Clinical and Experimental Health Sciences

Morphological Spectrum and Frequency of Ovarian Tumors in a Tertiary Care Hospital, Lahore

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Abstract

Objective: To determine the frequency and histological types of benign and malignant ovarian tumors in a Tertiary Care Hospital, Lahore.

Study Design: Cross-sectional, retrospective study.

Place and Duration of Study: Department of Pathology, Central Park Medical College/Central Park Teaching Hospital, Lahore, from January 2023- December 2024.

Methodology: All benign and malignant ovarian masses in all age groups were included. Inflammatory tubovarian masses, follicular cysts, cystic follicles, non specific pelvic masses and normal ovaries were excluded.

Results: A total of 116 ovarian tumors were reported including 77(66.3%) benign tumors having an age range between 14 years to 60 years and 39(33.6%) malignant cases having an age range between 17 years to 69 years. Bilateral ovarian tumors constituted 25 cases which included 13 benign & 12 malignant cases. Surface Epithelial tumors comprised the largest group of ovarian tumors constituting 82 cases (70.68%) followed by Germ cell tumors constituting 26 cases (22.41%). In the benign category, serous cyst adenomas constituted 22(28.5%) cases & endometriotic cysts comprised 17 (22.07%) cases. In the malignant category, High Grade Serous Carcinoma (HGSC) constituted of 19 cases (48.71%) & Endometrioid adenocarcinoma comprised of 10 (25.64%) cases. Serous borderline tumor (micropapillary type) was reported in 02 cases. Malignant germ cell tumors & granulosa cell tumor constituted 4 cases (10.25%) & 01 case respectively. Metastatic tumors included 02 cases of Krukenberg tumors (from gastric primary) & 01 case of metastatic Mucinous adenocarcinoma (from colorectal primary). **Conclusion:** Surface epithelial tumors were the commonest category of ovarian tumors in both benign and malignant cases, followed by germ cell tumors. An increase in the frequency of ovarian tumors in younger age groups was also noted. Metastases to the ovary were mostly gastrointestinal in origin. **Keywords:** Ovarian tumors, Surface epithelial tumors, High Grade Serous Carcinoma (HGSC), Germ Cell Tumors (GCT), Krukenberg tumor.

INTRODUCTION

The ovaries are a common site for both neoplastic and non-neoplastic lesions and show a wide spectrum of histological subtypes ranging from harmless simple cysts to aggressive malignant neoplasms (1). Ovarian tumors include a large variety of complex neoplasms arising from the epithelial tissues, connective tissues, specialized hormone secreting germinal and embryonal cell components of the ovary (2). Ovarian cancer is the commonest & most deadly malignancy of the female genital tract, representing the greatest clinical challenge in gynecology (3). It constitutes for 3% of all cancers in women worldwide and it was estimated that there were 295,414 new cases of ovarian cancer in 2018, with 184,799 deaths, making it one of the commonest types of gynecological malignancy (4). Worldwide data demonstrates variation in the incidence of ovarian cancer as well as its many morphological forms. It is estimated that more than 200,000 women are likely to develop ovarian cancer every year and about 100,000 die from the disease. It is the commonest cause of death from gynecological cancer in females in the United States. In most developed countries, it is the 2nd commonest malignancy of the female genital tract following endometrial cancer (5). Pakistan has one of the highest rates of ovarian cancer among various Asian countries. According to a recent study, ovarian cancer is the second most common cancer after breast cancer among females in Pakistan (4).

Although the exact etiology of ovarian cancers is not clear, but a positive family history has the strongest association with ovarian epithelial malignancies in Pakistan suggesting genetic factors playing significant role in our patients (3). The proposed mechanism for ovarian cancer is the incessant ovulation theory which suggests that ovulation traumatizes the ovarian surface epithelium and thus stimulates proliferation, creating a soil which predisposes to malignant transformation. Use of oral contraceptives, late menarche, early menopause, multiparity, and breast feeding decrease the ovulatory cycles thus reducing the chance of developing ovarian cancer (2). The five most common subtypes of epithelial ovarian cancers are high-grade serous, low-grade serous, endometrioid, clear cell and mucinous carcinomas. Other categories include the germ cell tumors, sex cord-stromal tumors and metastatic tumors (6).

The purpose of the present study is to determine the frequency and histological patterns of ovarian tumors in our geographical setup and to compare our data with other local and international studies. This will help in understanding the pathogenesis, risk factors, prognosis, screening techniques & planning appropriate patient management and treatment protocols.

MATERIALS AND METHODS:

The present study is a 2-year retrospective cross-sectional study commencing from 1st January 2023 to 31st December 2024, conducted at the Histopathology section of the Department of Pathology, CPMC/CPTH, Lahore. Approval letter for the study was taken from the Ethical Review

Committee of CPMC (Letter No CPMC/IRB-NO/1513 dated 3rd February 2025).

A total of 534 gynecological specimens were received during this period out of which 116 (21.72) specimens comprised of ovarian tumors. These cases were referred from the Gynecology Department of Central Park Teaching Hospital (CPTH) Lahore & comprised of both benign and malignant ovarian tumors fulfilling the inclusion and exclusion criteria. Benign tumors included serous cyst adenomas, mucinous cyst adenomas, mature teratomas, dermoid cysts & endometriotic cysts etc. Malignant cases included High Grade Serous Carcinomas, endometrioid carcinomas & metastatic tumors like Krukenberg tumors etc. Inflammatory tubo-ovarian masses and non-neoplastic cystic lesions like follicular cysts, corpus luteal cysts etc were excluded.

Data of ovarian tumors was retrieved from computer files and biopsy record registers of the Histopathology section of CPMC. Relevant information including the patient"s biodata, ultrasound findings, serum markers, type of gynecological surgery performed, per operative findings & gross features of the specimen like size, color, solid/cystic, bilaterality, intact or ruptured specimen, presence of hair, papillary & nodular areas, ascites etc were noted.

The specimens were received in 10% neutral buffered formalin, grossed, processed and stained according to the standard histopathology protocols. Relevant blocks from some ovarian tumors were recut and reviewed for confirmation of diagnosis and microphotography. Tumors were classified according to WHO Classification of Ovarian Tumors **(7,8).**

Results and data were compiled using SPSS version 23. Frequency and Percentages (%) were calculated for the total number of cases & benign and malignant categories. Mean and Standard deviation (SD) was calculated for quantitative variables like age.

RESULTS:

A total of 534 gynecological specimens were submitted to the Histopathology Section of the Department of Pathology, Central Park Medical College, Lahore, during a 2-year period (2023-2024). These comprised of 116 (21.72%) ovarian tumors from 91 female patients fulfilling the inclusion criteria. These included 25 (27.5%) cases having bilateral ovarian tumors.

Out of a total of 116 ovarian tumors, 77 (66.3%) tumors were reported as benign, and 39 (33.6%) tumors were classified as malignant with a benign to malignant ratio of 2:1 (Table-I). Patients ranged in age between 14 years to 69 years. (Mean= 36.97± 12.38 years). Females with benign tumors had an age range of 14 years to 60 years (Mean=31.65 ± 9.27 years) and with malignant tumors had an age range of 17 years to 69 years (Mean=47.46 ± 11.03 years). (Table II).

Out of 77 benign tumors, 51 (66.23%) cases were reported in the surface epithelial category with serous cyst adenomas comprising a maximum of 22 (28.5 %) cases & endometriotic cysts constituting 17 (22.07 %) cases. Patients in this category had an age range between 14 years to 60 years (Mean=31.65±9.27 years). Breakup of the benign

tumors is shown in Table III (Fig1, Fig2, Fig 3). Patients with mature teratomas/dermoid cysts ranged in age between 14 years to 60 years (Mean = 31.14 ± 11.88 years) & in the Sex Cord Stromal group ranged in age between 28 to 40 years.

Malignant tumors constituted 39 (33.6%) cases with maximum number reported in the surface epithelial group comprising of 31 (79.48%) cases. These included 19 (48.7%) cases of HGSC, 10 (25.6 %) cases of endometrioid adenocarcinoma & 2 (5.19%) cases of serous borderline tumor (micropapillary type). Breakup of the malignant tumors is shown in Table IV (Fig 4, Fig 5, Fig 6, Fig 7). Females with HGSC ranged in age between 27 years to 60 years (Mean= 46.42 ± 9.98 years) & with endometrioid carcinoma had an age range of 38 years to 69 years (Mean=52.80± 9.35 years).

The metastatic group comprised of 3(7.69%) cases, with 2 (5.1%) cases reported as bilateral signet ring adenocarcinoma (Krukenberg Tumors) aged 47 and 44 years respectively from primary in the stomach (Fig 8) & one case of a unilateral right sided metastatic mucinous cyst adenocarcinoma reported in a 17-year-old unmarried girl from a known colorectal primary (Table IV).

Bilateral ovarian tumors were reported in 25 cases which included 12 malignant tumors & 13 benign cases. Twenty-two cases had the same histopathological diagnosis in both ovaries whereas 03 cases had different diagnosis in both ovaries. Breakup of the various bilateral benign & malignant tumors is shown in Table V.

DISCUSSION

Ovarian neoplasms comprise a complex, wide spectrum of tumors varying in origin, morphology & biological behavior. No other organ gives origin to such a large variety of complex tumors & non neoplastic lesions as the ovaries which makes them the most challenging neoplasms of the female genital tract (9).

In most developed countries, ovarian cancer is the 2nd most common malignancy of the female genital tract after endometrial cancer (7, 8). In Pakistan, however, it ranks as the commonest malignancy in females being included in the top 5 cancers in females after breast cancer (10).

Currently ovarian tumors are not considered a single disease entity but a diverse group of neoplasms having unique genetic, biological & morphological features with variable prognosis, which warrants treating them as distinct diseases (7, 11). The exact cause of ovarian cancer is multifactorial attributed to age, various genetic & reproductive factors, family history of ovarian & breast cancer & Lynch syndrome (12). Mutations in BRCA1, BRCA2 & loss of p53 tumor suppressor gene increase the risk of developing ovarian cancer (13). Majority of cases are diagnosed at advanced stage III or IV having the worst prognosis among the gynecological malignancies due to late presentation (7, 14). Screening techniques include periodic pelvic radiological examination & serum CA-125 levels but these investigations lack specificity & sensitivity (12).

As a whole ovarian tumors comprise a heterogenous group of neoplasms originating from the surface epithelium, the germ cells & the sex

cord stromal components of the ovary which forms the basis of the WHO classification of ovarian tumors (7,8). The ovary is also a preferred site to receive metastatic deposits from gastrointestinal & breast cancer (7,8, 13, 15).

Gynecological specimens constitute a major bulk of workload received in a running histopathology laboratory of which ovarian masses comprise a considerable number. In the present study, a total of 534 gynecological specimens were reported out of which ovarian tumors constituted 116 (21.72%) specimens. This figure is almost similar to a recent study (16) conducted in India in which ovarian tumors constituted 191 (22%) cases of female genital tract tumors.

Out of a total of 116 ovarian tumors, 77 (66.3%) were reported as benign & 39 (33.6%) cases as malignant giving a ratio of 2:1. These also included 2 cases of serous borderline tumor which were counted in the malignant category for simplification of results. The present study shows quite a high ratio of malignant tumors when compared with some regional & international studies. Other studies report a low percentage of the malignant ovarian tumors when compared to the present study. A study in Nepal (1) categorized 83 (87.4%) cases as benign & 11 (11.5%) cases as malignant with a ratio of almost 8:1.

A 10 year study (9) on 472 ovarian tumors reported 75.21% cases as benign & 23.30% as malignant with a ratio of almost 3:1. Another study in India (16) on 191 ovarian tumors reported 175 (91.6%) cases as benign & 16 (7.9%) as malignant which also demonstrates a very high number of benign tumors. Birare et al (17) reported 85.71% tumors as benign, 6% cases as borderline & only 8.57 % cases as malignant.

However a recent study by Gupta (18) on 212 ovarian tumors during a 3 year period reported 135 (63.7%) cases as benign, 66 (31.1%) cases as malignant & 11 (5.2%) cases as borderline tumors with a benign to malignant ratio of 2:1, which is exactly similar to the results of the present study. A past study on 180 ovarian tumors at KEMU reported exactly similar results as the present study (5). These studies indicate that benign ovarian tumors far outnumber malignant tumors but a few studies also show a considerable number of malignant tumors. A likely explanation for this wide discrepancy could be an interplay between some genetic & environmental factors in different regional populations.

Regarding the pattern of age distribution in the present study, patients with benign tumors had an age range of 14 years to 60 years (Mean= 31.65 ± 9.27 years) & females with malignant tumors had an age range of 17years to 69 years (Mean= 47.46 ± 11.04 years). A past study by the same authors (5) reported a mean age for benign tumors as 31.60 ± 9.63 years & for ovarian cancers as 44.57 ± 12.78 years. A study by Shrestha (1) on 127 ovarian tumors observed benign tumors to be predominant in the mean age of 37.5 years & malignant tumors in a mean age of 50 years.

Mehra et al(15) observed an age range of 11years to 70 years in their study with maximum benign cases in the 21 years to 30 years age group & maximum malignant tumors in the age range of 41

years to 50 years which is in accordance with the present study.

A recent study published in 2024 on 118 malignant ovarian tumors by Kanwal & Sarfraz (19) reported an age range of 7 years to 75 years (Mean age = 46.4 ± 15.13 years). They noted an increasing frequency of malignant ovarian tumors in the younger age groups representing 22.2 % of their cases at or below 40 years of age. These studies indicate that ovarian tumors can occur at all ages including children but benign tumors occur predominantly in the younger reproductive age groups of 20 years to 40 years whereas malignant cases are more common towards the menopausal age between 50 years to 60 years. However, the study by Kanwal (19) also observed a rising trend of ovarian cancers in younger age females attributed to certain specific genetic factors, life style & other environmental influences.

Considering bilateral ovarian tumors, out a total of 116 tumors (from 91 female patients), 25 (27.47%) patients had bilateral ovarian masses which comprised of 13 bilateral benign tumors & 12 malignant ovarian tumors.

Out of 77 benign ovarian tumors, 64 (83.11%) cases were unilateral & 13 (16.88%) cases were bilateral. The malignant category of 39 cases comprised of 27 (69.23%) unilateral tumors & 12 (30.76%) bilateral tumors which included 6 cases of HGSC, 3 cases of endometrioid carcinoma, 2 cases of Krukenberg tumors & I case of a borderline serous tumor.

In a 4 year study by Shaikh (4) on 701 cases of ovarian tumors, 609 (86.9%) cases were unilateral & 92 (13.1%) cases involved both ovaries. Out of 602 (85.6%) benign tumors, 550 (90.5%) tumors were unilateral & 52 (8.5%)were bilateral tumors. Out of 93 malignant tumors, 69 (74.2%) cases were unilateral & 24 (25.8%) were bilateral. Four (04) cases of borderline tumors were unilateral & 2 cases were bilateral.

The study by Gupta (18), which comprised of 212 ovarian tumors, 186 (87.73%) tumors were unilateral & 26 (12. 3%) were bilateral. Out of 135 (63.7%) benign tumors, 127 (94 %) cases were unilateral & 8 (6%) were bilateral & out of 66 malignant tumors, 52 (78.8%) were unilateral & 14 (21.1%) were bilateral. Eleven borderline tumors comprised of 7 unilateral tumors & 4 bilateral tumors. Both studies show almost similar results, however the results of the present study shows a much higher number of bilateral tumors (27.47%) which could be due to larger sample size of those studies as compared to the present study.

Ovarian tumors are classified into 4 major classes according to WHO classification of ovarian tumors. These include the primary categories of Surface epithelial group, Germ cell group and Sex cord stromal group with a secondary category of Metastatic ovarian tumors **(7,8).** The present study comprising of 116 ovarian tumors, maximum number of cases were diagnosed in the Surface epithelial group constituting of 82 cases (70.68%), which included 51(66.23%) benign cases and 31 (79.48%) malignant cases. Germ cell tumors were the 2nd main category, comprising of 26 cases (22.41%) which included 22 (28.75%) cases of benign mature cystic teratomas and 4 (10.25%) malignant cases. Sex cord stromal tumors

constituted 4 (5.19%) benign and 1 (2.5%) malignant case. The Metastatic group included 3 cases (7.69%) out of 39 malignant cases.

This data is almost comparable with various regional studies in Pakistan. Irfan[3] **(3)** reported 408 cases at Jinnah Post Graduate Medical Institute, Karachi in which Surface epithelial tumors constituted 288 (70.6%) cases, GCTs comprised of 20.8% cases, Sex cord stromal comprised 7% and Metastatic category comprised of 1.7% cases. Figures of the 2 common categories are almost similar to the results of the present study, whereas the Sex cord stromal and Metastatic category show differences which may be attributed to the smaller sample size in the present study as compared to the study of Irfan **(3).**

A 4 year study by Sheikh et.al (4) on 701 cases reported 542 (77.3%) tumors in the Surface epithelial category, 129 (18.4%) cases in the GCT category, 25 (3.6%) cases as Sex cord stromal tumors and a miscellaneous category comprising of 5 (0.7%) cases. A study by Parmar et.al (2) on 125 cases categorized 69% cases in the Surface epithelial group, 21% cases in GCT group, 7% cases in the Sex cord stromal group and 3% cases as Metastatic tumors. Batool et.al (14) studied 319 ovarian tumors & reported 246 (63.08%) cases in the Surface epithelial group, 115(29.48%) cases in the GCT group, 27(6.92%) cases in the Sex cord category and 02(0.52%)cases in the Metastatic group. The study by Gupta et.al (18) on 212 ovarian tumors during a 3-year period categorized Surface epithelial tumors, GCT tumors, Sex cord stromal tumors and Metastatic tumors as 71.7%, 22.2%, 3.8% and 2.3% respectively. Alam **(20**) in a study at Nepal reported 84% cases in the Surface epithelial group,10% in the Germ cell group, 4% in the Sex cord stromal group & 2% in the Metastatic group.

Comparing the results of the present study with various national and international studies shows that the major bulk of ovarian tumors are of Surface epithelial origin. GCT tumors occupy 2nd position but numerically are but far below the Surface epithelial group. Sex cord stromal and Metastatic categories occupy the 3rd and 4th place frequency wise respectively.

Out of the 51 benign Surface epithelial tumors in the present study, serous cyst adenomas were the commonest benign tumor comprising 22(28.5%) cases followed by endometriotic cysts constituting 17 (22.07%) cases. Serous cyst adenofibromas and mucinous cystadenomas, each constituted 8(10.3%) and 4 (5.19%) cases respectively. Malignant tumors in the Surface epithelial group included 31 cases (79.48%) which constituted 19 (48.7%) cases of HGSC, 10 cases (25.6%) of endometrioid carcinoma and 2 cases of borderline serous tumors.. The study by Batool et.al **(14)** reported 246 (63.08%) ovarian tumors in the Surface epithelial category which included 196 (50.25%) benign cases, 11 (2.82%)cases in the borderline category and 39 (10%)tumors in the malignant group. In the benign category, serous cyst adenomas was the commonest tumor comprising 118(30.25%) cases. No endometriotic cyst was reported in that study. The malignant category included 28(7.17%) cases of HGSC, 4(1.02%) cases of mucinous cyst adenocarcinoma, 2 cases of

endometrioid carcinoma and 5 cases of clear cell carcinoma.

The study by Mehra et.al (15) on 110 cases of ovarian neoplasms reported a maximum of 77 cases in the Surface epithelial group with serous cyst adenomas being the commonest benign tumor comprising of 42 (38%) cases & HGSCs was the commonest malignant tumor reported in 10 (9%) cases. Germ cell tumors constituted 23 cases with benign teratomas being the commonest entity. Sex cord stromal & Miscellaneous category comprised of 3 cases & 7 cases respectively.

In the present study, HGSC was the commonest malignancy with a total of 19 (48.7%) cases followed by 10 (25.6%) cases of endometrioid carcinoma which is in accordance with other studies. No mucinous cyst adenocarcinoma or clear cell carcinoma was reported in the present study.

According to Dundre (**21**), the frequency of metastatic tumors to the ovary shows a wide range of 5-30% in different studies**.** His study reports 4.7% of ovarian cancers as metastatic, having a primary in gastrointestinal tract tumors. Approximately 80% of mucinous carcinomas of the ovary are metastatic in origin, the most common primary sites being GI tract, pancreas, cervix, endometrium and breast **(22).** The diagnosis of primary mucinous carcinoma requires thorough pathological assessment because of its histological resemblance to colorectal carcinoma **(23).** According to current concepts and availability of new diagnostic modalities like immunohistochemistry, some ovarian tumors that were previously classified as primary mucinous carcinomas were in fact metastases **(21).** The present study included 3 cases (7.69%) of metastatic tumors to the ovary (2 cases of Krukenberg tumors from gastric metastases and 1 case of mucinous cyst adenocarcinoma from rectal metastases. A past study by Arshad **(5)** comprising of 61 malignant tumors reported 4 cases (6.56%) of Krukenberg tumors (2 from colorectal carcinomas and 2 from carcinoma stomach) & Kanwal (19) reported 7 (5.9%) cases of metastatic tumors. These figures are somewhat quite similar to those reported in the present study.

Recommendation and suggestions

The present study although being a simple morphological study & comprising of a small sample size provides comprehensive information and data analysis regarding the frequency of the different morphological types of ovarian tumors in a regional population of Lahore. Studies with larger sample sizes will help in identifying more risk factors, preventive measures, control strategies and reforms to be implemented by the administrative health authorities. This will help in creating awareness in our females and formulating screening programs. Establishing population-based cancer registries in health care centers can play a significant role in understanding the national burden of the different cancers in different populations.

Table I. Frequency of Ovarian Tumors (n=116).

Types of ovarian tumors	**Frequency (no. of cases)**	**Percentage (%)**

Benign	77	66.3%
Malignant	39	33.6%
Total (n)	116	100

Ratio of benign and malignant ovarian tumors = 2:1

Table II. Age Distribution of patients with Benign and Malignant Ovarian Tumors

(n=116)

Total No. of cases n=116	**Age range of patients with Ovarian Tumors.**	
	Benign	**Malignant**
	77	39
Minimum age	14 years	17 years
Maximum age	60 years	69 years
Mean ± SD	31.65 ± 9.27 years	47.46 ± 11.04 years

Table III: Histological categorization of Benign Ovarian Tumors according to the WHO classification:

n= 77

Category	**Morphological types**	**No. of cases**	**(%)**	**Total no. of cases**
Surface Epithelial tumors	Serous Cyst Adenoma	22	28.5%	**51 cases (66.23 %)**
	Endometriotic Cyst	17	22.07%	
	Serous Cyst Adenofibrom			
	Mucinous Cyst Adenoma			
Germ Cell Tumors	Mature Teratoma (including Dermoid Cyst)			
Sex Cord Stromal Tumors	Ovarian Fibroma			
	Sclerosing Stromal Tumor			
	Leydig Cell Tumor			
Total benign tumors				

Table IV: Histological categorization of Malignant Ovarian Tumors according to the WHO classification

n= 39

Category	**Morphological types**
Surface Epithelial tumors	High Grade Serous Carcinoma (HGSC)
	Endometrioid Carcinoma
	Borderline Serous Tumor (Micropapillary type)
Germ Cell Tumors	Malignant Mixed Germ Cell Tumor
	Dysgerminoma
Sex Cord Stromal tumors	Granulosa Cell Tumor
	Krukenberg tumor

Metastatic Tumors to ovary	(from stomach primary)			a & Cyst	Serous		**(7.69%)**
	Mucinous Cyst Adenocarcinoma (from colorectal primary)		01	Adenoma	2.5%		
Total malignant tumors			**39**	Mucinous Cyst	**100%**	01	**39 cases**
				Adenoma & Teratoma			
				Serous Cyst Adenofibroma		01	
		Malignant cases n= 12		High Grade Serous Carcinoma (HGSC)		06	12
				Endometrioid Carcinoma		03	
				Krukenberg Tumor		02	
				Borderline Serous Tumor (Micropapillary Type)		01	
		Total (n)					25

Table V: Cases of Ovarian tumors with bilateral presentation

n= 25

Ovarian tumors with bilateral presentation n= 25	**Histological Subtypes**	**No. of cases**	**Total**
Benign cases n=13	Endometriotic Cyst	04	13
	Dermoid Cyst (Teratoma)	03	
	Serous Cyst Adenoma	02	
	Serous Cyst Adenofibrom	02	

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MICROPHOTOGRAPHS

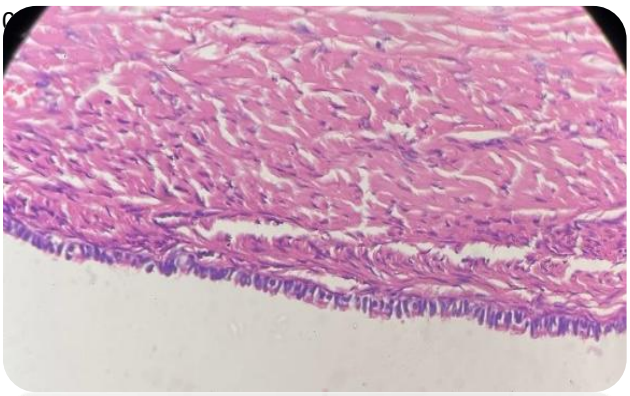

Fig-1: Micro photograph of Serous Cyst Adenoma showing simple ciliated epithelial lining (bottom).

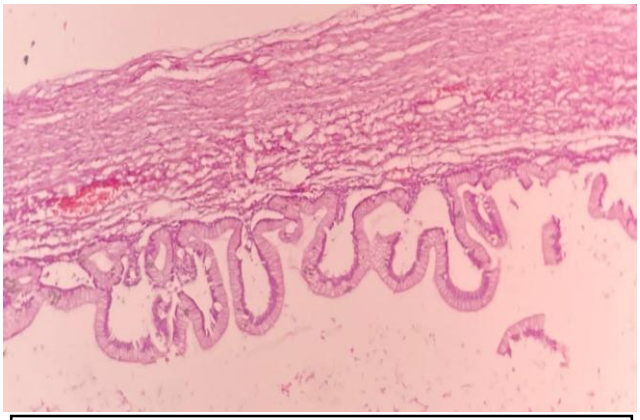

Fig-2: Micro photograph of Mucinous Cyst Adenoma showing columnar lining with apical mucin and basal nuclei(bottom).

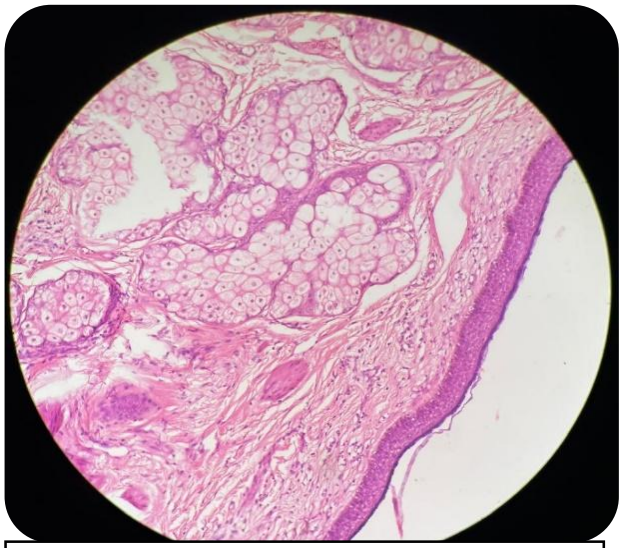

Fig-3. Micro photograph of mature Teratoma showing squamous epithelium (Right) and sebaceous glands (Left).

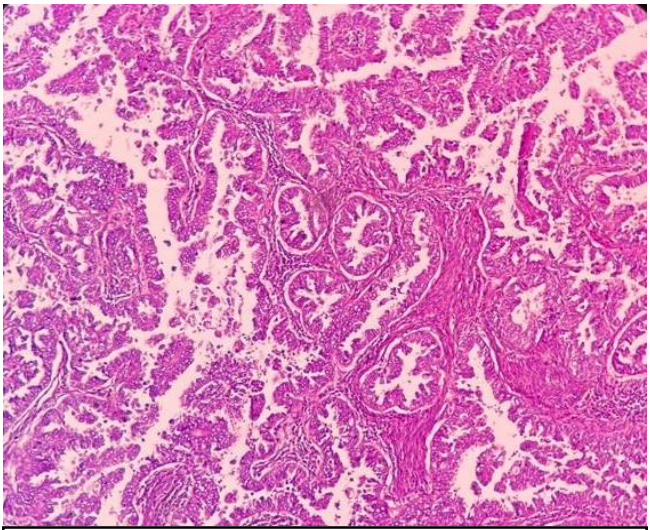

Fig-4. Micro photograph of High-Grade Serous Carcinoma showing papillary architecture

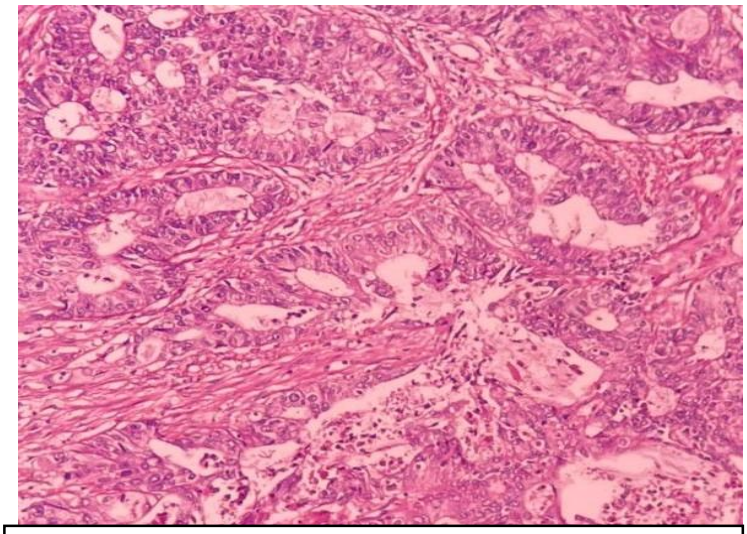

Fig-05: Micro photograph of Endometroid adenocarcinoma (FIGO grade I) showing well differentiated glands lined by pleomorphic cells.

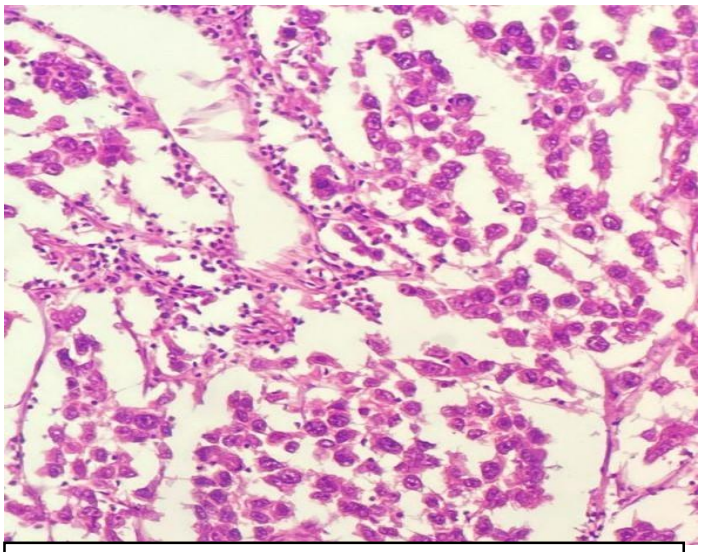

Fig-6. Microphotograph of Dysgerminoma showing nests of large pleomorphic cells and lymphocytic infiltration.

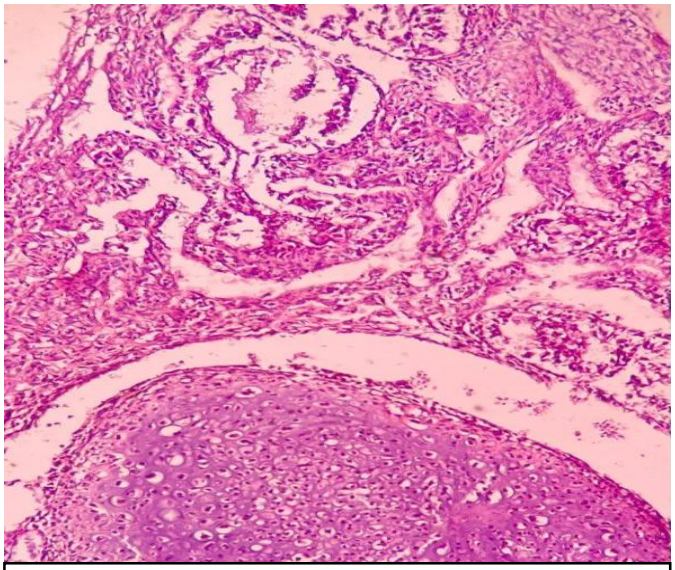

Fig-07: Micro photograph of Mixed Germ Cell Tumor showing cartilage (bottom) and yolk sac elements (top).

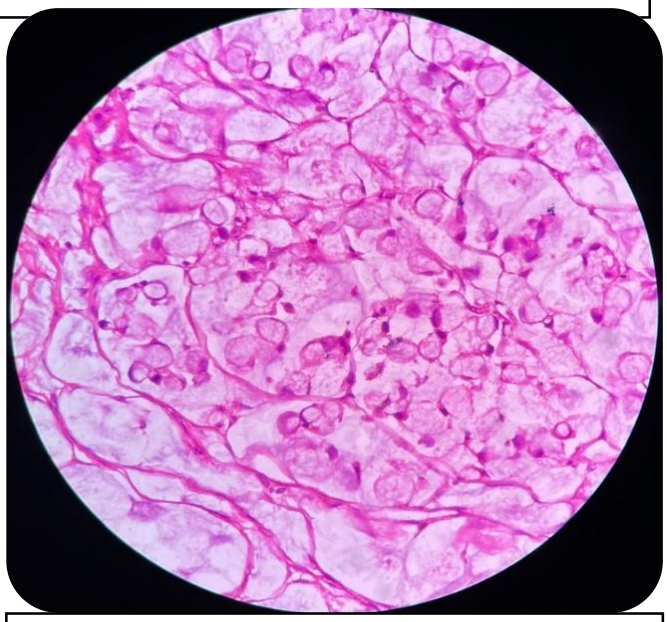

Fig-08: Micro photograph of Krukenberg tumor showing signet ring like cells with eccentric nuclei.