

**To Study and type the Ovarian Tumors based on Histopathological features**Dr. Priyanka Kiyawat<sup>1</sup>, Dr. S. S. Nandekar<sup>2</sup>, Dr. A. V. Varma<sup>3\*</sup>, Dr. Kamal Malukani<sup>4</sup><sup>1</sup>Asst. Prof, Dept. of Pathology, SAIMS & PGI, Indore, M.P, India<sup>2, 4</sup>Prof, Dept. of Pathology, SAIMS & PGI, Indore, M.P, India<sup>3</sup>Prof & Head, Dept. of Pathology, SAIMS & PGI, Indore, M.P, India**Original Research Article****\*Corresponding author**

Dr. A. V. Varma

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**Abstract:** Ovary is the most important organ, as it is concerned with the reproduction of progeny. Ovary is also unique in the variety of lesions that can arise from it. Ovarian cancer accounts for about 3% of all cancers in women. According to the Surveillance Epidemiology and End Results (SEER) data ovarian tumors represent about 27% of all female genital cancers and account for 52% of deaths caused by female genital cancers. Ovarian cancer is the ninth most common cancer among women, excluding non-melanoma skin cancers. It ranks fifth in cancer deaths among women, accounting for more deaths than any other cancer of the female reproductive system<sup>1</sup>. A woman's risk of having an ovarian cancer at birth is 1-1.5% and that of dying from it is 0.5%.<sup>2</sup> Surface epithelial tumors were the commonest variety constituting (69.46 %) of all the ovarian tumors followed by germ cell tumors (21.67%), sex-cord stromal tumors (8.37%) and metastatic tumors (0.49%). In the present study a total number of 203 cases of ovarian tumors were studied. Among 203 cases, 150 cases (73.89%) were benign, 2 cases (0.98%) were of borderline and 51 cases (25.12%) were malignant.

**Keywords:** Ovarian Tumors & Histopathological.**INTRODUCTION**

Ovary is the most important organ, as it is concerned with the reproduction of progeny. Ovary is also unique in the variety of lesions that can arise from it. Ovarian cancer accounts for about 3% of all cancers in women.

According to the Surveillance Epidemiology and End Results (SEER) data ovarian tumors represent about 27% of all female genital cancers and account for 52% of deaths caused by female genital cancers. Ovarian cancer is the ninth most common cancer among women, excluding non-melanoma skin cancers. It ranks fifth in cancer deaths among women, accounting for more deaths than any other cancer of the female reproductive system [1]. A woman's risk of having an ovarian cancer at birth is 1-1.5% and that of dying from it is 0.5% [2].

Of all the gynecological cancers, ovarian tumors represent the greatest challenge to clinicians, because it is very difficult to diagnose it in early stage due to its nonspecific symptoms & even asymptomatic nature in many cases [2]. On the other hand, ovarian tumors at advanced stage are easy to diagnose but associated with poor prognosis, despite advances in surgery, chemotherapy and more recently, targeted therapy. Ovarian tumors are also a constant source of confusion to the pathologists, because of the wide spectrum of clinical & morphological features. Further certain non-neoplastic lesions of ovary

frequently form a pelvic mass and often associated with abnormal hormonal manifestations, thus potentially mimicking ovarian neoplasm [2].

**Histology of ovary**

- **Germinal epithelium:** a simple cuboidal epithelium covering the ovary, continuous with the mesothelium of the peritoneum.
- **Medulla:** Located in the center of ovary, composed of loosely packed connective tissue, blood vessels, nerves and lymphatics.
- **Cortex:** Contain follicles in different stages of development. Stroma of the cortex forms a dense capsule called the tunica albuginea which lies beneath the basement membrane of germinal epithelium [5].

**Histogenesis of ovarian tumors**

- **Surface epithelial tumors:** are believed to originate from the surface epithelium of ovary which develops from the coelomic epithelium (mesothelium) which is the epithelium that lines the interior of the pelvic and abdominal cavities.

- Sex cord stromal tumors: are believed to originate from theca cells, other stromal cells, granulosa cells and their testicular sex cord counterpart, the Sertoli and Leydig cells.
- Germ cell tumors: derived from primordial germ cells [6].

#### AIMS AND OBJECTIVES

To study and type the ovarian tumors based on histopathological features.

#### MATERIALS AND METHODS

The present study of ovarian tumors was carried out at Sri Aurobindo Medical College & PG Institute; Indore (M.P.). Study included prospective cases over period of 2 years.

History, clinical features and investigation profile were collected from the patients and from the requisition form filled by clinicians. The blocks were cut and stained by routine H&E stain [1, 12].

The tissues received were fixed in 10% formal saline for 24 hours and processed in the tissue processing machine (Histokinette) in following manner:

- ✓ 10% formalin 1 hour
- ✓ 70% alcohol 1 hour
- ✓ 80% alcohol 1 hour
- ✓ 90% alcohol 1 hour
- ✓ 95% alcohol 1 hour
- ✓ Absolute alcohol 1 hour
- ✓ Absolute alcohol 1 hour
- ✓ Absolute alcohol 1 hour
- ✓ Xylene 1- 1 hour
- ✓ Xylene 2- 1 hour
- ✓ Paraffin wax 1- 2 hours
- ✓ Paraffin wax 2- 2 hours

Paraffin embedded tissue were then blocked in paraffin wax with the help of Plastic moulds. Sections of 3-4 microns were cut on a rotary microtome. Short Ribbons of the sections were floated out in a water bath. Then they were picked up on micro-slides already coated with albumin-glycerine adhesive and kept on hot plate at 60°C temperature for 45 minutes.

#### Staining

Paraffin sections were stained by hematoxyline and eosin method as follows:

- **Deparaffinization:** Sections were deparaffinized by immersing the sections in two changes of xylene for 5 minutes each.
- **Hydration:** Deparaffinized sections were dipped for two minutes each in 95% and 75% alcohol in turn and then transferred to distilled water.
- **Hematoxyline:** The Sections were transferred to "Harris Hematoxyline" for five minutes.

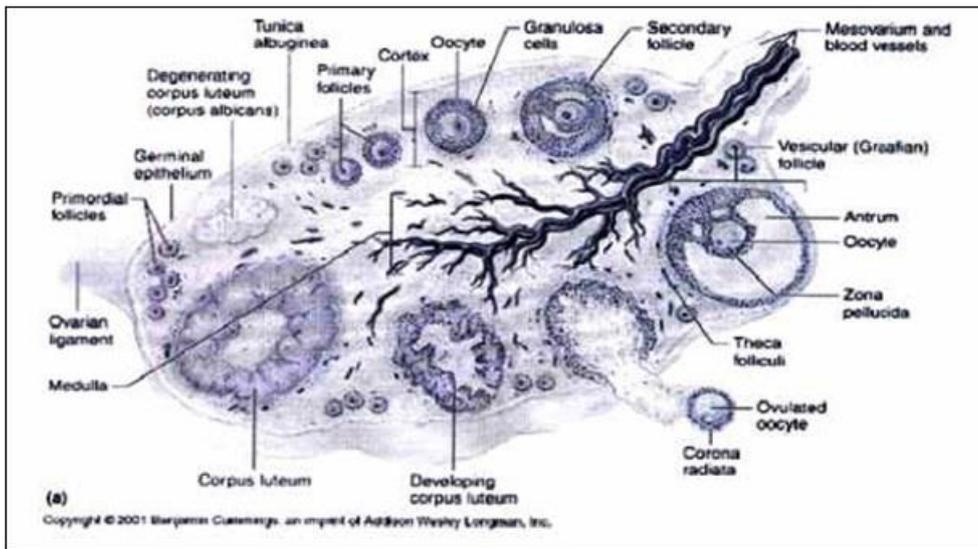
- **Decolorisation:** The sections were quickly dipped in 0.5% hydrochloric acid.
- **Blueing of sections:** Done by transferring the sections in running water, dipping it in dilute ammonia water and again washing them in running tap water for ten minutes.
- **Counter stain with eosin:** Sections were then counter-stained in 2% aqueous eosin solution.
- **Dehydration:** Sections were dehydrated by passing them in ascending concentrations of alcohol viz. 70, 80, 95% and absolute alcohol, for 2 minutes each.
- **Clearing:** Dehydrated sections were transferred to an alcohol-xylene mixture for 2 minutes and were passed through two changes of xylene.
- Sections were mounted in DPX and examined after drying.

Specimens received were studied thoroughly with special reference to following points:

1. Site (unilateral or bilateral)
2. Size of mass
3. External surface & colour
4. Intactness of capsule.
5. Presence of any papillae or nodules on external surface.
6. Cut surface of tumor for its nature (Solid/Cystic/Mixed).
7. Cut surface for presence or absence of necrosis and hemorrhages.
8. In case of cystic lesions, nature of the cyst (uniloculated or multiloculated) and its contents were noted. Presence of teeth, hair tufts, cartilage, bone and any other adnexal structures were also noted.
9. Any thickened area or papillae in the cyst wall were noted and the sections were taken from these areas.
10. Multiple sections were taken from cysts in cases of mucinous tumors to rule out the presence of borderline or malignant tumors.
11. Predominantly solid lesions were serially sectioned and checked for areas of hemorrhages, necrosis or any firmness.

Adequate representative sections from ovarian tumors along with uterus and contralateral adnexa, in hysterectomy specimens were submitted for histology. Omental biopsies and peritoneal fluid collected during operative procedures were submitted for appropriate processing. The tissues were fixed in 10% formalin and processed through standard paraffin embedding technique [14]. Sections of approximately 5  $\mu$  will be taken and stained by routine haematoxylin and eosin [13]. Special stains like PAS and reticulin were also done wherever necessary in both studies. They were further examined microscopically. The tumors were classified as per WHO classification [3].

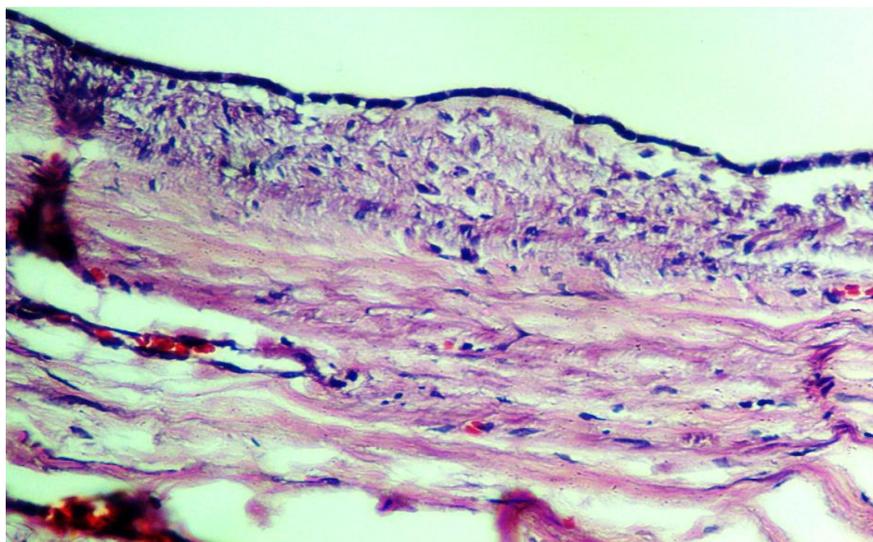
#### OBSERVATIONS & RESULTS



**Fig-(A): Histology of Ovary**  
(copyright©2001Benjamin Cummings, an imprint of Addison Wesley Longman, Inc.) [4]



**Fig-1: Serous cystadenoma: Cut surface showing multilocular cysts filled with serous fluid**



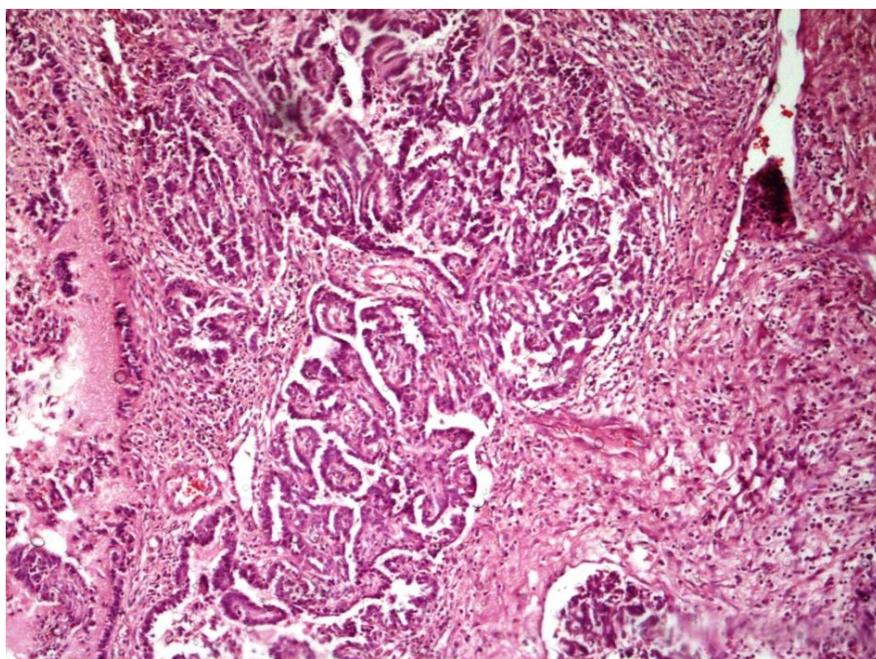
**Fig-2: Serous cystadenoma: Photomicrograph showing cyst wall lined by flattened epithelium (H&E: 100X).**

The material under the present study for the period from October 2013 to September 2015 (only prospective) contained 203 cases of ovarian tumors. Out

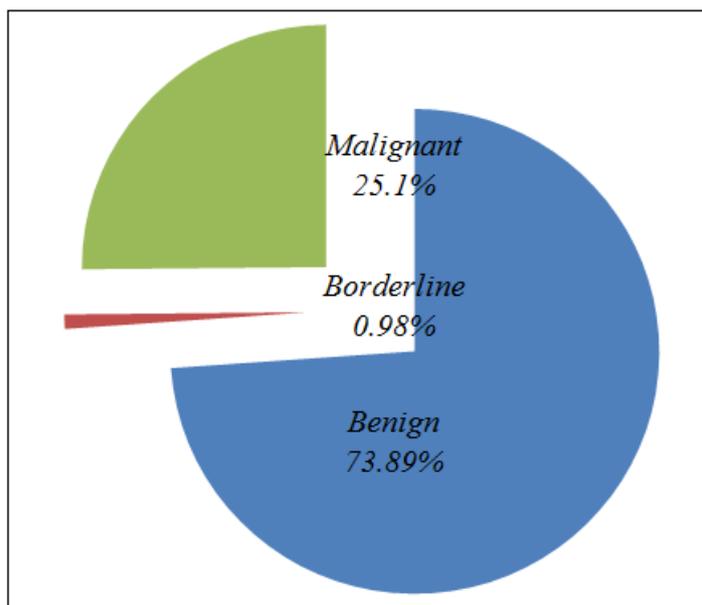
of 203 cases, 150 (73.89%) were benign, 51(25.1%) were malignant tumors and 2 (0.98%) cases were borderline tumors.



**Fig-3: Papillary serous cystadenocarcinoma: Gross photograph showing TAH + BSO specimen; Left Ovarian mass showing multiple papillary excrescences on surface.**



**Fig-4: Papillary serous cystadenocarcinoma: Photomicrograph showing papillary fronds, nuclear atypia and stromal invasion (H&E: 40X).**



**Fig-5: Distribution of ovarian tumors according to morphology**

The clinical presentation, symptoms and ovarian parameters viz, age; parity, menstrual pattern etc. were recorded. The specimens were studied in detail as per method described in materials and methods.

**Main histological types of ovarian tumors**

Frequency of commonest SETs in the present study was 69.46%, followed by germ cell tumors

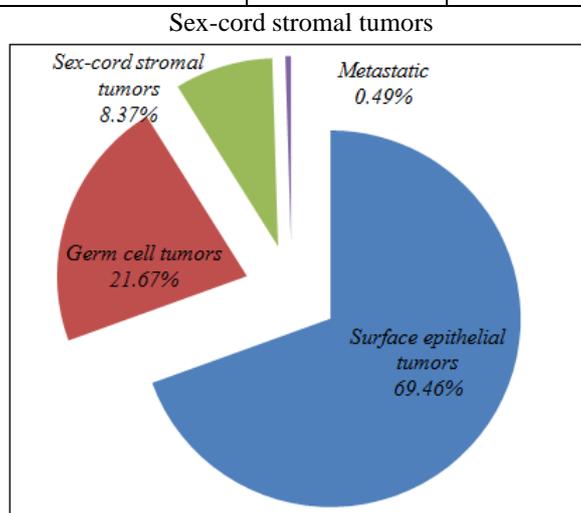
21.67%. Benign tumors were commonest accounting for 73.89% (Table-1).

**Frequency of different ovarian tumors**

Most common tumor observed in the present study was benign serous cystadenoma followed by mucinous cystadenoma (Table-2).

**Table-1: Distribution of ovarian tumors according to histological type**

Type	No. of cases (n)	Percentage (%)
Surface epithelial tumors	141	69.46
Germ cell tumors	44	21.67
Sex-cord stromal tumors	17	8.37
Metastatic	1	0.49
<b>Total</b>	<b>203</b>	<b>100</b>



**Fig-6: Distribution of ovarian tumors according to histology**

**Table-2: Different histological types of ovarian tumors**

	No. of cases (n)	Percentage (%)
<b>Surface epithelial tumors</b>	<b>141</b>	<b>69.46</b>
<b>A. Serous tumors</b>	<b>79</b>	<b>38.91</b>
a. Benign	55	27.09
i. Cystadenoma	49	
ii. Papillary cystadenoma	4	
iii. Cystadenofibroma	1	
iv. Papillary cystadenofibroma	1	
b. Borderline malignancy	1	0.49
i. Papillary cystadenoma	1	
c. Malignant	23	11.33
i. Cystadenocarcinoma	2	
ii. Adenocarcinoma	4	
iii. Papillary cystadenocarcinoma	17	
<b>B. Mucinous tumors</b>	<b>59</b>	<b>29.06</b>
a. Benign	45	22.16
i. Cystadenoma	45	
b. Borderline	1	0.49
c. Malignant	13	6.40
i. Cystadenocarcinoma	8	
ii. Papillary cystadenocarcinoma	3	
iii. Adenocarcinoma	2	
<b>C. Endometrioid carcinoma</b>	<b>1</b>	<b>0.49</b>
<b>D. Clear cell carcinoma</b>	<b>2</b>	<b>0.99</b>
	<b>No. of cases (n)</b>	<b>Percentage (%)</b>
<b>Germ cell tumors</b>	<b>44</b>	<b>21.67</b>
<b>A. Dysgerminoma</b>	<b>1</b>	<b>0.49</b>
<b>B. Teratoma</b>	<b>41</b>	<b>20.19</b>
a. Mature	41	
<b>C. Yolk sac tumor</b>	<b>1</b>	<b>0.49</b>
<b>D. Mixed germ cell tumor</b>	<b>1</b>	<b>0.49</b>
<b>Sex-cord stromal tumors</b>	<b>17</b>	<b>8.37</b>
<b>A. Granulosa cell tumor</b>	<b>8</b>	<b>3.94</b>
<b>B. Thecoma-fibroma group</b>	<b>5</b>	<b>2.46</b>
<b>C. Sertoli- Leydig cell tumor</b>	<b>3</b>	<b>1.47</b>
<b>D. Mixed Sex-cord stromal tumors</b>	<b>1</b>	<b>0.49</b>
<b>Metastatic tumors</b>	<b>1</b>	<b>0.49</b>
<b>A. Krukenberg tumor</b>	<b>1</b>	<b>0.49</b>

**DISCUSSION**

Ovary is perhaps the only organ of the body, tumor of which present with a wide spectrum of histological varieties, different behavior and different histomorphological features. In the era of immunohistochemistry and molecular pathology,

where diagnosis is based on these, in the institutes with limited resources like us, these clinicomorphological features are very helpful for diagnosis and proper management of the patients. The present study was conducted over a period of two years prospectively to study the clinical and histopathological

features of different type of ovarian tumors. We have compared our results with similar studies in India and abroad. Thus data available for comparison is from different geographic areas and over different time periods.

**Frequency of main histological types of ovarian tumors**

In our study, SET stands as the most common ovarian neoplasm 141 cases (69.46%) followed by germ cell tumors 44 cases (21.67%), sex cord stromal tumors 17 cases (8.37%) and metastatic tumor one case (0.49%) .These findings are in accordance with the literature.

**Table-3: Incidence of different histological types of ovarian tumors in various series**

Study	SETs n (%)	Germ cell tumors n (%)	Sex cord stromal tumors n (%)	Metastatic Tumors n (%)
Verma & Bhatia [15]	262 (65.0)	85 (21.1)	29 (7.2)	26 (6.5)
Prabhakar & Maingi [7]	386 (60.69)	173 (27.0)	51 (8.0)	26 (2.95)
Ahmad et al., [8]	543 (63.50)	232 (27.13)	50 (5.84%)	21(2.45)
Pilli GS et al.,[9]	200 (70.9)	60 (21.2)	19 (6.7)	02 (0.7)
Gupta et al., [10]	63 (65.6)	23 (23.9)	08 (8.3)	02 (2.0)
Swamy & Satyanarayana [11]	74 (61.6)	26 (21.7)	14 (11.7)	06 (5.0)
A. Bhagyalakshmi et al., [12]	214 (80.2%)	38 (14.2%)	11 (4.1%)	04(1.4)
Present Study	141(69.46)	44(21.67)	17(8.37)	1(0.49)

SETs of the ovary are the most commonly encountered tumors in all studies ranging from 60.69% to 80.2% followed by germ cell tumors 14.25% to 27.13%.

**SUMMARY & CONCLUSION**

In the present study we attempted to find out the frequency of various ovarian tumors and to review their clinical presentation, morphological and histological features.

- Surface epithelial tumors were the commonest variety constituting (69.46 %) of all the ovarian tumors followed by germ cell tumors (21.67%), sex-cord stromal tumors (8.37%) and metastatic tumors (0.49%).
- In the present study a total number of 203 cases of ovarian tumors were studied. Among 203 cases, 150 cases (73.89%) were benign, 2 cases (0.98%) were of borderline and 51 cases (25.12%) were malignant.

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