignant lesions, 50.94% of the cases occurred in the age range of 20 to 39 years. Every age group experienced non-neoplastic lesions, although the 40–59 age group accounted for 56.66% of all occurrences, or the majority of instances. The tumors were primarily unilateral. Of the 100 tumors, 30 (or 28%) presented bilaterally.

Conclusion: In our study, non-neoplastic ovarian lesions were more commonly observed than neoplastic lesions, and benign tumors were more common than malignant ones. Surface epithelial tumors were the most common histologic type in all age groups. The most common kind of ovarian cancer found was serous adenocarcinoma. By the time they become advanced, ovarian tumors act like "Silent Killers." Whether malignant or non-neoplastic, ovarian lesions often present with similar clinical and radiological features.

Keywords: Histopathology, Neoplastic, Non-Neoplastic Lesions, Ovarian Lesion, Sex Cord-Stromal Tumors, Germ Cell Tumors, and Surface Epithelial Tumors.

Introduction

The second most prevalent gynecologic cancer and the fifth most frequent cancer among women is ovarian cancer. It is the most frequent reason for mortality from female genital tract cancer. [1] Ovarian malignancies constitute about 4% of the total cancers in females and 25% of malignant tumors of the female genital tract. [2] In India, the ovary is the organ in the female genital canal where cancer of the cervix is most common. Ninety percent of ovarian malignancies are malignant

types, while two thirds of ovarian tumors are surface epithelial tumors. They are found in diverse histological patterns and display differing levels of aggression. [3,4]

During regular ovulatory cycles, the ovary is exposed to monthly endocrine and traumatizing assaults, which makes it prone to carcinogenesis. Malignant gene mutations may potentially arise from repeated ovulatory rupture and repair. This could account for the observed preventive benefits

of breastfeeding, multiparity, late menarche, early menopause, and oral contraceptives. Every one of these elements lessens the likelihood of ovulation. [5] While no age group is immune to cancers, certain age groups are more frequently affected by particular tumor types. Various cell types can result in tumors due to the intricate structure and unique physiology of the ovary, which undergo continuous cyclical changes from puberty to menopause. Ovarian cancers, both primary and secondary, are somewhat common and exhibit a range of histological characteristics. [6] Given the totipotential nature of germ cells, it is not unexpected that a remarkably diverse range of neoplasms can arise from them. The most prevalent ovarian neoplasms in the younger age range are germ cell tumors, which account for two thirds of ovarian tumors in this age group, of which one third is malignant. These tumors make up 25–30% of all ovarian tumors, and the bulk of them fall into the mature cystic teratoma group, which is the most prevalent type of ovarian neoplasm in people. Gynecological oncology places a lot of emphasis on ovarian cancers in young girls and adults. When these tumors are discovered at such a young age, parents become quite anxious and the treating physicians have many challenges due to concerns about surgical safety, the possibility of cancer, and the treatment's impact on future fertility. Today's prognosis is significantly better thanks to the use of fertility-sparing surgery, the introduction of newer chemotherapeutic medicines, and the substitution of chemotherapy for radiation therapy. Making the distinction between ovarian neoplasms and the diverse range of non-neoplastic diseases is the primary goal. Histopathological testing remains the primary method used to diagnose ovarian cancers, even with the advancements in imaging and clinical diagnosis. The diagnosis and prognosis of ovarian cancers depend greatly on the identification of the different histologic patterns of the lesions. The degree of differentiation of the tumors can also be used to predict their prognosis. The tumors' laterality and stage might also reveal information about their type; for instance, sex cord-stromal cancers are nearly invariably limited to a single ovary. Conversely, about 65 percent of cancers that metastasize are bilateral. The purpose of this study was to determine whether our population's more common histopathological patterns differ noticeably from those of other populations. [7] Therefore, understanding the distribution of various tumors according to age and the relative prevalence of malignancy over benign would be aided by researching the histological spectrum of ovarian cancers. Understanding the risk factors and pathogenesis of ovarian cancers can be aided by examining the correlations between tumors and several characteristics such as age of menarche, menstrual status, and parity. In the future, even

with a gross examination alone, our study may aid in the close differential diagnosis by clarifying the relationship between gross morphological traits and a histological diagnosis.

Material and Methods

The Department of Pathology carried out this descriptive investigation. The 100 ovarian tumor specimens that were forwarded to the hospital's Department of Pathology for histological analysis were included in this study. A study was carried out using specimens that were regularly brought into the pathology department. They often obtained consent. The patient paid no additional costs for the tissue part under study. At every stage of the study, the patient's confidentiality was upheld. Standard techniques were followed to prepare fresh slides from the paraffin-embedded blocks and stain them for H and E. Gross findings were looked for in preserved gross specimens from the pathology department. From the histopathological record portion of the test requisition forms, information such as age and laterality were obtained. Tumors were categorized according to World Health Organization classification criteria. The incidence of different tumor types, the age at which different tumor types present, the physical characteristics, and the histological patterns of specific tumor types were all determined by data analysis. It was investigated how often benign and malignant tumors were. Out of the 100 ovarian diseases cases that were examined, 60 of them were found to be non-neoplastic, and the other 40 to be neoplastic. Eighty out of the hundred tumors, or 90.6%, were found to be present between the third and sixth decade. Merely 10% of tumors were observed in those under 20 years old and those beyond 60 years old.

Inclusion Criteria:

1. All the ovarian tumors, irrespective of their clinical features, stage of the disease, or type of surgical procedure implemented were included.

2. Hysterectomy specimens with incidental ovarian tumors were also included.

Exclusion Criteria: Non-neoplastic ovarian lesions like simple ovarian cysts, tubo-ovarian masses, and polycystic ovaries were excluded

The tumors were sliced serially at a thickness of 1 cm to ensure appropriate fixation. Every specimen (biopsies and surgical specimens) that our histopathology section received was embedded in paraffin, sectioned at 3-5μ, fixed in 10% formalin, and stained with hematoxylin and eosin. When necessary, specific stains such as Periodic Acid Schiff (PAS) were applied. The study covered every specimen of ovarian lesions, including hysterectomy specimens, found in the pathology section's histology section. Excluded from the

study were patients of the ovarian lesion that had previously undergone treatment but had returned. Ovarian lesions were divided into non-neoplastic masses and neoplastic masses based on histology. Cysts were used to further categorize non-neoplastic masses, while benign, borderline, and malignant lesions were used to categorize other lesions and neoplastic masses. Every stained histology slide was carefully examined. Every tumor's histopathology report was obtained from Government Medical College's pathology department. When required, special stains of PAS and Reticulin were carried out. Every aspect of the specimen, including its microscopic features, gross features, and ultimate diagnosis, was examined.

Statistical Analysis: Data were analyzed using SPSS, version 22. The large data were sorted into various datasets based on the distribution of tumors as surface epithelial tumors (SETs), germ cell tumors (GCTs), sex cord-stromal tumors (SSTs), and metastatic tumors. The patients were divided into different age groups, and the frequency of ONs was analyzed. This was a descriptive study and analysis of data was done using the chi-square test and logistic regression analysis. Data thus collected was entered in Microsoft excel 2007 and appropriate statistical tests were applied using appropriate software, considering the p-value <0.05 as statistically significant.

Result

Out of the 100 ovarian diseases cases that were examined, 60 of them were non-neoplastic, while the other 40 were cancerous. Eighty out of the hundred tumors, or 90.6%, were found to be present between the third and sixth decade. Merely 10% of tumors were observed in those under 20 years old and those beyond 60 years old. Of the malignant lesions, 50.94% of the cases occurred in the age range of 20 to 39 years. Every age group experienced non-neoplastic lesions, although the 40–59 age group accounted for 56.66% of all occurrences, or the majority of instances. The tumors were primarily unilateral. Of the 100 tumors, 30 (or 28%) presented bilaterally.

Table 1: Age Distribution

Age	No. of Patients	%
< 20	5	5
21-30	15	15
31-40	30	30
41-50	33	33
51-60	12	12
> 60	5	5
Laterality		
UL	58	58
BL	42	42

Table 2: Histological Type of Lesion

Nonneoplastic Lesion	No. of patients	%
Follicular Cyst	47	47
Corpus Leutal Cyst	12	12
Endometriosis	2	2
Neoplastic Lesion		
Surface Epithelial Tumors	24	24
Germ Cell Tumor	12	12
Sex Cord Stronal Tumors	3	3
Metastatic Tumors	0	0

The most common non-neoplastic lesion was a follicular cyst (81.11%), followed by a corpus luteal cyst (12%), and endometriosis (2%). In the majority of cases, these were incidental findings. In histologic subtypes, surface epithelial lesions were most common and a total of 24 cases (24%) were found, followed by 12 cases (12%) of germ cell tumors, and 3 cases (3%) of sex cord-stromal tumors. Surface epithelial tumors were uncommon to present in the adolescent age group whereas germ cell tumors had a predilection for this age group.

Table 3: Age Distribution of The Various Histomorphological Types of The Tumors

Type of tumor	< 20	21-30	31-40	41-50	51-60	> 60
Serous Cystadenoma	1	1	5	3	1	1
Serous Cystadenofibroma	1	1	0	0	0	0
Mucinous Cystadenoma	0	1	1	1	1	0
Mucinous Cystadenofibroma	0	0	0	0	1	0
Endometrioid Adenofibroma	0	0	0	0	0	0
Mature Cystic Teratoma	0	6	1	0	0	1
Fibroma	0	0	0	0	0	0
Thecoma	0	0	0	0	0	0
Fibrothecoma	0	0	0	0	0	0
Granulosa Cell Tumor	0	1	0	1	0	0
Sertoli Cell Tumor	0	0	0	0	0	0
Sex Cord Tumor with Annular Tubules	0	0	0	0	0	0
Borderline Serous Tumor	0	0	0	0	1	0
Serous Cystadenocarcinoma	0	0	0	2	3	2
Borderline Mucinous Tumor	0	0	0	0	0	0
Mucinous Cystadenocarcinoma	0	0	0	0	0	0
Endometrioid Carcinoma	0	0	0	0	0	0
Clear Cell Carcinoma	0	0	0	0	0	0
Dysgerminoma	0	0	0	0	0	0
Mixed Germ Cell Tumor	0	0	0	0	0	0
Granulosa Cell Tumor	0	0	0	0	0	0
Metastatic	0	0	0	0	0	0

Surface epithelial cells were the most common type of uncommon germ cell cancers after the age of 40. The most frequent histological pattern seen in the current investigation, accounting for 30.18% of cases, was benign serous cystadenoma, which was followed by benign mucinous cystadenoma. For the sex cord tumor and coma, there was only one occurrence each. In this investigation, no metastatic cancers were found. The majority of cancers in patients under 20 were benign, with the exception of malignant germ cell tumors, which were more prevalent in this age range. Out of 100 cases in our study, we found neoplastic lesions of the ovary in 33 cases. Among these cases 20 cases (20 %) were benign, 1 case (1%) were borderline tumors and 12 cases (12 %) were diagnosed malignant. Malignant tumors commonly affected the older age group (>40 years) with only malignant germ cell tumors involving the younger age group. On the contrary, benign tumors predominantly involved patients < 40-year age. The increasing incidence of malignancy with increasing age was found to be statistically significant.

Discussion

Ovarian tumors might be undiagnosed for a long time due to their anatomical position. Both distension and pain in the abdomen may be caused by these tumors. The three types of these tumors are malignant, borderline, and benign based on histological findings. Sex cord-stromal cancers, germ cell tumors, and epithelial cell tumors are the prevalent variations. One of the most frequent locations for metastatic deposits from other abdominal cancers is the ovary. [8]

While some ovarian tumors may be symptomatic, others may be discovered by accident during an ultrasound. The current investigation shows that ovarian cancers can manifest in a variety of ways. The predominate symptom was regarded as the presenting symptom if the patient had multiple complaints upon presentation. The results comply well with a study carried out by Rashid et al 1998 [9] in which abdominal pain was the commonest presenting complaint (59%) followed by abdominal mass/distension (37%). A study done by Sumaria Yasmin et al2008 [10] showed similar findings. In contrast to this, in another retrospective analysis by Jamal et al1997 [11] the commonest mode of presentation was bleeding per vaginum, followed by pain abdomen, pelvic mass, and gastric intestinal symptoms.

The prognosis for ovarian neoplasms is usually poor and they usually appear at stages III or IV. There are times when the results of the USG, CT, and MRI can be misleading, and cytology has its own restrictions. Furthermore, there is a correlation between the prognosis and the histological type of ovarian tumor. Therefore, choosing a course of treatment is greatly influenced by the results of the histopathological diagnosis. [12,13] WHO classification of ovarian tumors is based on the tissue of origin of the tumors which have been found to arise from one of the three ovarian components- (1) epithelium, (2) the germ cells, and

(3) the stoma of the ovary. Both primary and secondary tumors of the ovary are relatively frequent showing a variety of histopathological patterns.

Further, Patel AS et al2018 [14] reported similar distribution of surface epithelial tumors, with the majority having serous tumors followed by mucinous tumors, and as opposed to the present study there was 1 case of transitional cell tumor reported by Patel AS et al2018 [14] while they also reported a single case.

While the distribution of female stromal tumors was inverse, with fibroma being the most common and granulosa cell tumor following, the distribution of germ cell tumors was likewise identical. Tumors, with no metastatic tumors as reported by Patel AS et al2018 [14]. The main goal of the current study was to examine the prevalence of different ovarian cancer types according to the WHO classification system. It was shown that surface epithelial tumors were the most common type, followed by germ cell tumors, sex cord-stromal tumors, and secondary tumors.

Zhao et al 2010 [15] most metastatic tumors occur in premenopausal patients and have a bilateral presentation. In the present study, all the metastatic tumors had a bilateral presentation. Ovarian dermoid can be bilateral in 15% of cases. Only 8% of the tumors in their study were solid, with the remaining tumors being both solid and cystic. Approximately 60% of the tumors were cystic. The benign and borderline tumors in a study by Ranjoalkar AP et al 1997 [16] were unilateral, however, whereas malignant tumors presented with a nearly equal number of unilateral and bilateral cases.

The study carried out by Rashid et al1998 [17], which abdominal pain was the commonest presenting complaint (59%) followed by abdominal mass/distension (37%). A study done by Sumaria Yasmin et al2008 [10] showed similar findings. In contrast to this, in another retrospective analysis by Jamal et al1997 [11] the commonest mode of presentation was bleeding per vaginum, followed by pain abdomen, pelvic mass, and gastric intestinal symptoms.

This study is descriptive. Prolonged research involving patient follow-up will undoubtedly be highly valuable in forecasting the efficacy of the risk variables for cancer assessed in this investigation. The current study only looked at a small number of parameters; however, it would be more beneficial to look into additional factors like obesity, tumor markers, socioeconomic status, age at first childbirth, use of oral contraceptives, or other hormonal intakes, as well as ovarian cancer in the family history. The occurrence of different histological patterns, the relative frequency of

benign and malignant ovarian tumors, and the risk variables linked to an elevated risk of malignancy in our community make this study significant for public health. Given the parameters this study provides to forecast the relative risk of malignancy and determine the treatment strategy, physicians may find it useful.

Conclusion

In our study, non-neoplastic ovarian lesions were more commonly observed than neoplastic lesions, and benign tumors were more common than malignant ones. Surface epithelial tumors were the most common histologic type in all age groups. The most common kind of ovarian cancer found was serous adenocarcinoma. By the time they become advanced, ovarian tumors act like "Silent Killers." Whether malignant or non-neoplastic, ovarian lesions often present with similar clinical and radiological features. Histological examination is also necessary for the diagnosis and prognosis of ovarian malignancies. In the current study, ovarian malignancies were classified according to the WHO classification. Benign tumors predominated over malignant ones. Surface epithelial tumors were the second most common type, behind germ cell malignancies. Most of the cancers were discovered in the fourth and fifth decades. Both sides had uncommon tumors.

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