Histopathological Study of Neoplastic and Non-neoplastic Lesions of the Ovary in Sanjay Gandhi Memorial Hospital/Gandhi Memorial Hospital, Rewa, Madhya Pradesh, India

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Abstract

Introduction: Tumors of the ovary are common forms of neoplasms in women. In the developed world, ovarian carcinoma is the fourth or fifth most common cause of death from all cancers in women, and 7% of patients with these tumors present with advanced stage disease. Ovarian cancers account for 6% of all cancers in females. 80% are benign and these occur mostly in young women between the ages of 20 and 45 years. Malignant tumors are common in older women between the ages of 40 and 65 years.

Aims: This study aims to the incidence of different histological types of ovarian lesions, histomorphological features, categorize ovarian lesions into neoplastic and non-neoplastic group, and correlate incidence of neoplastic and non-neoplastic lesion with particular age group and parity.

Materials and Methods: The study was conducted on approximate 50 patients of ovaries received these include surgically resected ovaries, either as part of total abdominal hysterectomy with bilateral salpingo-oophorectomy or as a clinically diagnosed ovarian lesions from Shyam Shah Medical College and Sanjay Gandhi Memorial Hospital, Rewa, Madhya Pradesh, from the duration of April 2017 to march 2018.

Results: The total number of ovarian lesions studied during the study period was 50 cases, among them, 15 (30%) cases were non-neoplastic and remaining 35 (70%) cases were neoplastic. The most common non-neoplastic lesion seen was follicular cyst 6 (40%) cases followed by corpus luteal cyst 4 (26.66%) cases. Among the 35 neoplastic ovarian lesions, 26 (74.28%) cases were benign, 1 (2.85%) case was at borderline, and 8 (22.85%) cases were malignant. In benign ovarian neoplasm, most commonly lesion were serous cystadenoma 17 (48.57%) cases followed by benign cystic teratoma 4 (11.42%) cases. In malignant cases, the most common lesion were serous cystadenocarcinoma 3 (8.57%) cases followed by mucinous cystadenocarcinoma 2 (5.71%) cases. Overall, ovarian lesions were more common in age group of 20–39 years followed by 40–59 years. The youngest patient was 9 years old and the oldest patient was 69 years old. The malignant tumors were more common in nulliparous women (33.33%) than benign neoplasm (15.38%). Of total 35 neoplastic ovarian lesions, 32 (91.42%) cases were unilateral and 3 (8.57%) cases were bilateral.

Conclusion: The histological type of ovarian tumor correlates with the prognosis of the tumor. Serum CA-125 screening along with annual pelvic examination after 35 years of age in women along with transvaginal ultrasonography can be used as regular screening methods to evaluate early detection of ovarian cancer. An accurate histopathological diagnosis combines with clinical staging will help in rendering prompt and appropriate treatment to the patients.

Key word: Histopathology, Incidence, Neoplastic ovarian lesions, Non-neoplastic lesions, Ovarian tumor

INTRODUCTION

Tumors of the ovary are common forms of neoplasms in women. In the developed world, ovarian carcinoma is the fourth or fifth most common cause of death from all cancers in women, and the primary cause of death from gynecological malignancies; 7% of patients with these
tumors present with advanced stage disease. Ovarian tumor and non-neoplastic lesions present a great challenge to gynecological oncologist. Certain non-neoplastic lesions of the ovary frequently form a pelvic mass and potentially mimic an ovarian neoplasm.

The most important clinical feature in ovarian tumor is the age of the patient. One of the eight ovarian tumors in patients <45 years of age is malignant; by contrast, in older women, the proportion is one to three. The single most common ovarian tumor, the mature cystic teratoma (dermoid cyst) is encountered at all ages, like most tumors in the sex cord-stromal category. Ovarian cancers account for 6% of all cancers in females. 80% are benign and these occur mostly in young women between the ages of 20 and 45 years. Malignant tumors are common in older women between the ages of 40–65 years. Classification of ovarian tumors is primarily morphological. It is based on that the ovary containing four major types of tissue: Surface, coelomic or germinal epithelium, germ cells, sex cord and ovarian stroma, specialized, and non-specific.

The treatment for ovarian neoplasms depends on the grade and stage of the tumor at presentation. Treatment modalities include cystectomy or oophorectomy, salpingo-oophorectomy, hysterectomy, chemotherapy, and/or radiotherapy. This study shows the patterns of ovarian lesions with regard to age, parity, origin, risk factors, clinical presentation, and histopathological classification.

Aims and Objectives

This study aims to the incidence of different histological types of ovarian lesions, histomorphological features, categorize ovarian lesions into neoplastic and non-neoplastic group, and correlate incidence of neoplastic and non-neoplastic lesion with particular age group and parity.

MATERIALS AND METHODS

The study was conducted on approximate 50 patients of ovaries received these include surgically resected ovaries, either as part of total abdominal hysterectomy with bilateral salpingo-oophorectomy or as a clinically diagnosed ovarian lesions from Shyam Shah Medical College and Sanjay Gandhi Memorial Hospital, Rewa, Madhya Pradesh, from the duration of April 2017 to march 2018. All sections were routinely processed under standardized conditions for paraffin embedding and then cut into 5 µ or thinner as needed and stained with hematoxylin and eosin (H and E) stain using standard procedure. For classification of ovarian lesion, the World Health Organization (WHO) was being used. Statistical tools, incidence, and percentage were calculated.

Inclusion Criteria

All the specimens of ovarian lesion (neoplastic and non-neoplastic) sent to the Department of Pathology, shyam shah medical college, rewa, were included in the study. Hysterectomy specimen with ovarian lesion was also included in the study.

Exclusion Criteria

Decomposed and poorly and improperly fixed specimens.

All the specimens received at the Department of Pathology, Shyam Shah Medical College, Rewa, were procedure fixation → grossing → dehydration → wax impregnation → blocking section cutting and followed by H and E section.

Data collection of the histopathological slides of patients included in the study was retrieved and reviewed by me and experienced histopathologist to confirm ovarian neoplasm diagnosis, determine the histopathological type of the tumor, and classify the ON using the WHO classification. Data analysis for quantitative data mean, standard deviation, etc., was obtained and for qualitative data, proportion will be obtained and analyzed using statistical software or MS Excel.

RESULTS

The present study of 50 cases of the ovarian lesions, 35 cases were neoplastic. The neoplastic lesion comprised 26/35 (74.28%) benign, 1/35 (2.85%) borderline, and 8/35 (22.85%) malignant tumors (Table 1).

Table 2 shows that in non-neoplastic lesions, follicular cyst was the most common lesion 6/15 (40%), followed by corpus luteal cyst 4/15 (26.66%), hemorrhagic cyst (20%), endometriosis (6.66%), and inclusion cyst (6.66%) (Table 2).

Table 1: Distribution of benign, borderline, and malignant neoplasm

<table>
<thead>
<tr>
<th>Ovarian neoplasm</th>
<th>Number of cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign</td>
<td>26 (74.28)</td>
</tr>
<tr>
<td>Borderline</td>
<td>01 (2.85)</td>
</tr>
<tr>
<td>Malignant</td>
<td>08 (22.85)</td>
</tr>
<tr>
<td>Total</td>
<td>35 (100)</td>
</tr>
</tbody>
</table>

Table 2: Distribution of various types of the non-neoplastic ovarian lesions

<table>
<thead>
<tr>
<th>Non-neoplastic ovarian lesion</th>
<th>Number of cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follicular cyst</td>
<td>6 (40.0)</td>
</tr>
<tr>
<td>Corpus luteal cyst</td>
<td>4 (26.66)</td>
</tr>
<tr>
<td>Hemorrhagic cyst</td>
<td>3 (20.00)</td>
</tr>
<tr>
<td>Inclusion cyst</td>
<td>1 (6.66)</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>1 (6.66)</td>
</tr>
<tr>
<td>Total</td>
<td>15 (100.0)</td>
</tr>
</tbody>
</table>
Table 3 shows that neoplastic tumors were divided into four groups, namely, surface epithelial tumors, germ cell tumors, sex cord-stromal tumors, and metastatic tumor. Surface epithelial tumors were maximum in number 26/35 (74.28%), followed by germ cell tumors 5/35 (14.28), sex cord-stromal tumors 3/35 (8.57%), and metastatic tumor 1/35 (2.85%).

Table 4 shows that in non-neoplastic lesions, the most common histopathological pattern was follicular cyst 6/15 (40%), followed by corpus luteal cyst 4/15 (26.66%), hemorrhagic cyst 3/15 (20%), inclusion cyst 1/15 (6.6%), and endometriosis 1/15 (6.6%).

Tables 5 and 6 show that in neoplastic lesion, the most common histological class is surface epithelial tumors 26/35 (74.28%) followed by germ cell tumors 5/35 (14.28%). Among all the benign lesions (n = 26), serous cystadenoma is the most common 17/26 (65.38%) while the benign cystic teratoma (dermoid cyst) is the second most common 4/26 (15.38%). On the other hand, among all the malignant lesions (n = 8), serous cystadenocarcinoma is the most common 3/8 (37.50%) followed by mucinous cystadenocarcinoma 2/8 (25.00%).

In germ cell tumor, the most common benign tumor was dermoid cyst and most common malignant tumor was dysgerminoma. In sex cord-stromal, the most common benign tumor was fibroma and most common malignant tumor was granulosa cell tumor. Under metastatic group, one case of Krukenberg tumor comprising 2.85% of all ovarian tumor was reported.

In neoplastic lesions, benign lesions were common in parity 2 and parity 3 followed by nulliparous patients.

Borderline neoplasm was common in nulliparous patient.

Malignant neoplasm was most common in nulliparous patients followed by parity 2 patients.

In the present study, it was observed that malignant tumors were more common in nulliparous women (33.33%) than benign neoplasm (15.38%). Figure-3 in neoplastic lesions of ovary most common clinical presentation was lump in abdomen 19/35 (54.28%) followed by pain in abdomen 12/35 (34.28%), GIT complaints 2/35 (5.71%), loss of weight/appetite 1/35 (2.85) and ascites 1/35 (2.85%).

Non-neoplastic Lesions of Ovary
- Follicular cyst - six cases of follicular cyst were studied. Microscopically, the cyst wall of all cases was lined by outer layer of thick theca interna cells. A single inner layer of granulosa cells were resting on a thick theca layer.
- Corpus luteal cyst - four cases of luteal cyst were studied. Microscopically, the cyst wall is composed of an inner connective tissue layer, a middle layer of large luteinized granulosa cells, and an outer layer of small luteinized theca interna cells.
- Hemorrhagic cyst - three cases of hemorrhagic cysts were studied. Cyst filled with hemorrhagic material and lined by single layer of cells.
- Inclusion cyst - one case of inclusion cyst was studied. Cyst being formed through invagination of the surface epithelium. Microscopically, they were lined by columnar cells.
- Endometriosis - one case of endometriosis was studied. Microscopically, they were composed of endometrial

### Table 3: Distribution of various types of the neoplastic ovarian lesions

<table>
<thead>
<tr>
<th>Classes of ovarian tumor</th>
<th>Number of cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface epithelial-stromal tumor</td>
<td>26 (74.28)</td>
</tr>
<tr>
<td>Germ cell tumor</td>
<td>05 (14.28)</td>
</tr>
<tr>
<td>Sex cord-stromal tumor</td>
<td>03 (8.57)</td>
</tr>
<tr>
<td>Metastatic tumor</td>
<td>01 (2.85)</td>
</tr>
<tr>
<td>Total</td>
<td>35 (100.0)</td>
</tr>
</tbody>
</table>

### Table 4: Histopathological patterns of the non-neoplastic lesions of ovary

<table>
<thead>
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<tr>
<td>Follicular cyst</td>
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<td>Hemorrhagic cyst</td>
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</tr>
<tr>
<td>Inclusion cyst</td>
<td>1 (6.6)</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>1 (6.6)</td>
</tr>
<tr>
<td>Total</td>
<td>15 (100.0)</td>
</tr>
</tbody>
</table>

### Table 5: Histopathological patterns of the neoplastic lesions of ovary

<table>
<thead>
<tr>
<th>Histopathological patterns</th>
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<tbody>
<tr>
<td>Surface epithelial-stromal tumor</td>
<td>26 (74.28)</td>
</tr>
<tr>
<td>A Serous tumor</td>
<td></td>
</tr>
<tr>
<td>Serous cystadenoma</td>
<td>17 (48.57)</td>
</tr>
<tr>
<td>Borderline serous cystadenoma</td>
<td>1 (2.85)</td>
</tr>
<tr>
<td>Serous cystadenocarcinoma</td>
<td>3 (8.57)</td>
</tr>
<tr>
<td>B Mucinous tumor</td>
<td></td>
</tr>
<tr>
<td>Mucinous cystadenoma</td>
<td>3 (8.57)</td>
</tr>
<tr>
<td>Mucinous cystadenocarcinoma</td>
<td>2 (5.71)</td>
</tr>
<tr>
<td>Germ cell tumor</td>
<td>5 (14.28)</td>
</tr>
<tr>
<td>Benign cystic teratoma</td>
<td>4 (11.42)</td>
</tr>
<tr>
<td>Dysgerminoma</td>
<td>1 (2.85)</td>
</tr>
<tr>
<td>Sex cord-stromal tumor</td>
<td>3 (8.57)</td>
</tr>
<tr>
<td>Granulosa cell tumor</td>
<td>1 (2.85)</td>
</tr>
<tr>
<td>Fibroma</td>
<td>2 (5.71)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (2.85)</td>
</tr>
<tr>
<td>Metastatic tumor</td>
<td>1 (2.85)</td>
</tr>
</tbody>
</table>
Neoplastic lesions of Ovary

- Serous cystadenoma - 17 cases of serous cystadenoma were studied. Gross findings - outer surface of all the cases was showing dilated veins. On cut, they were filled with serous fluid. Wall was variably thickened of all cases.
- Microscopically, the cyst was lined by single layer of columnar epithelium. In some cases, cyst was lined by single layer of flattened/cuboidal epithelium.
- Serous papillary cystadenoma - one case also reveals stromal papillae with single layer of columnar epithelium.
- Borderline serous cystadenoma - one case was studied. Microscopically, they were showing cyst wall lined by columnar epithelium. Epithelium was showing stratification (4–5 layers) and mild nuclear atypia and minimum mitotic activity. No stromal invasion was seen.
- Serous cystadenocarcinoma - three cases were studied. Microscopically, they were showing marked nuclear atypia, including pleomorphism, atypical mitotic figures, and multinucleation. They were also showing epithelial stratification, complex papillary architecture, branching papillary fronds, and destructive stromal invasion.
- Mucinous cystadenoma - three cases were studied. Microscopically, the cyst was lined by single layer of mucin filled columnar epithelial cells with basally located nuclei. Stromal element minimal between cyst wall.

Mucinous cystadenocarcinoma - two cases were studied.
- Microscopically, they were showing sheets, papillae, and trabeculae of tumors cells having round to oval pleomorphic nuclei, vesicular chromatin, and scanty amount of eosinophilic cytoplasm. Tumor cells embedded in mucinous background. In between tumor cells, there are bands of fibrocollagenous tissue separated by tumor cells in lobules.

Benign cystic teratoma - four cases were studied.
- Microscopically, they were showing areas of hemorrhage along with islands of sebaceous glands, shafts of hair follicles, and areas of chondroid differentiation.
- One case was showing sheets and nests of endoderm, mesoderm, and ectoderm mainly composed of thyroid follicles, respiratory epithelium, cartilage, neuroepithelium, shafts of hair follicles, and sebaceous glands with focal areas of squamous differentiation and keratin pearl formation.

Dysgerminoma - one case was studied.
- Microscopically, section was showing large areas of hemorrhage with distortion of architecture. However,
areas reveal few round cells having clear to eosinophilic cytoplasm with round or flattened nuclei. Occasional syncytiotrophoblastic cells are also seen.

Fibroma - two cases were studied.

- Microscopically, they were composed of spindle-shaped cells with uniform, bland nuclei, and scanty cytoplasm. The cells were arranged in fascicles or a storiform pattern.

Granulosa cell tumor - one case was studied.

- Microscopically, section was showing solid sheets of tumor cell having polygonal enlarged pleomorphic, hyperchromatic nuclei with scanty cytoplasm, and Call-Exner bodies. At few places, mitotic figures were also evident. Section was also showing areas of necrotic material and hemorrhage.

Metastatic tumor (Krukenberg tumor) - one case was studied

- Microscopically, section was showing highly fibrous stroma diffusely infiltrated signet ring cells containing abundant mucin.
DISCUSSION

Ovarian cancer is the second leading cause of mortality among all gynecological cancers. Due to similar clinical presentations, there is confusion in the diagnosis of non-neoplastic and neoplastic lesions of ovary although it is diagnosed as a mass or cystic lesion on ultrasonography (USG) and, hence, removed prophylactically in routine oophorectomies and hysterectomies. In the current study, 50 ovarian lesions of non-neoplastic and neoplastic origins were evaluated to find out incidence, age, parity, marital status, clinical, and histopathological features. Kreuzer et al. reported 82 (40.39%) non-neoplastic lesions of 203 ovarian lesions and Martínez-Onsurbe et al. reported 55 (41.67%) non-neoplastic lesions of 132 ovarian lesions. Incidence reported in our study regarding non-neoplastic lesions was lower and concurring with the above studies. The non-neoplastic lesions such as follicular or corpus luteum cysts are the commonly encountered conditions. Figure 1 In neoplastic lesions benign tumours were more common in age group of 20-39 year, borderline tumours was more common in age group of <19 year while malignant tumours were more common in age group of 40-59 years. In the current study, 14 cystic lesions were reported of which follicular 6 (42.85%), corpus luteum 4 (28.57%), three hemorrhagic cyst, and one inclusion cyst. Incidence of these cysts was accordance with to Kreuzer et al. (55% follicular cyst and 45% corpus luteal cyst) and Martínez-Onsurbe et al. (55% follicular cyst and 45% corpus luteal cyst). Gupta et al. reported follicular and corpus luteal cyst (80.2%). In the present study, the incidence was 93.32%, which was higher than this study. Endometriosis is common condition found in women of reproductive age. The most common location of endometriosis is the ovary and posterior cul-de-sac. In our study, one case (6.66%) was reported. This finding was higher than to Gupta et al. (2.9%), Carey and Kirk, and Clement et al. Al-Fozan and Tulandi in a study conducted for 6 years reported 340 lesions, of which 155 (45.59%) were ovarian endometriosis. In clinically suspected ovarian pathology cases, the most common clinical symptoms were menstrual irregularities/abnormal vaginal bleeding in 5 cases (33.33%), pain in abdomen in 4 cases (26.66%), pain in abdomen with white discharge per vagina in 2 cases (13.33%), and mass per abdomen only.
CONCLUSION

Effective therapeutic management of ovarian malignant tumors continues to be a challenge to the oncologist. An accurate histopathological diagnosis combines with clinical staging will help in rendering prompt and appropriate treatment to the patients.

The histological type of ovarian tumor correlates with the prognosis of the tumor. Serum CA-125 screening along with annual pelvic examination after 35 years of age in women along with transvaginal USG can be used as regular screening methods to evaluate early detection of ovarian cancer.

RECOMMENDATIONS

- Further, in-depth studies are highly recommended to be carried out for more evaluation of risk factors and to find out the causes for the high rate of the disease in this country. For unnecessary removal of the ovary, frozen section is recommended.
- Screening policy for ovarian cancer should be established for early detections.
- Improvement of the cancer reporting and registration. Detailed histopathological reporting, grading and staging.

REFERENCES

10. Al-Fozan H, Tulandi T. Left lateral predisposition of endometriosis and in 2 cases Figure - 2 (13.33%). These findings were similar to van Winter et al.[15] study.
- In the present study, 35 neoplastic lesions were diagnosed. The most common were benign tumors 26 cases (74.28%) followed by malignant tumor 8 cases (22.85%) and borderline malignancy 1 case (2.85%) (Table 1).
- In the present study, maximum numbers of cases were in the 3rd–4th decade of life. The present study is in concordance with Pilli et al.[10] and Ramachandra et al.[17] where the incidence of ovarian neoplastic lesions was more common in 20–39 years of age group. Tushar et al.[18] reported high incidence of ovarian tumors in 40–59 years age group.
- There is inverse relationship between ovarian cancer risk and parity. Parous women are at significantly lower risk than nulliparous women. In our study, the incidence of nulliparity (16%) is comparable with Misra et al. (16.00%) and Madan et al. (14.54%).[19-21]
- Based on histomorphological features, the incidence of surface epithelial tumors was most common (74.28%), followed by germ cell tumors (14.28%), sex cord-stromal tumors (8.57%), and metastatic (2.85%). Similar observations were seen in other studies (Table 3).
- In benign and malignant ovarian neoplasm, lump in abdomen was the most common complaint, followed by pain in abdomen, gastrointestinal disturbances with loss of weigh/appetite, and ascites. These findings were in accordance with other studies.
- The present study is concordant with studies by Gupta et al.[22] and Misra et al.[23] and with Nucci et al.[24] which showed high incidence of malignant tumor having more number of tumors with solid and mixed consistency. Majority of the benign lesions (68.57%) in the present study were cystic in consistency. Moreover, majority of malignant lesions (14.28%) were having mixed consistency. This result is concordant with studies by Gupta et al.[21] and Misra et al.[23]
- In the present study, of total 35 neoplastic ovarian lesions, 32 cases were unilateral and three cases were bilateral. This result is concordant with studies by Goldzieher et al.[24] Mushtaq et al.[25] and Couto et al.[26] Tushar et al.[18] reported more number of bilateral tumors compared to the present study. Most of the benign tumors (71.42%) were unilateral and most of malignant tumors (17.14%) were also unilateral tumors. This result is concordant with studies by Misra et al.[23] and Prabhakar et al.[27]
- Ovarian cancers are called “silent killer” as in most of the primary ovarian tumor, they remain asymptomatic until the advanced stage Figure 4[28] Out of total 35 neoplastic ovarian lesions, 32 cases were unilateral and 3 cases were bilateral.

Evaluate this statement: “In the present study, of total 35 neoplastic ovarian lesions, 32 cases were unilateral and three cases were bilateral.”

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