Original Article

DOI: 10.21276/APALM.1657

Analysis of Distribution and Patterns of Ovarian Lesions at a Tertiary Care Hospital

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ABSTRACT

Background: Ovarian lesions manifest in a wide spectrum of clinical, morphological and histological features. The aim of this study was to analyze the distribution and patterns of these lesions at a tertiary care hospital.

Methods: Retreivement and collection of the data was done along with demographic data including age, sex, Ultrasonography/Computed Tomography findings. The diagnosis was confirmed by histopathological examination. Correlation of histopathological patterns was done with age, bilaterality, type, size & morphology of the lesion.

Results: Follicular cyst was the commonest non-neoplastic lesion of the ovary. Surface epithelial tumor was the commonest tumor according to the histogenesis followed by germ cell tumor. Among the malignant surface epithelial tumors, commonest type was serous cystadenocarcinoma followed by endometroid carcinoma. Serous cyst adenoma was the commonest tumor in benign category. In germ cell tumors category, benign mature teratomas constituted highest numbers (15 cases). Six cases of sex cord stromal tumor and 2 cases of metastatic tumors were also detected in the study.

Conclusions: It is concluded from this study that benign ovarian tumors were more common than malignant ones across all age groups. Though a majority of the tumors were benign, more numbers of malignant tumours were observed in our study as compared to those by other authors, which is an alarming finding. As most of the malignant ovarian tumors present late, development of methods for early diagnosis & regular screening is a pressing need today.

Keywords: *Ovarian Lesions, Distribution, Benign, Malignant.*

Introduction

Ovary is the commonest site of non-neoplastic & neoplastic lesions, both present a great challenge. Certain non-neoplastic lesions of the ovary frequently form a pelvic mass and potentially mimic an ovarian neoplasm. Their proper recognition and classification is therefore important to allow appropriate therapy & for prognosis.[1] The ovary contains four major types of tissue, all of which can give rise to a variety of neoplasms, often combined: Surface epithelium, germ cells, sex cords and ovarian stroma.[2]

Ovarian tumours represent about 30% of all cancers of the female genital system. Indian trend analysis reveals a steady increase in the age-standardized incidence rate of ovarian cancer, ranging from 0.26% to 2.44% per year in different area registries.[3] National Cancer Registry data project ovary as an important site of cancer in women, comprising up to 5.34% of cancers in Ahmedabad urban.[4]

Ovarian Cancer is the most lethal gynecologic tumor, notorious for being diagnosed in late stages. Morbidity and mortality due to ovarian cancer have changed very little over the past 5 decades, despite extensive research efforts, identification of risk factors, chemotherapy and cytoreductive surgery. The reason for this dismal outcome is the fact that the vast majority of ovarian cancer cases (about 80%) are diagnosed in advanced stages of the disease, when the tumor is spread beyond the ovary. This is due to the lack of early specific symptoms (a notion recently challenged) and the absence of reliably sensitive and specific tumor markers. Anatomic characteristics of the ovaries such as their “hidden” location and paucity of sensorial nerves (early tumors are painless and clinically mute) preclude early diagnosis in most cases despite the current sophisticated technologies of pelvic visualization.[5]

The results of the study done by Lorena Dijmarescu and colab show that preoperative accurate diagnosis in ovarian tumors is difficult, which is uncorrelated with histopathological results. It is difficult to establish reproducible ultrasound features of these tumors; therefore the recommendation for histopathological examination for a suspected ovarian masses remains valid. [6] Identification of various histologic patterns of ovarian tumours is important for diagnosis

as well as prognosis. [7]In the era of personalized cancer medicine, reproducible histopathological diagnosis of tumor cell type is a sine qua non condition for successful treatment & it has been found that different tumor types respond differently to chemotherapy. [8] Peak incidence of invasive epithelial ovarian cancer is at 50-60yr of age. About 30% of ovarian neoplasms in postmenopausal women are malignant, whereas only about 7% of ovarian epithelial tumours in the premenopausal patient are frankly malignant. [9]

The etiology of ovarian cancers is poorly understood. Previous epidemiological studies have focused on etiology of epithelial tumours and found advanced age, nulliparity and a family history of ovarian cancer to be consistently associated with an increased risk while number of pregnancies, oral contraceptive use and history of hysterectomy or tubal ligation has been found to be associated with a decreased risk. On the other hand, few studies have focused on aetiology of non-epithelial ovarian tumours. It has been observed that an elevated risk of germ cell ovarian cancer occur among girls and young women, the mothers of whom were under 20 years of age at time of pregnancy, had used exogenous hormones during the pregnancy or had a high pre-pregnancy body mass whereas history of oral contraceptives use or oestrogen replacement therapy was associated with a decreased risk of developing sex cord-stromal ovarian tumors. [10, 11]

Material & Methods

This prospective & retrospective study was approved by the institutional review board and included 184 cases of ovarian lesions studied over a period of 5 years (from January 2011 to December 2016) at department of pathology, Gujarat Cancer Society Medical College Hospital & Research Center, Ahmedabad. All the patients who had ovarian lesions larger than 3.0cm in size diagnosed on ultrasonography and planned for surgery were included in the study. The patients with ovarian tumours who didn't undergo surgery or treated conservatively were excluded from the study. Retreivement and collection of the data were done along with demographic data including age, sex, USG/CT findings and histological findings. Correlation of histopathological patterns was done with age, bilaterality, type, size & morphology of the lesion. The World Health Organization classification of ovarian tumours (2014) was used for classifying tumours. [12] This study was undertaken to ascertain the distribution and pattern of neoplastic lesions of the ovary in this part of the country.

Results

Among 184 cases studied during study period, 51 were non-neoplastic and remaining 133 were neoplastic .Most of the non-neoplastic lesions of ovary were incidental findings. The most common non-neoplastic lesion found was follicular cyst (58.82%) [Table-1 & Graph-1].

Among the 133 neoplastic ovarian lesions 91(68.4%) cases were benign, 1(0.8%) case was borderline and 41(30.8%) cases were malignant [Table-2]. Most common histologic type was serous epithelial tumours 105 cases (78.95%) followed by germ cell tumours 20 cases (15.04%). 6 cases (4.51%) of sex cord stromal tumors & 2 cases (1.5%) of metastatic tumours were also noted [Table-1].

Out of 91 benign ovarian neoplasms, most common seen lesion was serous cystadenoma followed by mucinous cystadenoma and benign mature teratomas. Out of 41 malignant cases, maximum number of cases were of serous cystadenocarcinoma [Fig.1, 2 & 3]. The borderline tumour belonged to the mucinous group [Table-3].

When surface epithelial tumors(105) were evaluated for distribution, most of the serous tumors were benign (48) but good number of malignant variant were also seen (28), while in mucinous tumours majority cases were benign(19/21) [Table-4].In germ cell tumours, a majority (15/ 20) were benign mature teratomas [Table-3].

Most of the non-neoplastic and benign neoplastic lesions were observed in the age group of 20-40yr & >40yr, while most of the malignant neoplastic lesions were common in elderly (>40yr) age group. In our study, most frequently involved age group for malignant neoplasm was 41-50yrs [Table-2].

In the present study only 12 patients had bilateral ovarian lesions, while majority were unilateral. Majority lesions were between sizes of 5 to10cm. On gross examination, 61(46.21%) cases were cystic, 28(21.05%) cases were solid & 44(33.08%) cases were partly solid and partly cystic.

Table 1: Distribution of ovarian lesions.

TYPE	No. of cases (%)	TYPE	No. of cases (%)
Non-neoplastic lesions		**Neoplastic lesions**	
Follicular cyst	**30(58.82%)**	Surface epithelial tumours	**105(78.95%)**
Corpus luteal cyst	**10(19.61%)**	Germ cell tumors	**20(15.04%)**
Endometriotic cyst	**7(13.73%)**	Sex cord stromal tumours	**6(4.51%)**

TYPE	No. of cases (%)	TYPE	No. of cases (%)
Non-neoplastic lesions		**Neoplastic lesions**	
Endometriosis	**1(1.96%)**	Metastatic tumours	**2(1.5%)**
Inflammatory lesions	**2(3.92%)**		
Ectopic gestation	**1(1.96%)**		
Total no. of cases	**51(27.72%)**		**133(72.28%)**

Table 2: Distribution of ovarian lesions in different age groups.

TYPE	0-20 years	20-40 years	>40 years	TOTAL
• **Non-neoplastic lesions**	4	25	22	51
• **Neoplastic lesions**				
• **Benign lesions**	4	42	45	91(68.4%
• **Borderline lesion**	0	1	0	1(0.8%)
• **Malignant lesions**	2	7	32	41(30.8%)

Table 3: Distribution of ovarian neoplasms according to histological type.

BENIGN NEOPLASTIC LESIONS		MALIGNANT LESIONS	
TYPE	**No. of cases**	**TYPE**	**No. of cases**
Serous cystadenoma	45	Yolk sac tumour	2
serous cystadenoma with struma ovarii	1	Dysgerminoma	1
Serous cystadenofibroma	3	Serous cystadenocarcinoma	27
Mucinous cystadenoma	17	Mucinous cystadenocarcinoma	1
Mucinous cystadenoma with benign mature teratoma	1	Endometroid carcinoma	5
		Malignant Brenner tumour	1
Mucinous cystadenofibroma	1	Granulosa cell tumour	1
Brenner tumour	1	Undifferentiated carcinoma	1
Benign mature teratoma	15	Metastatic tumour	2
Dermoid cyst	2	**Total**	**41**
Fibrothecoma	2	**BORDERLINE LESIONS**	
Fibroma	2	Mucinous tumor	1
Ovarian leiomyoma	1		
Total	**91**		

Table 4: Distribution of surface epithelial tumours.

Type	No. of cases	%
Serous tumours		
Benign	48	45.71
Borderline	0	0.00
Malignant	28	26.67
Mucinous tumours		
Benign	19	18.10
Borderline	1	0.95

Type	No. of cases	%
Malignant	1	0.95
Endometroid carcinoma	5	4.76
Brenner tumour		
Benign	1	0.95
Malignant	1	0.95
Undifferentiated carcinoma	1	0.95
Total	**105**	

Table 5: Comparison of patterns of non-neoplastic ovarian lesions

Study	Follicular cyst
Kreuzer G F et al[14]	55%
Martinez-Onsurbe P et al[15]	55%
Present study	58.82%

Table 6: Comparison of distribution of ovarian lesions.

Study	Non-neoplastic lesions	Neoplastic lesions
Kreuzer G F et al[14]	40.39%	59.61%
Martinez-Onsurbe P et al[15]	41.67%	58.33%
Kanthikar S N et al[16]	51.72%	48.28%
Abdullah & Bondagji[17]	38.20%	61.80%
Present study	27.72%	72.28%

Table 7: Comparison of distribution of benign, malignant and borderline ovarian neoplasms

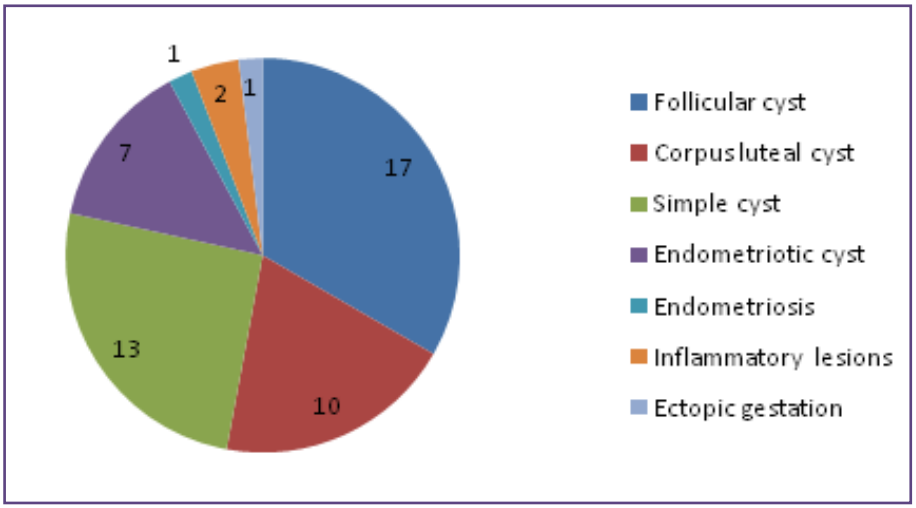
Study	Period	Region	CATEGORY	
			BENIGN	MALIGNANT
Gupta et al[1]	2007	Meerut	72.90%	22.90%
Ahmad et al[18]	2000	Pakistan	59.18%	40.81%
Swamy & Satyanarayan[19]	2010	Arunachal Pradesh	71.60%	25.10%
Sharma et al[20]	2011-2012	Gauhati	78.40%	20.60%
Modi et al[21]	2012-2013	Ahmedabad	84.53%	13.40%
Present study	2011-2016	Ahmedabad	68.40%	30.80%

Table 8: Comparison of patterns of ovarian tumors.

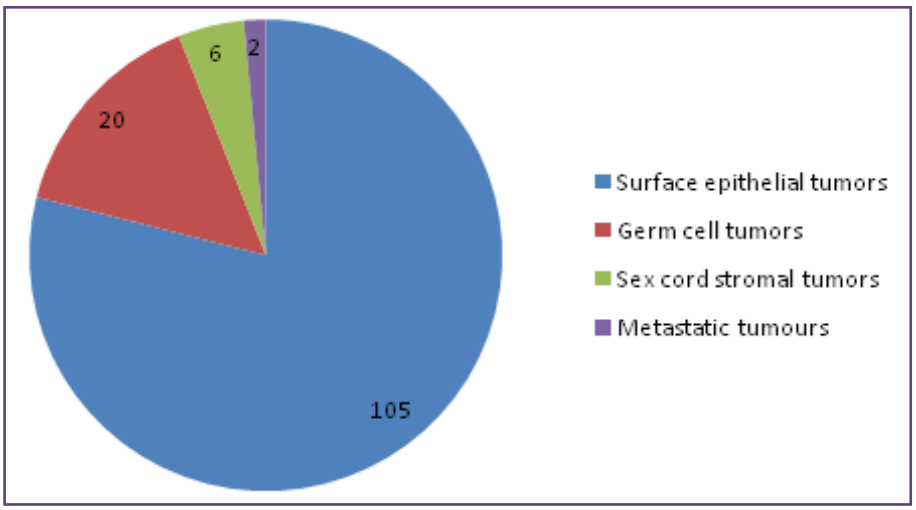
OVARIAN TUMOURS	Gupta et al[1]	Kanthikar S.N. et al[16]	Modi et al[21]	Present study
Surface epithelial tumors	65.60%	67.14%	76.30%	78.95%
Germ cell tumors	23.90%	22.85%	17.60%	15.04%
Sex cord stromal tumors	8.30%	5.71%	6.10%	4.51%
Metastatic tumors	2.00%	4.28%	0%	1.50%

Table 9: Comparison of consistency of neoplastic ovarian lesions

	Benign (%)			Malignant (%)	
Study	Cystic	Partly Cystic/Solid	Solid	Partly Cystic/Solid	Solid
Gupta et al[1]	76.2	21.50	2.4	44.10	49.2
Kanthikar S N et al[16]	66.67	28.88	13.3	55.00	42.85
Present study	65.93	26.37	7.69	48.78	51.22



Graph- 1: Distribution of ovarian non-neoplastic lesions according to histological type.



Graph - 2: Distribution of ovarian neoplasms according to histological type.

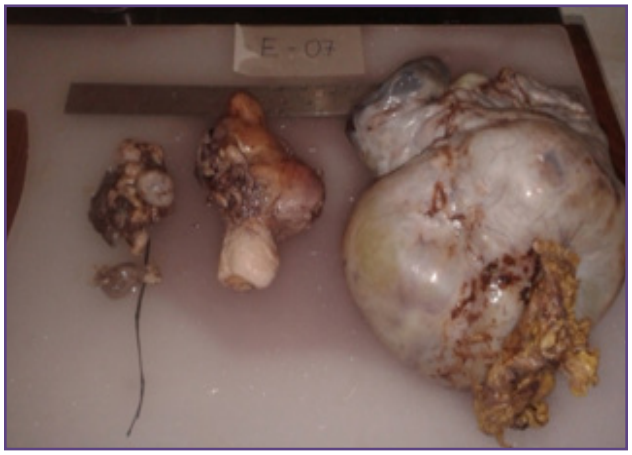


Fig. 1: Photograph showing uterus, cervix and bilateral ovarian tumour.

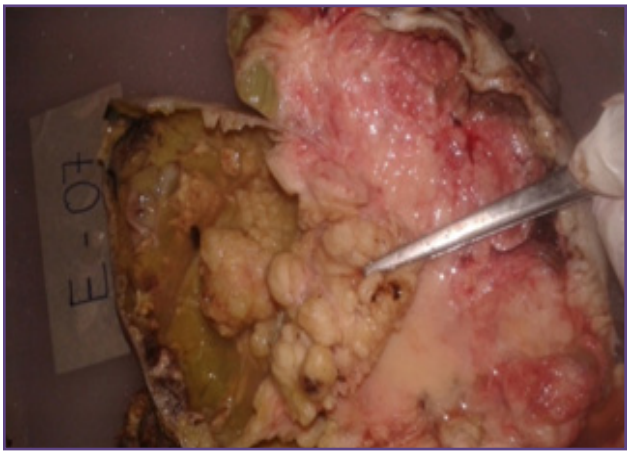


Fig. 2: Cut surface of ovarian tumour showing papillary projections.

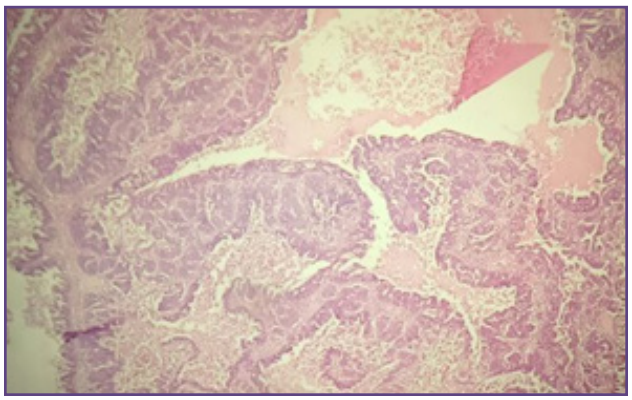


Fig. 3: (A) Photomicrograph showing well-defined papillae formation(H & E , x40).

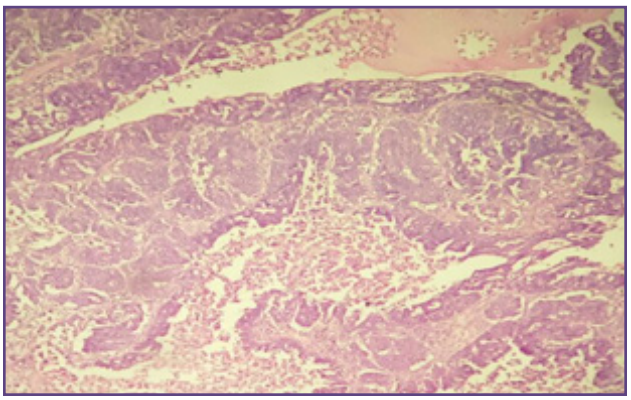


Fig. 3: (B) Photomicrograph showing papillae lined by multilayered malignant cells(H & E ,x100).

Discussion

Ovarian tumours may remain unnoticed for a long period of time because of their anatomical location and vague symptoms. The exact nature of the ovarian tumour cannot be confirmed preoperatively just by clinical examination. USG has demonstrated usefulness in the detection of ovarian cancer in asymptomatic women, but its value for the detection of early stage epithelial ovarian cancer in women of increased risk is uncertain. [13] The microscopic appearance of the tumour is a must to find the histopathological pattern upon which further management rests.

Amongst 184 cases studied, 51(27.72%) were non-neoplastic and remaining 133(72.28%) were neoplastic. Amongst non-neoplastic lesions 58.82% cases were of follicular cyst which is in concordance with Kreuzer G F et al [14] & Martinez-Onsurbe P et al.[15] [Table-5]

When distribution of ovarian lesions is compared with other studies, present study shows higher distribution of neoplastic lesions [Table-6]. [14-17] Also malignant tumours were higher than other studies as compared to benign tumours. Number of borderline tumors were similar to other studies [Table-7]. [1,18-21] Our hospital is a tertiary care and trust based hospital where patients are referred from the adjoining and far flung areas and variety of gynaecological diseases including neoplastic lesions are frequently seen.

It is globally seen that, surface epithelial tumours are the most common ones [7] This study is also in favor of similar observation and histomorphologically it is followed by germ cell tumors, sex cord stromal tumors & metastatic tumours. Similar patterns were seen in other studies [Table-8]. [1,16, 21]

In this study, similar numbers of benign tumours were found in the reproductive age group (20-40years) as well as in the perimenopausal group (41-60 years). However most of the malignant ovarian tumors were in the older group (41-70years) with maximum patients between 41-50 years. The single borderline tumour was present in the younger group (20-40 years). These observations were in concordance to Vinitha Wills & Rachel Mathew [22] and Manivasakam J & Arounssalame B. [23] In general, patients with borderline ovarian tumours are younger than those with invasive carcinoma. [24] In present study, most of the ovarian lesions were unilateral. Similar finding was observed by Vinitha Wills & Rachel Mathew [22] & Kanthikar et al .[16]

Grossly, it was found in our study that benign tumours were cystic as compared to malignant, which were solid in consistency followed by partly cystic and partly solid which were mostly in malignant tumour which is in accordance with other studies [Table-9]. [1, 16]

Conclusion

Ovarian cancers are called “silent killer”& in most of the primary ovarian lesions they remain asymptomatic until the advanced stage. Ovarian cancer has emerged as one of the commonest malignancy affecting women in India. Benign ovarian neoplasms were seen similarly in both reproductive and postmenopausal age groups. Malignant tumors were mostly in the postmenopausal group. Based on histopathology, most common neoplasm was surface epithelial tumors - serous tumors, then mucinous and germ cell tumors. Most common non-neoplastic lesion was follicular cyst. Though a majority of the tumours were benign, alarmingly, this study showed an increased distribution of ovarian malignancy as compared to other authors, which suggests that more research into region-specific risk factors is required. In India, absolute number of new cancer patients are increasing rapidly due to an increase in the size of the population, awareness of the diseases as well as an increase in the proportion of elderly persons due to improved life expectancy. So development

of methods for early diagnosis and screening is a pressing need today. Histomorphological study of ovarian lesions is still a gold standard method for and these observations and results prove to be valuable baseline information regarding distribution and pattern of ovarian lesions.

Acknowledgements

We thank the authorities of the GCSMC, Hospital & Research Centre especially Dr S. M. Patel, Professor and head Department of Pathology. We also thank all the histopathology staff of GCS Hospital, for their support for present study.

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Financial or other Competing Interests: None.