*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*
*e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 18, Issue 3 Ser. 7 (March. 2019), PP 12-19*
*www.iosrjournals.org*

# Histopathological Study of Spectrum of Ovarian Lesions

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***Abstract:***
***Introduction:*** *Ovarian neoplasms are herterogenous and manifest with wide spectrum of clinical, morphological and histological features. The complex nature, unpredictable behavior, prognosis and controversial management makes ovarian lesions fall in the line of interest.*
***Objectives:*** *This study was undertaken to analyse and characterize the ovarian lesions based on the histopathological features and to find out the frequency of benign and malignant neoplasms studied.*
***Materials and methods:*** *This is a retrospective-prospective study of ovarian lesions conducted at a tertiary care centre, over a period of four and half years.*
***Results****: Out of 96cases studied, majority were benign tumors, followed by malignant and borderline ovarian lesions. Most common age group of presentation was 41-50 years. Surface epithelial tumors out-numbered among the ovarian lesions and serous cystadenoma was the most predominant lesion.*
***Conclusion:*** *The ovary is a frequent site for primary and metastatic tumors. The prognosis and varying therapeutic strategies of ovarian tumors necessitate an accurate pathological evaluation. Although newer techniques like IHC and molecular analysis make diagnosis easier and precise, histopathological evaluation still remains gold standard.*

***Key Words:*** *Benign, malignant, ovarian, neoplasm*

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Date of Submission: 25-02-2019 Date of acceptance: 11-03-2019

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## I. Introduction

The ovaries are the paired intra-pelvic organ of the female reproductive system. Ovary being complex and unique organ include wide spectrum of neoplasms involving a variety of histological patterns ranging from epithelial tissues connective tissues, specialized hormone secreting germinal and embryonal cells.[1]

Tumors of the ovary are common form of neoplasia in women. [2] Ovarian tumors accounts for 3% of total cancers in females and the 5th most common form of cancer related deaths in females. Ovarian neoplasms are insidious in onset and the poor survival is due to the fact that they do not clinically manifest early and appropriately 60-70%of the neoplasms present in advanced stages.[3,4]

Ovarian cancer is the 7th leading cause of cancer death (age standardized mortality:4/1,00,000) among the worldwide.[5,6]

Ovarian neoplasms are rare in young age group.[8] They commonly present with abdominal pain, a lump or menstrual irregularities. In general benign ovarian tumors are more common and account for 80% of all ovarian neoplasms. Ovary being a common site of primary malignancy[7], metastasis may occur.

Risk factors for ovarian cancer are much less clear than for other genital tumors, but nulliparity, family history and heritable mutations play a role in tumor development.[9]

Serum HCG, serum CA-125,serum alpha-fetoprotein, placental alkaline phosphatase and lactacte dehydrogenase are useful tumor markers. Ancillary techniques like transvaginal ultrasonography Doppler colour flow, immunohistochemistry (IHC), genetic studies, and are helpful in diagnosis in difficult cases of ovarian tumors.

Ovarian tumors cannot confidently be distinguished from one another on the basis of their clinical, radiological or gross characteristics, it is important to determine the histological pattern of ovarian tumor to achieve the optimum treatment response as prognosis depends on the degree of differentiation.[3,11]

## II. Aim and objectives

The present study was undertaken:

1. To analyse the frequency and to study the distinctive morphological features of various neoplastic lesions of the ovary.
2. To study the age wise distribution of ovarian tumors.

## III. Materials and methods

***Study design:*** Descriptive cross-sectional (Retrospective-Prospective) study.
***Study location:*** Study was conducted in the Department of Pathology, Maharajah's Institute of Medical Sciences, Nellimarla, Vizianagaram.
***Duration of study:*** Four and a half years study. Retrospective study (November 2012 - June 2016) and a prospective study (July 2016 - April 2017).
***Sample size:*** A total of 96 cases were studied.
***Inclusion criteria:*** All histologically proven neoplastic lesions of ovary.
***Exclusion criteria:*** Non-neoplastic lesions and tumor like lesions of ovary during the study period.

***Methodology:***

The prospective study (July 2016 - April 2017) included all ovarian specimens that were received in the department of Pathology, Maharajah's Institute of Medical Sciences, Nellimarla, Vizianagaram.

For retrospective study, the cases reported during November 2012 - June 2016 were taken from the records of the department and the blocks were retrieved and relevant clinical history was noted from the requisition forms.

Gross specimens received in 10% formalin were adequately fixed and multiple sections were given from representative areas and tissue was processed and subjected to routine hispthopatholgical techniques.
Paraffin sections and slides from fresh blocks and the retrieved blocks were stained with Hematoxylin and Eosin (H&E). Special stains (like PAS and Reticulin, etc) were done by standard procedures whenever required. The slides were then reviewed microscopically in detail and tumors were classified according to the WHO classification of ovarian tumors.

## IV. Results

A total of 96 cases were studied.

**Table 1: AGE WISE DISTRIBUTION OF OVARIAN LESIONS**

| AGE | NO. OF CASES | PERCENTAGE |
|---|---|---|
| <20 | 7 | 7.29% |
| 21-30 | 12 | 12.5% |
| 31-40 | 24 | 25% |
| 41-50 | **36** | **35.7%** |
| 51-60 | 15 | 15.62% |
| >60 | 2 | 2.08% |
| Total | 96 | 100% |

In the present study most of the ovarian neoplasms were noted in the 5$^{th}$ decade (41-50years).

**Graph 1:**

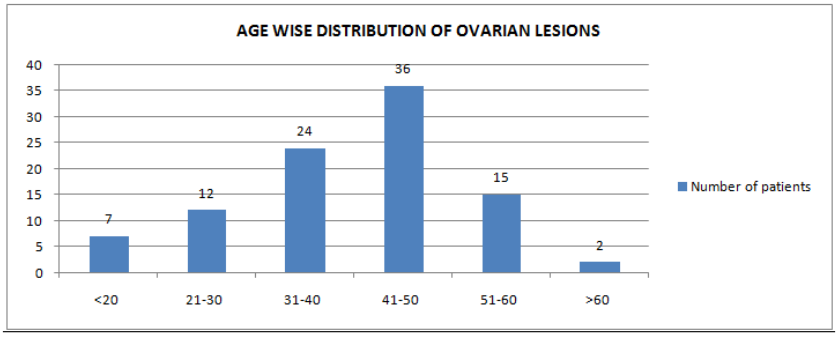


**Table 2: MODE OF CLINICAL PRESENTATION OF NEOPLASTIC LESIONS OF OVARY:**

| CLINICAL PRESENTATION | NO. OF CASES | PERCENTAGE |
|---|---|---|
| Mass per abdomen | **55** | **57.29%** |
| Mass with pain abdomen | 19 | 19.79% |
| Pain Abdomen | 11 | 11.45% |
| AUB | 3 | 3.12% |

| | | |
|---|---|---|
| Post menopausal bleeding | 4 | 4.16% |
| Irregular menstural cycles | 1 | 1.04% |
| Prolapse | 2 | 2.08% |
| Primary infertility | 1 | 1.04% |
| Total | 96 | 100% |

The most common clinical presentation was mass per abdomen followed by mass with associated pain abdomen and pain abdomen.

**Graph 2:**

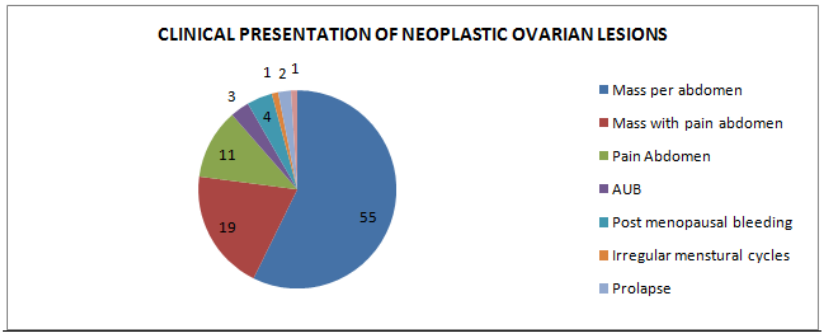


**Table 3: CONSISTENCY OF OVARIAN LESIONS:**

| CONSISTENCY | NO. OF CASES | PERCENTAGE |
|---|---|---|
| Cystic | **65** | **67.70%** |
| Solid/Cystic | 13 | 13.54% |
| Solid | 18 | 18.75% |
| Total | 96 | 100% |

In the present study cystic lesions showed a predominance correlating to their histologically benign nature.

**Table 4: HISTOPATHOLOGICAL PATTERN OF OVARIAN LESIONS:**

| HISTOPATHOLOGICAL PATTERN OF OVARIAN LESIONS | NO. OF CASES | PERCENTAGE |
|---|---|---|
| Surface Epithelial Tumors | **64** | **66.66%** |
| Germ Cell Tumors | 23 | 23.95% |
| Sex Cord Stromal Tumors | 7 | 7.29% |
| Metastatic Tumors | 1 | 1.04% |
| Miscellaneous | 1 | 1.04% |
| Total | 96 | 100% |

In this study, Surface epithelial tumors were noted in majority among ovarian tumors, followed by germ cell tumors and sex-cord stromal tumors.

**Graph 3:**

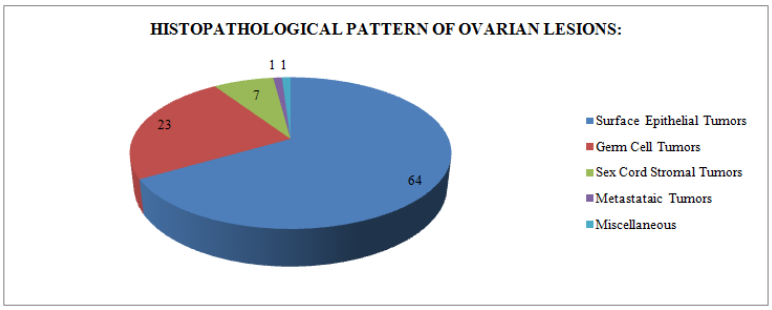


**Table 5: HISTOPATHOLOGICAL SPECTRUM OF OVARIAN NEOPLASTIC LESIONS:**

| OVARIAN TUMORS | NO. OF CASES | PERCENTAGE |
|---|---|---|
| **Surface epithelial tumors** | **64** | **100%** |
| **Benign:** | **56** | **87.5%** |
| Serous cystadenoma | 28 | 43.75% |
| Serous cystadenofibroma | 1 | 1.56% |
| Mucinous cystadenoma | 19 | 29.68% |
| Sero-mucinous cystadenoma | 6 | 9.37% |
| Brenner Tumor | 2 | 3.12% |
| **Borderline:** | **5** | **7.81%** |
| Borderline Serous | 1 | 1.56% |

| | | |
|---|---|---|
| Mucinous Borderline | 4 | 6.25% |
| **Malignant:** | **3** | **4.68%** |
| Serous cystadenocarcinoma | 1 | 1.56% |
| Mucinous cystadenocarcinoma | 1 | 1.56% |
| Endometrioid carcinoma | 1 | 1.56% |

| OVARIAN TUMORS | NO. OF CASES | PERCENTAGE |
|---|---|---|
| **Germ cell tumors** | **23** | **100%** |
| **Benign:** | **18** | **78.26%** |
| Benign cystic teratoma | **17** | 73.91% |
| Monodermal teratoma | 1 | 4.34% |
| **Malignant:** | **5** | **21.73%** |
| Immature teratoma | 1 | 4.34% |
| Teratoma with malignant transformation | 1 | 4.34% |
| Dysgerminoma | 2 | 8.69% |
| Yolk sac tumor | 1 | 4.34% |

| OVARIAN TUMORS | NO. OF CASES | PERCENTAGE |
|---|---|---|
| **Sex cord stromal tumors** | **7** | **100%** |
| **Benign** | **4** | **57.14%** |
| Thecoma | 1 | 14.28% |
| Fibroma | 1 | 14.28% |
| Fibrothecoma | 2 | 28.57% |
| **Malignant** | **3** | **48.85%** |
| Granulosa cell tumor | 3 | 48.85% |

In this study, Serous cystadenomas were noted to be the most common lesion among surface epithelial tumors, Benign cystic teratoma among germ cell tumors and Granulosa cell tumor among sex-cord stromal tumors. In the present study a case of Leiomyoma of ovary and a case of metastatic ovarian tumor/Krukenber's tumor was reported.

**Table 6: BEHAVIOUR OF OVARIAN LESIONS:**

| OVARIAN LESIONS | NO. OF CASES | PERCENTAGE |
|---|---|---|
| Benign | 79 | 82.29% |
| Borderline | 5 | 5.20% |
| Malignant | 12 | 12.5% |
| Total | 96 | 100% |

## V. Discussion

In the present study 96 cases of ovarian lesions were studied and maximum number of cases were seen in 5$^{th}$ decade followed by 4$^{th}$ decade. Present study is in concordance with Kar et al[15] with maximum number of lesions being noted in 40-59 years of age group.

**Table 7:** Comparision of age wise distribution of present study with other studies.

| | AGE GROUP IN YEARS | | | |
|---|---|---|---|---|
| STUDIES | 0-19 | 20-39 | 40-59 | >60 |
| Pilli et al (2001) | 7% | 58% | 30% | 5% |
| Kar et al (2005) | 7.4% | 41.79% | **46.28%** | 4.47% |
| Present study | 7.29% | 12.5% | **53.12%** | 2.08% |

**Table 8 :** Comparision of histopathological pattern of ovarian lesions with other studies

| STUDIES | BENIGN | BORDERLINE | MALIGNANT |
|---|---|---|---|
| Couto et al (1993) | **80.76%** | 16.91% | 2.33% |
| Maheshwari et al (1994) | **71.7%** | 23.7% | 4.4% |
| Pilli et al (2001) | **76%** | 21..2% | 2.8% |
| Gupta et al(20015) | **72.9%** | 4.2% | 22.9% |
| Present study | **82.29%** | 5.20% | 12.5% |

The present study was similar to all the other studies with benign ovarian lesions being most prevalent lesion.

**Table 9 :** Mode of clinical presentation of cases in various studies in comparision with present study.

| | MODE OF CLINICAL PRESENTATION | | |
|---|---|---|---|
| STUDIES | Mass per abdomen | Abdominal pain | Menstural irregularities |
| Couto et al (1993) | 80% | 5% | 3% |
| Maheshwari et al (1994) | 71% | 16% | 5% |
| Pilli et al (2001) | 23% | 63% | 4% |
| Present study | **57.29%** | 11.45% | 1.04% |

The most common clinical presentation in this study was Mass per abdomen and the present study showed concordance with Couto F et al[12] and Maheshwari et al[13].

**Table 10 :** Comparision of histological types of ovarian tumors in different studies and the present study.

| | HISTOLOGICAL TYPE OF OVARIAN NEOPLASM | | | |
|---|---|---|---|---|
| STUDIES | EPITHELIAL | GERM CELL | SEX CORD | METASTATIC |
| Gupta SC et al (1986) | 54.70% | 31% | 7.06% | 6.18% |
| Pilli et al (2001) | 71% | 21% | 7% | 0.70% |
| Kar et al (2005) | 79% | 16% | 1.50% | 1.20% |
| Present study | **66.66%** | 23.95% | 7.29% | 1.04% |

Present study correlated with all the other studies showing a similarity of higher incidence of ovarian neoplasm of surface epithelial in origin, followed by Germ cell tumors and sex cord stromal tumors.

Serous cystadenoma is the most common ovarian lesion among surface epithelial tumors and Benign/mature cystic teratoma showing predominance among germ cell tumors. Similar findings were seen in studies by Gupta et al[10] and Maheshwari et al[13].

Granulosa cell tumor (3.12%) showed a higher prevalence among sex-cord stromal tumors, and is the most common malignant tumor in the present study. Incidence in the present study was higher compared to Ramchandran et al[14] with Granulosa cell tumor accounting to 2.7%.

**Table 11:** Comparision of prevalance of consistency of lesions in different studies and present study.

| | CONSISTENCY OF OVARIAN LESIONS | | |
|---|---|---|---|
| STUDIES | CYSTIC | SOLID AND CYSTIC | CYSTIC |
| Gupta SC et al (1986) | 76.205 | 21.50% | 2.40% |
| Misra RK et al (1990) | 78% | 18% | 4% |
| Couto F et al(1993) | 61.23% | 28.57% | 10.20% |
| Present study | 67.70% | 13.54% | 18.75% |

Present study has concordance with the other studies and showing a majority of benign cystic ovarian lesions among the ovarian neoplasms. Majority of the malignant lesions had mixed consistency.

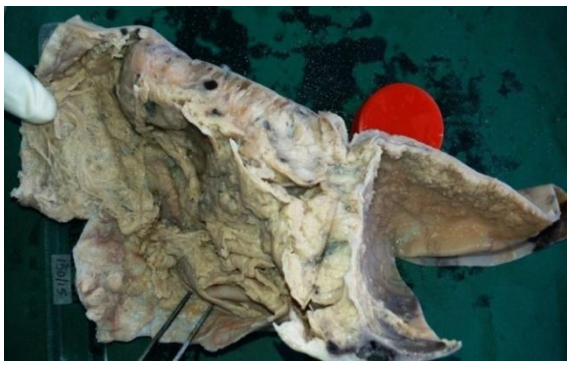

**Image 1:** Gross image of Serous cystadenocarcinona: Cut section showing thickened cyst wall with solid grey white areas and grey brown areas. Also showing papillary structures and granular areas.

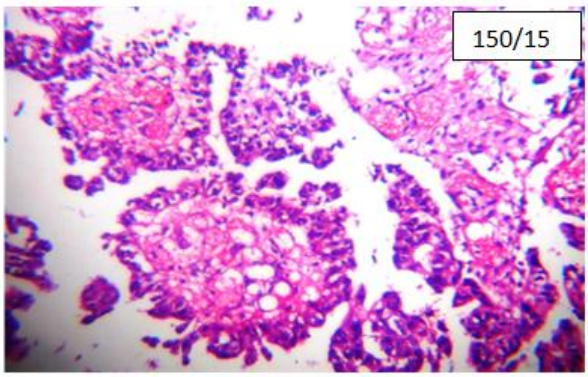


**Image 2: H&E(100x)**: Microphotograph showing papillary structures without intervening stroma. The cells are highly pleomorphic with atypia. There are also ocassional Psamomma bodies.


**Image 3:** Gross image-solid grey white nodular mass. Cut section showing capsule , solid homogenous areas with few cystic spaces

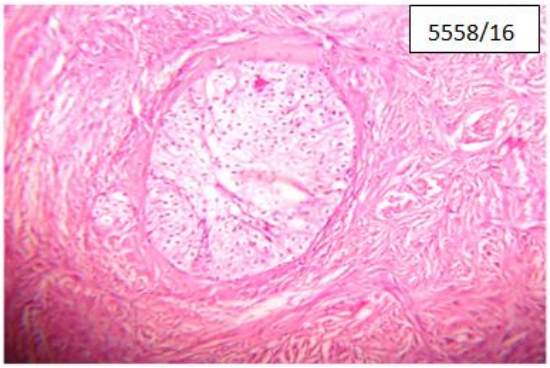


**Image 4: (H&E:400x)** Microphotograph showing nests of benign transitional epithelium with clear cell change surrounded by fibrocollagenous stroma.

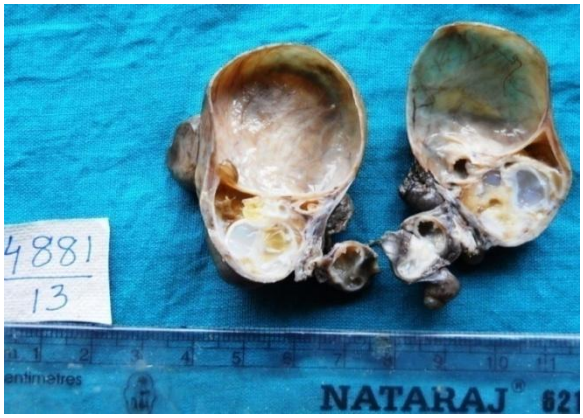


**Image 5**: Gross image of Monodermal Teratoma- **Struma Ovarii**

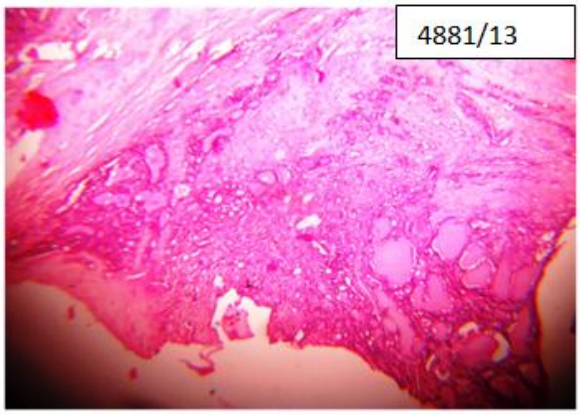


**Image 6: (H&E:100x)** Microphotograph of ovarian cyst constituting thyroid tissue.


**Image 7:** Gross image of Yolk sac tumor showing capsule with solid grey white areas, few cystic areas with focal grey brown areas.

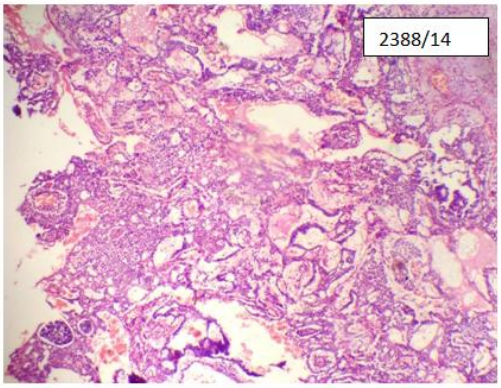


**Image 8: (H&E: 100X)** Microphotograph showing reticular pattern of arrangement of tumor cells with Schiller-Duval bodies.

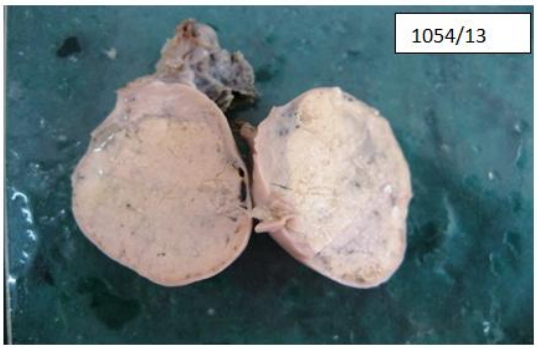


**Image 9:** Gross Specimen of Granulosa cell tumor showing greyish white and yellowish areas with few cystic spaces

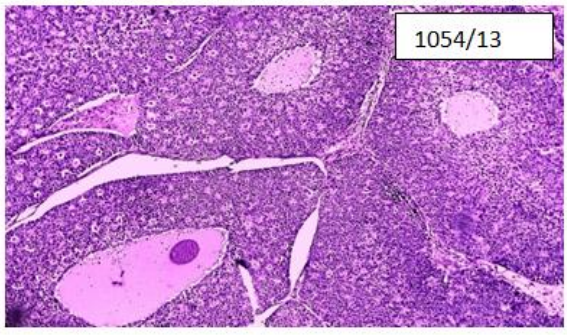


**Image 10: (H&E:100X):** Microphotograph showing follicular pattern of arrangement with Call-exner bodies

## VI. Conclusion

Majority of the ovarian lesions being noted in the 5th decade. Mass per abdomen was the most common clinical presentation.

Surface epithelial tumors are the commonest ovarian tumors followed by germ cell tumors and sex cord stromal tumors. Cystic ovarian lesions showed a higher prevalence in the present study. Benign ovarian lesions showed predominance, followed by malignant and border-line ovarian neoplasms.

An accurate histopathological diagnosis in combination with clinical staging will help in rendering prompt and appropriate treatment to the patient and still remains gold standard.

Specialised ancillary techniques like special stains, IHC markers, ultrastructural studies and cytogenetics enable a vast scope for reaching specific and reliable diagnosis in difficult cases of ovarian tumors.

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Sonia Mohan. "Histopathological Study of Spectrum of Ovarian Lesions." OSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 3, 2019, pp 12-19.