Histopathological pattern of ovarian neoplasms and their age distribution in the western region of Saudi Arabia

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ABSTRACT

الأهداف: دراسة مختلف أنواع أورام المبيض، ونمط التوزيع العمري لهذه الأورام في المنطقة الغربية بالمملكة العربية السعودية.

الطريقه: تحليل ودراسة جميع أورام المبيض التي تلقاها قسم علم الأمراض، مستشفى جامعة الملك عبدالعزيز، جدة، المملكة العربية السعودية وذلك خلال الفترة من يناير 1995م إلى ديسمبر 2010م، وتصنيفها حسب الفئات العمرية من ٠ إلى أكثر من 52 عاماً.

النتائج: شملت الدراسة 618 عينة من المبايض، وقد شُخصت 382 حالة (61.8%) منها بأورام المبيض، بينما كانت 236 حالة (38.2%) مصابة بالأكياس الوظيفية غير الورمية. وكانت الأورام الحميدة (278 حالة، 72.8%) أكثر شيوعاً من الشريط الحدودي (20 حالة، 5.2%)، والأورام الخبيثة (84 حالة، 22%) في جميع الفئات العمرية. ولقد كانت الأورام الظهارية السطحية الأكثر شيوعاً (61%)، تلتها أورام الخلية الجرثومية (28%)، والأورام اللحمية والحبل الجنسي (7.6%)، وأخيراً الأورام المتنقلة (3.4%). وأظهرت نتائج الدراسة إلى أن أكثر أورام المبيض الحميدة شيوعاً قد كان الورم الغدي الكيسي المصلي (44.6%)، فيما كان سرطان الغدد الكيسية المصلية من أكثر أورام المبيض الخبيثة شيوعاً (33.3%). وكانت الأورام الأكثر شيوعا في المبيض عند من هن دون سن 20 عاماً هي أورام السطح الظهارية (24 حالة)، تلتها أورام الخلايا الجرثومية (16 حالة). وكانت الأورام الحميدة (213 حالة) أكثر شيوعاً من الأورام الخبيثة (42 حالة) في الفئة العمرية من 20-51 عاماً. بينا كانت الأورام الخبيثة في المبيض (35 حالة من أصل 71) أكثر شيوعاً من الأورام الحميدة (34 حالة) وذلك في الفئة العمرية 52 عاماً فما أكثر.

خاتمة: أثبتت هذه الدراسة بأن الأورام الحميدة في المبيض هي أكثر شيوعاً من تلك الخبيثة، حيث كان الورم الغدي الكيسي المصلي أكثر أورام المبيض الحميدة شيوعاً فيما كان سرطان الغدد الكيسية المصلية من أكثر أورام المبيض الخبيثة شيوعاً. كما أظهرت الدراسة بأن انتشار الأورام الخبيثة في المبيض يزيد مع زيادة العمر.

Objectives: To identify the different histopathological types of ovarian neoplasms and their age distribution.

Methods: This is a retrospective study were ovarian neoplasms received by the Pathology Department of King Abdulaziz University, Jeddah, Saudi Arabia between January 1995 and December 2010 were reviewed and their frequencies in different age groups were calculated.

Results: Out of 618 ovarian specimens studied, 382 (61.8%) were ovarian neoplasms while 38.2% were non-neoplastic functional cysts. Benign neoplasms (n=278; 72.8%) were more common than borderline (n=20; 5.2%) and malignant ones (n=84; 22%) in all age groups. Surface epithelial neoplasms were the most common (61%) followed by germ cell (28%), gender cord stromal (7.6%) and metastatic tumors (3.4%). The most common benign neoplasm was serous cystadenoma (44.6%) and the most common malignant was serous cystadenocarcinoma (33.3%). The most common ovarian neoplasm below the age of 20 years was surface epithelial tumors (n=24) followed by germ cell tumor (16 cases). Benign neoplasms (n=213) were more common than malignant ones (n=42) in the age group from 20-51 years. Malignant ovarian neoplasms (35 out of the 71) were more common than benign (34 cases) in the age above 52.

Conclusion: Benign ovarian neoplasms are more common than malignant ones. The most common benign ovarian neoplasm is serous cystadenoma and the commonest malignant neoplasm is serous cystadenocarcinoma. The prevalence of malignant ovarian neoplasms increases with increasing age.

Ovarian tumors are one of the major health problems confronting the general practitioners in general and gynecologists in particular. Ovarian carcinoma represents the sixth most common female cancer, the second most common cancer of female reproductive system, and the fifth leading cause of death due to cancers in women.[1,2] In Saudi Arabia,[3] ovarian cancer ranks seventh among female population with a mean age at diagnosis of 54 years and a wide range of age distribution (5-97 years).[3] The prevalence of ovarian neoplasms and their age distribution is not well studied in Saudi Arabia and no study identifies the age distribution of such tumors. King Abdul-Aziz University Teaching Hospital (KAUH) is a tertiary care center that receives patients from all western region of Saudi Arabia. This study is carried out in order to identify the frequency of different histopathological types of ovarian neoplasms and their age distribution in the western region of Saudi Arabia and to compare the results with the international figures.

Methods. This is a retrospective case study of all cases of ovarian specimens received and reported by the Department of Pathology at King Abdul-Aziz University Hospital (KAUH), Jeddah, Kingdom of Saudi Arabia between January 1995 and December 2010.

The inclusion criteria involved all ovarian specimens received by the pathology department whether operated in the same hospital or received as a referral for pathological review from different hospitals. All cases of ovarian neoplasms were retrieved from the pathology department computerized database. The study was approved by the hospital ethical committee based on the best practice of ethics in medicine and in concordance with the principals of Helsinki declaration.

The ovarian specimens were first classified into non-neoplastic lesions (functional cysts) and ovarian neoplasms. All ovarian neoplasms were classified according to the World Health Organization classification of ovarian tumors[4] into surface epithelial, germ cell, gender cord, stromal, and metastatic tumors.

For descriptive purposes, the age of patients with ovarian neoplasms is divided into 3 age groups as follows: 0-19, 20-51, and older than 51 years. The ovarian neoplasms are classified according to the above age distribution and the number and percentage of each ovarian neoplasm in each age group was calculated.

The data collected in SPSS data collection sheet and statistical analysis was carried out using SPSS version 16. No statistical tests were used, only frequencies were calculated.

Results. Six hundred and eighteen ovarian specimens were retrieved from the computerized database of pathology department, from January 1995 to December 2010. Out of these, 236 (38.2%) were non-neoplastic functional cysts and these were excluded from further analysis while the 382 (61.8%) were ovarian neoplasms. Of all ovarian neoplasms, 278 (72.8%) were benign, 20 (5.2%) were borderline and 84 (22%) were malignant ovarian neoplasms. Surface epithelial tumors were the most common ovarian neoplasm (n=233, 61%) followed by germ cell tumors (n=107, 28%), gender cord stromal tumors (n=29, 7.6%) and metastatic tumors (n=13, 3.4%) (**Table 1**).

Out of the 278 benign ovarian neoplasms, the most common was benign surface epithelial neoplasms including serous and mucinous cystadenoma (n=162, 58.2%) followed by germ cell tumors in the form of mature cystic teratomas (n=94, 33.8 %), finally sex cord stromal tumors including fibromas and Sertoli Leydig cell tumor (n=22; 7.9%) (**Table 2**).

Twenty borderline epithelial ovarian neoplasms were identified 12 of which were of serous and 8 of mucinous type. Out of the 84 cases of malignant ovarian neoplasms, 51 (60.7%) were malignant surface epithelium, 13

Table 1 - Frequency of various ovarian neoplasms in different age groups in the Department of Pathology at King Abdul-Aziz University Hospital, Jeddah, Kingdom of Saudi Arabia.

Age (years)	Surface epithelial tumors	Germ cell tumors	Sex cord /stromal tumors	Metastatic tumors	Total	
0-19	24	16	1	0	41	(10.7)
20-51	160	86	15	9	270	(70.7)
>51	49	5	13	4	71	(18.6)
Total (%)	233 (61.0)	107 (28.0)	29 (7.6)	13 (3.4)	382	(100.0)

Table 2 - Frequency of benign ovarian neoplasms in different age groups in the Department of Pathology at King Abdul-Aziz University Hospital, Jeddah, Kingdom of Saudi Arabia.

Diagnosis	0-19	20-51	>51	Total	
Mature cystic teratoma	9	81	4	94	(33.8)
Mucinous cystadenoma	5	28	5	38	(13.6)
Serous cystadenoma	16	92	16	124	(44.6)
Fibroma	0	10	8	18	(6.47)
Sertoli-Leydig cell tumor	1	2	1	4	(1.43)
Total (%)	31 (11.6)	213 (76.6)	34 (12.2)	278	(100.0)

Table 3 - Frequency of malignant ovarian neoplasms in different age groups in the Department of Pathology at King Abdul-Aziz University Hospital, Jeddah, Kingdom of Saudi Arabia.

Diagnosis	Age distribution			Total	
	0-20	20-51	>51		
Serous cystadenocarcinoma	0	13	15	28	(33.3)
Mucinous cystadenocarcinoma	0	8	5	13	(15.4)
Malignant Brenner tumor	0	3	2	5	(5.9)
Mixed mulerian tumors	0	1	4	5	(5.9)
Dysgerminoma	3	1	0	4	(4.76)
Immature malignant teratoma	0	2	0	2	(2.38)
Yolk sac tumor	3	0	1	4	(4.76)
Mixed germ cell tumor	1	2	0	3	(3.57)
Granulosa cell tumor	0	3	4	7	(8.33)
Metastatic carcinoma	0	9	4	13	(15.5)
Total	7 (8.3)	42 (50)	35 (41.6)	84	(100.0)

(15.5%) were metastatic carcinoma. Thirteen cases (15.5%) were malignant germ cell tumor and 7 cases (8.3%) were gender cord stromal tumor (**Table 3**).

The surface epithelial tumors constituted 233 (61%) of all ovarian neoplastic lesions. 162 (69.5%) out of these cases were benign, 20 (8.6%) borderline, and 51 (21.9%) were malignant. The most common surface epithelial tumor was of the serous type forming (n=164; 70.4%) of all surface epithelial ovarian neoplasms while the mucinous type formed (n=59; 25.3%). Out of all serous tumors, n=124(75.6%) were benign serous tumors, 12 (7.3%) borderline, and 28 (17.1%) malignant. On the other hand, 38 (64.4%) mucinous tumor were benign, 8 (13.6%) borderline, and 13 (22%) malignant. The germ cell tumors formed 107 cases (28%) of all ovarian neoplasms. Benign germ cell tumors in the form of mature cystic teratomas constituted 94 (88%) cases while malignant germ cell tumors in the form of immature teratoma, dysgerminoma, yolk sack tumor, and mixed germ cell tumor constituted 13 (12%) cases. A total of 29 gender cord stromal tumors (7.6%) were identified, 22 of which were benign and 7 malignant. When ovarian tumors were analyzed according to the 3 selected age groups, 41 out of the 382 ovarian tumors were identified in the age below 20 years. The most common ovarian neoplasm below the age of 20 was surface epithelial tumors (n=24) followed by germ cell tumor (n=16). Serous cyst adenomas and mature cystic teratomas formed the 2 most common benign tumors in this age group with 16 cases and 9 cases. All malignant neoplasms (n=7) in this age group were germ cell type. The malignant germ cells tumors were as follows: 3 dysgerminoma, 3 yolk sac tumor, and one mixed germ cell tumor. In the age group from 20-51 years, 270

ovarian neoplasms were identified. Benign neoplasms (n=213) were more common than malignant (n=42) in this age group. The most common benign ovarian neoplasm in this age group was serous cystadenoma (n=92) and the most common malignant neoplasms was serous cystadenocarcinoma (n=13). Malignant ovarian neoplasm constituted 35 out of the 71 ovarian neoplasms in the age above 51 years, been slightly more common than their benign counterparts (34 cases). Two cases of borderline ovarian tumors were identified in this age group. The most common benign ovarian neoplasm in this age was benign serous cystadenoma (16 cases) and the most malignant ovarian neoplasm was serous cystadenocarcinoma (15 cases). Calculating the age specific prevalence for ovarian malignancies among all ovarian neoplasms in different age groups showed that the prevalence of ovarian malignancy in the age group above 51 was 49.3% (35/71). In the age group between 20-51 years was 15.6% (42/270) and in the age group 0-19 years was 17.1% (7/41).

Discussion. The current study reveals that 72.8% of all ovarian neoplasms are benign while only 22% are malignant. This finding concurs with data from western countries[2,4] where 75-80% of ovarian neoplasms are benign and 20-25% are malignant. Similar figures are reported by authors from several Asian countries such as India, Pakistan, and Malaysia[5-10] while other authors from the same countries had some slightly different figures.[11,12] In the present study, the non-neoplastic ovarian lesions (functional cysts) comprised 38.2% while the ovarian neoplasms were 61.8%. Mansoor[13] reported in his study from the same region of Saudi Arabia that benign cystic non-neoplastic lesions comprised 47.5%, neoplastic lesions 29.7% while 22.8% had normal ovarian tissue with no pathological diagnosis. Among different histological types, the most common category of ovarian neoplasms encountered in our series was tumors of surface epithelial origin (61%) followed by germ cell tumors (28%), gender cord stromal tumors (7.6%), and finally metastatic tumors (3.4%). Studies from western countries also show that surface epithelial tumors are the most common ovarian neoplasm, but with a slightly lower percentage (55%).[2] Gupta et al[5] from India show in their study that surface epithelial tumors were the most common (48.8%) followed by germ cell tumors (23.9%), sex cord stromal tumors (8.3%) and metastatic tumors (2%). The most common benign ovarian neoplasm in this study was benign serous cystadenoma (44.6%) and the most common malignant neoplasm was serous cystadenocarcinoma (33.3%). This finding concurs with previous studies by Gupta et al[5] and Khan et al[8] shows similar findings. On the other hand, our data disagree with several studies

from within our country[13] as well as from neighboring Asian countries.[6,7,9] A study from the same region of Saudi Arabia[13] revealed that benign cystic teratoma was the most common benign tumor (35.2%) that both serous cystadenocarcinoma and metastatic carcinoma were the 2 most common malignant neoplasms (33%). Differences in the study period and variation in diagnostic criteria between different pathologists as well as different study design may explain the differences. Jha and Karki[9] study from Nepal, benign serous tumors accounted for 78.9% while 21.1% were malignant. In the same study, 77.8% of mucinous tumors were benign and 22.2% were malignant. Borderline tumors were not seen. Similar figures were seen in the west, 2 were serous tumors account for 30% of all ovarian neoplasms, 60% of these are benign, 10% are borderline and 30% are malignant. Similarly mucinous tumors accounted for 12-15% of all ovarian neoplasms. Approximately 75% of mucinous tumors are benign, 10% borderline and 15% malignant. Germ cell tumors comprised 28% of all ovarian neoplasms. This is similar to findings by Gupta et al[5] Khan et al,[8] and Tyagi et al[11] who reported germ cell tumors to be 23.9%, 21%, and 22.2% of all ovarian neoplasms. Other studies;[9,14] however, showed that germ cell tumors are more common. Similar to other studies,[2,4,9] the majority (87.8%) of ovarian germ cell tumors in the present study were mature cystic teratomas. Malignant germ cell tumors constituted 12.2% only of all germ cell tumors. Sex cord tumors constituted 6.7% and metastatic carcinomas 3.4%. This finding is similar to some studies,[2,5,8] while different from others.[9,11] Sex cord tumors accounted for only 3% of all ovarian neoplasms in the study from Nepal by Jha and Karki[9] while they constituted 21.4% in the study by Tyagi et al from India.[11] Variation in the size sample between different studies both from other developing countries and from the west may explain the difference in the incidence of different types of ovarian neoplasms. Most ovarian neoplasms occur in women of reproductive age group.[2,3] Benign ovarian neoplasms occur at any age where as malignant ovarian neoplasms are more common in elderly.[9,14-16] Koonings et al[14] found that the risk that an ovarian neoplasm was malignant increased 12 folds from ages 20-29 and 60-69 and that the overall risk that ovarian neoplasm was malignant was 13% in premenopausal and 45% in postmenopausal women. The present study show similar trend (putting in consideration the differences in age classification between the 2 studies) with prevalence of ovarian malignancy of 15.6% in the age group between 20-51 years and 49.3% in the age group above 51. In the present study, benign and borderline surface epithelial neoplasms occurred at any age, although more common in the age group from 20 years to 51 years. Malignant

surface epithelial neoplasms on the other hand were not identified in the age group below 20 years. This finding concurs with several previous studies.[9,14-16] Merino and Jaffe[15] reported that epithelial neoplasms accounts for 85% of all neoplasms above the age of 50 years and that the peak incidence of benign epithelial tumors occurs between the ages of 20-40 years. The same study revealed that young women ages 30-40 years of age are frequently affected by the tumors of borderline category which have a good prognosis. In the present study, out of the total 20 cases of borderline epithelial tumors, 2 serous and one mucinous borderline tumors were identified in the age range of 0-19 years, 8 serous and 7 mucinous borderline tumors were identified in the age group of 20-51 while 2 serous and no mucinous in the age group above of 51 years. The present study show a different pattern of distribution of ovarian neoplasms in the age group 0-19 years than the previously reported data[2,4,9,14-18] by showing that the surface epithelial neoplasms are more common than the germ cell neoplasms; however, all malignant neoplasms in this age group are of germ cell origin. Jha and Kharki[9] reported that 8 out of 11 (72.7%) ovarian tumors seen in the age group under 21 years were of the germ cell type and mature cystic teratoma accounted for 63.6% of all ovarian neoplasms in the first 2 decades of life, while malignant germ cell tumors in the same study comprised 100% of all malignancies in the same age group. This concurs with the present study were all malignant ovarian neoplasms under the age of 20 years were of the germ cell origin.

We only included patients from different nationalities and ethnic groups. Further studies concentrating on Saudi females may accurately reflect the distribution of different types of ovarian neoplasms in Saudi Arabia.

These findings may contribute significantly in the understanding of the distribution of the different ovarian neoplasms among our local population, which may lead to the development of some strategic planning to investigate the underlying causes of the most prevalent neoplasms and can create preventive and therapeutic strategies.

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Related topics

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