Original Article

Frequency of Morphological Types of Ovarian Tumors in a Tertiary Care Hospital of Karachi

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ABSTRACT

Objective: To determine the frequency of different morphological types of ovarian tumors in a tertiary care hospital of Karachi.

Study Design: A retrospective study of all cases of ovarian tumors

Place and Duration of Study: This study was conducted at the Department of Pathology, Jinnah Postgraduate Medical Centre Karachi over a period from July 2020 to December 2020.

Materials and Methods: Ethical approval was granted by ethical committee of organization. Laboratory request forms and histopathology reports of all histologically diagnosed ovarian tumors registered in last five years were retrieved from the record and were analyzed, excluding small biopsies. All cystectomy, oophorectomy, salpingo-oophorectomy and total abdominal hysterectomy (with bilateral or unilateral salpingo-oophorectomy) specimens were included. Patients with non-neo-plastic ovarian lesions and functional cysts were not included.

A total of 408 cases fulfilled the inclusion criteria. We reviewed all the histopathology slides and reports of the cases in the study, and analyzed for histopathological type, subtype, grade and age of the patients.

Results: In a total of 408 cases, 288 (70.6%) were surface epithelial tumors, 85 (20.8%) germ cell tumors and 28 (6.9%) were sex cord-stromal in origin. Among surface epithelial tumors, 190 (66%) were benign, 85(29.5%) were malignant and only 13 (4.5%) were found to be borderline. The commonest benign tumor was serous cystadenoma. The commonest malignant tumor was serous cystadenocarcinoma followed by mucinous cystadenocarcinoma.

Conclusion: We concluded that findings of our series correspond to majority of the published national and western data; however mucinous epithelial tumor and germ cell tumors turnout are more common in our population as compared to the western population. Moreover, ovarian cancers tend to involve relatively younger women in our region in contrast to West.

Key Words: Ovarian tumors, epithelial ovarian tumor, Germ cell ovarian tumors, Surface epithelial tumors, Ovarian cystadenoma

Citation of article: Irfan A, Zafar MS, Jabeen S, Qamar N, Nusrat N, Asadullah. Frequency of Morphological Types of Ovarian Tumors in a Tertiary Care Hospital of Karachi. Med Forum 2021;32(2):37-41.

INTRODUCTION

Gynecological cancers account for a huge burden of morbidity and mortality around the world; among which ovarian cancer is particularly deadly gynecological malignancy due to the fact that majority of them are associated with vague symptoms initially and therefore incurable when discovered at an advanced stage.

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Received: January, 2021
Accepted: January, 2021
Printed: February, 2021

According to American cancer society, an estimated 22,280 new cases and 15,500 deaths were expected to be caused by ovarian cancer in the U.S in 2012.[1] Moreover, it ranks second among the gynecological cancer following uterine cancer in U.K.[2]

In Pakistan, ovarian cancer ranked second among malignancies in adult females by Shaukat khanum collective cancer registry report (1994-2011).[3] However some of the studies has reported it as most common gynecological cancer as well.[4,5]

Although exact etiology of majority of ovarian cancers is not clear, but positive family history was found to have strongest association with ovarian epithelial malignancies in Pakistani women [6,7] suggesting genetic factors playing significant role in our patients.

It has been also observed that data available worldwide shows variability not only in incidence but in different morphological types of ovarian cancer as well.

Our pathology lab located in Jinnah postgraduate medical centre which is a tertiary care referral centre in Karachi, receives averaged 4800 specimens per year. The purpose of this study was to see frequency and

histological pattern of ovarian tumors in our setup and to compare our data with local and international studies.

MATERIALS AND METHODS

This study was a retrospective observational analysis of all consecutive cases with histopathologically proven ovarian tumors, reported from Department of pathology of BMSI, JPMC a tertiary care centre. Ethical approval was granted by ethical committee of organization. Laboratory request forms and histopathology reports of all histologically diagnosed ovarian tumors registered in last five years were retrieved from the record and were analyzed, excluding small biopsies. All cystectomy, oophorectomy, salpingo-oophorectomy and total abdominal hysterectomy (with bilateral or unilateral salpingo-oophorectomy) specimens were included. Patients with non-neo-plastic ovarian lesions and functional cysts were not included.

A total of 408 cases fulfilled the inclusion criteria. We reviewed all the histopathology slides and reports of the cases in the study, and analyzed for histopathological type, subtype, grade and age of the patients.

The data feeding and analysis was done on computer package SPSS (Statistical Packages of Social Sciences) version 16.0. Clinical characteristics was summarized in terms of frequencies and percentages for qualitative variables (age grouping, tumor grade and type of neoplastic lesions), mean ± S.D for age in years. In statistical analysis only p-value <0.05 was considered significant.

RESULTS

From the data of last five-year period, total of 408 cases of ovarian tumors were found to be received in our centre. World health organization classification of ovarian tumors was used for classification of tumors. As can be observed in TABLE 1, histopathological typing showed a markedly predominant frequency of surface epithelial tumors with 288 (70.6%) followed by germ cell tumors (20.8%) and then sex cord-stromal tumors (6.9%). The remaining 7 cases (1.7%) comprised of undifferentiated and metastatic tumors.

It has been seen (as shown in TABLE 2) that most of the epithelial tumors were benign (66%), 29.5% were malignant and only 4.5% were borderline. Among surface epithelial tumors, majority were serous (64%) followed by mucinous tumors (28.1%) as second most common type. 11 cases (3.8%) of endometroid carcinoma, 2 cases (0.7%) each of clear cell carcinoma and malignant mixed mullerian tumors, 1 (0.3%) of transitional cell carcinoma and 7 cases (2.4%) of poorly differentiated carcinomas were found.

Serous cystadenoma was found to be the commonest among benign surface epithelial tumor, while serous cystadenocarcinoma as commonest malignant tumor.

It has been also observed (as shown in table 3) that most of our patients with benign tumors belonged to the 3rd and 4th decade, while patients with malignant tumors to 5th decade. Patients with borderline tumors were mostly found in 4th decade of life.

Among germ cell tumors, majority (87.1%) were benign and all consist of mature cystic teratoma (including dermoid cysts), fewer (12.9%) were malignant comprises of dysgerminoma (7%), immature teratoma (4.7%) and yolk sac tumor (1.2%).

Among sex cord-stromal tumors, 53.6% were malignant and 46.4% were benign, in which granulosa cell tumor (50%) and fibroma-thecoma (46.4%) were the most frequently seen lesions respectively.

Table No.1: Distribution of Major Types of Ovarian Tumors According to Origin (n=408)

Types	No	%age	Confidence Interval CI
Ovarian epithelial tumors	288	70.6%	65.9-74.8
Germ cell tumors	85	20.8%	17.2-25.0
Sex-cord stromal tumors	28	6.9%	4.7-9.7
Others	7	1.7%	0.8-3.5

Table No.2: Different histologic types of ovarian neoplastic lesions

Histogenesis	Histopathology	Total	%tage
Surface epithelial tumors (n=288)	Serous		
	Total	184	64%
	Benign	131	45.5%
	Borderline	9	3.1%
	Malignant	44	15.3%
	Mucinous		
	Total	81	28.1%
	Benign	59	20.5%
	Borderline	4	1.4%
	Malignant	18	6.2%
	Endometroid	11	3.8%
	Clear cell	2	0.7%
	Mixed	2	0.7%
	Transitional	1	0.3%
	Poorly differentiated	7	2.4%
Germ cell tumors (n=85)	Teratoma		
	Total	78	91.7%
	Benign	74	87.1%
	Malignant	4	4.7%
	Dysgerminoma	6	7%
	Yolk sac tumor	1	1.2%
Sex cord-stromal tumors (n=28)	Benign	13	46.4%
	Fibroma-thecoma	13	46.4%
	Malignant	15	53.6%
	Granulosa cell tumor	14	50%
	Undifferentiated stromal tumor	1	3.6%
Other (7)		7	100%

Table No. 3: Distribution of ovarian epithelial neoplasms according to age (n=288)

n 288	Total no.	(11-20) (Yrs)	(21-30) (Yrs)	(31-40) (Yrs)	(41-50) (Yrs)	(51-60) (Yrs)	>61 (Yrs)	Mean age (Yrs)
Benign	190	16 (8.42%)	72 (37.89%)	44 (23.15%)	32 (16.84%)	22 (11.57%)	4 (2.1%)	36
Borderline	13	2 (15.38%)	3 (23.07%)	5 (38.46%)	0 (0%)	2 (15.38%)	1 (7.69%)	39
Malignant	85	0 (0%)	10 (11.76%)	18 (21.17%)	31 (36.47%)	18 (21.17%)	8 (9.41%)	47

DISCUSSION

In our study, attempt has been made to determine the frequency and distribution of ovarian tumors in a tertiary care hospital where a variety of malignancies are frequently seen.

According to the Karachi Cancer Registry, Karachi south and all urban population falls into a high risk region for ovarian cancer,[8] which accounts to second highest incidence in Asia after urban delhi.[9]

In our study, tumors of surface epithelial in origin were found to be the major type of ovarian tumors accounting for 70.58% of all cases. Our this finding is almost close to the observation made in most of national studies i.e. 63.5%, 70.9%, 68.4% respectively.[10-12] Our data also closely corresponds to the western figures in which frequency range of epithelial tumors is 65-70%[13] and to an Indian study reporting 67.9%.[14] The exact causes for this relatively high incidence of surface epithelial cancers in Pakistan are not clear; however Rashid et al mentioned in his study that substantial proportion of these cancers in Pakistani women is due to germ-line mutations in the BRCA1 and BRCA2 genes.[15]

In addition, we have found that among surface epithelial tumors, serous type being most common histological type, which is in accordance to majority of local and international figures. [10,14,16,17] It was also observed that most of local and south Asian [10,14,16] studies have mentioned mucinous subtype as second most common subtype similar to our results, which differs to western figures where endometroid ranked second behind serous tumors. [18,19] This could be due to the geographical variation of diseases.

In our series, most (65.97%) of epithelial tumors were benign in nature followed by malignant (29.51%). In a western literature by Kurman RJ, 57.5% of ovarian epithelial tumors were benign, 32.6% were malignant and 9.9% were reported as borderline, [17] which are in close proximity to our findings, but differed in part. Frequency of borderline tumors was found to be 4.51% in our series, which is lower as compared to western studies but approximately similar to a study done in Pakistan by Ahmed et al, [10] reporting 5.1%. The reason of low frequency in present study could be due to variation in environmental and genetic factors. Keeping in view a literature by Shih & Kurman, low grade serous carcinoma (but not high grade), mucinous, endometroid, clear cell and Brenner carcinomas are postulated to arise in a stepwise fashion from intermediate borderline tumors; [20] another possible reason could be the fact that our patients seek medical help late in the course of disease due to lack of awareness and low socioeconomic condition, which lead to progression of tumor from borderline to malignant grade.

We found that germ cell tumors and sex cord-stromal tumors comprised 20.83% and 6.83% respectively of all ovarian neoplasms. This was different from western figures where germ cell tumors and sex cord-stromal tumors comprised 3% and 5% respectively. [21,22] This is consistent with the high prevalence of germ cell and sex cord tumors in asian versus the western societies. Therefore, further research is required to more specifically determine the reasons for this disparity and to advance understanding of the disease in order to identify modifiable risk factors, develop effective early detection methods, and improve treatment.

Majority of germ cell tumors in present study were found to be benign (87.05%), whereas malignant constituted 12.94%. Approximately similar findings were reported by Ahmed et al and Zaman et al with corresponding figures of (80.17% & 19.82%) and (81.08% & 18.91%) respectively. [10,12] Mature cystic teratoma comprises of 20% of all ovarian tumors in West.[15] Similar figure of 18.68% (74/397) have been found in our study also. Among malignant germ cell tumors, dysgerminoma seen to be the most frequent, which matches the observation of Ahmed et al who reported its frequency of 9.91%.[10]

Among group of sex cord-stromal tumors, fibroma-thecoma has made most (46.42%) of the benign turnout in our series; moreover, granulosa cell tumor being most common (50%) of all malignant ones. This is an agreement with Mondal et al[14] which denoted Fibroma-thecoma as commonest benign and granulosa cell tumors as commonest malignant tumors in their studies.

Similar to most of local, Asian and western studies, in our study serous cystadenoma was found to be the commonest i.e. 68.94% among benign and serous cystadenocarcinoma as commonest i.e. 51.76% among malignant epithelial tumors. Mucinous cystadenoma ranked second (30.89%) in benign epithelial neoplasms and mucinous cystadenocarcinoma (21.17%) ranked

second among epithelial tumors. No benign and borderline case of other histological types was observed in our study.

As we know, demographic factors play an important role in the process of carcinogenesis; therefore, keeping in view age is reported in majority of cancer incidence publications. Majority of our patients with benign ovarian epithelial tumors were in 3rd and 4th decade of life, while that of malignant were seen in 5th decade. In western literature, mean age of 63 yrs has been reported in patients with malignant ovarian tumors; [24] however we have found the mean age of 47 years similar to most of local studies. This feature of younger age at presentation in pakistani women with ovarian epithelial cancer is similar to Indian (48 yrs), Japanese (51 yrs), Irani (49 yrs) and African women (46 yrs).[14,25-27] Reasons for lower mean age of ovarian cancer could be difference in risk and genetic factors existing in societies of western and asian countries. Another possible reason given by Saeed & Akram was shorter life expectancy in population of developing countries as compared to the west.[28]

Peak incidence of borderline tumors is between age group of 31-40 yrs; moreover, the mean age for borderline epithelial ovarian tumors in our series is 39 yrs. This finding is compatible with Kennedy & Hart reporting a mean age of 38 yrs. [29] Moreover, we observed that majority (38.46%) of the patients with borderline tumors belongs to the age group of 31-40 yrs, followed by 23.07% of patients belonging to 21-30 yrs age group. This data is compatible with other asian study by Mondal reporting 54.28% and 21.42% of patients belonging to age group of 31-40 yrs and 21-30 yrs respectively.

However, a Sweden study reported the median age at diagnosis of borderline ovarian cancer was 55.2 years [30]. Another study reported that the median age at diagnosis of borderline ovarian cancer was 45 years in Caucasians [31]. This contrasts the age of patients with borderline tumors in our study, which is more than 10 years younger than other ethnicities. Taken together our data suggest that age at diagnosis of borderline ovarian cancer is also younger in our study population than Caucasians.

Due to the lack of widespread population based data, hospital based registries form the main source of data for epidemiological estimates in our country. Our study provides a comprehensive information regarding frequency of ovarian tumors and their pattern in population of Karachi. Although it was a simple analysis, but with hope that it could help in promoting larger studies and formulate better for ovarian cancer prevention and control strategies in our region.

CONCLUSION

According to our study, surface epithelial tumors are most common among ovarian tumors followed by germ cell tumors and then sex cord-stromal tumors. Serous cystadenoma is the commonest benign while serous cystadenocarcinoma is the commonest malignant tumor. Mucinous subtype of surface epithelial tumors and germ cell tumors appear to be more common in our population as compared to the west. Moreover, ovarian cancer found to involve relatively younger age group in our region in contrast to west.

Thus this research illuminates the epidemiology of diverse ovarian tumors with respect to age in our Karachi region, which will assist in spreading awareness in the public about the disease especially about the age groups in which ovarian tumors are common. It will also help contriving screening programs by providing the age groups which need to be targeted.

Author's Contribution:

Concept & Design of Study:	Alfarah Irfan
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Revisiting Critically:	Alfarah Irfan, Mohammad Salman Zafar
Final Approval of version:	Alfarah Irfan

Conflict of Interest: The study has no conflict of interest to declare by any author.

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