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Original Research Article

Clinico-pathological study of ovarian tumors in Goa medical college: a tertiary care centre in Goa, India

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ABSTRACT

Background: Ovarian neoplasms are a distinct entity in women health care and are increasingly contributing to morbidity and mortality among women. The burden is not only related to the increasing incidence but also to the varied pathological features depending on the tissue of origin and pathogenesis. The study was carried out to find the prevalence and determine the clinical presentation and histo-pathological distribution of ovarian neoplasms. Management options were also noted.

Methods: It is a retrospective study carried out at Goa Medical College between January 2013 to December 2015. All patients diagnosed and treated for ovarian neoplasm were included in the study. Data was tabulated using Microsoft Excel and descriptive statistical analysis was carried out using SPSS version 23.

Results: A total of 3111 patients were admitted in gynecology at Goa Medical College during the specified time period. Of these 358 cases were diagnosed with ovarian neoplasm. On histopathology 196 were benign tumors and 162 were reported to be malignant. Commonest presenting symptom was abdominal distention seen in 51.1% of the patients, pain in 44.4%, followed by dyspepsia in 26.85%. Epithelial tumors were most common (Benign - 39.3%, Malignant - 41%) followed by sex cord stromal tumors and germ cell tumors in 7.26% of cases.

Conclusions: Surface epithelial tumors were most common neoplasm. An alarming high no. of malignant tumors (45.25%) was found in present study. 44.4% tumors presented in 41-50 years age group. Presenting complaints were vague and nonspecific leading to delay in diagnosis. Histological type correlates with prognosis; therefore, preponderance of histological type will guide treatment options and patient education with respect to epidemiology.

Keywords: Benign, Germ cell, Histopathological type, Malignant, Ovarian neoplasm, Surface epithelial

INTRODUCTION

Ovary, the Female gonad is very complex in its embryology and histology. Due to complex histology, the ovarian tumors have different cell origins, complex nature and varied clinical presentation.¹ They present at any age but 90% of benign tumors are seen in childbearing age.² Benign tumors are cystic in nature and presence of solid components increases suspicion of malignancy. The potential malignant behaviour of some

ovarian tumors causes dilemma with respect to conservative/definitive surgery.

Malignant ovarian tumors comprise of 3.6% of all cancers in women. It is the seventh most common cancer among women (age standardised incidence rate being 6.1/100,000) and fifth leading cause of cancer deaths (4.3%) globally with age standardised mortality rate being 3.8/100,00.³ In developed countries, more than 90% of malignant ovarian tumors are epithelial in origin,

5%-6% of tumors constitute sex cord-stromal tumors, and 2%-3% are germ cell tumors.⁴ The common epithelial ovarian cancers (EOCs) include high-grade serous (70%), endometrioid (10%), clear cell (10%), mucinous (3%), and low-grade serous carcinomas (<5%).⁴

Ovarian tumors are not detected early as they occupy available space in pelvis and abdomen for expansion. They seek attention after achieving big size.⁵ In malignant tumors, the symptoms are vague, and therefore patients unfortunately present in late stages.⁶

The clinical presentation and imaging findings provide diagnostic clue in some cases. The laterality of the tumor also indicates their nature, as sex cord stromal tumors are usually unilateral.² The role of pathologist is important in establishing correct diagnosis and effective treatment.¹

Study of clinical presentation, histopathological pattern, management options and response not only help for prognostication, but also redefines management. With government focus on maternal and child health services, these women are usually neglected. Health seeking behaviour is also guided by social and economic factors.

Present study is undertaken to find out the prevalence, age distribution and histological pattern prevalent in our population so as to guide treatment options and provide patient education.

METHODS

This is retrospective descriptive study carried out in the Department of Obstetrics and Gynecology, Goa Medical College, A tertiary care center of state of Goa from January 2013 to December 2015. Study subjects consisted of admitted patients in gynecology ward; diagnosed as case of ovarian tumor on basis of clinical and imaging findings and confirmed by laparotomy/

laparoscopy findings and histopathology. Pelvic masses other than ovarian tumor on histopathology were excluded from the study. The clinical data specially included was physical symptoms, examination findings. Study data included age at diagnosis, obstetric history, menstrual history, personal and family history, and presenting complaints. Imaging studies included USG in all cases and CECT/MRI wherever indicated. Laparotomy/laparoscopy findings and treatment was noted. Histopathology details were noted down and classification was done according to International Classification of diseases (WHO classification 2019). Data was tabulated using microsoft excel and expressed in terms of percentage and means with standard deviation.

Approval of Institutional Ethics committee of Goa Medical College was taken.

Objectives of this study were to study the proportion of ovarian tumors. To study the distribution of ovarian neoplasms as per WHO classification. To study their age distribution. To study the clinical presentation and correlation to histopathology.

RESULTS

There were 358 cases of ovarian tumors among 3311 Gynecological admissions during three years period from January 2013 to December 2015. Thus, the proportion of ovarian tumors among all gynecological admissions was 10.8%. Among these, 196 (54.75%) were benign tumors and 162 (45.25%) cases were malignant tumors including four cases of borderline malignancy.

Histo-pathology

The surface epithelial tumors were most common (80.45%) as per WHO classification as shown in Table 1.

Table 1: Distribution of tumors on histo-pathological basis.

Histology	Benign	Malignant	Total	Total %age
Surface epithelial	141 (39.4%)	147 (41%)	288	80.45%
Sex cord stromal	34 (9.5%)	6 (1.67%)	40	11.17%
Germ cell	21 (5.86%)	5 (1.4%)	26	7.26%
Secondary	-	2	2	0.56%
Undifferentiated	-	2	2	0.56%
Total	196	162	358	100%

Table 2 shows the histopathological pattern of benign ovarian tumors. In benign tumors serous epithelial tumors were most common followed by mucinous tumors.

Table 3 shows that epithelial tumors comprised the bulk of malignant tumors (90.73%). There were 6 cases of sex cord stromal tumors, 5 cases of germ cell tumors. And 2 cases of Kruckenberg tumor.

Table 2: Distribution of benign ovarian tumours as per histo-pathology.

Histology	N=196	%
Serous tumor	95	48.47
Mucinous tumor	38	19.38
Endometrioid tumor	3	01.53
Brenner tumor (transitional cell)	3	01.53
Mixed	2	01.02
Steroid cell	2	01.02
Adeno-fibroma	18	9.19
Fibroma thecoma	14	7.14
Mature cystic teratoma	21	10.72

Table 3: Distribution of malignant ovarian tumours including borderline malignancy as per histo-pathology.

	Histology	N=162	%
Epithelial tumors	Serous tumor	121	74.69
	Mucinous tumor	11	06.79
	Endometrioid tumor	3	01.85
	Clear cell	12	07.40
Sex cord stromal tumor	Mixed mullerian tumor	1	0.6
	Granulosa cell	5	3.1
Germ cell tumors	Dysgerminoma	3	1.85
	Immature teratoma	2	1.24
Secondaries	Krukenberg	2	1.24
	Undifferentiated	2	1.24

Age

Surface epithelial benign tumors were seen at mean age of 42.06±5.8 years while malignant tumors were found at

mean age of 52.97±6.27 years. Malignant germ cell tumors were seen at mean age of 23.5±8.3 years and benign tumors at mean age of 37.3±5.3 years. Table 4 shows mean age of cases with various ovarian tumors.

Table 4: Mean age of cases with ovarian tumors.

Histology	Mean age in years		
	Benign	Borderline	Malignant
Surface epithelia	42.06±5.8	45.46±1.2	52.97±6.27
Serous	38.84±8.7	43.7	53.8±7.4
Mucinous	41.31±6.4	46.3±0.8	56.4±5.6
Endometrioid tumor	43.8±2.3	46.4	57.1±3.2
Clear cell			44.3±8.9
Brenner tumor (transitional cell)	39.75±1.3		
Mixed	46.6±0.8		
Sex cord stromal Tumor	39.59±9.9		43±2.4
Steroid cell	24.8±1.9		
Adeno-fibroma	42.8±2.7		
Fibroma thecoma	46.66±3.4		
Granulosa cell			43.1±2.6
Mixed mullerian tumor			43.6
Germ cell tumor	37.3±5.3		23.5±8.3
Mature cystic teratoma	37.3±5.3		
Dysgerminoma			26.1±9.2
Immature terator			20.9±1.3
Secondary (Krucken berg)			46.7±2.8
Undifferentiated			43.4±3.4

Table 5: Age wise distribution of ovarian tumors.

Age in years	Total no. of tumors	No. of Benign/ borderline/malignant	Histopathology	No. of Benign/ borderline/malignant	%
<20	4 (1.1%)	2/0/2	Surface epithelial	2/0/0	2
			Sex cord stromal	0	0
			Germ cell	0/0/2	2
			Secondary	0	0
			Undifferentiated	0	0
21-30	28 (7.8%)	25/0/3	Surface epithelial	13/0/0	13
			Sex cord stromal	4/0/0	4
			Germ cell	8/0/3	11 (42.3%)
			Secondary	0	0
			Undifferentiated	0	0
31-40	89 (24.8%)	76/2/11	Surface epithelial	53/2/8	63 (21.8%)
			Sex cord stromal	12/0/2	14 (35%)
			Germ cell	12/0/0	12 (46%)
			Secondary	0	
			Undifferentiated	0/0/1	

Age in years	Total no. of tumors	No. of Benign/ borderline/malignant	Histopathology	No. of Benign/ borderline/malignant	%
41-50	159 (44.4%)	88/2/69	Surface epithelial	70/2/63	135 (46.9%)
			Sex cord stromal	17/0/4	21 (52.5%)
			Germ cell	1/0/0	
			Secondary	0/0/1	
			Undifferentiated	0/0/1	
51-60	74 (20.8%)	4/0/70	Surface epithelial	3/0/68	71 (24.6%)
			Sex cord stromal	1/0/0	
			Germ cell	0	
			Secondary	0/0/1	
			Undifferentiated	0	
>60	4 (1.1%)	0/0/4	Surface epithelial	0/0/4	
			Sex cord stromal	0	
			Germ cell	0	
			Secondary	0	
			Undifferentiated	0	
Total	358	196/4/158			

Benign epithelial and sex cord stromal tumors were most common in 41-50 years while malignant epithelial tumors were seen in age group of 41-60 years. Germ cell tumors occurred in younger patients (21-40 years). The youngest patient was 16 years old, a case of endodermal sinus tumor while the 73 years old lady had serous cyst adenocarcinoma. Age wise distribution is shown in Table 5. Surface epithelial tumors were most common in all age groups. Benign surface epithelial tumors were more than malignant tumors till 40 years of age and after 40 years

malignant tumors took preponderance. Most of the sex cord stromal tumors were seen in 31-50 years of age. Malignant germ cell tumors were seen before 30 years of age while mature cystic teratoma was seen between 21-40 years and only one case was at 43 years of age.

Obstetric history

The cases had no specific relation to parity as shown in Table 6.

Table 6: Para wise distribution of ovarian tumors.

Parity	Benign	Borderline	Malignant	Total
0	56 (28.6%)		17 (10.6%)	73 (20.4%)
1	33 (16.8%)		31 (19.29%)	64 (17.9%)
2	51 (26.1%)	1 (25%)	44 (28.17%)	96 (26.8%)
3	38 (19.4%)	2 (50%)	33 (21.05%)	73 (20.4%)
4	16 (8.1%)	1 (25%)	18 (11.48%)	35 (9.7%)
>4	2 (1%)		15 (9.57%)	17 (4.8%)
Total	196 (100%)	4 (100%)	158 (100%)	358 (100%)

Table 7: Clinical presentation.

Symptom	Benign	Malignant	Total N=358*
Asymptomatic	5 (1.4%)	0	5 (1.4%)
Infertility	27 (7.54%)	0	27 (7.54%)
Pain abdomen	102 (28.5%) includes 3 cases of acute abdomen	57 (15.9%)	159 (44.4%)
Abdominal distension	92 (25.7%)	91 (25.4%)	183 (51.1%)
Amenorrhea	3 (0.83%)	0	3 (0.83%)
Abnormal uterine bleeding	16 (4.47%)	18 (5.02%)	34 (9.5%)
Dyspepsia	0	96 (26.8%)	96 (26.8%)
Loss of weight	2 (0.56%)	61 (17.0%)	63 (17.6%)
Urinary symptoms	3 (0.84%)	6 (1.68%)	9 (2.51%)
Breathlessness	6 (1.58%)	20 (5.59%)	26 (7.26%)

* Few patients had multiple symptoms therefore the total no. exceeds actual cases.

Menstrual function

90 (97%) women were regularly menstruating among benign ovarian tumors as compared to 99 (61.1%) women having malignant tumor. Six (3.06%) women were post-menopausal among benign tumors compared to 63 (38.9%) women with malignant tumor.

Clinical presentation

The clinical presentation is as shown in Table 7. The predominant symptom in benign tumors was pain abdomen (28.5%) followed by abdominal distension in 25.7% cases. Among malignant tumors dyspepsia was the predominant symptom in 26.8% followed by abdominal distension in 25.4% of all tumors. Among benign tumors serous cyst adenoma was commonest comprising of 48.47% followed by mucinous cyst adenoma (19.38%) and mature cystic teratoma (10.72%).

Laterality

Benign tumors were unilateral in 134 (68.36%) cases while malignant tumors were bilateral in 94.9% cases and unilateral only in 5.1% cases (Table 8).

Table 8: Laterality of ovarian tumors.

Laterality	Benign	Borderline	Malignant
Unilateral	134 (68.4%)	1	8 (5.1%)
Bilateral	62 (31.6%)	3	150 (94.9%)
Total	196	4	158

Table 9: Treatment options in benign tumors.

Type of Surgery	No.	%
Cystectomy	97	49.5
Ovariectomy	28	14.3
Salpingo-ovariectomy	12	6.2
Hysterectomy with ovariectomy	59	30
Total	196	100

Table 10: Treatment options in malignant tumors.

Type of treatment	No.	%
Ovariectomy	4	2.5
TAH with BSO with / without omentectomy	10	6.2
Surgery + Chemotherapy	43	26.5
NACT+surgery+chemo	61	37.7
NACT Awaiting surgery	26	16.0
Palliative Chemotherapy	18	11.1
Total	162	

Management

The treatment options were noted in both benign and malignant ovarian tumors. The treatment was

conservative in most of benign tumors as shown in Table 9.

As malignant tumors are diagnosed late, 87 cases (53.7%) cases received neo-adjuvant chemotherapy (NACT). Table 10 shows the treatment options in malignant ovarian tumors.

DISCUSSION

The proportion of ovarian tumors among gynaecological admissions in our study was 10.85 % while Yogambal et al, reported 5.4% (402/7492) cases to be of ovarian tumors among hospital admissions.² The benign tumors comprised of 54.75%, border line tumors were 1.12% and malignant tumors were 44.13%. All the studies (Table 11) reported a high proportion of benign tumors ranging from 64-90% while in our study benign tumors were 54.75%. We had a large number of malignant tumors as ours is the only tertiary hospital catering to whole of population of Goa and neighboring areas from states of Maharashtra and Karnataka.

Table 11: Incidence of benign and malignant tumors in various studies.

Study	Benign	Borderline	Malignant
Yogambal et al ²	78.6%	0.75%	20.65%
Manoja et al ¹	90%	-	10%
Shanthi V ⁷	91.67%	-	8.33%
Ameena ⁸	64.57%	-	35.43%
Amod S ⁹	75.7%	6.1%	18.2%
Swamy G ¹⁰	71.6%	3%	25.4%
Sarangan A ¹¹	89%	4%	7%
Sumaira Y ¹²	89.71%	-	10.29%
Present study	54.75%	1.12%	44.13%

The clinical presentation of the tumors was variable. Abdominal distension/mass was the commonest symptom (51.1%) among all tumor followed by pain in 44.4% cases. Manoja et al, also reported mass per abdomen to be the commonest symptom in 40.8% followed by pain abdomen in 37.5% cases. In their study menstrual abnormality was seen in 10%, GI disturbance in 6.7% and infertility in 2.5% cases. In the study by Sumaira et al and Yogambal et al, pain abdomen was the commonest symptom in 70.59% and 66.92% respectively followed by mass abdomen in 14.71% and 28.11% respectively as shown in Table 12.^{2,12}

Table 12: Clinical presentation of ovarian tumors in various studies.

Study	Mass abdomen	Pain abdomen
Manoja et al ¹	40.8%	37.5%
Sumaira et al ¹²	14.71%	70.59%
Yogambal et al ²	28.11%	66.92%
Present study	51.1%	44.4%

Table 13: Clinical presentation in benign tumors in various studies.

	Asymptomatic	Infertility	Menstrual abnormality	Pain	Mass abdomen	Loss of weight	GI symptoms	Misc.
Manoja et al ¹	-	1.8%	9.3%	38.9%	42.6%	-	7.4%	-
Shanthi V et al ⁷	-	-	13.99%	36.36%	39.16%	-	10.49%	-
Present study (N=196)	2.55%	13.8%	9.7%	52%	46.9%	1.0%	-	4.6%

Table 14: Clinical presentation in malignant tumors in various studies.

Study	Pain	Mass abdomen	Menstrual abnormality	Dyspepsia	Ascites	Loss of weight	Misc.
Manoja et al ¹	25%	25%	16.7%	-	8.3%	16.7%	8.3%
Shanthi V et al ⁷	30.77%	23.08%	23.08%	-	7.69%	15.38%	-
Present study (N=162)	35.2%	56.2%	11.1%	59.2%	16%	37.6%	16.0%

Pain in abdomen was the most common symptom in benign tumors 52% in present study while Manoja et al and Shanthi V, reported mass abdomen to be the commonest symptom in benign tumors as shown in Table 13.^{1,7}

Among malignant ovarian tumors, dyspepsia 59.2% was the most common symptom followed by mass abdomen 56.2% and pain 35.2%. There were multiple symptoms present in many patients. Manoja et al and Shanthi V et al reported pain and mass in abdomen to be the commonest presenting symptom in their study in malignant tumors of ovary as shown in Table 14.^{1,7}

Laterality

In present study benign tumors were unilateral in 68.36% cases while malignant tumors were unilateral in only 5.1% cases similar to the findings reported by Swamy G et al, where benign tumors were unilateral in 71% but 50% of malignant tumors also were unilateral.¹⁰ These findings were different from the findings of Manoja V et al, who reported unilateral benign tumors in 92.6% and 75% of malignant tumors also were unilateral as shown in Table 15.¹

Table 15: Laterality of ovarian tumors.

Study	Benign		Malignant	
	Unilateral	Bilateral	Unilateral	Bilateral
Swamy G et al ¹⁰	71%	29%	50%	50%
Manoja V et al ¹	92.6%	7.4%	75%	25%
Present study	68.36%	31.64%	5.1%	94.9%

Table 16: Histopathological pattern in various studies.

Study	Surface epithelial	Sex cord stromal	Germ cell	Metastatic	Undifferentiated/others
Yogambal et al ²	71.64%	-	-	0.75%	-
Manoja et al ¹	84.2%	4.2%	10%	0.8%	0.8%
Shanthi V et al ⁷	84.62%	3.85%	10.9%	0.64%	-
Ameena et al ⁸	52.76%	3.15%	43.31%	0.78%	-
Amod S et al ⁹	84.8%	6.1%	9.1%	-	-
Swamy G et al ¹⁰	61.6%	11.7%	21.7%	5%	-
Sumaira Y et al ¹²	76.5%	-	-	-	-
Sarangan A et al ¹¹	81%	4%	15%	0%	0%
Present study	80.45%	11.17%	7.26%	0.56%	0.56%

The exact nature of tumor cannot be confirmed by just clinical examination. Tumor markers and imaging

techniques are supportive measures in guiding the nature of tumor. The microscopic appearance is important and

further management is guided by histopathological pattern.^{1, 2} Grading of tumor is also important in further management.¹²

Among histopathological types the commonest tumor encountered in our study was epithelial tumor (80.45%) followed by sex cord stromal tumors (11.17% and germ cell tumors (7.76%). All the studies have shown

preponderance of surface epithelial tumors ranging from 61.6 to 82.8% followed by germ cell tumors. In our study sex cord stromal tumors were more than germ cell tumors. In study by Ameena et al, germ cell tumors were comparatively more constituting 43.3%.⁸ The authors contributed it to geographical variation. (Lahore) Table 16 shows the histopathological pattern of tumors in various studies.

Table 17: Proportion of tumors according to WHO classification.

Histology	Manoja V	Shanthi V	Ameena	Amod S	Swamy G	Sumaira Y	Present study
Surface epithelial	80±4.2%	-	26±26.76%	-	47.4±14%	-	39.4±41%
Serous	62.5±3.2	64.75±1.92%	15.7±11%	54.5±18.2%	40.8±6.6%	24.5%	48.47%
Mucinous	17.5±1	16.67±1.3%	10.3±7%	6.1%	6.6±4.9%	-	19.38%
Endometrioid tumor	-	-	0±5.51%	6.1%	-	28.5%	01.53%
Clear cell	-	-	1.57%	-	-	-	-
Brenner tumor (transitional cell)	-	-	0±1.57%	-	-	-	01.53%
Mixed	-	-	-	-	2.5%	-	-
Sex cord stromal tumor	0.8±3.4%	1.28±2.56%	0.8±2.35%	6.1%	-	-	9.5±1.6%
Steroid cell	-	-	0.8%	-	-	-	-
Sertoli leydig cell	0.8%	0.64%	-	-	-	-	-
Adeno-fibroma							
Fibroma thecoma	0.8%	1.28%	-	6.1%	-	-	-
Granulosa cell	1.7%	1.28%	2.27%	-	-	28.5%	-
Mixed mullerian tumor	0.8	0.64	-	-	-	-	-
Germ cell tumor	9.2±0.8	8.97±1.92	37.8±5.5	9.1%	-	-	5.86±1.4%
Mature cystic teratoma	9.2%	8.97%	37.8%	9.1%	-	18%	-
Dysgerminoma	-	1.28%	1.59%	-	-	-	-
Immature teratoma	0.8%	0.64%	1.59%	-	-	-	-
Yolk sac tumor	-	-	2.27%	-	-	-	-
Secondary (Krucken berg)	0.8%	0.64%	0.8%	-	-	-	0.56%
Undifferentiated	0.8%	-	-	-	-	-	0.56%

Table 18: Comparison of distribution of ovarian tumors in different age groups in various studies.

Age	Manoja V ¹	Shanthi V ⁷	Ameena	Sarangan A ¹¹	Present study
<20 years	11.7%	10.26%	12.21%	2%	1.1%
21-30 years	25%	25.64%	30.19%	24%	7.8%
31-40 years	29.2%	28.85%	22.64%	29%	24.8%
41-50 years	18.3%	18.59%	18.40%	27%	44.4%
51-60 years	9.2%	9.62%	10.38%	13%	20.8%
>60 years	6.6%	7.0%	5.18%	5%	1.1%

When the tumors were categorised according to WHO subtypes, serous epithelial tumors were more common in both benign and malignant category followed by mucinous tumors as shown in Table 17.

Age

The mean age in benign epithelial tumors in present study was 42.06±5.8 years while malignant tumors presented at mean age of 52.97±6.27 years. Deeba et al reported mean

age as 40.6±12.5 years in ovarian cancer cases while in study by Ameena A et al mean age at presentation of ovarian tumors was 35.6 years. Shanthi V, reported preponderance of benign tumors in 21-50 years similar to present study and malignant tumors were more common after 40 years.⁷ The age comparison of ovarian tumors in various studies is as shown in Table 18. All studies show similar pattern of occurrence of ovarian tumors that is preponderance in 21-50 years of age.

CONCLUSION

It is concluded from this study that the tumors originating from surface epithelium are the commonest variant. Germ cell tumours and sex cord stromal tumors were next to epithelial ovarian tumours. Majority of them were benign. Amongst malignant ovarian tumours late reporting is common and patients usually present in advanced stages of the disease. Commonest clinical presentation was mass abdomen and pain abdomen. Though the imaging technique and clinical examination help in detecting ovarian tumors, histopathological examination is the gold standard to determine the type of the ovarian tumor and its histogenesis which affects the treatment and prognosis of the tumor.

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