Original Article

Morphological Spectrum of Ovarian Tumors in Kumaon Region of Uttarakhand – An Institutional Based Study

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Abstract
Background: *Ovary is a paired organ located in pelvic cavity of women. Despite being small in size, ovary is an organ that requires the attention of several specialties like gynaecology, endocrinology and pathology. It is the common site for neoplastic and non-neoplastic lesions. That is why ovary constitutes a major health concerns for women all over the world.*
Aims: *To study histomorphological spectrum of ovarian tumors in a tertiary care centre of kumaon region of uttarakhand.*
Settings and Design: *Cross sectional study.*
Material and Methods: *This is one year study of 54 cases of ovarian tumors, submitted for histopathological examination in the department of pathology, GMC Haldwani. Clinical history and examination were recorded and histopathological evaluation of specimen was done. Ovarian tumors were classified according to WHO Classification 2016.*
Results: *Out of total 54 ovarian tumors studied, 40 (74.1%) cases were of benign tumors and 13 (24.1%) were of malignant tumors. There was only 1(1.8%) case of borderline tumor. Among total 54 tumors, 35 (64.8%) were epithelial, 18 (33.3%) were germ cell and 1 (1.8%) was sex-cord stromal tumor. Age of presentation ranged from 12 to 80 years. Pain in lower abdomen was the commonest presentation.*
Conclusions: *This study will provide histomorphological spectrum of ovarian tumors in this region which will help in proper management and prognosis of the patients.*
Keywords: *Ovarian tumors, epithelial tumors, germ cell tumors, sex cord stromal tumors*

Introduction

Ovarian tumors constitute major health problem for women. Ovaries are relatively inaccessible for clinical examination and there is no effective screening test for ovarian tumors, this is the reason they often present in advanced stages with minimal and non specific symptoms, making it difficult to detect cancer in early stage. This leads

to delay in diagnosis which is responsible for overall low survival in cases with ovarian malignancy. Women who are diagnosed at an early stage have a good prognosis. However, majority of tumors are diagnosed when they have metastasized to distant sites, and their prognosis is very poor.[1]

The cause for ovarian neoplasms in majority of cases is largely unknown. Majority are cryptogenic. However there are certain risk factors identified such as positive family history, nulliparity, not using oral contraceptives, obesity, increasing age. BRCA1 and BRCA2 mutations are also implicated in certain cases. Unmarried women as well as married women with low parity are also at increased risk.[2]

Various ovarian neoplasms are different with regards to incidence, clinical course and prognosis. Exact nature of the neoplasm cannot be ascertained preoperatively just by clinical examination and even on exploration. So histopathologic characterisation is the key for further management of the ovarian neoplasm.[3] Thus there is a need for the knowledge of different morphological patterns of ovarian tumors. Besides, determination of various histologic patterns is very important to decide prognosis which also depends upon the degree of differentiation of these tumors.

Materials and Methods

This is a cross sectional study of 54 cases of ovarian tumors, submitted for histopathological examination in the Department of Pathology, Government Medical College and associated Dr. Sushila Tiwari Government Hospital Haldwani, which is the sole tertiary care center in Kumaon region of Uttarakhand. The study was conducted from July 2016 to July 2017. The relevant clinical history, socio-demographic profile, laboratory investigations and findings of radiological studies conducted were recorded on a proforma.

The excised specimens were fixed in 10% neutral buffered formalin, processed using automatic tissue processor and embedded in paraffin. Tissue sections of 3-5 microns thick were cut, number of sections were decided on the basis of size of tumor and gross appearance of cut section of tumor. Staining was done by hematoxylin and eosin in all cases and special stains were done wherever necessary. The histopathological diagnosis was made and tumors were classified according to latest WHO classification 2016**.**

Results

Total number of cases studied were 54 out of which 40 (74.1%) were benign, 13 (24.1%) were malignant and 1 (1.8%) was of borderline tumor. Maximum 40 (74.1%) ovarian tumors were noted in 21-50 years age group. The age of presentation ranged from 12 to 80 years. Out of total 40 benign tumors maximum 35(64.8%) are in the age group of 21-50 years. Out of total 13 malignant tumors maximum 11 (20.4%) cases are in the age group 41-70 years. Besides there was only one borderline tumor in a 20 years old patient. (Table.1)

Table. 1: Age wise distribution of ovarian tumors (n=54)

Age (years)	No. of cases of benign tumors(n=40)	No. of cases of malignant tumors(n=13)	No. of cases of borderline tumors(n=1)
0-10	0(0%)	0(0%)	0(0%)
11-20	1(1.8%)	1(1.8%)	1(1.8%)
21-30	12(22.2%)	1(1.8%)	0(0%)
31-40	7(12.9%)	0(0%)	0(0%)
41-50	16(29.6%)	4(7.4%)	0(0%)
51-60	2(3.7%)	1(1.8%)	0(0%)
61-70	1(1.8%)	6(11.1%)	0(0%)
71-80	1(1.8%)	0(0%)	0(0%)
Total	**40**	**13**	**1**

Pain abdomen was the most common clinical presentation (100%) followed by menstrual irregularities (61.1%) (Table. 2)

Table. 2: Distribution of clinical features

Clinical features	No. of Cases	Percentage (%)
Pain in lower abdomen	54	100
Lump in lower abdomen	9	16.7
Menstrual irregularity	33	61.1
Urinary symptoms	10	18.5
Ascites	8	14.8
Pleural effusion	2	3.7

The largest tumor in the present study measured 27.0x21.5x11.0 cms and smallest 2.0x2.0x1.0 cms. Out of total 54 ovarian tumors 52 (96.3%) were unilateral and 2 (3.7%) bilateral.(Table.3) Among two bilateral tumors one was benign mucinous cystadenoma and the other was malignant Brenner Tumor.

Table. 3: Distribution of laterality

Laterality	No. of Cases	Percentage(%)
Unilateral	52	96.3
Bilateral	2	3.7
Total	**54**	**100**

On gross examination 46 (85.2%) tumors were having intact capsule. Capsular breach was noted in 8 (14.8%) cases. Cut surface was cystic in 34(63.0%), partly solid partly cystic in 19(35.2%) cases. Solid consistency was observed in only one case of malignant Brenner Tumor. Out of total 54 cases of ovarian tumors, 35 (64.8%) were epithelial, 18 (33.3%) germ cell and only1 (1.8%) was sex-cord stromal tumor**.** (Table. 4)

Table. 4: Distribution of various types of ovarian tumors

	Type of ovarian tumor	No. of cases	Percentage (%)	Overall (%)
1.	**Epithelial tumors**	**35**	**100**	**64.8**
A.	Serous tumors			
	Benign	22	62.8	40.7
	Malignant	4	11.4	7.4
B.	Mucinous tumors			
	Benign	3	8.6	5.5
	Borderline	1	2.8	1.8
	Malignant	1	2.8	1.8
C.	Endometrioid tumors			
	Endometrioidcarcinoma	3	8.6	5.5
D.	Brenner tumor			
	Malignant Brenner tumor	1	2.8	1.8
2.	**Germ cell tumors**	**18**	**100**	**33.3**
	Mature cystic teratoma	15	83.3	27.8
	Immature teratoma	2	11.1	3.7
	Embryonal carcinoma	1	5.5	1.8
3.	**Sex-cord Stromal tumor**	**1**	**100**	**1.8**
	Adult granulosa cell tumor	1	100	1.8
	Total	**54**		**100**

Among epithelial tumors serous cystadenoma was the most common benign tumor comprising 62.8% of all epithelial tumors followed by 8.6% cases of mucinous cystadenoma. Serous carcinoma was the commonest malignant epithelial tumor which constituted 11.4%. Next common malignant epithelial tumor was endometrioid carcinoma with a percentage of 8.6% of all epithelial tumors. Mature cystic teratoma formed the main bulk of germ cell tumors comprising 83.3% of all germ cell tumors.

Only one sex cord stromal tumor was encountered.

Discussion

Ovarian cancers are one of the most common malignancies of female genital tract. These are responsible for heavy death toll every year globally. Ovarian neoplasms are hetrogenous group of neoplasms comprising of epithelial, germ cell and sex cord stromal tumors. In the same group, their biological behavior range from benign indolent to highly aggressive malignant tumor. In

our study out of total 54 ovarian tumors, benign tumors were 74.1%(40), borderline tumors were 1.8%(1) and malignant tumors were 24.1%(13), which is close to the studies done by Gupta N *et al.*[4] who reported 72.9% benign, 4.1% borderline, 22.9% malignant tumors, Pilli GS *et al.*[5]who reported 75.2% benign tumors, 2.8% borderline tumors and 21.9% malignant tumors, Saxena HMK *et al.*[6] who reported 77.03% benign, 22.97% malignant tumors. Our study also correlated with study done by Mishra RK *et al.*[7]who reported 79.4% benign and 20.26% malignant tumors. Epithelial tumors constituted 64.8% of all ovarian tumors, which is close to findings of Gupta N *et al.*[4], Swamy GG *et al.*[8], Maheshwari V *et al.*[9] and Bhattacharya *et al.*[10]

Benign serous tumor (serous cystadenoma) was the most common epithelial tumor and accounted for 62.8% of all epithelial tumors and comprised of 22 cases of serous cystadenoma in present study. Pilli GS *et al.*[5] found 31.32% serous cystadenoma of all epithelial tumors in their study which is lower as compared to our study. It may be due to smaller sample size (n=54) in our study in contrast to larger sample size (n=282) in the study by Pilli GS *et al.*[5]

Germ cell tumors constituted 33.3% of all ovarian tumors in the present study which is close to findings of Kayastha S[11], Gupta SC *et al.*[12], Prabhakar BR *et al.*[13] Mature cystic teratoma was the commonest type of germ cell tumor recorded in our study which formed 27.8% of all ovarian tumors which correlated with findings of Gupta SC *et al.*[12]who reported 25.88% and Prabhakar BR *et al.*[13]who reported 22.30% mature cystic teratoma in their study.

There was only one case of adult granulosa cell tumor (sex cord stromal tumor) in the present study which constitute 1.8% of all ovarian tumors which is similar to findings of Chhanda M *et al.*[14] and CoutoF *et al.*[15]

Pain abdomen was the most common presenting feature in our study and was present in all the patients (100%). This was in accordance with the findings of Kayastha S[11]who also reported pain abdomen in 84% of cases. Pain abdomen was also the most common presenting feature in the study by Yasmin S *et al.*[16]

Maximum number (87.5%) of cases of benign tumors occurred in the age group 21-50 years. Similar finding were recorded in the studies conducted by Jagadeshwari N *et al.*[17], Ramachandran *et al*[18], Verma& Bhatia A[19] and Jha R *et al.*[20]

In our study maximum number (84.6%) of malignant ovarian tumors occurred in the age group 41-70 years which is consistent with the study conducted by Jha R *et al.*[20]

Unilateral tumors were more common than bilateral tumors and 97.5% benign tumors and 92.3% malignant tumors were unilateral which is in accordance with findings of Pilli GS *et al.*[5]

Conclusion

In our study epithelial tumors were most common followed by germ cell tumors. The most common benign tumor was serous cystadenoma and most common malignant tumor was serous carcinoma. Malignant neoplasms presented in older age group as compared to benign ones.

Ovarian tumors are a major health hazard for women and also present a great diagnostic challenge to gynaecologists. Exact nature of the neoplasm, which determine the line of treatment as well as prognosis, cannot be ascertained preoperatively. The study of macroscopic and microscopic features of different ovarian tumors will enable for categorization into exact morphological type which will help the gynaecologists for proper management. The latest chromosomal and immune-histochemical techniques has made the diagnosis and differentiation of tumors easier, but in developing countries like India, histopathological studies which are cost effective and widely available still form the back bone of diagnosis of ovarian neoplasms.

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