International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

A Study of Histopathological Spectrum of Ovarian Lesions at A Tertiary Care Centre

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Received: 01-04-2026
Accepted: 05-05-2026
Available online: 19-05-2026

ABSTRACT

Introduction: In ovary, neoplastic lesions can be grouped according to their origin from each of the three main types; mullerian epithelium, germ cells and sex cord stromal cells. Epithelial ovarian tumors are classified into benign, borderline and malignant.
Aims And Objectives: To analyse the spectrum of ovarian lesions and to categorize them on the basis of histopathological patterns, and the frequency of non-malignant (benign) and malignant neoplasms.
Materials And Methods: Ovarian specimens and hysterectomy with adnexa specimens submitted in the Department of Pathology for histopathological examination were studied.
Observations And Results: Out of 400 ovarian lesions, 99 (24.75%) were neoplastic and 301 (75.25%) were non-neoplastic. Mean age was 41.73 ± 11.46 years. Neoplastic lesions were unilateral (92.93%) and presented as cystic masses (59.60%) or cystadenoma (23.23%), non-neoplastic lesions were associated with abnormal uterine bleeding (58.80%) fibroids (11.63%). Most common neoplastic lesions were serous cystadenoma (16.16%), mature cystic teratoma (18.18%), mucinous cystadenoma (11.11%), while cystic follicle (34.55%), hemorrhagic corpus luteum (17.94%), and simple serous cyst (12.96%) were the most common non-neoplastic lesions. 70.71% of ovarian neoplasms were benign, 23.23% were malignant, and 6.06% were borderline.
Conclusion: Histopathological examination remains the gold standard for accurate diagnosis and prognostication of ovarian tumors, enabling effective management and improved patient outcomes.

Keywords: *ovarian lesions, histopathological spectrum, neoplastic lesions, Serous cystadenoma, Mature cystic teratoma, Cystic follicle.*

INTRODUCTION

Ovarian lesions encompass a spectrum of Benign conditions, including infectious, non infectious inflammatory, non-neoplastic and vascular entities. Infectious lesions arise from various sources, such as Bacterial (Actinomycosis, Tuberculosis, Leprosy, Syphilis), Viral (cytomegalovirus), Parasitic (Schistosomiasis, Enterobius vermicularis), and fungal. Non-infectious inflammatory lesions are typically granulomatous like Foreign body granuloma, necrobiotic granuloma and granulomas secondary to systemic diseases. Non neoplastic lesions of the follicular and stromal elements include Solitary follicle cysts and corpus luteum cysts, Ovarian Hyperstimulation Syndrome, Polycystic Ovarian Syndrome, Stromal Hyperplasia and Stromal Hyperthecosis, Leydig cell Hyperplasia. Vascular lesions encompass a range of abnormalities like Ovarian Vein Thrombophlebitis, Ovarian Hemorrhage, Ovarian Torsion and Infarction[1].

Cystic follicles are very common in the ovary. Functional cysts differ from neoplastic cysts in being usually of size 6-8 cm, asymptomatic, regress spontaneously and are unilocular containing clear fluid. These are frequently seen in young females in their 2nd decades due to failure of ovulation. Ovarian cysts are usually present with pain or discomfort in the lower abdomen. Cyst rupture may lead to peritoneal signs, abdominal distention. Polycystic ovarian syndrome also known as

Stein Leventhal syndrome, affects 6% to 10% of reproductive age group women worldwide. Association with obesity, type 2 diabetes and premature atherosclerosis is there.[2]

Ovarian tumors that present in the reproductive age group are mostly benign while about 30% in the postmenopausal age group are malignant[3]. Ovarian cancer comprises up to 8.7% of cancers in different parts of India.[4-5] Ovarian cancer accounts for 3% of all cancers in females in the United States. Ovarian cancer is the fifth most common malignancy among women and second most common gynecologic malignancy. It is the most common cause of death due to malignancy of female genital tract. Ovarian malignancies constitute about 4% of the total cancers in females and 25% of malignant tumors of the female genital tract. In India, the ovary is next in importance to cervix as the seat of cancer of female genital system[6].

The purpose of the study was to analyse the spectrum of ovarian lesions in a tertiary care center and to categorise histomorphological patterns as inflammatory, non neoplastic and neoplastic (benign, borderline and malignant).

AIMS AND OBJECTIVES

To analyse the spectrum of ovarian lesions and to categorize them on the basis of histopathological patterns, and the frequency of non malignant (benign) and malignant neoplasms, examining their age distribution and comparing findings with similar studies.

MATERIALS AND METHODS

This prospective cross-sectional study was conducted at the Department of Pathology, JLN Medical College, Ajmer from January 2024 to December 2024, analyzing 200 resected ovarian specimens and hysterectomy with adnexa specimens received for histopathological examination. Specimens were excluded if they were small biopsies (insufficient for diagnosis) or not well fixed in formalin (compromising tissue integrity).

Data were systematically recorded, including patient age, gender, registration number, histopathology number, type of surgery (ovarian resection or hysterectomy with adnexectomy) and gross features of the resected specimen (size, shape, color, consistency, and any notable abnormalities). All surgical pathology specimens underwent routine processing: tissues were fixed, embedded in paraffin blocks and serially sectioned at 3–5 micron thickness using a rotary microtome. Slides were stained with conventional Haematoxylin and Eosin (H&E) for microscopic evaluation, and special stains were applied selectively when required. The stained slides were then mounted with DPX (Di-styrene Plasticizer Xylene) and reviewed under a microscope to determine the histopathological diagnosis, ensuring accurate categorization of ovarian lesions.

Descriptive and Inferential statistical analysis has been carried out in the present study using computer software (IBM SPSS version 23). The qualitative data were expressed in number and percentages and the quantitative data expressed as mean and standard deviations. Association were analyzed by using chi-square test. Significance level for tests was determined as 95% (P< 0.05).

RESULTS

TABLE 1 : Age distribution and Complaints

	Neoplastic (n=99)		Non-neoplastic (n=301)		Total		p value
	No. of Patients (%)	Mean± SD	No. of Patients (%)	Mean± SD	No. of Patients (%)	Mean± SD	
Age Range (years)							
< 20	7 (7.07%)		9 (2.99%)		16 (4%)		
21 - 40	41 (41.41%)		111 (36.88%)		152 (38%)		
41 - 60	34 (34.34%)	42.05± 16.24	174 (57.81%)	41.62± 9.41	208 (52%)	41.73± 11.46	
61 - 80	17 (17.17%)		7 (2.33%)		24 (6%)		
Complaints							
Pain	99 (100%)		108 (35.88%)		207 (51.75%)		
Mass	47 (47.47%)		18 (5.98%)		65 (16.25%)		<0.0001 (HS)
Abdominal Distension	12 (12.12%)		1 (0.33%)		13 (3.25%)		
Men. Irreg.	8 (8.08%)		205 (68.11%)		213 (53.25%)		

TABLE 2 : Ovarian Lesions

Neoplastic	Number of Patients	Percent
Benign	71	71.72
Borderline	5	5.05
Malignant	23	23.23
Total	**99**	**100.00**

TABLE 3 : Microscopic Diagnosis (Non-Neoplastic)

Microscopic Diagnosis (Non-Neoplastic)	Number of Patients	Percent
Corpus luteum Haemorrhagicum	8	2.66
Corpus Albicans	9	2.99
Corpus luteum	16	5.32
Corpus luteum cyst	5	1.66
Cortical incluson cyst	13	4.32
Cystic follicle	106	35.22
Endometriosis	10	3.32
Follicular cyst	16	5.32
Haemorrhagic corpus luteum	54	17.94
Haemorrhagic cyst	12	3.99
Inflammatory pathology	1	0.33
Luteal cyst	1	0.33
Mucinous cyst	1	0.33
Ovarian Ectopic Pregnancy	3	1.00
Ovarian torsion	6	1.99
Simple serous cyst	39	12.96
Stromal tumor	1	0.33
Total	**301**	**100**

TABLE 4 : Microscopic Diagnosis (Neoplastic)

Microscopic Diagnosis (Neoplastic)	Number of Patients	Percent
Adult granulosa cell tumor	2	2.02
Benign brenner tumor	1	1.01
Borderline mucinous tumor	2	2.02
Borderline serous tumor with microinvasion	1	1.01
Clear cell adenocarcinoma	1	1.01
Dysgerminoma of ovary	1	1.01
Fibro thecoma	2	2.02
Fibroma	4	4.04
Malignant neoplasm	1	1.01
Mature cystic teratoma	18	18.18
Metastatic Deposits of Adenocarcinoma	2	2.02
Metastatic moderately differentiated of Sq. cell ca	1	1.01
Mixed Germ cell tumor	2	2.02
Mucinous carcinoma with expansile invasive pattern	1	1.01
Mucinous cystadenoma	14	14.14
Papillary mucinous cyst adenoma	1	1.01
Papillary mucinous cyst adenoma of borderline tumor	1	1.01
Papillary serous cyst adenoma	2	2.02
Poorly differentiated adenocarcinoma	1	1.01
Serous borderline tumor	1	1.01
Serous Carcinoma	4	4.04
Serous Carcinoma high grade	1	1.01
Serous Carcinoma moderate-poorly differnciated	1	1.01
Serous cyst Adenocarcinoma	2	2.02
Serous cyst adenofibroma	3	3.03
serous cystadenoma	26	26.26
Serous papillary adenocarcinoma	3	3.03
Total	**99**	**100.00**

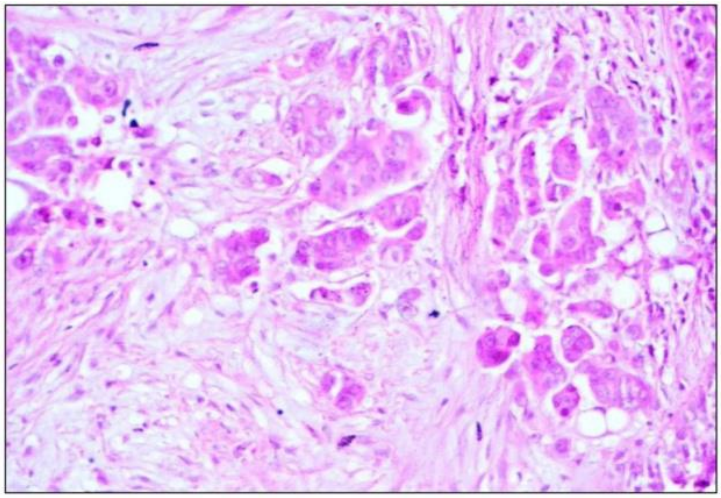

Figure : Krukenberg tumor –Showing mucin filled tumor cells with nuclei pushed to periphery giving signet ring appearance (H&E, 200X).

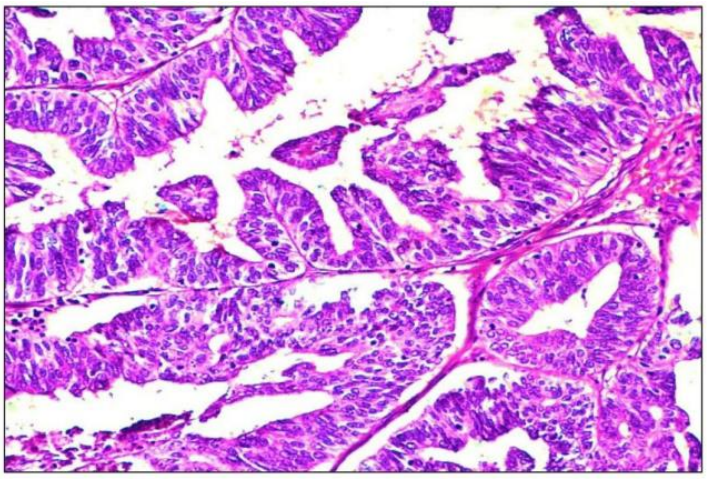

Figure : Papillary serous cystadenocarcinoma – Showing tumor cells arranged in papillae and sheets. Islands of tumors cells is invading the stroma (H&E, 100X).

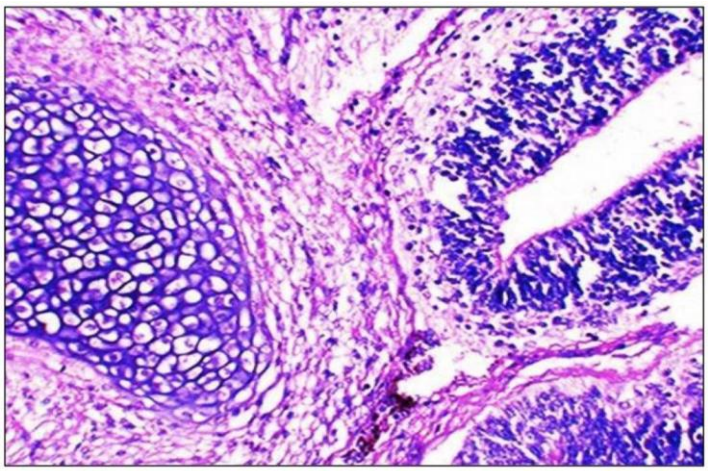

Figure : Immature Teratoma – Section of immature cartilage with immature neural tissue. (H&E, 200X)

DISCUSSION

The age-wise distribution of ovarian lesions in the present study aligns with existing literature, highlighting a predominant occurrence in the 41–60 years age group (52%), consistent with Mohan S et al. (2019)[7], who reported a similar peak (51.32%). In contrast, Yasmeen QS et al. (2023)[2] reported a younger cohort, with 52.28% cases under 20 years, possibly reflecting regional or genetic variations, as this age group is typically associated with functional cysts rather than neoplasms. Ahmad N et al. (2019)[8] observed a peak in the 21–40 years group (55.50%), indicating variability in age patterns across studies, which may correlate with differing etiological factors

The 61–80 years age group accounted for 6% of cases in the present study, comparable to Yasmeen QS et al. (2023)[2] (6.06%) but higher than Ahmad N et al. (2019)[8] (3.50%), underscoring the risk of malignancy in elderly women While the present study mirrors trends from Mohan S et al. (2019)[7], differences with Yasmeen QS et al. (2023)[2] suggest geographic or demographic influences on ovarian pathology, warranting larger multicentric analyses to establish regional patterns and optimize early detection protocols. **(Table 1)**

The present study found that benign ovarian tumors were most common (70.71%), followed by malignant (23.23%) and borderline (6.06%) tumors, consistent with the trend observed in other studies. Mohan S et al. (2019)[7] Patel PK et al. (2020)[9], and Gaikwad SL et al. (2020)[10] reported higher benign rates (82.29%, 85.72%, and 88.10%, respectively), However, the present study's lower benign proportion (70.71%) and higher malignant rate (23.23%) align more closely with Shringi P et al. (2023)[11] (19.51% malignant), indicating possible variations in referral bias, genetic factors, or late presentation in symptomatic cases.

The malignant proportion in the present study (23.23%) is higher than most studies (Mohan S et al.: 12.50%, Gaikwad SL et al.[10]: 9.50%) but lower than Hathila R et al. (2020)[12] (33.30%), highlighting heterogeneity in study populations or diagnostic settings (tertiary care vs. community). The borderline tumors were relatively low across studies (2.4–6.06%), including the present study (6.06%), reflecting their rarity but clinical importance, as they require close follow-up due to malignant potential. **(Table 2)**

Microscopic Diagnosis (Non-Neoplastic Lesions)

The present study found serous cystadenoma as the most common benign neoplastic lesion (26.26%), followed by mature cystic teratoma (18.18%), mucinous cystadenoma (14.14%), fibroma (4.04%), and borderline mucinous tumor (2.02%), aligning with trends from other studies. Mohan S et al. (2019)[7] and Gaikwad SL et al[10]. (2020) also reported serous cystadenoma as predominant (43.75% and 35.70%, respectively), reflecting its frequent occurrence, likely due to its association with surface epithelial origin and hormonal influences. Mature cystic teratoma (18.18%) was the second most common in the present study, consistent with Patel PA et al. (2020)[9] (33.92%) and Parmar RA et al. (2021) (19.00%)[13], highlighting its prevalence in reproductive-age women. The distribution of mucinous cystadenoma (14.14%) was comparable across studies (14.28–29.68%), indicating its common benign nature. Fibroma (4.04%) and borderline mucinous tumor (2.02%) were less frequent, consistent with their rarity. Variations between studies may stem from genetic, geographic, or age-related factors, as ovarian neoplasms show regional heterogeneity. **(Table 3)**

Microscopic Diagnosis (Neoplastic Lesions)

The present study observed simple serous cyst as the most common non-neoplastic ovarian lesion (12.96%), followed by follicular cyst (5.32%), haemorrhagic cyst (3.99%), endometriosis (3.32%), and corpus luteum cyst (1.66%), indicating a predominance of functional cysts. This pattern contrasts with Ahmad N et al. (2019)[8], where corpus luteum cyst (24.50%) and endometriosis (19.80%) were more prevalent, and Patel PA et al. (2020)[9], who reported a higher incidence of simple serous cyst (38.88%) and endometriosis (27.77%). The low incidence of corpus luteum cyst (1.66%) and endometriosis (3.32%) in the present study compared to others suggests possible underreporting or differences in diagnostic thresholds. Follicular cysts (5.32%) were consistent across studies (5.55–5.60%), indicating their common occurrence as transient, self-limiting lesions. **(Table 4)**

CONCLUSION:

This study underscores the diverse spectrum of ovarian lesions, highlighting a notable predominance of non-neoplastic lesions over neoplastic ones. Most cases occurred in the middle reproductive age group, with pain and menstrual irregularities being key presenting symptoms. Benign tumors, particularly serous cystadenoma and mature cystic teratoma, were the most common neoplastic findings, while functional cystic changes dominated the non-neoplastic category. The majority of neoplastic lesions were benign, emphasizing the importance of histopathological evaluation to differentiate these from potentially malignant tumors, especially in symptomatic women. Further research is warranted to explore regional variations and risk factors influencing ovarian pathology, ultimately guiding early detection and tailored management strategies. Histopathological examination remains the gold standard for accurate diagnosis and prognostication of ovarian tumors, enabling effective management and improved patient outcomes particularly in high-risk age groups.

ACKNOWLEDGEMENT
The authors wish to acknowledge the Department of Pathology, JLN Medical College Ajmer for its support and opportunity. The authors also wish to acknowledge **Dr. Shailendra Vashistha** (Assistant Professor, Transplant Immunology – HLA Lab, Department of IHTM, GMC, Kota) and the VAssist Research team (www.thevassist.com) for their contribution in journal selection and manuscript submission process.

Conflict of interest: None

Source of funding: Nil

REFERENCES:

1. Kurman RJ, Ellenson LH, Ronnett BM. Non-neoplastic lesions of the ovary chapter 12. Blausteins Pathology of the Female Genital Tract, Seventh Ed. Springer Nature Switzerland AG. 2019; P. 715-70.
2. Yasmeen QS, Dhule SM, Narkhede PP et al. A histopathological study of ovarian lesions in a rural medical college. Indian J Pathol Oncol 2023;10(2):121-125.
3. Murthy NS, Shalini S, Suman G et al. Changing trends in incidence of Ovarian Cancer –the Indian Scenario. Asian Pac J Cancer Prev. 2009;10(6):1025-30.
4. Basu P, De P, Mandal S et al. Study of 'patterns of care' of ovarian cancer patients in a specialized cancer institute in Kolkatta, Eastern India. Indian J Cancer. 2009; 46(1):28–33.
5. Mondal SK, Banyopadhyay R, Nag DR et al. Histologic pattern, bilaterality and clinical evaluation of 957 ovarian neoplasms: A 10-year study in a tertiary hospital of eastern India. J Cancer Res Ther. 2011;7(4):433–7.
6. Mario M. Leito et al. Clinicopathologic analysis of early stage sporadic ovarian carcinoma. Am J Surg Pathol. 2004;28(2):1-7.
7. Mohan S, Kanchana PVN, Ramya N. Histopathological Study of Spectrum of Ovarian Lesions. OSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 3, 2019, pp 12-19.
8. Ahmad N, Hassan MJ, Khan S et al. Histopathological Spectrum of Ovarian Lesion in a Tertiary Care Hospital over a Period of Five years. Saudi J Pathol Microbiol.2019;4(11):868–74.
9. Patel PK, Patel DN, Patel MM et al. A Study of Histopathological spectrum of Ovarian neoplastic and non neoplastic lesions at teaching hospital. Annals of Pathology and Laboratory Medicine. 2020; 7 (issue 10):10(30):A514 -A521.
10. Gaikwad SL, Badlani KS, Birare SD. Histopathological study of ovarian lesions at a tertiary rural hospital. Trop J Pathol Microbiol. 2020;6(3):245-252.
11. Shringi P, Matariswa Samanta, Vishakha Behl et al. Histopathological study of ovarian lesions at a tertiary health-care center. *Asian Journal of Medical Sciences*, *14*(6), 159–164.
12. Hathila R, Nishal A, Shah P et a;. Histomorphological Spectrum of Ovarian Lesions in a Tertiary Care Institute in Gujarat with Special Emphasis on Ovarian Tumors. Int J Sci Stud 2020;8(3):93-100.
13. Parmar RA, Patel JM, Sharma BS et al. Study of histopathological spectrum of ovarian lesions. IP Arch Cytol Histopathology Res 2021;6(4):230-236.