Histopathological Analysis of Neoplastic Lesions of the Ovary: A 5-Year Retrospective Study at Tertiary Health Care Centre

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ABSTRACT

Introduction: Ovarian tumors represent about 30% of all cancers of the female genital system and 4% of all cancers in women. Indian trend analysis reveal a steady increase in the age-standardized incidence rate of ovarian cancer over past years, comprising up to 8.7% of cancers in different parts of the country. Aim and objective: To study the morphological pattern of benign and malignant ovarian neoplasm in various age presenting at our center over a period of 5-years.

Material and methods: The present study was conducted retrospectively in the department of Pathology, BPS, GMC, Khanpur Kalan, Sonipat. Data was collected after reviewing cases from 2012 to 2016 (5years). All cases of ovarian neoplasm both primary (benign and malignant) and metastatic were included in the study.

Results: Of the total 152 ovarian specimens that presented during the study period, 119 were benign, 5 were borderline tumors and 28 malignant. Most of the benign tumors occurred between 20-40 years of age, while malignant tumors presented commonly after 50 years of age. Out of these only 24 cases had bilateral ovarian neoplasm. Surface epithelial tumors were the most common type followed by germ cell tumors.

Conclusion: Benign ovarian tumors were more common than malignant ones across all age groups. On morphological grounds, tumors originating from surface epithelium were the most common variant.

Keywords: Germ cell, Ovarian Tumor, Histopathology, Female Genital Tract Malignancy

INTRODUCTION

Ovary is an important organ as it is concerned with the production of progeny. The ovary consists of sex cells and mesenchymal cells which are totipotential and multipotential respectively. So, whenever it develops neoplasia, almost any types of tumor can result.[1]

Among the cancers of female genital tract, the incidence of ovarian tumor ranks below only carcinoma of cervix.[2] It represent about 30% of all cancers of the female genital system and 4% of all cancers in women.[3] Indian trend analysis reveal a steady increase in the age-standardized incidence rate of ovarian cancer, comprising up to 8.7% of cancers in different parts of the country.[4]

Early diagnosis is difficult due to its asymptomatic nature and inaccessible site leading to disproportionate number of fatal ovarian carcinomas responsible for almost half of the deaths from carcinomas of female genital system. Determination of various histologic patterns of ovarian tumors is very important in diagnosis, prognosis as well as treatment of ovarian tumors. Prognosis of the tumors can also be predicted from the degree of differentiation of the tumors. Primary tumors are classified into surface epithelial tumors, germ cell tumors, sex cord stromal tumors, germ cell sex cord stromal tumors, tumors of rete ovarii and miscellaneous tumors of which surface epithelial tumors are most common. The stage and laterality of the tumor also indicates their nature for example, tumors in the sex cord stromal category are almost always confined to a single ovary. On the other hand, approximately 65% of the metastatic tumors are bilateral. In this study we aim to study the morphological pattern of benign and malignant ovarian neoplasm in various age presenting at our center over a period of 5-years.

MATERIAL AND METHODS

The present study was conducted retrospectively in Department of Pathology, BPS, GMC, Khanpur Kalan, Sonipat and data was collected from 2012 to 2016 (5years). All cases of ovarian neoplasm both primary (benign and malignant) and metastatic were included in the study. The diagnosis of ovarian tumor was based on histopathological examination conducted in our pathology department. All non-neoplastic and tumor like lesions were excluded from the study. The WHO classification (2003) for ovarian tumors was used to classify ovarian neoplasms. The clinical data was collected from archived forms. The patients were divided into six different age groups to study the proportion of benign and malignant tumors in theses age groups and to determine the predominant histologic type.

RESULTS

From Jan 2012 till Dec 2016, a total of 152 neoplastic ovarian specimens were received in pathology department of our institute. Most of the benign tumors occurred between 20-40

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How to cite this article: Deepti Agarwal, Swaran Kaur, Ruchi Agarwal, Monika Gathwal. Histopathological analysis of neoplastic lesions of the ovary: a 5-year retrospective study at tertiary health care centre. International Journal of Contemporary Medical Research 2018;5(5):E14-E17.

DOI: http://dx.doi.org/10.21276/ijcmr.2018.5.5.36

Age group	Benign	Borderline	Malignant	Total
11-20	7	-	-	7
21-30	32	-	3	35
31-40	26	-	2	28
41-50	22	4	8	34
51-60	18	1	9	28
>60	14	-	6	20
Total	119	5	28	152

Table-1: Distribution of benign and malignant ovarian neoplasm in different age groups

years of age, while malignant tumors presented commonly after 50 years of age (Table 1). Out of these only 24 cases had bilateral ovarian neoplasm.

Of the total 152 cases, 119 were benign, 5 were borderline tumors and 28 malignant. Surface epithelial tumors were the most common type followed by germ cell tumors. (Table 2)

Surface epithelial tumors were the most common benign and borderline tumors across all age groups while most germ cell tumors, both benign and malignant, were seen in women younger than 40 years. Most sex-cord stromal tumors occurred in women above 50 years of age (Table 3).

Among benign surface epithelial tumors, serous cystadenomas were the most common, while both mucinous and serous borderline tumors had nearly equal incidence. Among malignant surface epithelial tumors, serous cystadenocarcinomas outnumbered all others (Fig.1a and 1b). Among the germ cell tumors, mature cystic teratoma was the most common (Fig.1c) followed by immature teratoma (Fig.1d and 1e).

Metastatic ovarian neoplasms were seen in 2 patients, 1 of whom had bilateral metastasis. One of these was case of Krukenberg tumor metastatic from colonic adenocarcinoma (Fig. 1f) and other was a case of metastatic poorly differentiated carcinoma.

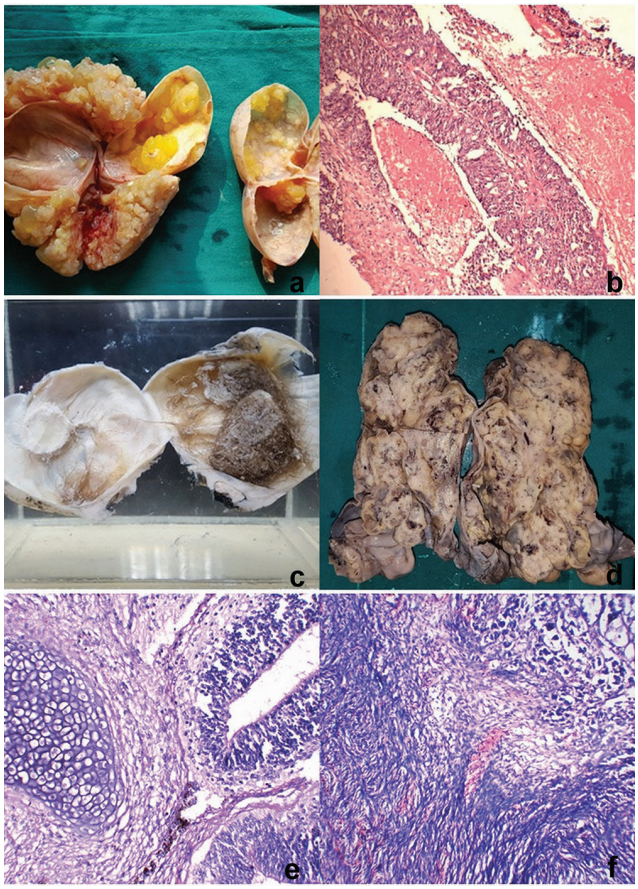

Figure-1: (a) Gross specimen of bilateral serous cystadenocarcinoma exhibiting enlarged ovaries. Cut surface reveals mostly cystic areas with inter-dispersed solid areas exhibiting papillary excrescences; **(b)** H&E 200X: Section of serous cystadenocarcinoma shows papillae lined by malignant cuboidal cells; **(c)** Cut section of enlarged cystic ovary showing hair ball suggestive of mature cystic teratoma (dermoid cyst); **(d)** Specimen of Immature teratoma showing enlarged ovaries and solid surface on cut-section; **(e)** H&E 200X: Section of immature teratoma showing mature cartilage with immature neural tissue; **(f)** H&E 200X: Section shows sheets of mucin secreting cells infiltrating into ovarian parenchyma

Histopathology	Type	Number of cases	Percentage	Bilaterality
Surface epithelial tumors	Serous			
	Benign	68		10
	Borderline	3		1
	Malignant	13		9
	Mucinous			
	Benign	20		
	Borderline	2		
	Malignant	3		1
	Endometrioid	3		
Germ cell tumor	Teratoma			
	Mature	29		1
	Immature	1		
	Dysgerminoma	1		1
Sex Cord stromal tumor	Fibroma/Thecoma	1		
	Granulosa cell tumor	3		
	Sertoli Leydig cell	1		
Others	Mixed mullerian tumor	1		
	Metastatic tumors	2		1

Table-2: Frequency of different histologic types of ovarian neoplasm and their bilaterality

Age Group	SET			SST		GCT		Metastatic/ others	Total
	Benign	Borderline	Malignant	Benign	Malignant	Benign	Malignant		
11-20	4	-	-	-	-	3	-	-	7
21-30	19	-	1	-	1	13	1	-	35
31-40	22	-	2	-	-	4	-	-	28
41-50	17	4	8	-	-	5	-	-	34
51-60	15	1	6	1	-	2	-	3	28
>60	12	-	2	-	3	2	1	-	20

Table-3: Age wise incidence of various histologic types of ovarian tumors

DISCUSSION

Ovarian cancer is the second leading cause of mortality among all gynecological cancers.[5] Ovarian cancer is said to be a silent killer, as majority of patients do not have any significant symptoms until an advanced stage.[6] Due to similar clinical presentations there is confusion in the diagnosis of non-neoplastic and neoplastic lesions of ovary although it is diagnosed as a mass or cystic lesion on ultrasonography and hence removed prophylactically in routine oophorectomies and hysterectomies.

In the present study, out of a total of 152 cases of ovarian neoplasm received in our pathology department, 119 were benign, 5 were borderline tumors and 28 malignant. This finding is in concordance with studies done by Pilli et al[7] and Gupta et al.[8] They have reported figures of 75.2%, 2.8%, 21.9% and 72.9%, 4.10%, 22.9% for benign, borderline and malignant ovarian tumors respectively. Scully et al[3] also observed that benign tumors were more common than malignant tumors, incidence being 75-80% of all ovarian neoplasm. However, Manker and Jain[9] and Ahmed et al[10] in their studies observed a relative decrease in the percentage of benign tumors and consequent increase in the percentage of malignant tumors. According to Mankar and Jain 63.04% tumors were benign, 5.84% were borderline and 31.12% were malignant. Ahmad et al., who reported an incidence of 59.18%, 0.2% and 40.81% for benign, borderline and malignant tumors respectively.

Ovarian tumor may occur at any age, including infancy and childhood. Incidence rate, however increase with age, with the greatest number of new cases being diagnosed beyond 4th and 5th decade. In present study, benign tumors were more commonly seen in the age group 20-40 years, while malignant tumors presented commonly after 50 years of age. Similar observations were made by Mondal et al[11], where they observed that median age of presentation of all ovarian neoplasm is 35 years and that benign tumors were common in age group 20-40 years while median age malignant lesion was 48 years. Basic et al[12] found ovarian cancers occurred most frequently in a similar age group, but they reported no ovarian cancers below 40 years of age. Shah et al[13] and Wasim et al[14] also found ovarian cancers unusual before age 40. A higher median age of 60-65 years for malignant lesions has been reported in western countries and from southern India. Malignant surface epithelial and sex cord stromal tumors have been found to be more common after 50 years, while germ cell tumors are more prevalent before the age of 30 years.

Histopathologically, surface epithelial tumors (73.68%) were the most common category of ovarian tumors encountered, followed by germ cell tumors. This agrees with the findings of Gupta et al[14] Yogambal et al[15] and others. Surface epithelial tumors account for 50.0-55.0% of all ovarian tumors and their malignant forms for approximately 90.0% of all ovarian cancers in the western world. Corresponding figures for Japan are 46.0-50.0% and 70-75% respectively. Malignant surface epithelial tumors account for 67.85% of all ovarian malignancies in our series of which serous cystadenocarcinoma was the most common malignant tumor accounting for 46.42% of all malignant cases followed by mucinous cystadenocarcinoma and endometroid carcinoma (10.71% each). This corresponds with the findings of Ahmed et al[10] and Jha et al[16], who reported incidences of 63.5% and 69.2% respectively for surface epithelial malignancies. However, Swamy et al[17] having recorded granulosa cell tumors, and Yasmin et al[18] observing endometroid carcinomas as the most common ovarian malignancies respectively, differed.

Germ cell tumor was the second major group of tumors in the present study (20.39%). The proportion of germ cell tumors varied in other studies from 23.9 to 42.2%. Significantly higher number of germ cell tumors has been reported from South Africa.[19] Mature teratoma was the commonest benign germ cell tumor in our study, comprising 19.07% of all ovarian tumors. The proportion was even higher than mucinous cystadenoma. Mature teratoma has been found to be the most common benign tumor in one study. These findings are in concordance with those of Mondal et al. In the present study, we encountered one case each of dysgerminoma and immature teratoma. In the study conducted by Mondal et al[11], they encountered 69 malignant germ cell tumors with predominance of dysgerminoma (36.2% of malignant germ cell tumors, 2.6% of all ovarian tumors).

Ovarian tumors are well known for bilateral involvement. The likelihood of bilateral involvement by primary ovarian tumors varies with histologic subtype. In a study done by Boger-Megiddo et al[20], using data collected by the Surveillance Epidemiology and End Results (SEER) program including 22,328 women diagnosed with a borderline or malignant epithelial ovarian tumor, malignant serous tumors were found to be bilateral in 57.5% of cases. Corresponding figures for mucinous, clear cell, endometrioid and other epithelial tumors were 21.3%, 13.3%, 26.8%, and

35.6%, respectively. Serous tumors were bilateral in 20 cases (13.15%) compared to only 1 case of mucinous in our study. This is an important statistic because bilaterality of a mucinous tumor should always suggest the possibility of a metastatic tumor to the ovaries from the appendix or other gastrointestinal sites, the pancreas or the endocervix, rather than a primary ovarian neoplasm.

CONCLUSION

To conclude, number of various clinical parameters such as age of the patient, location, dimensions and histological type of ovarian neoplasm affect the prognosis. In our study benign ovarian tumors were more common than malignant ones across all age groups. On morphological grounds, tumors originating from surface epithelium were the most common variant.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 06-05-2018; **Accepted:** 09-06-2018; **Published:** 17-06-2018