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ORIGINAL ARTICLE

Histopathological patterns of ovarian neoplasms: A retrospective study from a Tertiary Care Centre in Pakistan.

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ABSTRACT… Objective: To evaluate the histopathological patterns of ovarian neoplasms and compare findings with the national and international literature. **Study Design:** Retrospective Descriptive study. **Setting:** Department of Pathology, Dow University of Health Sciences, Karachi. **Period:** January 2019 to December 2023. **Methods:** Histopathological reports of all ovarian biopsies diagnosed as neoplastic lesions, were included. Data on age, marital status, presenting complaints, and tumour type were recorded and categorised per the WHO classification. Tumours were further grouped into epithelial, germ cell, and sex cord-stromal types. Age stratification was done into pre-reproductive, reproductive, and post-reproductive groups. **Results:** A total of 319 ovarian neoplasms were studied. The mean age was 37.35 ± 13.725 years, with most patients in the reproductive age group (71.5%). Benign tumours were predominant (77.4%), followed by malignant (17.8%) and borderline (4.7%) lesions. The most common benign tumour was mature teratoma (28.8%), followed by serous cystadenoma (22.2%) and mucinous cystadenoma. **Conclusion:** Ovarian neoplasms chiefly affect women in their reproductive age and are predominantly benign. The most common benign tumour was mature teratoma (28.8%), Histopathological evaluation remains crucial for diagnosis and management. Understanding these patterns can guide clinicians toward timely and effective treatment strategies.

Key words: Age Distribution, Epithelial Ovarian Neoplasms, Germ Cell and Embryonal Neoplasms, Histopathology, Ovarian Neoplasms.

INTRODUCTION

Ovarian neoplasms encompass 23% of gynecologic tumours.[1] Malignant ovarian tumours are a leading cause of cancer-related mortality in women.[2] These diverse tumours can range from benign to malignant.[3] Risk factors include Nulliparity and family history of ovarian neoplasms, as a comparatively higher frequency of carcinoma is seen in unmarried women as well as in married women with low parity.[4,5,6] These tumours primarily manifest with nonspecific signs and symptoms so, need to be addressed promptly.[7] These tumours are notorious for their large size and their frequent association with relatively mild symptoms. Based on their cellular origin, these neoplasms can be broadly classified into epithelial, germ cell, and sex cord-stromal tumours.[8] Each category displays unique histological characteristics essential for pathologists to accurately identify and classify the tumour.

Examining the tumour's architecture, cellular morphology, and growth patterns is crucial for understanding the behaviour and malignant potential of the tumour.[9] The extensive multiplicity of ovarian tumours stresses precise classification for effective diagnosis, prognosis, and treatment strategies. Recent advancements in histopathology, supported by immunohistochemical techniques, have markedly enhanced the precision of ovarian tumour diagnosis.[10,11]

The identification of these histological and molecular markers aids not only in precise tumour classification but also in the creation of personalized treatment options, such as targeted medicines for ovarian cancer.[12]

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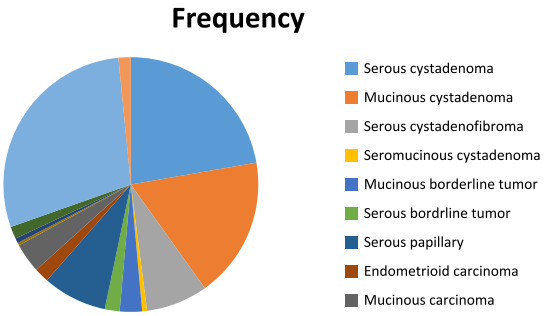
Ovarian neoplasms nevertheless pose diagnostic difficulties despite these developments, especially when it comes to differentiating between benign and malignant tumours and forecasting the clinical course of borderline tumours.[13,14] As histological examination plays a critical role in guiding treatment so clinicians and pathologists must have a detailed cognizance of the histological patterns of ovarian neoplasms.[15] This paper explores the histological features of ovarian neoplasms This study seeks to identify the histological patterns of ovarian neoplasms in a substantial cohort of patients and to link our results with existing national and international literature.

METHODS

This study received exemption from the institutional review board (IRB) of Dow University of Health Sciences (Ref no. IRB-3434/DUHS/EXEMPTION/2024/79). Informed consent was not required owing to the retrospective design of the study. This retrospective descriptive study utilized request forms and histopathological reports of all ovarian tumours diagnosed at the Pathology Department of Dow University of Health Sciences, a tertiary care center in Karachi, Pakistan. Medical records of all patients were retrieved and reviewed. The research encompassed all specimens identified as neoplastic ovarian lesions, gathered from January 2019 to December 2023. Specimens lacking complete data and exhibiting unremarkable ovarian findings were excluded. The collected data comprised the patient's medical record number, age, marital status, and initial presenting complaint. The histopathology reports contained data on specimen source, tumour type, and subtype. In this study, ovarian tumours were categorized into three groups according to the WHO classification: epithelial, germ cell, and Sex cord stromal tumours. Epithelial tumours encompass serous, mucinous, endometrioid, clear cell, Brenner, fibroma, adenosarcoma, sero-mucinous carcinoma, and serous cystadenofibroma. Germ cell tumours comprise mature cystic teratoma, immature teratoma, and dysgerminoma. Sex cord stromal tumours encompass fibroma, fibrothecoma, Sertoli cell tumour, juvenile granulosa cell tumour, and adult granulosa cell tumour The age range for our study was between 13-85 years. This was divided into 3 age groups, namely pre-reproductive (0-15 years), reproductive (16-45 years), and post-reproductive (>45 years). Qualitative data were represented in numerical form and as percentages. Quantitative data were presented as measures of central tendency. This research seeks to illustrate the histopathological diagnosis of ovarian neoplasms in women of all age groups

RESULTS

We observed a total of 319 neoplastic lesions from biopsy samples submitted during 2019-2023. The age range for our study was between 13-85 years. This was divided into 3 age groups, namely pre-reproductive (0-15 years), reproductive (16-45 years), and post-reproductive (>45 years). Most of the cases lie in the reproductive age group (71.5%), followed by post-reproductive (n=86, 27%), and lastly pre-reproductive (1.6%). From a total of 319 lesions, benign tumours comprised the majority (77.4%) followed by malignant lesions (17.8%) and then borderline (4.7%). The most common benign lesion was mature teratoma (28.8%), followed by serous cystadenoma (n=71, 22.2%) and mucinous cystadenoma. Table-I shows the number and frequency of all Benign, Malignant and Borderline cases.



Histological Type	Frequency	Percentage
Surface epithelial tumour	217	68
Sex cord stromal tumour	5	1.6
Germ cell tumour	97	30.4

Table-I. Frequency and percentages of neoplastic lesions

Histological Type	Benign		Borderline		Malignant	
	No.	%	No.	%	No.	%
Surface Epithelial tumour (n=217, 68%)	155	48.5	15	4.7	47	14.7
Serous cystadenoma	71	22.2	0	0	0	0
Mucinous cystadenoma	57	17.8	0	0	0	0
Serous cystadenofibroma	25	7.8	0	0	0	0
Seromucinous cystadenoma	2	0.6	0	0	0	0
Mucinous borderline tumour	0	0	9	2.8	0	0
Serous borderline tumour	0	0	6	1.8	0	0
Serous papillary carcinoma	0	0	0	0	26	8.1
Endometrioid carcinoma	0	0	0	0	6	1.8
Mucinous carcinoma	0	0	0	0	12	3.7
Clear cell carcinoma	0	0	0	0	1	0.3
Brenner cell tumour	0	0	0	0	2	0.6

Table-II. Frequency and percentages of surface epithelial tumours

Histological Type	Benign		Border line		Mali gnant	
	No.	%	No.	%	No.	%
Sex Cord Stromal tumour (n= 5, 1.6%)	0	0	0	0	5	1.5
Granulosa cell tumour	0	0	0	0	5	1.5

Table-III. Frequency and percentages of sex cord stromal tumours

Histological Type	Benign		Border line		Mali gnant	
	No.	%	No.	%	No.	%
Germ Cell Tumours (n=97, 30.4%)	92	28.8	0	0	5	1.5
Mature teratoma	92	28.8	0	0	0	0
Dysgerminoma	0	0	0	0	5	1.5

Table-IV. Frequency and percentages of germ cell tumours

DISCUSSION

The results of our study divulge a notable prevalence of neoplastic lesions in individuals within the reproductive age group (16–45 years), comprising 71.5% of the total cases. This indicates a potential relationship between hormonal activity, reproductive factors, and the emergence of neoplastic lesions during this life stage. in contrast, On the other hand, post-reproductive women in post-reproductive age groups contributed smaller but noteworthy percentage (27%). Neoplasms were uncommon in the pre-reproductive group (1.6%), suggesting a low prevalence of such lesions in younger groups.

Moreover, majority of diagnosed lesions were benign (77.4%), which has usually good prognosis in most patients. Although malignant neoplasms were less prevalent (17.8%), but they remain a considerable clinical concern, because of their long-term outcomes realted to malignancy. Borderline tumours on the other hand, accounted for 4.7%, signifies the diagnostic complexities involved in categorizingtumours, on the other hand, accounted for 4.7%, which signifies the diagnostic complexities involved in categorising specific lesions and the requirement for thorough histopathological assessment. These patterns emphasise the requirement for detailed screening and diagnostic strategies based on age to report neoplastic conditions efficiently. These findings are reinforced by research performed in India[16] and Pakistan.[8,17] However, contrast findings were found in research done in Sudan[18] and India[19], in which the mean age was 52.36 ± 14.21 and 48.1 years, respectively, that lie in the post-reproductive age group.

In agreement with researches conducted in India[27] and KPK[26], we found that the most common benign lesion in our study was mature

teratoma (n=92, 28.8%) while these results were contradictory with some local and international researches in which serous cystadenoma was the most common benign lesion.[28,29,30,25,16,31] While research conducted by Shaik M et al.[28], Anitha Das PH et al[30] Parvez S et al[26] all found serous borderline tumour to be the most common borderline tumour, our results show mucinous borderline tumour (2.8%) to be the commonest.

In our study, serous adenocarcinoma appeared as the most prevalent malignant neoplastic ovarian lesion, with serous papillary carcinoma contributing for the majority of these cases (8.1%). The finding is consistent with existing literature that highlights serous carcinomas, predominantly the high-grade papillary subtype, as the most frequent form of epithelial ovarian cancer. Our findings were consistent with research done in India, Saudi Arabia, Rawalpindi, and Pakistan (KPK).[29,23,25,20,26,31]

In our Study, surface epithelial tumours were the most frequent histopathological variant of ovarian neoplasms, accounting for 68% of all cases, while Germ cell tumours and sex cord stromal tumours accounted for 37.4% and 1.6% of cases, respectively. The results align up with world trends and show that among ovarian neoplasms, surface epithelial tumours are most common. The decreased incidence of germ cell and sex cord stromal tumours underlines the heterogeneity in cancer origins and calls for differential diagnosis depending on histological subtypes

Our study found the surface epithelial tumours as the most common histopathological variant of ovarian neoplasms (68%), followed by germ cell tumours (37.4%) and sex cord stromal tumours (1.6%). These results are in line with some earlier studies, strengthening the predominance of surface epithelial tumours in ovarian pathology. For instance, Shaik M et al reported a frequency of surface epithelial as 78.3%, germ cell 16.8%, and sex cord stromal tumours 3.6%.[28] Similarly, Ramakrishnan J et al reported their frequency as 72%, 19%, and 5%, respectively. Dutta A et al observed 51.4%, 38.5%, and 7.1%, while Batool A et al reported 63.08%, 29.4%, and 6.9%.[29,27,24] Additional studies by Cheema MK et al (63.8%:23.8%:6.9%), Khan MA et al (72.6%:23.2%:4.2%), Parvez S et al (60.6%:32.7%:3.9%), and Maurya G et al (70.08%:22.2%:4.2%) further support our findings.[25,8,26,31] These relative findings high spot the constant predominance of surface epithelial tumours across various populations, accentuating their clinical significance in the diagnosis and management of ovarian neoplasms. Moreover, our study also established similar findings concerning frequency when compared with earlier studies conducted in India (19)(22)(23)(30) and a local research project done in Rawalpindi.[25] Serous cystadenoma was recognized as the most predominant surface epithelial tumour, accounting for 22.2% (n=71) of cases. The results correspond with the broader pattern identified in the regional context. In contrast, our data reveals a significant difference when compared to studies conducted in Saudi Arabia[20] and Sudan[18], where serous adenocarcinoma was found to be the most common epithelial neoplasm.

Our results demonstrated that granulosa cell tumour was the most common type of sex cord stromal tumour, accounting for 1.5% of all ovarian neoplasms (n=5). This observation is in line with the findings of several previous studies, including those by Mahajan S et al, Dutta A et al, Cheema MK et al, Yousif HM et al, Kheiri SA et al, and Khan MA et al, all of whom also reported granulosa cell tumour as the predominant sex cord stromal tumour in their respective cohorts.[19,27,25,20,18,8] The uniformity in these studies supports the concept that granulosa cell tumours, although rare, but the most frequently encountered subtype in this category, because of their relatively indolent behavior and tendency for delayed presentation. In contrast, Bandla S et al and Batool A et al, identified fibromas as the most common sex cord stromal tumour, and Ramakrishnan J et al and Anitha Das PH et al, reported fibrothecomas as the leading subtype.[21,24,29,30]

In our study, mature teratoma appeared as the most common germ cell tumour, accounting for 28.8% of all ovarian neoplasms (n=92). This verdict is consistent with multiple studies

conducted in India and Pakistan, where mature teratomas have also been reported as the chief germ cell tumour subtype.[28,21,22,30,24,25] The high frequency of mature teratomas, predominantly in younger females, is well-documented and shows their generally benign nature and favorable prognosis. However, our results contrast with those of Yousif HM et al from Saudi Arabia, who recognized dysgerminoma as the most common germ cell tumour in their population.[20]

Differences in recorded frequencies or prevalence of neoplastic lesions can be said to be based on diverse sample sizes, diverse population dynamics, and regional inequalities. Furthermore, the variation in the main subtype of tumours among studies highlights variability and the need for comprehensive histological assessment to guarantee accurate diagnosis and suitable clinical therapy.

CONCLUSION

The results of our study indicate that ovarian neoplasms predominantly affect women of reproductive age, with the largest proportion comprising benign lesions. Surface epithelial tumours were the most frequent type, with serous cystadenoma being the most common subtype. Among sex cord-stromal tumours, granulosa cell tumour comprised the largest proportion, while mature teratoma was the most frequent germ cell tumour.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Hina Abbas:** Conception, design, data analysis.
2	**Naseem Ahmed:** Critical review manuscript.
3	**Aiman Mahboob:** Data collection, analysis, writing.
4	**Arsh-e-Mah Ansari:** Data collection, manuscript writing.