e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(10); 2061-2065

Original Research Article

Histopathological Analysis of Ovarian Tumors in a Tertiary Care Centre

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Received: 25-07-2023 / Revised: 28-08-2023 / Accepted: 30-09-2023

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Conflict of interest: Nil

Abstract:

Background and Aim: Ovarian tumors have emerged as a prominent cause of mortality, encompassing a diverse range of clinical, morphological, and histological diagnoses. A study was done to determine the overall occurrence, distribution, and different histological classifications of ovarian neoplasms.

Material and Methods: The study was conducted in the Department of Pathology, a tertiary care teaching institute in India, for a length of one year.The possibility of employing random sampling was taken into consideration. Women over the age of 18 years, with histologically confirmed ovarian tumours, measuring more than 5 centimeters in diameter, were included.We evaluated abdominal hysterectomy specimens. A macroscopic examination was performed. Observations were made regarding the dimensions and coloration of the specimen.The stained sections were scrutinized using a light microscope to determine the histological diagnosis.

Results: Throughout the duration of the study, a collective of 100 individuals were selected for participation. Out of them, 83 (83%) were classified as benign tumours (Bet), 6 (6%) were classified as borderline tumours (BoT), and 11 (11%) cases were classified as malignant tumours (MlT). Borderline tumours are the third most prevalent, preceded by malignant tumours. Out of the total cases studied, 91% were unilateral and only 9% were bilateral, with all of the bilateral cases being BeT. The most frequently observed bilateral tumor was Seromucinous cystadenoma. Cystic instances account for the highest proportion (74%) of the OTs. The bulk of the histological patterns observed were surface epithelial tumours (SETs), accounting for 83 cases. Germ cell tumours were the second most common, with 8 cases, followed by sex cord-stromal tumours, which accounted for 3 cases.

Conclusion: The majorities of tumour cases were found to be benign and were most commonly reported in individuals of reproductive age. On the other hand, malignant neoplasms were more prevalent in those over the age of 40. This study highlights the importance of conducting thorough histological investigation and screening at all stages of life in order to identify and exclude malignancies, given the higher occurrence of OTs. The most prevalent primary malignant tumor was serous cystadenocarcinoma, which belongs to the category of surface epithelial tumours.

Keywords: Cystadenocarcinoma, Germ cell tumor, Histopathology, Ovarian tumor.

Introduction

The ovaries are bilateral organs located on either side of the uterus in the pelvic region and are a common yet intricate site for the development of tumors in women. [1] The ovaries contain totipotent sex cells and multipotent mesenchymal cells, which are crucial in a diverse range of neoplasms involving various histopathological diagnoses. These neoplasms can originate from epithelial tissues, connective tissue, germ cells, embryonic cells, or non-ovarian tumours that have metastasized. [2,3] Ovarian cancer ranks as the sixth most prevalent cancer and the seventh highest cause of cancer-related deaths among women globally. [4,5] Based on data from population-based cancer registries in India, ovarian cancer ranks as the third most common type of cancer among women, following cervical and breast cancer. It accounts for approximately 8.7% of cancer cases in various regions of the nation. Ovarian tumors exhibit the greatest fatality-to-case ratio among all gynecologic cancers. [6] The ovary, a complex and distinctive organ, has been found to be affected by a diverse range of tumors. This phenomenon can be attributed to the abundance of diverse cell types in this organ during normal circumstances, including those cells that possess

the ability to differentiate into multiple or all cell types. Only the ovary produces such a diverse array of tumours within the body. Ovarian tumours are appropriately classified as a diverse range of complex disorders, rather than a singular entity. [7] Typically, benign ovarian tumors are more prevalent than malignant ones, constituting around 80% of all ovarian neoplasms. The ovary is frequently affected by primary malignancies, although metastatic lesions can also develop in the ovary. [8] Within the female population in India, the ovary ranks as the third most prevalent location for primary malignancies in the female reproductive system.

Benign neoplasms are more prevalent among individuals aged 20 to 45, and malignant tumors are more prevalent among women aged 40 to 65. [9] Null parity, family history, and heritable mutation are different risk factors that contribute to the development of ovarian tumours. Ovarian tumours typically occur in women who are in the perimenopausal or postmenopausal stage, and they are rare in children. [10] Women aged 40 to 59 who have used oral contraceptives for an extended period or have undergone tubal ligation have a lower risk of developing ovarian cancer compared to others. [8]

There exists a broad spectrum of histological differentiation, with several forms being observed in both benign and malignant cases. The majority (80%) of cases are benign, with the usual age range affected being between 20 and 45 years. Simultaneously, there is a high prevalence of malignant cases in elderly women with unfavourable prognoses. [11] A comprehensive assessment conducted before to surgery serves as the foundation for treatment and subsequent monitoring. The more recent diagnostic procedures, such as ultrasonography and tumor markers, are beneficial for both early detection and accurate clinical assessment. [12,13] However, histological analysis can provide us with a conclusive diagnosis, classification, and assessment of severity, which can assist the doctor in determining prognosis and therapy options. A study was done to determine the overall occurrence, distribution, and different histological classifications of ovarian neoplasms.

Material and Methods

The study was carried out over a one-year period in the Department of Pathology, Banas Medical College and Research Institute, Palanpur, Gujarat, India. This study took into account all eligible members who met the inclusion requirements. The current investigation included 100 ovarian tumours. These pathological signs were examined.

Criteria for inclusion: Women over the age of 18, with histologically verified OTs measuring more than 5 cm in diameter, were included.

Women with follicular cysts, haemorrhagic inclusion cysts, endometriosis, and those who were uncooperative and did not provide consent were not considered.

A lone specimen or sections of a whole abdominal hysterectomy specimen were considered. The gross examination was performed upon receipt of the clinical specimen. The specimen's characteristics, such as size and colour, were documented. The external surface features and contents were reported and recorded in the proforma as part of the study.

After 24 to 48 hours of fixation, several bits were extracted from sample locations that could be OT. Tissue was prepared for processing, and paraffin blocks were created. 5 micron tissue slices were cut and stained with Hematoxylin and Eosin. Xylene was used to clean the sections before mounting them on a glass slide. Each biopsy was labelled explicitly based on its orientation and sent for histological evaluation. For histological diagnosis, the stained sections were examined under a light microscope. When necessary, special stains such as periodic acid Schiff and reticulin stains were used. CA 125 levels were assessed in patients who were clinically and radiologically suspected of having OTs. IHC-Inhibin was used in the case of granulose cell tumour.

Statistical analysis

The collected data was assembled and input into a spread sheet programme (Microsoft Excel 2007) before being exported to the data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). The confidence level and level of significance for all tests were set at 95% and 5%, respectively.

Results

The bulk of the tumours were SETs, with serous cystadenoma being the most prevalent benign epithelial tumour. During the study period, a total of 100 people took part. There were 83(83%) benign tumours (Bet), 6(6%) borderline tumours (BoT), and 11(11%) malignant tumours (MlT) (Table 1). Malignant tumours are the second most prevalent type, followed by borderline tumours.

The ages ranged from 16 to 77 years. The most BeT was identified in the 20-40 age group, followed by 41-60 and 61-80 years. The 20-40 age range is also regularly involved in BoTs. The 41-60 year age group had the highest number of MlT patients. Malignant tumours are more common in people aged 41-60. In this study, 91% of the tumours were unilateral, with just 9% being

bilateral, and all of them being BeT; seromucinous cystadenoma being the most prevalent bilateral tumour. The majority of unilateral tumours were on the right side, as were the majority of MlT (Table 2).

MTs are unilateral, with the majority occurring on the right side. The majority of the OTs in this study (75%) were extensively cystic, with mixed tumours (22%) and solid tumours (3%). The majority of the Benign category were cystic (64), followed by mixed (17) and solid (2). All six borderline MlTs were cystic, and of the 11 MlTs, six were mixed, four were cystic, and one was solid (Table 3).

Cystic instances account for the majority of OTs (74%). Surface epithelial tumours (SETs) were the most common histological pattern, followed by germ cell tumours and sex cord-stromal tumours. Serous cystadenoma was the most prevalent benign epithelial tumour among the individual tumours, followed by mucinous cystadenoma.

Table 1: Incidence of various OTs among the study participants

Type of tumor	Number	Percentage (%)
Benign	83	83
Malignant	11	11
Borderline	6	6

Table 2: Site of involvement of OTs among the study members, Number (Percentage %)

Type of tumor	Unilateral		Bilateral
	Right	Left	
Benign	42 (42)	32 (32)	9 (9)
Malignant	10 (10)	1 (1)	0
Borderline	1 (1)	5 (5)	0

Table 3: Consistency of OTs among the study participants, Number (Percentage %)

Consistency	Benign	Borderline	Malignant	Total
Cystic	64 (64)	6 (6)	4 (4)	74 (74)
Mixed	17 (17)	0	6 (6)	23 (23)
Solid	2 (2)	0	1 (1)	3 (3)
Total	83 (83)	6 (6)	11 (11)	100 (100)

Discussion

Ovarian neoplasms have grown in importance not only because of their wide range of histomorphological patterns, but also because they have gradually increased the mortality rate in female genital cancers due to nonspecific symptoms and being detected at an advanced stage. The incidence, clinical appearance, and behavior of various forms of ovarian tumors vary greatly. Although clinical or gross examination might provide valuable diagnostic clues in creating a differential diagnosis, it is typically hard to detect the nature of an ovarian tumor. As a result, proper ovarian tumor type must rely on the microscopic appearance of the tumour. [14,15]

The current investigation included 100 ovarian tumors. These pathological findings were analyzed and correlated with other investigations. According to our findings, 83 instances were benign and 11 were malignant. This is almost identical to the available literature reports, which indicated more common benign lesions than malignant tumours. [9,16] The ages ranged from 16 to 77 years. The majority of cases were benign and occurred in the reproductive age range of 20-40 years; similar findings were reported by Deepti et al. [17] BoTs were found in people aged 31 to 70, and MlTs in people aged 40 and up. OTs occurred unilaterally in 91% of individuals and bilaterally in 9% of instances.

The majority of BeTs and the majority of MlTs were also unilateral. Right-sided OTs was more prevalent in this study than left-sided OTs. These findings were consistent with those of Manoja et al [18], who discovered that the majority of bilateral tumours were benign. According to Chandanwale SS et al. and Mondal SK et al., most malignant lesions are bilateral. [5,19] Seromucinous cystadenoma was the most prevalent bilateral tumor, with one case of mucinous cystadenoma. It was proposed that bilaterality of a mucinous tumour should always indicate the likelihood of a metastatic tumour to the ovaries from the appendix, pancreas, or endocervix rather than primary ovarian neoplasms, and that such neoplasm should be thoroughly investigated.

The majority of the OTs was highly cystic, followed by mixed and solid tumors. The majority of the benign group was cystic, followed by mixed and solid. The borderlines were all cystic, and of the 11 MlTs, 6 were mixed, 4 were cystic, and one was solid. According to Saha et al., 70% were SET, 26% were germ cell, and 4% were sex cordstromal tumours [20]. According to Sudha et al., 64% were SET, 26% were germ cell, and 8% were sex cord-stromal turoms. [11] These findings were

corroborated by Thakkar N, et al [21] and Misra R, et al. [22]

The benign serous tumors' exterior surfaces were smooth because the majority of them are unilocular, nodular, and mucinous because they are multilocular. The capsule was intact in all BeTs, microscopy of the capsule of all the borderline tumors was reassessed for microscopic invasion. At the same time, the malignant lesions grossly showed a variegated appearance with hemorrhage and necrosis. This was also observed in the studies done by Modepalli et al. [23]

The SETs in the present study comprised 71% of all tumors. Among the individual tumors, the epithelial tumors the commonest was serous cystadenoma followed by mucinous cystadenoma, one clear cell carcinoma, one endometrioid carcinoma. This was in contrast to Deepti et al., where mucinous cystadenoma was reported to be the commonest. Among primary malignant tumors, serous cystadenocarcinoma was the commonest in this study; Whereas Deepti et al. reported this to be 6%. [17] Germ cell tumors were the second major group of tumors in the present study; these were seen between 20–40 years.

In the present study, the incidence of germ cell tumors was relatively less than in other studies. Madhumita et al. reported 17.46 % of germ cell tumors. [24] Whereas it was said to be 21% by Ranjana et al. [25]. These findings may contribute significantly to the understanding of the distribution of different ovarian neoplasms among the local population, which may lead to the development of some strategic planning to investigate and treat the underlying causes of concerning neoplasms and may suggest preventive strategies.

Sex cord-stromal tumors constituted 3% in this report. This was similar to the study reported by Buelaprescillaet al, Madhumita et al, 4.6% and 7.93 %, respectively. [24,26]. Similar to this research, Ranjana hawaldaret al [25]. Also didn't report Sertoli leydig cell tumor. Ancillary techniques like immunohistochemistry are rarely used in the diagnosis of OTs. These can differentiate the primary ovarian mucinous tumors from malignant metastatic colorectal carcinomas. The results were in agreement with the observations of Jha et al in 2004, Bhagyalaxmi et al in 2014, and Wills et al in 2016. [27-29]

Genetic testing was not done in our study due to financial constraints. This is the major limitation of this research.

Conclusion

The majority of tumor cases were benign, reported in the reproductive age group, with malignant neoplasms in those older than 40 years. Because of the relative preponderance of OTs to rule out malignancies, the current study emphasizes the importance of appropriate histological examination and screening at all ages. The most prevalent primary malignant tumors were surface epithelial tumors and serous cystadenocarcinoma.

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