IJPRP

Indian Journal of Pathology: Research and Practice 8(4) July - August 2019
DOI: http://dx.doi.org/10.21088/ijprp.2278.148X.8419.6

Original Research Article

Histomorphological Study of Ovarian Tumors : A Three Year Institutional Experience

Almas Sahir Chopdar[1], Leena Ashok Nakate[2]

[1]Assistant Professor, [2]Professor & Head, Department of Pathology, B. J. Government Medical College, Pune, Maharashtra 411001, India.

Corresponding Author:

Almas Sahir Chopdar, Assistant Professor, Department of Pathology, B.J. Government Medical College, Pune, Maharashtra 411001, India.

E-mail: almaschopdar1234@gmail.com

Received on 08.05.2019,

Accepted on 08.06.2019

Abstract

Context: Ovary contains four major types of tissue (Surface epithelium, Germ cells, Sex cords and Ovarian stroma), all of which can give rise to a variety of neoplasms, often combined with a varied morphological and histological features. *Aims:* The aim was to study the age distribution, frequency and histomorphological diversity of different ovarian tumors. *Methods and Material:* The present retrospective and prospective study was carried out in the Department of Pathology, B.J. Government Medical College, Pune, Maharashtra, India, from January 2016 to December 2018. The diagnosis was confirmed by histopathological examination using Hematoxylin and Eosin (H & E) stain. Special stains were used whenever needed. *Statistical analysis used:* MS Excel Work sheet. *Results:* Out of 219 ovarian neoplasms analysed in this study, 216 were primary (98.63%) and 3 were metastatic tumors (1.36%). Among these 219 cases 174 were benign tumors (79.45%), 41 were malignant tumors (18.72%) and 04 were borderline tumors (1.82%). The Surface epithelial tumors were most common ovarian tumors constituting 176 cases (80.36%), followed by Germ cell tumors constituting 28 cases (12.78%), Sex cord stromal tumors were 12 in number (5.47%) and 3 were Metastatic tumors (1.36%). Serous cystadenoma was the most common benign tumor and serous cyst adenocarcinoma was the common malignant ovarian tumor. A wide variation of age was noted. Age ranged from 10-79 years. Majority of the cases were seen in age group of 21-40 years. *Conclusion:* From this study it is concluded that on morphological basis, tumors originating from surface epithelium are the common variant and majority of the ovarian tumors are benign.

Keywords: Germ cell tumor; Histomorphological diversity; Metastatic tumor; Neoplasms; Ovarian tumor; Surface epithelial tumor.

How to cite this article:

Almas Sahir Chopdar, Leena Ashok Nakate. Histomorphological Study of Ovarian Tumors : A Three Year Institutional Experience. Indian J Pathol Res Pract. 2019;8(4):409–415.

Introduction

The ovaries are paired pelvic organs located on the sides of the uterus close to the lateral pelvic wall. The classification of ovarian tumors is primarily morphologic. Ovary contains four major types of tissue (Surface epithelium, Germ cells, Sex cords and Ovarian stroma), all of which can give rise to a variety of neoplasms, often combined [1]. The ovary is the third most common site of primary malignancy in female genital tract after cervix and endometrium [2] accounting for 30% of all cancers of female genital tract [2,3,4]. The poor survival is due to the fact that they do not clinically manifest early and approximately 60-70% of the neoplasms present as either stage III or stage IV [5,6]. Fortunately 80% of the ovarian tumors are benign [7] and mostly occur in young women between the age of 20-40 years [5]. Borderline tumors occur at slightly older age whereas the malignant tumors are seen in older women between the age of 40-65 years. Metastatic tumors subsequently involve the ovaries and mimic primary ovarian neoplasia [5]. Depending on the type of the ovarian tissue where the neoplasm develops, ovarian tumors are classified into three primary classes namely Surface epithelial tumors (SET), Germ cell tumors (GCT) and Sex cord-stromal tumors (SCST). Risk factors for ovarian cancer are much less clear than for other genital tumors, but nulliparity, family history, and heritable mutation play a role in tumor development [7,8]. The aim of the present study was to assess the age distribution pattern, frequency of various histological subtypes and the histomorphological diversity of ovarian tumors. We compared our findings with other studies.

Materials and Methods

The present retrospective and prospective study was carried out in the Department of Pathology, B.J. Government Medical College, Pune from January 2016 to December 2018. The prospective study included all ovarian tumors that were received in the histopathology section of our department in the year 2018. On receiving the specimen, gross features like size, shape, colour, external appearance, consistency, cut section and contents were noted. Then the tumors were cut at various levels depending on the individual case and they were allowed to fix in 10% buffered formalin. After careful gross examination multiple bits were taken especially from areas with papillary excrescences, also one section from non-neoplastic ovary was taken where it was identifiable. After sectioning tissues were processed in an automated tissue processor. After processing, paraffin blocks were made. The tissue sections were cut and stained with Hematoxylin and Eosin stain. These slides were then examined under a light microscope for a histopathological diagnosis. The tumors were classified according to WHO (World Health Organisation) classification. Special stains were done whenever required.

For the retrospective study, the cases reported during January 2016 to December 2017 were taken from the records of the department and blocks were retrieved and relevant clinical history was noted from the requisition form.

All histologically proven both primary and secondary ovarian tumors were included in the study while non-neoplastic ovarian lesions were excluded.

Results

Retrospective and prospective study was carried out at B.J. Government Medical College, Pune from January 2016 to December 2018. During the study period a total number of 219 cases of ovarian tumors were studied in our histopathology section.

Out of 219 ovarian tumors studied, 174 tumors were benign (79.45%), 4 tumors were borderline (1.82%) and 41 tumors were malignant (18.72%) as shown in Graph 1.

Surface epithelial tumors were most common followed by Germ cell tumors. Out of total 219 cases of ovarian tumors 176 were Surface epithelial tumors (80.36%), 28 were Germ Cell tumors (12.78%), Sex Cord Stromal Tumors were 12 (5.47%) and Metastatic Tumors were 03 in number (1.36%) as shown in Table 1.

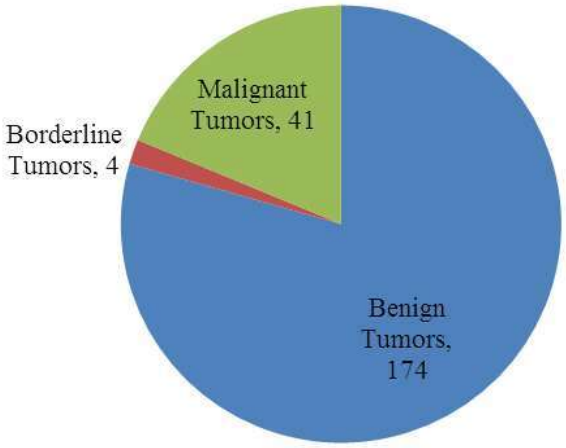
Table 1: Distribution of ovarian tumors according to histological types.

Histological Types	No. of cases	Percentage
Surface Epithelial Tumors	176	80.36%
Germ Cell Tumors	28	12.78%
Sex Cord Stromal Tumors	12	5.47%
Metastatic Tumors	03	1.36%
Total	219	

Majority of the Surface Epithelial Tumors were benign (140/176). Borderline tumors were 04/176 and malignant tumors were 32/176. Graph 2 shows distribution of benign, borderline and malignant tumors in different histological types.

On gross examination majority of tumors were cystic constituting 73.97% (162/219), 8.21% (18/219) were solid, 17.80% (39/219) showed both solid and cystic areas. Based on site of involvement majority of the tumors were unilateral about 84.93% (186/219) with right side predominance while most of the malignant tumors were bilateral. About 15.06% (33/219) tumors were bilateral. Tumor size range was 4–25 centimeters in our study. The largest tumor was papillary serous cyst adenocarcinoma of size 25x16x10 centimeters.

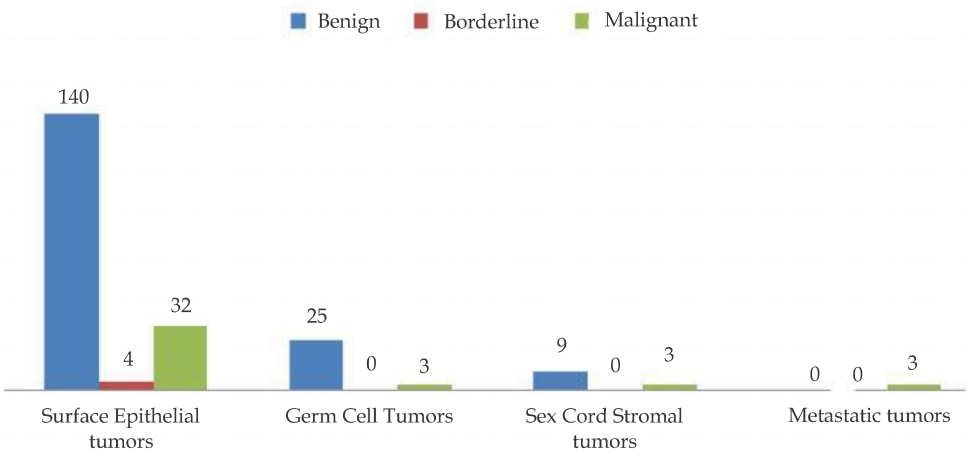
Age ranged from 10–79 years (mean age of 34.5 years) with majority of benign tumors diagnosed among age group 21 to 40 years as shown in Table 2. Borderline tumors were seen in 41–60 year age group and malignant tumors were commonly seen in ≥61 year age group. The youngest patient of our series was of 10 year old girl diagnosed with dysgerminoma and the oldest patient was 79 year old lady diagnosed as a case of mucinous cystadenocarcinoma.



Graph 1: Distribution of Ovarian Tumors.

Table 2: Distribution of ovarian tumors as per age and nature of ovarian tumors.

Nature of tumor	≤20 years	21-40 years	41-60 years	≥61 years	Total
Benign	13 (5.93%)	101 (46.11%)	56 (25.57%)	4 (1.82%)	174
Borderline	--	--	4 (1.82%)	--	4
Malignant	2 (0.91%)	8 (3.65%)	11 (5.02%)	20 (9.13%)	41
Total	15 (6.84%)	109 (49.76%)	71 (32.41%)	24 (10.95%)	219



Graph 2: Distribution of Benign, Borderline & Malignant tumors among different histological types

Serous cystadenoma (78), mucinous cystadenoma (54) and Benign cystic teratoma (25) were common benign tumors, majority of which were seen among 21-40 years age group. Granulosa cell tumor (3), fibroma (3), thecoma (2), fibrothecoma (1) and Sertoli Leydig cell Tumor (2) were seen mostly in 21–40 and 41–60 years age group. A rare case of Sex cord stromal tumor with annular tubules was diagnosed in 32 year old lady. Serous cystadenocarcinoma (22) and mucinous cystadenocarcinoma (10) were diagnosed commonly among 41–60 and ≥ 61 years age group as shown in Table 3. Metastatic tumors of ovaries were far less common than primary ovarian tumors. They comprised only 1.36% (3/219) of all ovarian tumors. Out of 3 metastatic tumors one was Krukenberg tumor seen in 21 year old young female with primary gastric carcinoma. Other 2 were from female genital tract.

The histopathological pattern of various tumors encountered during our study are shown in Figures 1–3. (Figure 1: Mucinous cystadenoma, Figure 2: Benign Brenner tumor and Figure 3: Dysgerminoma).

Table 3: Frequency of individual ovarian tumors seen in different age groups.

Types of Tumors	≤20 years	21–40 years	41–60 years	≥61 years	Total Number	Percentage (%)
1) Surface Epithelial Tumors (176)						
i) Serous cystadenoma	06	43	26	03	78	35.61%
ii) Serous cystadenofibroma	--	01	--	--	01	0.45%
iii) Borderline serous tumor	--	--	01	--	01	0.45%
iv) Serous cyst adenocarcinoma	--	05	07	10	22	10.04%
v) Mucinous cystadenoma	04	33	16	01	54	24.65%
vi) Borderline mucinous tumour	--	--	03	--	03	1.36%
vii) Mucinous cyst adenocarcinoma	--	01	02	07	10	4.56%
viii) Seromucinous cystadenoma	--	04	01	--	05	2.28%
ix) Benign Brenner tumor	--	--	02	--	02	0.91%
2) Germ Cell Tumors(28)						
i) Benign cystic teratoma	03	16	06	--	25	11.41%
ii) Dysgerminoma	02	01	--	--	03	1.36%
3) Sex cord stromal Tumors(12)						
i) Granulosa cell tumor	--	--	01	02	03	1.36%
ii) Fibroma	--	01	02	--	03	1.36%
iii) Thecoma	--	01	01	--	02	0.91%
iv) Fibrothecoma	--	01	--	--	01	0.45%
v) Sertoli Leydig cell Tumor	--	--	02	--	02	0.91%
vi) Sex cord stromal tumor with annular tubules	--	01	--	--	01	0.45%
4) Metastatic Tumors(03)						
i) Krukenberg tumor	--	01	--		01	0.45%
ii) Other Metastatic Tumors	--	--	01	01	02	0.91%
Total	15	109	71	24	219	100%

Table 4: Comparison of incidence of benign, borderline and malignant tumors with other studies.

Type of Tumors	Manupriya Sharma *et al.* [3]	Dimple Modi *et al.* [2]	Rasheed Fatima *et al.* [11]	Geeta Pachori *et al.* [12]	Present Study
Benign Tumors (%)	184 (76%)	82 (84.53%)	72 (85%)	175 (72.31%)	174 (79.45%)
Borderline Tumors (%)	7 (3%)	2 (2.07%)	02(02%)	6 (2.48%)	04 (1.82%)
Malignant Tumors (%)	51 (21%)	13 (13.40%)	11(13%)	61 (25.21%)	41 (18.72%)
Total	242	97	85	242	219

Table 5: Comparison of Histomorphological Pattern of ovarian tumors with other studies.

Histomorphological Pattern (%)	Neha Garg *et al.* [5]	Nirali Thakkar *et al.* [8]	Jyothi Kancheria *et al.* [14]	Vaddatti Tejaswini *et al.* [6]	Sanjay Gaur *et al.* [15]	Present Study
Surface epithelial Tumors	70.6%	73.8%	80%	85.25%	60.33%	80.36%
Germ cell Tumors	18.8%	17.8%	16%	9.72%	33.88%	12.78%
Sex cord stromal Tumors	8.2%	6.1%	04%	3.95%	5.37%	5.47%
Metastatic Tumors	2.4%	2.3%	Nil	1.08%	0.42%	1.36%

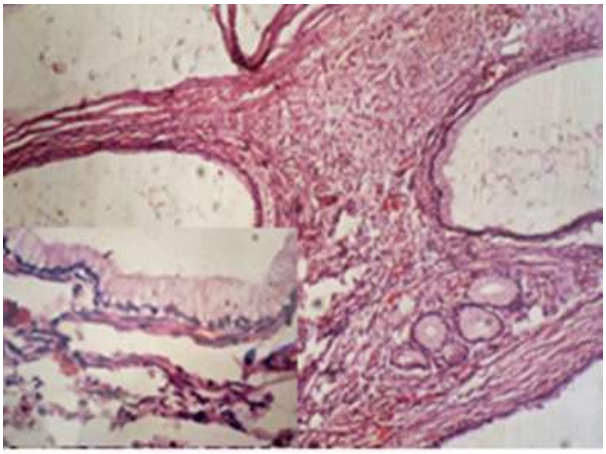


Fig. 1: Mucinous cystadenoma showing cyst lined by tall columnar cells. Hematoxylin and Eosin stain (x100). Inset shows high power view. (x400).

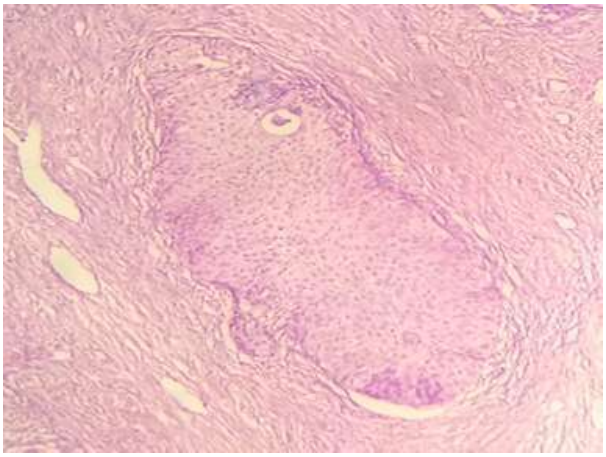


Fig. 2: Benign Brenner tumor- Nests of round epithelial cells embedded in fibrous stroma. Hematoxylin and Eosin stain (x100).

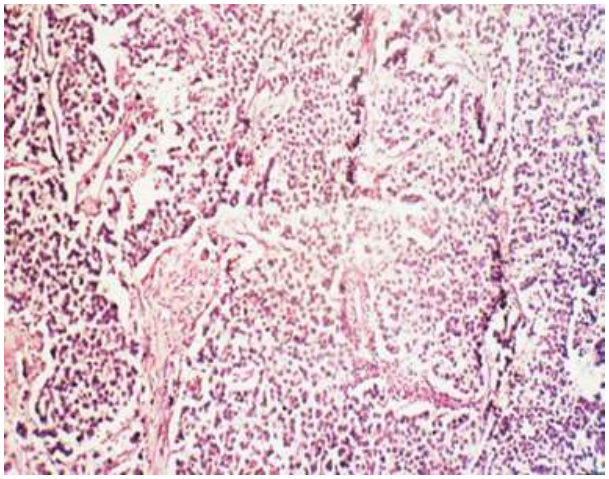


Fig. 3: Dysgerminoma-Uniform round cells seprated by fibrous septae showing lymphocytic infiltration. Hematoxylin and Eosin stain (x100).

Discussion

Ovarian neoplasm has become increasingly important not only because of its large variety of histomorphological patterns but more because they have gradually increased the mortality rate in female genital cancers. The incidence, clinical appearance and the behavior of the different types of ovarian tumors is extremely variable [2,9]. A female's risk at birth of having ovarian tumor sometime in her life is 6% to 7%, of having ovarian cancer is almost 1.5% and dying from ovarian cancer is 1%. [4] Nulliparity, family history of cancer and genetic mutations are some of the risk factors associated with the development of ovarian neoplasms although not much is clear about the risk factors involved in this neoplasm as compared to other genital tumors [10].

Table 4 shows comparative study in which out of 219 cases of ovarian tumors, benign tumors comprised of 79.45%, borderline 1.82% and malignant 18.72% in our study. Almost similar results were seen in study conducted by Manupriya Sharma *et al.* [3] where the incidence of benign, borderline and malignant ovarian tumors comprised of 76%, 3% and 21% respectively. Studies conducted by Dimple Modi *et al.* [2] and Rasheed Fatima *et al.* [11] showed slightly higher incidence of benign tumors about 84.5% and 85% respectively, while Geeta Pachori *et al.* [12] reported higher incidence of malignant tumors (25.21%) and lower incidence of benign tumors (72.31%) as compared to our study.

In the present study, the patients were from 10-79 years. We found higher incidence of ovarian tumors with predominance of benign tumors among 21 to 40 years age group. Borderline and malignant tumors were seen after 40 years. Similar results were reported by Rasheed Fatima *et al.* [11] and Ranjana Hawaldar *et al.* [13]. Nirali Thakkar *et al.* [8] reported the higher incidence of ovarian tumors among 40 -59 years age group. The youngest patient in our study was 10 year old girl who had diagnosed with dysgerminoma and the oldest patient was of 79 year old lady who had diagnosed with mucinous cystadenocarcinoma.

Among the different histopathological patterns, Surface epithelial Tumors constituted majority of the ovarian neoplasm with 80.36%, followed by Germ Cell Tumors 12.78%, Sex Cord Stromal Tumors 5.47% and metastatic tumors were 1.36%, similar to the results of other studies as shown in Table 5. [5,6,8,14] Sanjay Gaur *et al.* [15] reported lower incidence of Surface epithelial Tumors and higher incidence of Germ cell Tumors as compared to our findings.

In our study among the benign tumors serous cyst adenomas were found to be more common (35.61%) than mucinous cystadenomas (24.65%). This was followed by mature cystic teratoma constituting 11.41% of all ovarian tumors. These finding are similar to the findings of other authors [2,3,4,6,11]. Serous cystadenocarcinoma constituted the most common malignant tumor (10.04%) in our study followed by mucinous cystadenocarcinoma (4.56%). Similar findings were documented by other studies [2,3,6].

Conclusion

From this study it is concluded that on morphological basis, tumors originating from surface epithelium were the most common variant and majority of the ovarian tumors were benign. Even though malignant tumors were less common, they do not clinically manifest early and increase the morbidity and mortality in women. Hence macroscopic and microscopic features of various ovarian tumors will help us in diagnosing the exact morphological type for proper management.

Key Messages

Macroscopic and microscopic features of various ovarian tumors will help us in diagnosing the exact morphological type for proper management.

References

1. Rosai J. Female reproductive system- Ovary. Rosai and Ackerman's Surgical Pathology. 10th edition. Elsevier, 2011;2:1553–1609.
2. Modi Dimpal,. Rathod Gunvanti B, Delwadia K. N, Goswami H. M. Histopathological pattern of neoplastic ovarian lesions. International Archives of Integrated Medicine. 2016;3(1):51–57.
3. Sharma Manupriya, Soni Anjali, Kaul Rashmi. Histopathological pattern of ovarian neoplasms in Sub-Himalayan belt of rural India: a four-year study from a tertiary care teaching hospital. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2017 Dec;6(12):5448–5452.
4. Pati Rashmi K, Bhandari Bhumika Jeevanraj, Kittur Shreekant K, Haravi Rekha M, S Aruna and Jadhav Meena N. Histomorphological Study of Ovarian Tumors at a Tertiary Care Centre. Annals of Pathology and Laboratory Medicine. November-December, 2017;4(6):A638–644.
5. Garg Neha, Anand AS, Annigeri Chaya. Study of histomorphological spectrum of ovarian tumours. International Journal of Medical and Health Research. October 2017;3(10):12–20.
6. Vaddatti tejawini, Reddy E Sudhakar, P. Premlatha, G. Vahini. Study of morphological pattern of ovarian neoplasms. IOSR Journal of Dental and Medical Sciences. 2013;10(6):11–16.
7. Ellenson LH, Piorg EC. The Female Genital Tract. Kumar V, Abbas AK, Aster JC. In: Robbins and Cotran Pathologic Basis of Disease. 9th edition: Elseiver. 2014;2:1022–34.
8. Thakkar Nirali N, Shah Shaila N. Histopathological Study of Ovarian Lesions. International Journal of Science and Research. 2015 October;4(10):1745–1749.
9. Pradhan A, Sinha AK, Upreti D. Histopathological patterns of ovarian tumors at BPKIHS. Health Renaissance. 2012;10(2):87–97.

10. Dutta Aparna, Imran Reshma, Saikia Projnan, Borgohain Mondita. Histopathological Spectrum of Ovarian Neoplasms in a Tertiary Care Hospital. International Journal of Contemporary Medical Research. 2018 August;5(8):H1–4.
11. Rasheed Fatima, Sandhya M, Sowmya T. S. Study of histomorphological pattern of ovarian neoplastic and non-neoplastic lesions. International Journal of Research in Medical Sciences. 2017 May;5(5):2095–98.
12. Pachori Geeta, Uday Singh Meena, Sunaria Ravi Kant, Pachori Pramendra, Jethani Nanik, Bayla Tushar. Histopathological study of ovarian tumors in Ajmer region. International Journal of Medical Science and Public Health. 2016;5(7):1400–03.
13. Hawaldar Ranjana, Sodani Sadhna, Patidar Ekta. Histopathological spectrum of ovarian tumours-A two year retrospective study. Indian Journal of Pathology and Oncology. 2017 Jul-Sep;4(3):450–53.
14. Kancheria Jyothi, Kalahasti Raghu, KPA Chandra Sekhar, Yarlagadda Srikanth Babu, SParimala Devi S. Histomorphological Study of Ovarian Tumors: An Institutional Experience of 2 Years. International Journal of Scientific Study. 2017 June; 5(3):232–35.
15. Gaur Sanjay, Joshee Rajni, Kalla AR, Chichani Sushil, Sirvi Gautam Chand. Histomorphological study of neoplastic ovarian lesions in Jodhpur region. International Journal of Applied Research 2016;2(6):461–62.