Ovarian Tumors: Clinicopathological Analysis

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Abstract: _Background_: _Ovarian tumors are one of the main tumors affecting female at different age group with different histopathological types and broad clinical outcomes. Histologically, ovarian tumors are calcified into three main subtypes, surface epithelial tumors, germ cell tumors and sex cord tumors, each type then calcified as benign, borderline or malignant. The etiology, age relation, risk factors and clinical outcome for these tumors are differ according to their histological types. This study describes the distribution of ovarian tumors considering the age, the laterality and the histologic types in a selected group of patients._ _Materials and methods_: _A retrospective study including total number of 76 ovarian tumor was done. The specimens were collected from a private histopathology laboratory in Benghazi during the period from January 2019 to December 2020. The specimens were classified according to the newest WHO classification into epithelial tumors, germ cell tumors, sex cord–stromal tumors, and others. The lesions then were classified according to age, laterality and frequencies. The data were computed and analyzed._ _Results_: _The total number of specimens in this study was 76. most of the affected patients were between 21-40 years old (30%). the most commonly seen tumor was epithelial tumor (51%) followed by germ cell tumors (28%), sex cord stromal tumor (16%) and others (5%). the study concluded that the benign tumors form 72%, borderline tumors form 13% and the malignant tumors form 14%, the most common benign tumor in this study was serous cyst adenoma 20%, whereas the most common malignant one was serous cyst adenocarcinoma 9%. Regarding laterality, 50 were unilateral (66%) and 26 were bi-laterality (34%)._ _Conclusion_: _In this study, the samples were classified according to WHO classification, majority of the tumors were epithelial and germ cell tumors. Most of cases were benign epithelial tumors. The most common type of epithelial and germ cell tumor was serous cystadenoma and teratoma, respectively, and the most commonly affected age group was 21 to 40 years old. The least common age group was 61 to 70 years old. Unilateral tumors were more frequently than bilateral tumors._

Keywords: ovarian tumors, benign ovarian tumors, serous cystadenoma, malignant ovarian tumors, serous cystadenocarcinoma

1. Introduction

Ovarian tumors are considered as one of the most common tumors that affect women at different age group. It is considered as the sixth cause of death in female worldwide (1). Histologically, ovarian tumors are calcified into three main subtypes, surface epithelial tumors, germ cell tumors and sex cord tumors, each type then calcified as benign, borderline or malignant. The etiology, age relation, risk factors and clinical outcome for these tumors are differ according to their histological types. (2) . The prognostic factors of ovarian tumors relay on the TNM staging system and the histologic grade. (3) and the criteria that was revised by Kurman _et al_, (4) . In general, benign ovarian tumors either solid or cystic tumors, are more common than their malignant counterpart (5). The outcome of any malignant ovarian tumor usually based on histological type, grade and stage at the time of diagnosis (6).

This study investigates the distribution of the ovarian tumors according to age groups, its histological types, laterality, and malignant potentiality in the collected specimens

2. Material and Methods

A retrospective study was conducted on 76 cases of ovarian specimens which were diagnosed as ovarian tumors in a private histopathology laboratory in the period from Jan 2019 to Dec 2020. The histological typing and character were revised and were classified into epithelial tumors, germ cell tumors, sex cord–stromal tumors and others, according to the newest WHO classification of ovarian tumors. The data were distributed based on age, histologic types and laterality. The data then were computed and analyzed

3. Results

A total number of 76 cases of ovarian tumors were collected. The percentage of each tumor was as following, an epithelial tumor was 51%, germ cell tumor was 28%, sex cord stromal tumor was 16% and metastatic tumors was 5% (figure 1).
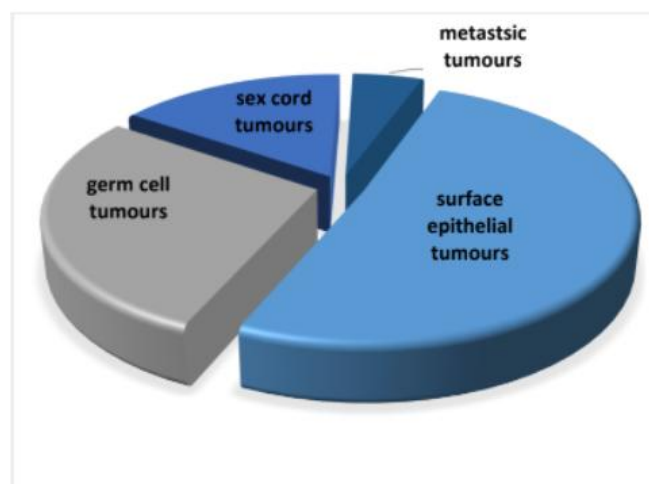
Figure 1: Percentage of tumors according to general histological type. Most common type was surface epithelial tumor 51%, followed by germ cell tumors 28%, sex cord tumors 16% and metastatic tumors 5%.

The most common subtype of ovarian tumors noticed in this study was dermoid cyst (17 out of 76; 24%). The least common tumor seen was sclerosing stromal tumor (1 out of 76 cases; 1.33%). The percentages of the rest of tumors were as following from less to more frequent, struma ovarii 4%, mesenteric krukenberg 5%, borderline serous 5%, fibroma 7%, granulosa cell tumor 8%, borderline mucinous 8%,

mucinous cystadenoma 9%, serous cystadenoma 9% and   serous cystadenocarcinoma (figure 2).
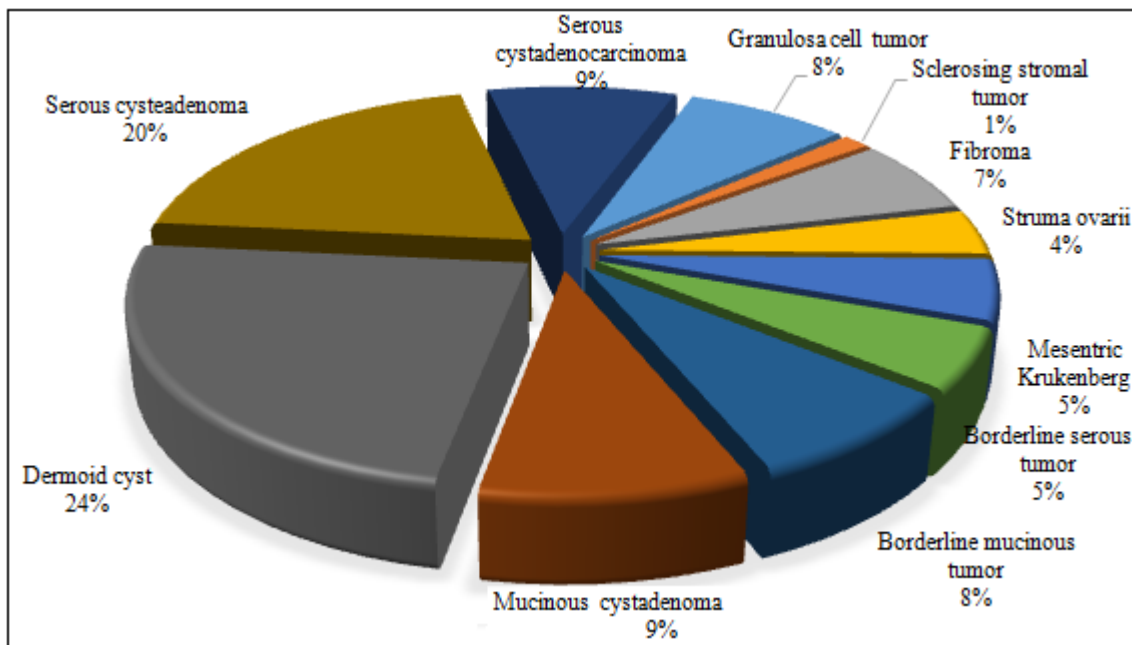
Figure 2: Percentage of tumors according to histological type. Most common type was serous cystadenocarcinoma while struma ovarii was the less common detected tumor

the mean age of patients with ovarian tumor included in this study was 36.6 ± 12.6 (between 13-72 years). The number of patients between 21-30 & 31-40 years old was seen in 40 cases. Whereas, the total nu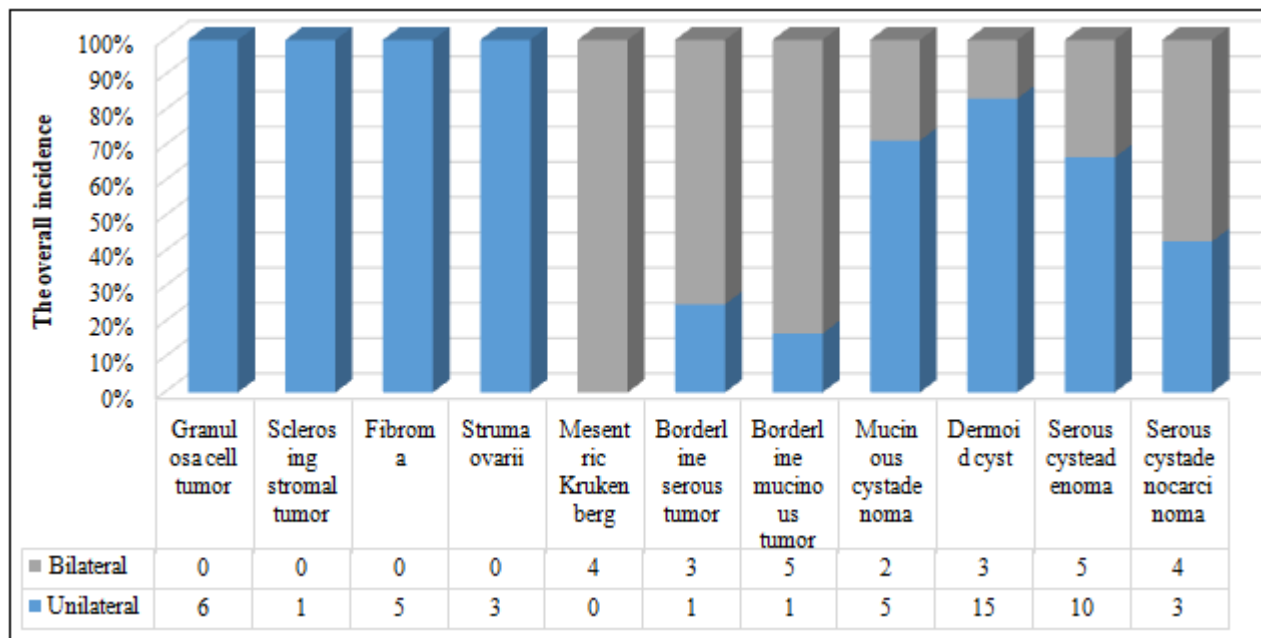mber of patients between 51-60 years old was 8. This was followed by the age groups of 11-20 and 61-70 years which seen in 7 and 3 of cases respectively (figure3).
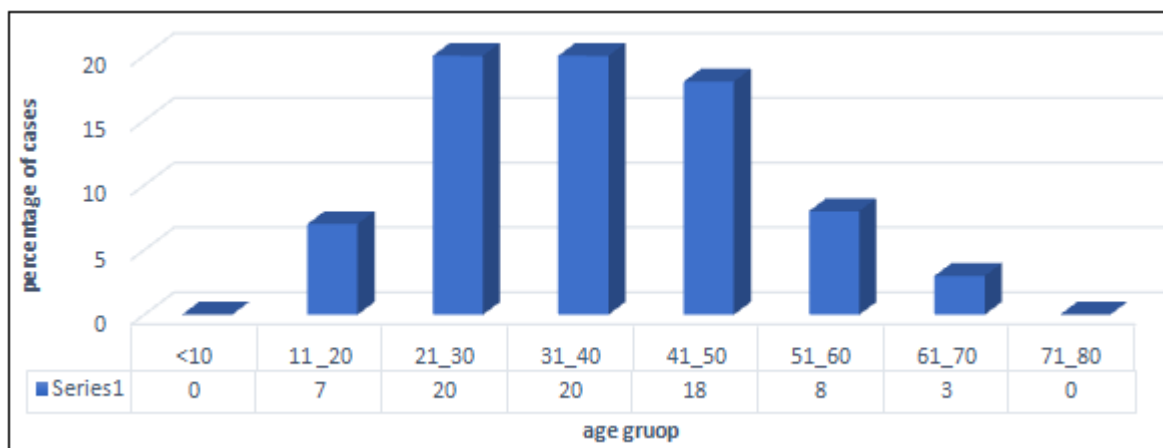
Figure 3: Age distribution. The higher percenters of ovarian tumors were seen between 21 to 40 years of age followed by 41 to 50 years. Less number of cases were seen in 11 to 20 and 61 to 70 respectively. No cases were recorded in age less than 10 years or above 71.

Regarding the occurrence of bilateral versus unilateral tumors, 50 out of 76 cases were unilateral (66%) and the rest of patients presented with bilateral ovarian tumor (34%) (Data not shown). The incidence of bilaterally among different types of ovarian tumor was shown in figure 4. By far all cases of mesenteric krukenberg tumors were bilateral in contrast to granulosa cell tumor, sclerosing stromal tumor and fibroma cases were unilateral only.

	Granul osa cell tumor	Scleros ing stromal tumor	Fibrom a	Struma ovarii	Mesent ric Kruken berg	Borderl ine serous tumor	Borderl ine mucino us tumor	Mucin ous cystade noma	Dermoi d cyst	Serous cystead enoma	Serous cystade nocarci noma
■ Bilateral	0	0	0	0	4	3	5	2	3	5	4
■ Unilateral	6	1	5	3	0	1	1	5	15	10	3

Figure 4: Laterality in ovarian tumors. Granulosa cell tumor, sclerosing stromal tumor, fibroma and struma ovarii are presented in unilateral pattern only. All cases of mesenteric krukenberg tumors were bilateral. Borderline mucinous and serous adenoma show bilateral: unilateral ration of 5: 1 & 3: 1 respectively. Dermoid cyst and serous cystadenoma were seen more as unilateral tumors. Serous cystadenoma

According to the menopausal status, most of ovarian tumors were seen in patient in reproductive ages younger than 35 years of age with a percentage of 43%. This is followed by perimenopause and post-menopause with percentage of 33% and 24% respectively. There were no cases in prepubertal age group (figure 5)
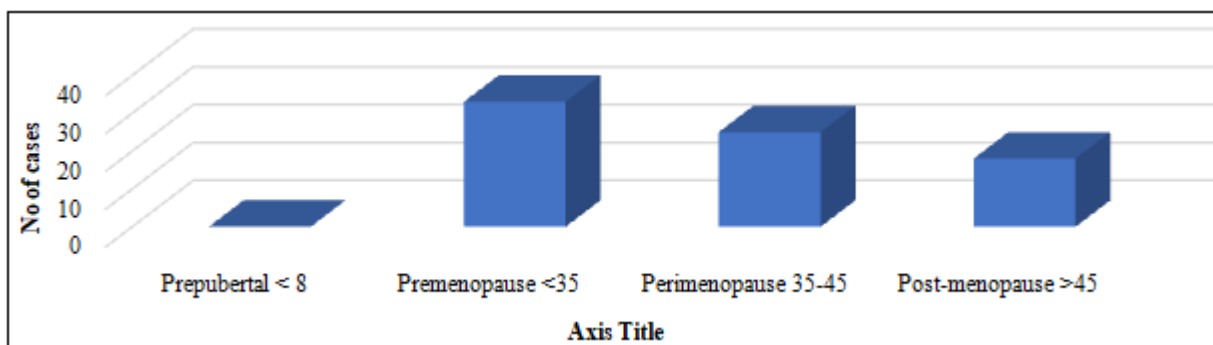

Figure 5: Distribution of patients according to menopausal status. There were no recorded cases of ovarian tumors in patients younger than 8 years of age. The number of cases inpremenopausal age was is 33 (43%) and the number of patientsin perimenopause and post-menopause were 25 (33%) and 18 (24%) respectively

Most of the tumors recorded in premenopausal age, were benign type (seen in 25 cases out of 33 total benign cases (76%). The almost near percentage was seen with perimenopausal and post-menopausal age, were benign tumors seen in 18 out of 25 cases (72%) and 12 out of 18 cases (67%) respectively. In reproductive age, 6 out of 33 cases (18%) were borderline and two were malignant (6%), whereas, in perimenopause, the percentages were 3 (12%) for borderline and 4 (16%) for malignant tumors. in the postmenopausal period, the malignant tumors represent 5 out of 12 cases (28%) while the borderline is only seen in one case (6%) (figure 6).
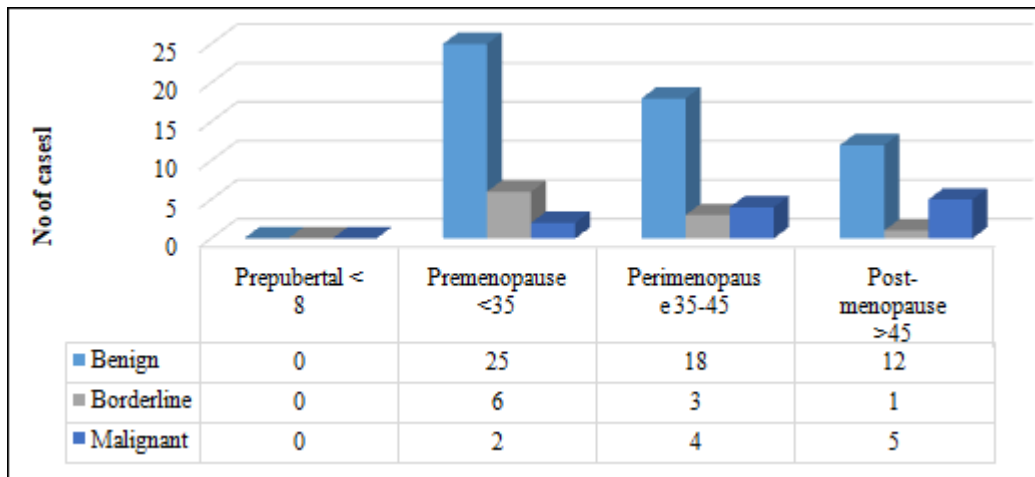
Figure 6: distribution of patients by menopausal status as Benign, Borderline and Malignant. Benign tumors are the most common tumor seen in all age group with different incidence. Borderline tumors are more seen in reproductive age compared to peri-and post-menopause. On the other hand, malignant tumors were seen in a higher number in patients older than 45 years old.

Regarding the distribution of different histological type at different age groups. The histological types were plotted against two age groups; 15-35 and 35-55. Fibroma, dermoid cyst, mucinous cystadenoma and borderline mucinous tumors were more frequently among ages less than 35 years old. Whereas, sclerosing stromal tumor, granulosa cell tumor, serous cyst adenocarcinoma and serous cyst adenoma were common between 35-55 years old. Mesenteric krukenberg and borderline serous tumor were seen equally at different ages (figure 7).
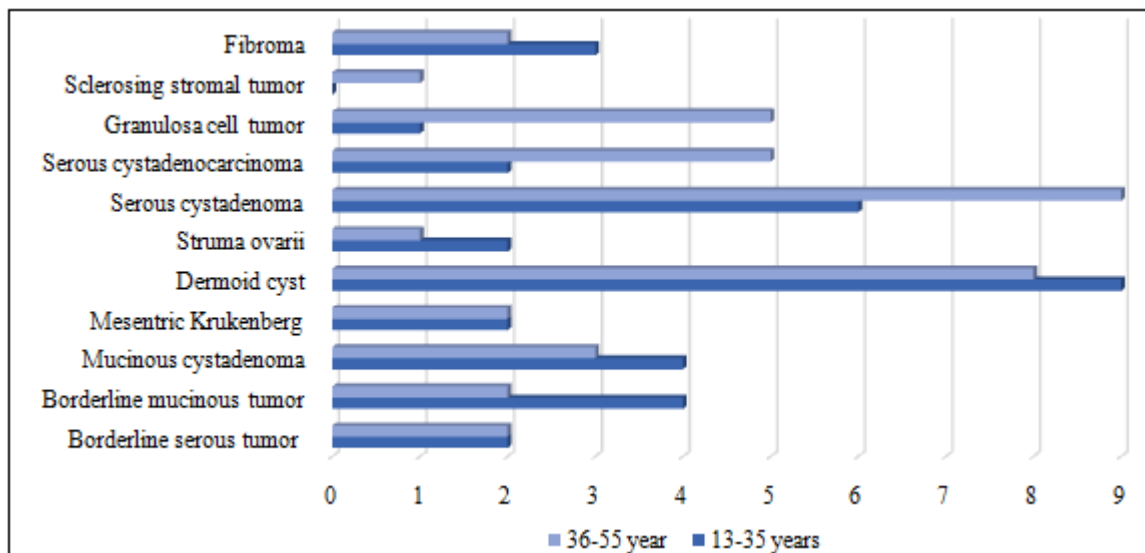
Figure 7: The distribution of histological types at different age groups. Sclerosing stroma tumor, granulosa cell tumor, serous cystadenocarcinoma and serous cystadenoma are commonly seen in 35-55 years old. Unlike, fibroma, dermoid cyst, mucinous cystadenoma and borderline mucinous tumor which were seen in younger age group, 13-35 years old

4. Discussion

In this study, 76 specimens of ovarian tumors were analyzed, the most common type of ovarian tumors was epithelial tumors which form 51% of all cases followed by Germ cell tumors 28% of cases. these results are comparable with other studies (7, 8) .

Regarding the ages of the patients, most of ovarian tumors were seen at age < 35 (perimenopause), Followed by <45 years old (perimenopause). This result is closely related to Mankar and Jain work (9) . The youngest age with ovarian tumor in our study was 13 years-old. Some other studies showed younger ages, some at 2 years. (10) Others studies showed a younger patient-as young as 6 days (11) . Benign tumor is the most common type of ovarian tumors, seen in all age groups and the incidence of malignant ovarian tumors increased with age. Fibroma, dermoid cyst, mucinous cystadenoma and borderline mucinous tumors are more frequently seen among ages less than 35 years old. In contrast, sclerosing stromal tumor, granulosa cell tumor, serous cyst adenocarcinoma and serous cyst adenoma are more frequently seen in ages older than 35 years old. Other tumors are seen equally at different ages. Giri & Nayak found that the incidence of malignant tumors increased with increased age (12) but fibroma was seen in younger age where a case report recorded fibroma in a patient as young

as 15 years (13) . Mucinouscystadenoma and dermoid cyst can also be seen in young patients (14, 15) . Like our results, otherresearchers have found that granulosa cell tumor is more seen in old age group (16) . In a study conducted by Siedman and Mehrota, serous cyst adenoma was seen in patient between 40-60 years old which is compatible with our results. (17) .

The most common subtype of ovarian tumor in this study was dermoid cyst (24%) followed by serous cystadenoma (20%). Mucinouscystadenoma and serous cystadenocarcinoma, each form9% of cases. A study by Malde*et. al,* found the same result where the dermoid cyst was the most commonly diagnosed ovarian tumor (18) . Onthe other hand, Garg *et al*, and Patil *et al*, found a different result as their studies showed that the most common recorded ovarian tumor was serous cyst adenoma (7, 8) .

In this paper, the most common malignant tumor was serous cystadenocarcinoma followed by the metastatic mucinousadenocarcinoma known as krukenberg tumor. The same findings were shown in another study (19) . In the present study, the most common borderline tumor was the borderline mucinous tumor. However, other study has shown that the most common borderline tumor was serous type (20) .

The result of this study has shown that 66% of cases were unilateral which is comparable with the results that are obtained by Kanpurwala *et al*. (19) .

5. Conclusion

This study describes the incidence of different types of ovarian tumors among female patient underwent surgical excision where the resected ovarian specimen submitted to private histopathology lab. The WHO classification was followed. The result shows that the epithelial tumors are the most frequent type and most of them were benign serous tumors. Dermoid cyst was the most common type of germ cell tumors, with more than half of the cases showed unilateral mass. Krukenberg tumor was the onlytumor presented as bilateral ovarian mass, Granulosa cell tumor and sclerosing stromal tumor were rare tumors compared to surface epithelial ones.

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