Ovarian tumors: a retrospective study at tertiary care cancer centre

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Abstract:

Objectives: To study epidemiology, clinical presentation, reproductive risk factors, histopathology and surgical management of ovarian tumours. **Methods:** This is a retrospective study of primary ovarian tumour cases treated in the past 2 - year at a tertiary care cancer centre of Jaipur, Rajasthan. **Results**: A total of 60 cases were studied, out of these 76.6% malignant. The mean age of cases was 53.57 years. Most of the benign tumours (66.7%) and malignant tumours (80.4%) were 71-80 and 41-70 years age group respectively. 50% of the benign tumours presented with lump and pain abdomen, while 2/3 of malignant presented with lump abdomen. 66.6% benign and 78.2% malignant tumours were in postmenopausal and 60.7% of them not had tubal ligation. About 2/3 of malignant tumours were in nullipara or with low parity (≤2). As per histopathology, a majority (78.2%) were serous tumours. Ten malignant cases that underwent neoadjuvant chemotherapy (NACT) as per protocol before surgery had a complete response (40%), partial response (50%) and poor response (10%) was seen as per RECIST 1.1 criteria. **Conclusion:** The majority of ovarian tumours occurred in the 4th to 7th decade of life. Low parity and postmenopausal status were the common risk factors. A significant difference was observed in the mean duration of surgery and mean blood loss in benign and malignant tumours.

Keywords: Ovarian tumour, benign ovarian tumour, borderline ovarian tumour, malignant ovarian tumour, NACT for ovarian carcinoma.

As per GLOBACON 2020, the incidence of ovarian cancer worldwide is 3,13,959 (6.7%) and death due to ovarian cancer is 2,07,252 (4.8%). In India, the incidence is 45,701(3.5%) and mortality being 32,077(3.8%) [1]. Incidence of ovarian carcinoma in India is estimated to rise by 55% i.e., 3,71,000 cases per year by 2035, while the death rate is expected to rise by 67% to 2,54,000. World ovarian cancer collation atlas 2018 reports that India has the world's second-highest ovarian carcinoma incidence. Pune and Delhi registries have shown the highest incidence among India. Ovarian cancer is the seventh most common cancer among women and 8th most common cause of death from cancer in women [2]. World cancer collation atlas 2020 estimated that incidence of ovarian cancer will rise to 29.4 million and death 16.4 million a year by 2040. In Asia highest mortality due to ovarian cancer in seen in India and ranked second after China in incidence, and 5-year prevalence due to ovarian cancer [3]. A study has shown the effect of life style, genetics and environment on ovarian cancer and have emphasized on the importance of OCPs, breast

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feeding and parity to minimize the disease risk [4]. The main purpose of this article is to understand the latest patterns and trends of ovarian tumours and to evaluate the risk factors in our part of the world.

Methods

This is a retrospective study of ovarian tumours diagnosed and treated at a tertiary care super speciality cancer hospital, attached to medical college, Jaipur, Rajasthan from April 2019 to April 2021. Ovarian tumour cases are mostly referred cases. The archived case records of all ovarian tumours admitted were studied in detail includes the clinical history and examination, imaging, endoscopy, biopsy, and histopathological reports. The following parameters were collected: age, date of admission, presenting complaints, status, parity, size of the tumour, stage of disease, serum tumour markers (CA-125, CA19-9 and CEA), neoadjuvant chemotherapy (NACT) protocol, date of surgery, presence of malignant ascites, peritoneal disease, lymph nodal dissection and the nodal status, pathological stage, grade of tumour, adjuvant chemotherapy, date of the last follow-up, and status at follow-up. NACT was given as per protocol [5, 6]. Chemotherapy response assessed as per RECIST criteria [7].

Statistical analysis: Data was collected from archived case records and studied in detail. Master chart was made and analysis was done using Excel. Analysis was done in the form of percentage, contingency tables and tests of significance were applied in form of chi square. All the tests were analysed at a significance level of 0.05.

Results

The age distribution of ovarian tumour cases is depicted in table 1. 66.7% of benign cases and 80.4% of malignant tumours were in the age group 71-80 years and 41-70 years age group respectively, and the difference observed was statistically insignificant. Table 2 shows the distribution of cases as per their morphology and mean age. Most of the cases studied were having either low or normal BMI, only 23.3% (14) were overweight.

Table 1: Age distribution of ovarian tumour cases

Age in years	Benign No (%)	Borderline No (%)	Malignant No (%)	Total Cases No (%)
11-20	0	0	2(3.33)	2(3.3)
21-30	0	0	0	0(0)
31-40	2(16.1)	0	2(3.33)	4(6.6)
41-50	0	2(100)	18(30)	20(30)
51-60	0	0	10(20)	10(20)
61-70	2(16.6)	0	14(30.4)	16(26.6)
71-80	8(66.4)	0	0	8(13.3)
Total	12(20)	2(3.3)	46(76.6)	60(100)
x2=4.33, df=4, df >0.05				

Table 2: Distribution of cases according to morphology and mean age

Distribution of cases	Number of cases (%)	Mean age in years
Benign	12 (20)	52.3
Borderline	2 (3.3)	58
Malignant Stage 1: Stage 2: Stage 3: Stage 4:	46 (76.6) 12(26.08) 2 (4.34) 24 (52.17) 8 (17.38)	53.9
Total	60 (100)	53.57
x^2=26.6, p= <0.001, df=2		

50% of patients with benign tumours presented with lump and pain abdomen, while 69.56% cases with malignant ovarian tumours presented with lump abdomen. Pain abdomen, the fullness of abdomen and bleeding per vagina were found only in 8.6% each. Reproductive risk factors studied in ovarian tumour cases were as per table 3.

Table 3: Reproductive risk factors in ovarian tumour cases

Groups	**Benign No. (%)**	**Borderline No. (%)**	**Malignant No. (%)**	
Age group				x^2 =0.349
Repoductive age	4(33.3)	-	10(21.8)	df=1
Postmenopausal	8(66.6)	2(100)	36(78.2)	p=>0.05
Tubal ligation				x^2=0.018
Yes	4(33.3)	-	14(30.4)	df=1
No	8(66.6)	2(100)	32(60.7)	p=>0.05
Parity				$x^{2=}$ 1.23
Nulliparity	Nil	Nil	4(8.6)	df=2
≤2	6(50)	2(100)	26(56.5)	p=>0.05
3-4	4(33.3)	-	14(30.4)	
>4	2(16.6)	-	2(4.3)	
Total	12(20)	2(3.33)	46(76.6)	60(100)

x^2 has been applied between benign and malignant cases in the various reproductive factors and the difference was found statistically insignificant.

As per comorbidities among benign cases, two (16.67%) patients had both hypertension and diabetes mellitus, while two (16.67%) had hypothyroid. Among malignant cases, four (8.6%) had hypertension and diabetes mellitus. Two (4.3%) had hypertension only and eight (16.6%) cases had hypothyroidism. In benign ovarian tumours CA-125 was raised in 60%, CA19-9 50% cases and CEA 30%, while in malignant CA 125 was raised in 47.3%, CA19-9 in 25.8%, CEA17.2%, AFP 8.6%, β- hCG 4.3%, LDH 4.3%.

Histological distribution of ovarian cases was observed as per table 4 and shows that serous are the most common histology in both benign and malignant ovarian tumour cases. In benign serous and mucinous both were 33.3% each, while in malignant main histology was serous (36/46) 78.2% out of this 94.4% (34/36) were high grade. The size of the tumour was less than 10 cm in 50% of benign cases and 65% of malignant cases. Eight ovarian tumour cases with stage 4 and were lost to follow up.

Table 4: Distribution of cases according to histopathology

Histopathology	**Benign No (%)**	**Borderline No (%)**	**Malignant No (%)**	**Total No (%)**
Serous	4(33.3)	2(100)	36(78.2)	42(70)
Mucinous	4(33.3	-	2(4.3)	6(10)
Simple cyst	2(16.7)	-	-	2(3.33)
Benign maligant neoplasm	2(16.7)	-	-	2(3.33)
Endometroid	-	-	2(4.3)	2(3.33)
Brenner	-	-	2(4.3)	2(3.33)
Poorly differentiated carcinoma of uncertain origin	-	-	2(4.3)	2(3.33)
Dysgerminoma	-	-	2(4.3)	2 (3.33)
Total	12(20)	2(3.33)	46(76.6)	60(100)

Twenty ovarian carcinoma cases received NACT as per protocol. Stage 1 and 2 (2 patient each) received 3 cycles of NACT, whereas 16 patients received 6-9 cycles in stage 3. Out of 38 malignant cases which were operated upon 78.9% (30) had omental/peritoneal metastasis. Fluid for cytology of malignant tumours cases who underwent surgery after NACT was positive for 40% (8/20) cases and 55.55 % (10/18) of operated patients who did not receive NACT respectively and the difference was statistically significant.

Surgical details of ovarian tumours are as per table 5 and the difference observed in the mean duration of surgery and mean blood loss among benign and malignant tumours was statistically significant. Eight cases who received NACT had a complete response (CRS III) (40%), 10 had a partial response (CRS II) (50%) and 2 case had a poor response (CRS I) (10%) as per RECIST 1.1 criteria. Chemotherapy response score (CRS) was partial in brenner and mucinous histology whereas in serous tumours partial response & complete response was found in 50% cases each. The mean duration of surgery and mean blood loss during surgeries of benign and malignant tumours was as per table 5 and the difference observed was statistically highly significant.

Table 5: Surgical details of the ovarian tumour cases

Surgical details	Benign N=12	Borderline N=2	Malignant N=38	Statistics
Mean duration of surgery	43 minutes SD±17.95	120 minutes	110.26 minutes SD ± 33.618	t=6.32; df=32 p<0.001
Mean blood loss	20 ml SD±22.36	30ml	54.20ml SD±27.01	t=3.09; df=23 p<0.05
Mean duration of stay (post-operatively)	5.8days SD±1.06	6 days	7.155 days SD ± 2.263	t=2.005;df=23 p=>0.05

Discussion

Ovarian cancer is emerging as one of the most common malignancies affecting women in India. Due to the asymptomatic growth of the ovarian tumour, they are usually diagnosed in the advanced stage. In the present study, majority of ovarian tumours (76.6%) were in the age group 41-70 years. Similar findings were reported by Krishnaswamy et al [8] most common age group being 40-49 years, as per Gangia et al [9] most common age group was 51-60 years. Yorito Yamomoto et al [10] reported about 58.9% in the 50-60 years group. Also, Robert L Hollis et al [11] reported a higher number of cases in the 41-82 years of age group comparable to our study.

The mean age in the present study is 53.57 years but that reported by Dhende et al [12] was 38.6 years, a reason can be fewer number cases in our study. In our study mean age for the various ovarian tumour was 52.3 years, 58 years, 53.6 years for benign, borderline and malignant tumours respectively.

In the present study, we found the majority of the malignant case (76.6%) followed by benign (20%) and borderline (3.3%) while studies by different authors Sharadha et al [13], Mondal et al [14], Ashraf et al [15] showed a majority of benign tumours as compared to malignant tumours in their studies. The reason can be ours is a tertiary cancer centre, where most of the malignant cases report.

Present study shows most of the cases in stage 3 (52.2%) similar to Krishnaswamy et al [8], Sharadha et al [13] and 71.4% (stage 3 and 4) by Sharadha et al [13]. Present study shows 16.6%, 13.3% and 3.3%, cases in stage1, stage 4 and 2 respectively. Only 3.3% cases were in stage 2. Similar to Krishnaswamy et al [8] stage 1(14.1%), stage 4 (10%) and stage 2 (7%) but study by Gangia et al [9] showed 26% (stage 2), 14% (stage 4) and 1.7 % (stage 1) and Sharadha et al [13] shows 28.6% in stage1.

In the present study, the most common presenting symptom was a lump abdomen (64.5%) while the study by Gangia et al [9] and Krishnaswamy et al [8] showed the most common symptom is pain abdomen in 53% and 69.8% respectively.

In the current study, most of the patients were in the postmenopausal period, 30% were with the history of tubal ligation and had 1-2 children, while in the study by Sharadha et al [13] most of the patients were in the reproductive age group, 80% tumours cases with tubal ligation. But low parity was associated with increased risk of ovarian cancer. Sieh W et al [16] showed that there is reduced risk of ovarian cancer in women with tubal ligation, but in our study relation between tubal ligation and ovarian tumours was not statistically significant.

In our study, most of the patients were in the postmenopausal period Sharadha et al [13] most of the patients were in the reproductive age group. In the present study, most of the patients had 1-2 children similar to as reported by Sharadha et al [13], this shows as low parity is associated with an increased risk of ovarian cancer. In our study, 30%

of ovarian tumours were sterilized in contrast to a study by Sharadha et al [13] where 80% of tumour cases were sterilized. Study by Seih W et al [16] showed that risk of ovarian cancer was reduced in women with tubal ligation. But there is no statistical significance seen in the relation between tubal ligation and ovarian neoplasm in our study.

In the present study, serous histology was the most common histology. Among benign tumours, serous cystadenoma accounted for 33.3%. Results were similar to Dhende et al [12] and Mondal et al [14]. But lower as compared to the study by Manivasakan et al [17]. The reason can be in the above 2 studies only benign ovarian tumours were considered. Among benign tumours, mucinous cystadenoma was reported in 33.3% of cases similar to study by Dhende et al [12] and higher than various other studies by Sharadha et al [13], Mondal et al [14], and Manivasakan et al [17].

Among malignant ovarian tumours, serous cystadenocarcinoma accounted for 78.25% in our study which is very high in various other studies ranging from 4.5% to 56% (Gangia et al [9], Robert L Hollis et al [11], Sharadha et al [13], Mondal et al [14] and Ashraf et al [15]). Mucinous cystadenocarcinoma accounts for 4.3% which is similar to Mondal et al [14] and Das et al [18] but low compared to various studies (Krishnaswamy et al [8], Yarito Yamoamoto et al [10], Dhende et al [12] and Sharadha et al [13]).

The limitation of our study is that it is a single centre retrospective study. Other multicentre similar studies with large numbers are further needed to know actual data.

Conclusion

Malignant ovarian tumour was almost four times of benign tumours and mostly (79.9%) diagnosed at advance stage of disease. High-grade serous cystadenocarcinoma was most common histological subtype. Low parity and postmenopausal status were the risk factors.

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