Clinical and Research Journal in Internal Medicine
Vol. 4 No. 1, May 2023
e-ISSN: 2723 - 5122, p-ISSN: 2723 - 5130
Available online at https://crjim.ub.ac.id/index.php/crjim/

Original Article

Histopathologic Examination of Ovarian Lesions: A Prospective Observational Study in Women from Central India

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ARTICLE INFO

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https://doi.org/10.21776/ub.crjim.04.01.3

Received on February, 19 2023;
Revised on March, 24 2023;
Accepted on April, 27 2023

ABSTRACT

Background: There is age related increase in the incidence of ovarian cancer. Most Indian population-based cancer registries have reported a gradual rise in the ovarian cancer incidence over the years. Since ovary is composed of totipotent gametocytes and multipotent mesenchymal tissues, almost any type of tumor can arise from these tissues. Therefore, their proper recognition and classification is important for appropriate therapy and better prognosis.
Aim: to look at the histopathological profile of various ovarian lesions in the local female subjects from central India.
Methods: A prospective observational study was carried out on the surgically resected ovarian samples that were referred to the Pathology department over two and half year. A total of 100 ovarian cases were included. Histopathological examination of the specimen was done using standard protocols.
Results: On gross examination, majority of non-neoplastic specimen showed unremarkable findings. Microscopic examination of non-neoplastic cases revealed that most of the cases were of follicular cyst followed by corpus luteum cyst. On the contrary, majority of neoplastic specimen showed cystic external surface on gross examination. Surface epithelial tumor was the most common histologic type amongst neoplastic cases. Most common histologic subtype amongst the surface epithelial tumors was found to be benign simple serous cystadenoma.
Conclusion: In women from central India, commonest non-neoplastic lesion of ovary is follicular cyst whereas most common neoplastic lesion is surface epithelial tumor (benign simple serous cystadenoma).

Keywords: *Ovarian Neoplasms, Female, Ovarian Cysts, India, Abdomen*

Singh R, Patidar H, Bhagora R, Saxena S, Khare V. Histopathologic Examination of Ovarian Lesions: A Prospective Observational Study in Women from Central India. CRJIM. May 2023; 4(1);366-372. https://doi.org/10.21776/ub.crjim.04.01.3

INTRODUCTION

It is a well-known fact that neoplastic conditions of ovaries are a complicated and interesting subject in the history of oncology. These neoplasms inherit a spectrum of genetic background, much more varied than any other gynecological condition and present a big challenge to a gynecological oncologist.[1] Even, certain non-neoplastic ovarian lesions frequently present with a pelvic mass and mimic an ovarian tumor. Therefore, proper recognition and classification of such pelvic masses is important for appropriate therapy and better prognosis. This study aimed to look at the histopathological profile of various ovarian lesions in the local female subjects from central India.

Since ovary is composed of totipotent gametocytes and multipotent mesenchymal tissues, almost any type of tumor can arise from these tissues.[2] Ovarian carcinoma is the third most prevalent one in Indian women and eighth in the world, contributing to 3.44% of all cancer cases.[3] Also, it is an important cause of cancer related mortality in Indian women and constitutes about 3.34% of all cancer deaths in India. Most (about 62%) of the cases of ovarian carcinoma are diagnosed in advanced stages (between Stages III and IV), when 5-year survival is merely 28%.[1] However, the 5-year survival rate of ovarian carcinoma is quite good (about 94%) if diagnosed early in Stage I, but only 15% of cases are diagnosed at this stage. Since advanced ovarian cancers have worst prognosis (highest case fatality ratio amongst all gynecological cancers globally), it is of paramount importance to catch these killers early on.[4]

There is age related increase in the incidence of ovarian cancer. The ASIR (age specific incidence rate) starts increasing from 35 years of age and peaks between 55-64 years of age. Most Indian population-based cancer registries have reported a gradual rise in the ovarian cancer incidence over the years. They have reported that age-adjusted incidence of ovarian cancer varies from 0.9 – 8.4 per 100,000 women.[5] However, many western countries have documented a decreasing trend of incidence and mortality. This could be due to wider increase in preventive measures like use of oral contraceptives, reduction in post-menopausal HRT (hormone replacement therapy) and increased application of risk-reduction surgeries.[4]

METHODS

This research study was conducted after getting approval from the institutional ethics committee of L.N. Medical College & Research Centre, Kolar Road, Bhopal, Madhya Pradesh. A prospective observational study was carried out on the surgically resected ovarian samples that were referred to the Pathology department of L.N. Medical College & Research Centre over two and half year starting from May 2019. This cleared by the ethics committee (ECR/1190/INST/MP/2019).

All resected samples with diagnosis of ovarian lesion of all age groups were included, while autolyzed specimen were excluded from study. A non-probability convenient sampling technique was used and a total of 100 ovarian cases were included. Gross examination of specimens was done with respect to size, external surface, mucosal surface, and wall thickening. All the specimens obtained were fixed in buffered neutral formalin for a period of 12-24 hours & then they were submitted for processing. After routine paraffin processing, 3–5 µm sections were cut and stained by H & E staining method. Following techniques of processing were applied:

Method	Type of Reagent	No. of Stations	Time
1. Fixation	10% Buffered Formalin	2 jars	1 hour each
2. Dehydration	Isopropanol	70%	1 hour
		80%	1 hour
		90%	1 hour
		100%	1 hour
		100%	1 hour
		100%	1 hour
3. Clearing	Xylene	2 jars	1 hour each
4. Infiltration and Embedding	Paraffin wax (37 °C)	2 jars	1 hour each
5. Blocks	L mould {molten paraffin wax}	1	10-15 minutes
6. Sectioning	Microtome	1	Till 2-4 microns thin sections obtained
7. Floating	Water Bath (60 °C)	1	Till Ribboning
8. Mounting tissue onto the slide	Egg Albumin	1	Till ribbon like sections stick to the slide
9. Heat the slide	Hot Plate (50 ° C)	1	Till Wax is melted

Data analysis was performed with the help of Microsoft Excel 20087 and SPSS version 20 software. Frequency distribution and cross tabulation were used to make tables. All the qualitative data were expressed as number and percentage. p value < 0.05 was taken to be statistically significant.

RESULTS

Table 1. Laterality of non-neoplastic cases.

Laterality	Number of cases (%)
Left	18 (50)
Right	14 (38.89)
Bilateral	4 (11.11)
Total	36 (100)

Table 1 shows that among the non-neoplastic cases, majority had lesions on left side of ovary followed by right side. Only 11% patients had lesions in both the ovaries. On histopathological gross examination of non-neoplastic cases, majority of the ovaries showed unremarkable findings. About 17% samples showed cystic changes on external surface (Table 2).

Table 2. Gross findings (external surface) of non-neoplastic cases.

External Surface	Number of cases (%)
Cystic	6 (16.67)
Unremarkable	30 (83.33)
Total	36 (100)

On microscopic examination, majority of non-neoplastic cases showed cystic changes (Table 3). Microscopic spectrum of non-neoplastic cases revealed that most of the cases were of follicular cyst (Figure 1) followed by corpus luteum cyst and hemorrhagic cyst. Other less common microscopic findings were torsion ovary followed by endometriosis, cystic follicle, luteinizing cyst and corpus inclusion cyst (Table 4).

Table 3. Cut section findings in of non-neoplastic cases.

Cut Surface	Number of cases (%)
Cystic	29 (80.56)
Solid	4 (11.11)
Unremarkable	3 (8.33)
Total	36 (100)

Table 4. Microscopic findings of non-neoplastic cases.

Microscopy	N (%)
Hemorrhagic Cyst	6 (16.67)
Corpus Luteum Cyst	8 (22.22)
Torsion of Ovary	3 (8.33)
Follicular Cyst	14 (38.89)
Endometriosis	2 (5.56)
Cystic Follicle	1 (2.78)
Luteinizing Cyst	1 (2.78)
Corpus Inclusion Cyst	1 (2.78)
Total	36 (100)

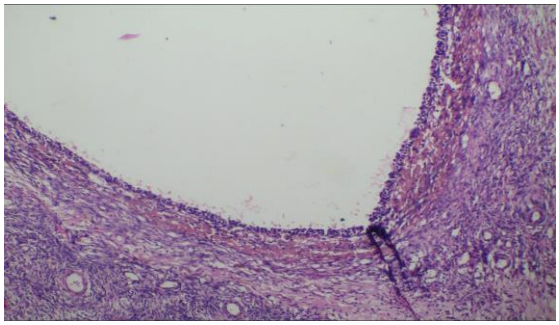

Figure 1. Histopathology section showing follicular cyst lined by follicular epithelial cells. (High power, 40x H&E)

Figure 2. Serous cyst-Cut section showing inner aspect of the cyst having thin and smooth wall.

Histopathological gross examination of neoplastic cases revealed that of out 58 benign cases, majority had cystic external surface (Figure 2) whereas rest of the cases showed unremarkable lesions. Of the 6 malignant cases, half of the cases had cystic external surface while ovarian mass was the least common (Table 5). Out of 64 neoplastic cases, majority presented with surface epithelial tumor. Incidence of bilaterality was highest among surface epithelial tumors followed by germ cell tumors. Sex chord stromal tumors showed no bilateral lesions (Table 6).

Table 5. Gross findings (External surface) of neoplastic cases.

External surface	Benign N (%)	Malignant N (%)	Total N (%)
Cystic	36 (62.07)	3 (50)	39 (60.94)
Unremarkable	22 (37.93)	2 (33.33)	24 (37.50)
Ovarian Mass	0 (0)	1 (16.67)	1 (1.56)
Total	58 (100)	6 (100)	64 (100)

Table 6. Incidence of bilaterality in the major histopathological subtypes.

Type of Tumor	N	Bilaterality	%
Surface Epithelial Tumor	42	8	19.5
Germ Cell Tumor	18	2	11.1
Sex Cord Stromal Tumor	3	0	0
Other (metastatic)	1	0	0

On histologic subtype of neoplastic lesions, most surface epithelial tumor presented with benign simple serous cystadenoma (Figure 3) followed by benign mucinous cystadenoma and borderline serous cystadenoma. Most common germ cell tumor was teratoma. Other germ cell tumors included mixed germ cell tumor, dysgerminoma, struma ovarii, and yolk sac tumor. Out of 3 patients with sex cord stromal tumor, 2 cases reported as fibrothecoma and 1 as granulosa cell tumor (Table 7).

Table 7. Distribution of histologic subtype of neoplastic lesions.

Type of Lesion	Subtype	N (%)
Surface Epithelial Tumor (n=42)	Benign simple serous cystadenoma	29 (45.31)
	Borderline serous cystadenoma	3 (4.69)
	Papillary serous cystadenoma	1 (1.56)
	Malignant serous carcinoma	1 (1.56)
	Benign mucinous cystadenoma	4 (6.25)
	Mucinous cystadenocarcinoma	1 (1.56)
	Endometroid (benign)	2 (3.13)
	Transitional cell carcinoma	1 (1.56)
Germ Cell Tumor (n=18)	Teratoma (mature/benign)	14 (21.88)
	Mixed germ cell tumor	1 (1.56)
	Dysgerminoma	1 (1.56)
	Struma ovarii	1 (1.56)
	Yolk sac tumor	1 (1.56)
Sex Cord Stromal Tumor (n=3)	Granulosa cell tumor	1 (1.56)
	Fibrothecoma	2 (3.13)
Metastatic (n=1)	Metastatic tumour	1 (1.56)
Total		64 (100)

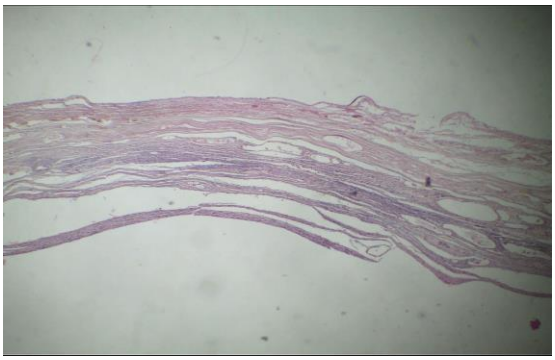

Figure 3. Serous cystadenoma ovary: Histopathology section showing cyst wall lined with flattened cuboidal epithelium (High power,40x H&E)

DISCUSSIONS

Ovarian lesions are the most undifferentiated problem in today's gynecological practice. Mortality rate of ovarian tumors exceeds the combined mortality rate of endometrial and cervical cancers. We studied the histopathological findings of ovarian lesions that are of great clinical significance better treatment, prognosis, management of the disease.[6] In this study, we divided the ovarian tumors into two parts: non-neoplastic and neoplastic using WHO classification. The neoplastic lesions were subdivided into benign and malignant.

In our study, we observed that the most common cause of the non- neoplastic lesions of ovary were follicular cysts (38.89%) followed by Corpus luteal cysts (22.22%). Our study closely resembles that of Akina et al and Kanthikar et al study.[7,8] Kanthikar S.N. et al showed that out of 145 cases studied, 75 were non-neoplastic and the remaining 70 were neoplastic.[8] The most common non-neoplastic lesion found was solitary follicular cysts (74%) followed by corpus luteal cysts (20%). Thus the prevalence was very high for follicular cyst. Similarly, in Akina Prakash et al (7) study, follicular cysts were the most common non-neoplastic lesions (45.5%) followed by corpus luteum cysts (25%).82 On the contrary, study by Gaikwad S.L. et al revealed that corpus luteal cysts were the most common non-neoplastic the lesion in this study (27.7%) followed by simple ovarian cysts (24.7%) followed by follicular cysts in 21.8% cases.[9] This could be because they included most of the incidental findings in ovarian specimen.

Amongst the neoplastic lesions of ovary, surface epithelial tumor constituted the highest and the metastatic tumor is least number of

cases in our study. Similarly, Kanupriya et al reported that most commonly encountered tumors of the ovary were the surface epithelial tumors (63%) followed by germ cell tumors (29%) in a total of 258 cases.[10] Also, Pradhan HK et al (11) showed that the prevalence of surface epithelial tumor was 70.2 % followed by germ cell tumor (28%); less common ovarian neoplasm were sex cord stromal tumors (1.8%) and metastatic tumor (0.4%). A study by Mondal et al 89 showed that out of 957 cases, surface epithelial tumors comprised 67.9% of all tumors and 73% of the malignant group. The sex cord-stromal were very less (5.3%) in distribution. Endometrioid ovarian carcinoma comprises 10–25% of all primary ovarian carcinomas in literature.[12] Similar to our findings, many previous studies showed that amongst the surface epithelial tumors, benign simple serous cystadenoma was the most common.[7, 8, 10, 12]

CONCLUSION

In women from central India, commonest non-neoplastic lesion of ovary is follicular cyst whereas most common neoplastic lesion is surface epithelial tumor (benign simple serous cystadenoma).

Acknowledgement

We would like to express our sincere gratitude and appreciation to all the individuals and organizations who contributed to the completion of this research article. Their invaluable support and assistance have played a significant role in the successful execution of this study. We extend our heartfelt thanks to the participants who willingly dedicated their time and effort to provide the necessary data for our research. Furthermore, we would like to acknowledge the guidance and expertise of our advisors and mentors, whose invaluable insights and feedback have shaped the development of this article. Additionally, we are grateful to the academic institutions that provided the necessary resources and facilities for conducting this research. Finally, we acknowledge the CRJIM for publishing the article in the journal.

Conflict of Interest

All authors declare no conflict of interest, and agree to publish the article in journal.

Ethical consideration

Ethics clearance was obtained prior to start of study and all participants provided the written consent.

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