Evaluation of histo-pathogical patterns of ovarian masses in relation to age in Rawalpindi-Islamabad region

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Abstract

Objective: To evaluate the histopathological patterns of ovarian tumours in relation to age in Rawalpindi-Islamabad region of Pakistan.

Methods: The retrospective study was conducted at the Army Medical College, Rawalpindi, Pakistan, and comprised data related to ovarian tumour cases from 2013 to 2017). Tumour type, tumour subtype, tumour size, cancer staging and age of patients were noted from the medical records. Ovarian tumours were broadly classified in accordance with the World Health Organisation system for ovarian neoplasms.

Results: Out of 420 ovarian tumour cases, 250 (59.5%) were benign, 24 (5.7%) were borderline, and 146 (34.8%) were malignant. In terms of classification, 268 (63.8%) were surface epithelial tumours, 100 (23.8%) germ cell tumours, 29 (6.9%) sex cord stromal tumours, 12 (2.9%) metastatic tumours, n= and 11(1.2%) were miscellaneous.. Of the malignant tumours, 146(61.6%) were found in patients aged over 40 years. Serous cystadenoma was the most common 82(32.8%) benign tumour, while serous cyst-adenocarcinoma constituted the main bulk 48(32.9%) of malignant tumours.

Conclusion: The frequency of ovarian tumours was found to be quite high among women of Rawalpindi-Islamabad region.

Key Words: Ovarian tumour, Ovarian mass, Surface epithelial tumours, Germ cell tumours, Sex cord stromal tumours. (JPMA 69: 285; 2019)

Introduction

Ovarian cancer is the seventh most common cancer among women. Every year 238,719 new cases of ovarian cancer are diagnosed globally, while 151,917 women lose their lives to this deadly disease.[1] Epidemiological data from around the globe reveals that 1 in 71 women will eventually develop ovarian cancer over the course of her lifetime, while 1 in 95 will be unfortunate enough to die of the disease.[2]

The global burden of cancer, once considered largely to be a problem of the financially privileged nations, is now shifting dramatically to the developing world. Studies[1] predict that most new cases (56.8%) of cancer and associated mortality (64.9%) will occur in developing countries. In Pakistan, the incidence of malignant tumours is on rise. Ovarian cancer is found to be the fifth most common cancer (4.8%) among women of the region.[3] Furthermore, Pakistan has one of the highest mortality rates for ovarian cancer.[4]

Although the exact aetiology of ovarian cancer is unknown, various risk factors have been implicated in the development of the disease. Extensive studies have shown that genetic predisposition, number of ovulations, early menarche, genital talc usage, infertility, endometriosis, pelvic inflammatory disease, oestrogen replacement therapy, obesity and smoking are all directly related to ovarian cancer incidence. On the other hand, parity, lactation, oral contraceptive usage, intrauterine device placement, vegetable-rich diet, physical activity, non-steroidal anti-inflammatory drugs (NSAID)/aspirin/ metformin usage and procedures like oophorectomy, hysterectomy and tubal ligation are associated with a reduced risk.[5]

Unfortunately, early symptoms of ovarian cancer are minimal and non-specific. Few cases (15%) are diagnosed with localised tumour (stage 1) when the 5-year survival rate is 92%.[6] Parameters that govern the survival prognosis

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of patients with ovarian cancer include tumour stage, age, general health and post-operative residual tumour. Mucinous tumours have a significantly worse prognosis than serous papillary and endometrial cancers.[7] The current study was planned to evaluate the frequency and histopathological features of ovarian tumours in the Rawalpindi-Islamabad region of Pakistan.

Materials and Methods

The retrospective study was conducted at the Histopathology Department of Army Medical College, Rawalpindi, Pakistan, from October to December 2017, and comprised data of ovarian tumour cases from 2013 to 2017 that was retrieved non-probability purposive sampling technique from the lab archives of the department after due permission from the department head of Histopathology was taken. The data related to benign ovarian neoplasms as well as malignant ovarian tumours diagnosed on the basis of their histopathological features. Functional ovarian cysts were excluded. Tumour type, tumour subtype, tumour size, cancer staging and age of patients were noted from the medical records. Ovarian tumours were broadly classified into five major types in accordance with the World Health Organisation (WHO) system for Ovarian Neoplasms;[8] surface epithelial-stromal tumours, germ cell tumours, sex cord-stromal tumours, metastatic tumours, and miscellaneous tumours. Percentage frequency distribution, mean tumour size and mean age for each of the tumour subtype were calculated. Data analysis was done using Excel 2013.

Results

There were 420 tumours and the median age of the patients was 36 years (interquartile range [IQR]: 9 months to 80 years). Of the cases studied, 250 (59.5%) tumours were benign, 24(5.7%) were borderline and 146 (34.8%) were malignant. Benign tumours were found to be most common in the third decade of life 92(36.8). Malignant neoplasms were most common in the fifth decade of life 49(33.6%), and 90(61.6%) were seen in patients aged above 40 years. In terms of classification, there were 268(63.8%) surface epithelial-stromal tumours, 100 (23.8%) germ cell tumours, 29(6.9%) sex cord-stromal tumours, 12(2.9%) metastatic tumours, and11(2.6%) miscellaneous tumours. Tumour subtypes and their relation with age were noted (Tables 1-3).

Serous cyst-adenocarcinoma was the most common type of malignant tumours 48(32.9%). It was followed by endometrioid adenocarcinoma 20(13.7%), mucinous cyst-adenocarcinoma 15(10.3%), granulosa cell tumour 15(10.3%), metastatic tumour 12(8.2%), mixed germ cell

Table-1: Frequency distribution, mean age and mean size of surface epithelial stromal tumours.

Tumour type	Tumour subtype	Frequency distribution n (%)	Age (years) (mean ± SD)	Size (cm) (mean ± SD)
Surface Epithelial-Stromal Tumour (n=268, 63.8%)				
a. Serous	cystadenoma	82 (19.5)	38.6 ± 13.9	7.7 ± 4.6
	cyst-adenofibroma	14 (3.3)	38 ± 13.9	6.3± 4.1
	borderline	13 (3.1)	32.4± 9.2	11± 7.1
	cyst-adenocarcinoma	48 (11.4)	47.2± 11.1	6.6± 4.5
b. Mucinous	cystadenoma	59 (14)	36.5± 14.2	10± 5
	borderline	11 (2.6)	29± 5.5	14.3± 7.6
	cyst-adenocarcinoma	15 (3.6)	43.1± 13.9	8.2± 5.9
c. Endometrioid	adenocarcinoma	20 (4.8)	47.5± 12.2	5.9± 5.1
d. Transitional cell	Brenner's malignant	1 (0.2)	55	13
e. Mixed	mucinous cystadenoma with Brenner's	5 (1.2)	63.6± 10.3	7± 3.8

SD: Standard deviation

Table-2: Frequency distribution, mean age and mean size of germ cell tumours.

Tumour type	Tumour subtype	Frequency distribution n (%)	Age (years) (mean ± SD)	Size (cm) (mean ± SD)
Germ Cell Tumour (n=100, 23.8%)				
a. Teratoma	Benign	73 (17.4)	32± 13.4	8.6± 4
b. Monodermal	benign	10 (2.4)	39.7± 11	6.6± 3.6
c. Dysgerminoma	malignant	4 (1)	19.8± 10.6	19.2 ± 5.6
d. Yolk sac tumour	malignant	5 (1.2)	18.8± 6.4	16.2± 3.6
e. Mixed germ cell	malignant	8 (1.9)	35.4± 18.2	12.4± 4.4

SD: Standard deviation

Table-3: Frequency distribution, mean age and mean size of sex cord stromal, metastatic and miscellaneous tumours.

Tumour type	Tumour subtype	Frequency distribution n (%)	Age (years) (mean ± SD)	Size (cm) (mean ± SD)
Sex Cord-Stromal Tumour (n= 29, 6.9%)				
a. Granulosa Cell	malignant	15 (3.6)	46.2± 11.4	10.1± 7.1
b. fibrothecoma	malignant	3 (0.7)	23.3± 2.3	9± 7.8
	benign	5 (1.2)	47.2± 17.9	11± 7.4
c. fibroma	benign	5 (1.2)	54.4± 7	8.7± 7.1
d. sertoli-stromal cell	malignant	1 (0.2)	47	14
Metastatic Tumour (n=12, 2.9%)				
		12 (2.9)	43.2± 9	9.3± 5.8
Miscellaneous Tumours (n=11, 2.6%)				
		11 (2.6)	34.9± 13.9	10.8± 7.8

SD: Standard deviation

Table-4: International Federation of Gynaecology and Obstetrics (FIGO) classification of ovarian tumours.

FIGO stage	N (no. of cases)
Stage I	**32**
Stage IA	14
Stage IB	4
Stage IC	11
Stage II	**04**
Stage III	**14**

tumour 8(5.5%), yolk sac tumour 5(3.4%), mixed surface epithelial tumour 4(2.7%), dysgerminoma 4(2.7%), fibrothecoma 3(2.1%), transitional cell tumour 1(0.7%) and sertoli-stromal cell tumour 1(0.7%).

Serous cystadenoma topped the list of most common benign ovarian tumours 82(32.8%), benign teratomas 73(29.2%), mucinous cystadenoma 59(23.6%), serous cystadenofibroma 14(5.6%), monodermal tumour 10 (4%), fibrothecoma 5(2%), fibroma 5(2%), and cystadenoma 1(2.5%).

Dysgerminoma tumours comprised the largest malignant tumours with a mean size of 19.8± 10.6cm, while benign fibrothecomas constituted the largest benign neoplasms with a mean size of 11± 7.4 cm.

Of the 146 malignant tumours, only 50(34.2%) had been staged (Table 4).

Discussion

It is of utmost importance to make correct and efficient diagnosis of ovarian tumours in order to ascertain the nature of neoplasms as each tumour type has its own treatment regimen and prognosis. Age becomes a significant prognostic factor in patients of ovarian cancer. It has now been established that younger women have a significant survival advantage over older patients.[9] Extensive local and international studies have been carried out to evaluate the histopathological patterns of ovarian neoplasms in relation to age.

A study[10] carried out in Rawalpindi (n=2,146) demonstrated that 67% of all ovarian tumours were benign, 2.6% were borderline and 30.4% were malignant. However, the frequency of benign neoplasms (59.5%) in our study was lower, 5.7% were borderline while 34.8% of all lesions fell into the malignant category. Surface epithelial tumours (59.6%) followed by germ cell tumours (25.5%) were found to be the most common tumour types in that study[10] as was the case in our study. The study[10] also revealed serous cystadenoma to be the commonest of benign ovarian tumours (29.5%) and serous cyst-adenocarcinoma to be the commonest of malignant ones (34.4%). Our study exhibited similar findings. It[10] also showed that benign ovarian neoplasms were most common during the third decade of life (38.4% of benign lesions) while malignant were most common during the fifth decade (26.5%) which was consistent with our findings. A similar study[11] conducted at Army Medical College reported 65.35% of ovarian tumours to be benign, 4.33% borderline and 30.31% malignant.

Another study[12] in Rawalpindi (n=107) from 1980-1985 showed 27.06% of ovarian tumours to be malignant. Mucinous variety constituted the main bulk of all tumours, benign (24.29%) as well as malignant (13.08%). These findings were in contrast to our study which exhibited a higher frequency (34.8%) of malignant lesions. Also, serous variety of cystadenoma and cyst-adenocarcinoma were the commonest types of tumours in our study. These findings suggest a rise in malignant cases over the years.

Another study[13] was conducted in Lahore comprising 498 cases of ovarian tumours. Among them, 78.70% were benign and 21.29% were malignant. Thus, the incidence of malignant tumours was lower compared to our study. Benign serous cyst was the commonest benign tumour followed by mature cystic teratoma and mucinous cyst. Serous cyst-adenocarcinoma was the commonest malignant tumour followed closely by endometrioid carcinoma and granulosa cell tumour. These findings were in accordance with ours.

According to a similar study[14] conducted in Lahore, 64.57% ovarian neoplasms were benign and 35.43% (45/127) were malignant. The commonest benign tumour was dermoid cyst in contrast to our study which reported serous cystadenoma to be constituting the bulk.

The frequency of malignant ovarian tumours was reported to be 31% in Jamshoro,[15] 20.26% in Mirpurkhas[16] and 22% in Islamabad[17], and these rates were lower compared to our rate of 34.8%. However, the predominant serous nature of most common benign and malignant neoplasms remained the common finding of these studies which was consistent with ours.

A US study[18] (n=55,775) showed serous cyst-adenocarcinoma (37.7%) to be the most common of malignant ovarian tumours, followed by mucinous cyst-adenocarcinoma (12.5%) and endometrioid carcinoma

(9.6%). The mean age at the time of diagnosis among women with serous carcinoma was 59.4 years, while it was 54.7 years for mucinous carcinoma, 58.4 years for endometrioid carcinoma, 26.6 years for germ cell (malignant) tumour and 52.6 years for sex-cord stromal (malignant) tumour. This age pattern was in contrast to that observed in our study which reported malignancy at a much younger age. In our study, mean age of serous carcinoma patients at the time of diagnosis was found to be 47.2 years while it was 43.1 years for mucinous carcinoma, 47.5 years for endometrioid carcinoma, 26.8 years for germ cell (malignant) tumour and 45.4 years for sex-cord stromal (malignant) tumour. Another US study[19] reported that 75.0-80.0% of ovarian tumours were benign.

An Indian study[20] (n=100) reported that 73% of women with ovarian tumours had benign lesions while only 27% of the lesions were malignant. The occurrence of malignant neoplasms up to 40 years of age was quite low, accounting for only 25.9% of all malignant cases. It was in contrast to our study in which the frequency of ovarian malignancy among women in the same age group was high at 38.4% of all malignant cases. Also, our study reported an overall higher frequency of malignancy (34.8%).

A study[21] on 161 ovarian tumour cases, conducted in Nepal, demonstrated an even lower frequency of malignant ovarian tumours (16.1%) compared to that found by our study. Mature cystic teratoma was the commonest benign tumour (48.2%) in contrast to our study which found serous cystadenoma to be the dominant type. However, serous adenocarcinoma constituted the bulk of malignant tumours (46.2%) as was the case in our sample.

In a Nigerian study,[22] 163/203 (80.3%) of the true ovarian neoplasms were benign while malignant tumours were 40(19.7%). Tumours of germ cell origin were the commonest, accounting for 107 (52.7%) of the ovarian neoplasms seen. Mature teratoma was the commonest benign tumour, while serous cyst-adenocarcinoma (42.5%) was the commonest ovarian malignancy.

A Chinese study[23] found that median age of women at the time of diagnosis was 53, 44 and 23 years for epithelial ovarian cancer, sex-cord tumours and germ cell tumours respectively. This was similar to our findings.

Our study suggests a higher frequency of malignant ovarian tumours among women of Rawalpindi-Islamabad compared to regions of other countries. Moreover, incidence of the disease is found to be at a relatively younger age. A number of factors can be attributed to the observed trends. Increasing elderly population, adoption of sedentary lifestyle and changes in dietary habits seem to have significantly contributed to an increase in all the non-communicable diseases, including ovarian cancer. Lack of screening facilities and quality treatment further exacerbates the problem. Preventive programmes should be the top priority in a country like Pakistan.

Our study had its limitations. Being a retrospective study, it relied on administrative data that was not designed for evaluative purposes and could have been subjected to registry bias. Therefore, it is imperative to design prospective studies with larger sample sizes in order to confirm the findings.

Conclusion

The frequency of ovarian tumours was found to be quite high among the women of Rawalpindi-Islamabad region. The histopathological typing and patterns of ovarian masses were in concordance with those documented in other studies. However, the average age at diagnosis of ovarian cancer was relatively lower compared to that in other countries.

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