

Histopathological Analysis of Ovarian Tumors

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Abstract

Background: Ovarian tumors are among the most frequent pathologic conditions in gynaecological practice. They arise from different cell lineages and constitute a wide variety of neoplastic entities with diverse morphological and clinical manifestations. Among cancers of the female genital tract, it ranks only below carcinoma of the cervix and the endometrium. Histopathological study is the gold standard to assess the treatment modalities and prognosis of various tumors.

Objective: To determine the frequency and morphological variants of neoplastic lesions of the ovary.

Methods: It was a retrospective cross sectional study conducted in the Department of Pathology, Enam Medical College & Hospital, Savar, Dhaka during the period from January 2011 to December 2016. A total of 300 ovarian biopsies were selected for histopathological evaluation.

Results: The age of the patients ranged from 7 to 85 years with a mean age 36.95 years. The commonest age group affected was from 31 to 40 years (84, 28%) and most of the tumors occurred between 21 and 40 years of age (166, 55.3%). Out of 300 ovarian tumors 248 (82.67%) were benign, 8 (2.66%) were borderline and 44 (14.67%) were malignant tumors. Surface epithelial tumors (218, 72.67%) formed the largest group among the histological types of ovarian tumors, followed by germ cell tumor (21.67%), sex cord stromal tumor (4.33%) and metastatic carcinoma (1.33%). Serous cyst adenoma (171, 68.95%) was the commonest benign tumor, followed by mature cystic teratoma (52, 20.97%). Serous cyst adenocarcinoma (15, 34.09%) was the commonest malignant tumor, followed by dysgerminoma (12, 27.27%). Conclusion: Surface epithelial tumors were the most common group in both benign and malignant tumors. Serous cyst adenoma was the most common benign tumor whereas serous cyst adenocarcinoma was the most common malignancy.

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Introduction

Ovarian tumors are among the most frequent pathologic conditions in gynaecological practice and a frequent cause of hospitalization and surgery.¹ They arise from different cell lineages and hence constitute a wide variety of neoplastic entities with diverse morphological and clinical manifestations. These can be benign, borderline or malignant. Majority ovarian tumors are benign having cystic, solid or

mixed characteristics. It constitutes about 80% of all ovarian tumors, and these occur mostly in young women between the ages of 20 and 45 years. Borderline tumors occur at slightly older ages. Malignant tumors are more common in older women, between the ages of 45 and 65 years.² About two third of ovarian tumors occur in women of reproductive age group. Fewer than 5.0% are found in children.

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Cancers of ovary and ovarian adnexae, including fallopian tube cancer, constitutes the eight most common cancers among women worldwide. The incidence rate of ovarian cancers is at least twice as high in Europe and North America than in Asia and Africa. The incidence of ovarian cancers ranks below only carcinoma of cervix and endometrium among the cancers of the female genital tract. It accounts for 3% of all cancers in female and about 15% to 20% of genital malignancies.^{3,4} Early ovarian cancer is not associated with significant symptoms and most women present with advanced disease.

The recognition of the various histological patterns is important for correct diagnosis, which has important implications for treatment and prognosis. This study was conducted with the aim to find out the frequency of different histologic types of ovarian tumors and to analyze age distribution of these tumors.

Methods

This is a retrospective cross-sectional study of ovarian tumors, reported from the Department of Pathology of Enam Medical College & Hospital, during a period of 6 years, from January 2011 to December 2016. These were mostly referred from gynecology & obstetric department of this institute, but a few were referred from other hospitals in the vicinity. All surgical procedure by which tumor was removed like cystectomy, oophorectomy, salpingo-oophorectomy and total abdominal hysterectomy with unilateral or bilateral salpingo-oophorectomy specimens were included. All histopathologically diagnosed cases of ovarian tumors were included in this study. Patient with abdomino-pelvic masses other than ovarian tumors diagnosed on histopathology and with two different synchronous ovarian tumors were excluded from the study. Detailed clinical information and radiological findings were obtained from

histology request forms and register. These included age of the patients, laterality, signs and symptoms, fine needle aspiration cytology (FNAC) findings of the available cases, complete blood count, ultrasonography (USG)/ computed tomography (CT) findings and biochemical investigations including serum tumor markers like CA 125, α fetoprotein and β human chorionic gonadotropin (β HCG).

Formalin-fixed, paraffin-embedded tissue sections were stained with hematoxyline and eosin (H & E) and other special stains like periodic acid-Schiff, when required. A total of 300 biopsies were selected for morphological evaluation. The patients were divided into eight age groups to study the proportion of benign and malignant tumors in these age groups. The proportion of malignant cases was noted in the four major histological subtypes of ovarian tumors.

The results were tabulated and presented as percentage frequencies. Means was used to summarize continuous variables, while percentages were used for categorical variables.

Results

A total of 300 ovarian tumors were included in this study. Neoplastic lesions included benign tumors (248, 82.67%), borderline tumors (8, 2.66%) and malignant tumors (44, 14.67%). Surface epithelial tumors formed the largest group (218, 72.67%) among the histological types, followed by germ cell tumors, sex cord stromal tumors and metastatic tumors (Table I). Benign surface epithelial tumors comprised 75% (n=186) of all benign tumors whereas their malignant counterpart formed 54.5% (n=24) of all malignant tumors. The commonest surface epithelial tumor was serous cyst adenoma (171, 78.44%), followed by mucinous cyst adenoma (15, 6.88%). Serous tumors

accounts 63% of all ovarian tumors, of which 90.48% was benign, 1.59% was borderline and 7.94% was malignant tumor. The tumors varied in size. The largest tumor was a dermoid cyst measuring 45x30x25 cm in a female of 55 years age and smallest tumor was serous cyst adenoma measuring 2x2x1.5 cm.

Age of the patients ranged from 7 to 85 years with a mean age 36.95 years. The mean age for benign tumors was 36.48 years, while for borderline and malignant tumors it was 50.5 and 37.16 years. The commonest age group (Table II) affected was from 31 to 40 years (84, 28%), followed by age group 21-30 years (82, 27.3%). Most of the tumors occurred between 21 and 40 years of age (166, 55.3%). For all age groups, benign tumors were more common than malignant ones. Benign serous tumors were found from 14-85 years of life. These were 36.8% up to 30 years of age and 59.1% were in 4th-6th decades (Table III).

Borderline tumors were 25% up to 30 years of age and were 50% in 4th-6th decades (Table IV). Serous carcinomas were rare up to 30 years. Most serous carcinomas (80%) were seen above 40 years (Table V). Germ cell tumors were encountered in younger age group with a mean age 21 years. Malignant germ cell tumor was found one case in 1st decade and 83.3% occur in 21-40 years age group (Table VI).

The occurrence of malignancy was seen more in serous tumors (15, 34.01%) as compared to mucinous tumors (5, 11.36%). Mature cystic teratoma (52, 20.97% of benign) and dysgerminoma (12, 27.27% of malignant) were the commonest benign and malignant tumors respectively among germ cell tumors. The group sex-cord stromal tumor had nine cases of fibroma and four cases of malignant granulosa cell tumor. Four cases of metastatic Krukenberg tumors were found.

Table I: Frequency and distribution of different types of ovarian tumors (n=300)

Histological classes	Benign tumors (n=248)	Borderline tumor (n=8)	Malignant tumors (n=44)	Total	%
Surface epithelial tumor	Serous cyst adenoma (171)	Serous tumor (3)	Serous cyst adenocarcinoma (15)	218	72.67
	Mucinous cyst adenoma (15)	Mucinous tumor (5)	Mucinous cyst adenocarcinoma (5)		
	Mature teratoma (52)		Endometrioid carcinoma (3) Clear cell adenocarcinoma (1)		
Germ cell tumor	Struma ovarii (1)		Dysgerminoma (12)	65	21.67
Sex cord stromal tumor	Fibroma (9)		Granulosa cell tumor (4)	13	4.33
Metastatic			Krukenberg tumor (4)	4	1.33

Table II: Age distribution of ovarian tumors (n=300)

Types of tumor	Up to 20	21-30	31-40	41-50	51-60	>60
Benign	26	71	77	44	15	15
Borderline	0	2	0	1	3	2
Malignant	7	9	7	12	9	0
Total	33	82	84	57	27	17

Table III: Frequency of benign tumors in different age groups (n=248)

Diagnosis	Up to 20	21-30	31-40	41-50	51-60	>60
Serous cyst adenoma	16	47	55	33	10	10
Mucinous cyst adenoma	3	6	0	1	2	3
Mature cystic teratoma	6	16	18	8	3	1
Struma ovarii	0	0	1	0	0	0
Fibroma	1	2	3	2	0	1
Total	26	71	77	44	0	15

Table IV: Frequency of borderline tumors in different age groups (n=08)

Diagnosis	Up to 20	21-30	31-40	41-50	51-60	>60
Serous tumor	0	1	0	0	2	0
Mucinous tumor	0	1	0	1	1	2
Total	0	2	0	1	3	2

Table V: Frequency of malignant tumors in different age groups (n=248)

Diagnosis	Up to 20	21-30	31-40	41-50	51-60	>60
Serous cyst adenocarcinoma	1	0	2	8	4	0
Mucinous cyst adenocarcinoma	1	0	2	0	2	0
Endometrioid carcinoma	0	0	2	1	0	0
Clear cell adenocarcinoma	0	0	0	0	1	0
Dysgerminoma	5	6	1	0	0	0
Granulosa cell tumor	0	1	0	1	2	0
Metastatic tumor	0	2	0	2	0	0
Total	7	9	7	12	9	0

Table VI: Frequency of different classes of tumors in different age groups

Diagnosis	Up to 20	21-30	31-40	41-50	51-60	>60
Surface epithelial tumor	21	55	61	44	22	15
Germ cell tumor	11	22	20	8	3	1
Sex-cord stromal tumor	1	3	3	3	2	1
Metastatic tumor	0	2	0	2	0	0

Discussion

The ovary is a complex structure from an embryological, anatomical and functional stand point. The value of detailed morphological study of ovarian tumors lies

not only in systematic diagnosis but also in planning the modality of treatment and assessing the prognosis. There is a wide spectrum of pathological neoplastic conditions affect the ovary from early age to

throughout life. The mean age of the patients was 36.95 years with age range 7 to 85 years. The mean age for benign tumors was 36.48 years, while for borderline and malignant tumors it was 50.5 and 37.16 years. In a similar study, Vaidya et al. reported median age for all tumors was 33 years and while for benign, borderline and malignant tumors it was 32, 47 and 40 years, respectively.⁵ Mondal et al. in their study found mean age 35 years.⁶ The commonest age group affected in this study was from 31 to 40 years followed by 21-30 age group. This correlates with another study.⁷ In the present study most of the tumors occurred between 21 and 40 years of age. Similar studies by other investigators have highlighted that most ovarian tumors are seen between 21 and 40 years.^{6,7} Above 40 years malignant tumors were 47.7% in this study. However, most malignant tumors have been noted above 40 years in other studies.^{6,8}

Malignant 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 20.⁹ In the present study, malignant epithelial tumors were found predominantly in 41-60 year age group. A significant number of malignant surface epithelial tumors were also found in the 31-40 year group, which is similar to another study.⁶ Benign and borderline tumors were predominant in 31-40 and 51-60 age groups respectively in this study.

In current study, neoplastic lesions contained 82.67% benign, 2.66% borderline and 14.67% malignant. The frequency of benign tumors was similar to other studies in India,¹⁰ Pakistan¹¹ and Nepal,⁷ 78.7%, 80.71% and 83.9% respectively. Still higher values are found by others, 90.5% and 93.85% respectively.^{12,13} However, the frequency of benign tumors was relatively lower in other literature.^{14,15}

In agreement with others, the majority of the benign category of ovarian neoplasms was serous cyst adenoma (68.95%).^{2,10,16} It was followed by mature cystic teratoma (20.97%). Studies from Nepal found mature cystic teratoma as the most common benign ovarian neoplasm.^{5,7} Maharjan S observed equal frequency of serous cyst adenoma and mature cystic teratoma, in benign category.¹²

In the western literature, surface epithelial tumor is the commonest category of ovarian tumors among the histological types which accounts for 65% to 70%.² In current study, surface epithelial tumors were the major histological type of ovarian tumors followed by germ cell tumors. These results are same with the reported findings by western literature² and multiple studies from the subcontinent.^{6,7,17} Surface epithelial tumors in our study accounts 72.67%. However, low frequency of surface epithelial tumor was documented in the literature.^{5,12,16} Serous tumor constitutes about 30% of all ovarian tumors, of which 70% are benign or borderline and 30% are malignant.² In our study, serous tumors accounts 63% of all ovarian tumors, of which 90.48% was benign, 1.59% was borderline and 7.94% was malignant tumor. In the west, Mucinous tumors account for about 20% to 25% of all ovarian neoplasms, 80% of these are benign, 10% each are borderline and malignant.² In this study, mucinous tumors comprised 8.3% of all ovarian tumors, 60% of these were benign 20% each were borderline and malignant. Similar studies from the subcontinent document mucinous tumors account for 15.7% to 30% of all ovarian tumors.^{5,6,7,17}

There is a great variation in the frequency of different categories of malignant neoplasms in various studies. In agreements with many studies, the most common malignancy was serous cyst adenocarcinoma (34.09%).^{2,10,11,16}

In some studies mucinous cyst adenocarcinoma was the commonest malignancy.^{18,19} Yasmin et al.²⁰ observed granulosa cell tumor and endometrioid carcinoma (28.5% each) as the most common malignant ovarian neoplasms. Maharjan S found dysgerminoma was the most common malignancy.¹²

Germ cell tumors constitute 15-30% of all ovarian tumors.² In our study germ cell tumor was the second major group of tumors and this accounts 21.67%. However, the figure was significantly high incidence of 51.52% was observed in a study from Nepal.⁵ In agreement with other studies mature cystic teratoma was the commonest germ cell tumor.^{6,7,11} Mature teratoma has been found to be the most common benign tumor in studies from Nepal.^{5,7} Cystic teratomas are usually found in young women during the active reproductive years. It accounted for 11.5% cases in 1st two decades and 65.4% in 21-40 years age group. Dysgerminoma was the only malignancy found among germ cell tumor. They may occur in childhood, but 75% occur in the second and third decades.² In this study, one case was found in 1st decade and 83.3% occur in 21-40 years age group.

Sex cord stromal tumors account for 5-10% of all ovarian tumors. In this study, it comprised 4.3% of all ovarian tumors. Fibroma was found as the most common tumor in this group which is similar to another study.⁵ Still others found granulosa cell tumor as the commonest tumor in this group.^{6,10}

Tumors in borderline category are characterized by epithelial proliferation greater than that of the benign tumor in absence of destructive invasive stroma. Mucinous borderline tumor was prevalent and seen in 5/8 cases which was also seen in another study.⁵ The frequency of borderline tumor (2.66%) in the present study was lower

than the studies by Vaidya et al.⁵ and Okugawa et al.,¹⁴ both have observed 3.58% and 4% respectively. A higher proportion of borderline tumors (nearly 20%) have been reported in another study.²¹

Conclusion

According to this study ovarian tumors are common in age group of 21 to 40 years. Benign tumors were more common than malignant tumors. Among the histological types surface epithelial tumors were predominant type, followed by germ cell tumors. Serous cyst adenoma was the most common benign tumor whereas serous cyst adenocarcinoma was the most common malignancy. This study is institutional based; therefore the results obtained may or may not reflect the actual histological pattern of ovarian tumors in Bangladeshi women. Therefore, multicentric study with larger sample size should be carried out.

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