



Histopathological presentation of ovarian lesions in Indian women: An observational study

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ABSTRACT

Background and Objectives: An age-associated escalation in the prevalence of ovarian cancer is reported by majority of Indian population-based cancer registries. Due to the presence of totipotent gametocytes and multipotent Mesenchymal tissues, the ovary is susceptible to the development of various tumor types. The current investigation endeavored to examine the histopathological characteristics of ovarian lesions in Indian female patients.

Materials and Methods: A prospective observational investigation was conducted on ovarian samples that had undergone surgical resection and were referred to the Pathology department of tertiary care teaching hospital over a span of two years. 163 cases of ovarian cancer were included. Standardized histopathological protocols were employed to examine the specimen. **Results:** On gross examination, the vast majority of non-neoplastic specimens displayed unremarkable findings. Upon microscopic examination of non-neoplastic cases, it was observed that a majority of the cases exhibited follicular cyst, with corpus luteum cyst presenting as the second most frequent. Majority of neoplastic specimens displayed a cystic external surface upon gross examination. The surface epithelial tumor was found to be the most prevalent histologic subtype among the neoplastic cases. The prevalent histologic subtype among surface epithelial tumors was benign simple serous cystadenoma.

Conclusion: The predominant non-neoplastic ovarian lesion in Indian women is the follicular cyst, while the most frequently occurring neoplastic lesion is the benign simple serous cystadenoma, which is a type of surface epithelial tumor.

Key Words: Female, Indian, Ovarian Neoplasm, Cancer, Abdomen.

INTRODUCTION

The intricate nature of neoplastic ovarian conditions has resulted in their status as a fascinating and established topic within the field of oncology. The neoplasms in question inherit a spectrum of genetic backgrounds that are significantly more diverse than those observed in other gynecological conditions [1]. As a result, these neoplasms pose a

considerable challenge to gynecological oncologists. Numerous non-neoplastic ovarian lesions often manifest as a pelvic mass and imitate the appearance of an ovarian tumor. Hence, it is crucial to duly perceive and categorize pelvic masses in order to ensure optimal treatment and enhanced prognostic outcomes. The present study sought to examine the histopathological characteristics of diverse ovarian lesions among female subjects residing in the central region of India. The ovary, being comprised of totipotent gametocytes and multipotent mesenchymal tissues, has the potential to give rise to a wide range of tumors [2]. Ovarian carcinoma ranks as the third most prevalent cancer in Indian women and eighth globally, making up 3.44% of all diagnosed cancer cases [3]. A substantial proportion, approximately 62%, of instances of ovarian carcinoma are detected during the later stages of the disease (involving Stages III and IV), during which the 5-year survival rate is considerably low, at 28% [1]. The survival rate for ovarian carcinoma over a period of five years is considerably favorable, standing at a rate of approximately 94%, in instances where diagnosis is made in early Stage I. However, the number of cases diagnosed at this stage is only limited to 15%. Due to their particularly poor prognosis, with the highest case fatality ratio among all gynecological cancers worldwide, early detection of advanced ovarian cancers is of utmost significance [4].

An elevated incidence of ovarian cancer has been observed in correlation with age. The age-specific incidence rate (ASIR) demonstrates an upward trend from the age of 35, culminating in its highest peak between the age group of 55-64. Several Indian population-based cancer registries and studies have documented a steady increase in the incidence of ovarian cancer over time. According to prior reports, the incidence rates of ovarian cancer, adjusted for age, exhibit a range of 0.9 to 8.4 per 100,000 women [5 – 8]. In numerous Western nations, a declining pattern in both the incidence and mortality rates has been duly recorded and documented. The observed phenomenon may be attributed to a broader implementation of preventative strategies, including the utilization of oral contraceptives, the mitigation of post-menopausal hormone replacement therapy, and the proliferation of interventions aimed at reducing risk.

MATERIALS AND METHODS

This research endeavor was undertaken subsequent to securing the sanction of the institutional ethics committee affiliated with a tertiary care teaching hospital located in India. A prospective observational study was conducted on the surgically extracted ovarian specimens referred to the Pathology department within a span of two years, commencing in July 2019.

The present study included resected samples of ovarian lesions across all age cohorts, while autolyzed specimens were excluded from analysis. The present study utilized a non-probability convenient sampling method, whereby a total of 163 cases of ovarian cases were incorporated. The specimens were subjected to a gross examination, which encompassed an evaluation based on several parameters such as size, external surface, mucosal surface, and wall thickening. All specimens were subjected to fixation in buffered neutral formalin for duration of 12 to 24 hours, followed by submission for processing. Following standard paraffin processing protocols, 3-5 μm sections were obtained and subsequently stained utilizing the H & E (hematoxylin and eosin) staining using standard methodology and protocols.

The methodology employed in the data analysis involved the utilization of frequency distribution and cross tabulation techniques to construct tables. The qualitative data were represented using numerical values and percentages. A significance level of $p < 0.05$ was adopted to indicate statistical significance. The data analysis was conducted utilizing the Microsoft Excel 2007 and SPSS version 20 software applications.

RESULTS

Table 1 display that a significant proportion of non-neoplastic cases exhibited lesions on the left ovary, followed by the right ovary. A mere 11 percent of the patients were found to possess lesions present in both ovaries. Upon conducting a histopathological gross examination of non-neoplastic cases, the predominant observation pertaining to the ovaries revealed unremarkable features. Approximately 18 percent of the samples exhibited cystic transformations on their external surface, as evidenced by Table 2.

Table 1: Laterality of non-neoplastic cases

Laterality	Number of cases	%
Left	29	50
Right	22	39
Bilateral	6	11
Total	57	100

Table 2: Gross findings (external surface) of non-neoplastic cases

External Surface	Number of cases	%
Cystic	10	18
Unremarkable	47	82
Total	57	100

Upon microscopic examination, a significant proportion of non-neoplastic cases demonstrated the presence of cystic alterations, as indicated in Table 3. The microscopic spectrum of non-neoplastic conditions denoted that a substantial proportion of cases manifested as follicular cyst, with corpus luteum cyst and hemorrhagic cyst following as the subsequent most prevalent presentations

Table 3: Cut section findings in of non-neoplastic cases.

Cut Surface	Number of cases	%
Cystic	46	80
Solid	6	11
Unremarkable	5	9
Total	57	100

Table 4 presents a range of less frequent microscopic discoveries, including ovarian torsion accompanied by endometriosis, cystic follicle, luteinizing cyst, and corpus inclusion cyst. The histopathological gross examination conducted on cases of neoplastic growths revealed that the majority of the 92 benign cases exhibited a cystic external surface, with the remaining cases presenting unremarkable lesions

Table 4: Microscopic findings of non-neoplastic cases

Microscopy	Number	%
Hemorrhagic Cyst	8	14
Corpus Luteum Cyst	14	24
Torsion of Ovary	3	6
Follicular Cyst	23	41
Endometriosis	3	5
Cystic Follicle	2	4
Luteinizing Cyst	2	3
Corpus Inclusion Cyst	2	3
Total	57	100

In Table 5, it is elucidated that out of the total 14 cases diagnosed with malignancy, approximately fifty percent of them presented with a cystic external surface. On the other hand, ovarian mass prevalence was found to be comparatively lower. Among the total of 106 neoplastic cases analyzed, the preponderant incidence was attributed to surface epithelial tumor. The surface epithelial tumors exhibited the highest prevalence of bilaterality, surpassing that of germ cell tumors.

Table 5: Gross findings (External surface) of neoplastic cases

External surface	Benign		Malignant		Total	
	N	%	N	%	N	%
Cystic	60	65	7	50	64	60
Unremarkable	32	35	5	36	39	37
Ovarian Mass	0	0	2	14	3	3
Total	92	100	14	100	106	100

Table 6 depicts that no bilateral lesions were observed in sex cord stromal tumors. The preponderant form of germ cell neoplasm was the teratoma. Several types of germ cell tumors were observed, including mixed germ cell tumor, dysgerminoma, struma ovarii, and yolk sac tumor. In a sample of five patients diagnosed with sex cord stromal tumor, four were classified as fibrothecoma and one as a granulosa cell tumor, as shown in Table 7.

Table 6: Incidence of bilaterality in the major histopathological subtypes

Type of Tumor	N	Bilaterality	%
Surface Epithelial Tumor	71	15	21
Germ Cell Tumor	29	4	14
Sex Cord Stromal Tumor	5	0	0
Other (metastatic)	1	0	0

Table 7: Distribution of histologic subtype of neoplastic lesions

Type of Lesion	Subtype	N	%
Surface Epithelial Tumor (n=71)	Benign simple serous cystadenoma	51	48
	Borderline serous cystadenoma	4	4

	Papillary serous cystadenoma	1	1
	Malignant serous carcinoma	1	1
	Benign mucinous cystadenoma	7	6
	Mucinous cystadenocarcinoma	1	1
	Endometrioid (benign)	2	2
	Transitional cell carcinoma	1	1
Germ Cell Tumor (n=29)	Teratoma (mature/benign)	28	26
	Mixed germ cell tumor	2	2
	Dysgerminoma	2	2
	Struma ovarii	1	1
	Yolk sac tumor	1	1
Sex Cord Stromal Tumor (n=5)	Granulosa cell tumor	1	1
	Fibrothecoma	2	2
Metastatic (n=1)	Metastatic tumour	1	1
Total		106	100

DISCUSSION

Ovarian lesions are notably among the most undifferentiated predicaments encountered in current gynecological practice. The mortality rate of ovarian tumors surpasses the collective mortality rate of endometrial and cervical carcinomas. In order to improve the treatment, prognosis, and management of ovarian lesions, we conducted a study of their histopathological findings, which possess notable clinical relevance [9]. In the present investigation, the ovarian tumors were categorically classified into non-neoplastic and neoplastic subsets based on the World Health Organization (WHO) classification. The neoplastic lesions were categorized into two groups based on their pathological characteristics: benign and malignant.

In the current investigation, it was discovered that the primary etiology of non-neoplastic ovarian lesions was follicular cysts (41%), with Corpus luteal cysts coming in at a close second (24%). The present investigation exhibits a striking similarity with the studies conducted by Akina et al. [10] and Kanthikar et al. [11]. According to the study conducted by Kanthikar et al [11], among the 145 cases analyzed, 75 were identified as non-neoplastic, while the remaining 70 were recognized as neoplastic. The prevalent non-neoplastic anomaly identified in the study was solitary follicular cysts, situated in approximately 74% of the cases, followed by corpus luteal cysts, which were observed in approximately 20% of the cases. Consequently, the incidence of follicular cyst was observed to be significantly elevated. In a study conducted by Akina Prakash et al [7], it was found that follicular cysts were the most prevalent non-neoplastic lesions (45.5%), followed by corpus luteum cysts (25%). In contrast, Gaikwad S.L. [12] reported differing findings. In their study it was discovered that corpus luteal cysts exhibited the highest prevalence of non-neoplastic lesions with a frequency of 27.7%. This was followed by simple ovarian cysts with a frequency of 24.7%, while follicular cysts were detected in 21.8% of cases. The possible reason for this could be that the researchers have incorporated a substantial number of unstudied findings encountered during the examination of ovarian specimens.

Within the realm of ovarian neoplastic lesions, it was observed that surface epithelial tumors held the most prevalence, while metastatic tumors were found in the least number of cases, based on the findings of our study. In a study conducted by Kanupriya and colleagues [13], it was observed that the predominant tumors found in the ovary were those of surface epithelial origin (63%), with germ cell tumors accounting for 29% of the total sample population of 258 cases. Pradhan et al. (2014) demonstrated that the predominant type of ovarian neoplasm was the surface epithelial tumor, accounting for 70.2% of cases. Germ cell tumors were the second most prevalent (28%), whilst sex cord stromal tumors were found in only 1.8% of cases, with metastatic tumors being the least commonly noted (0.4%). Mondal et al. (89) conducted an investigation wherein 957 cases were assessed, and findings revealed that surface epithelial tumors accounted for 67.9% of all tumors and 73% of the malignant group. The distribution of sex cord-stromal was found to be significantly lower, constituting only 5.3% of total observed cases. According to existing literature, the proportion of primary ovarian carcinomas attributed to the endometrioid subtype ranges from 10% to 25% [15]. Consistent with our observations, numerous prior studies [10, 11, 13, 15] have demonstrated that benign simple serous cystadenoma was the prevailing form of surface epithelial tumors..

CONCLUSION

The predominant non-neoplastic ovarian lesion in Indian women is the follicular cyst, while the most frequently occurring neoplastic lesion is the benign simple serous cystadenoma, which is a type of surface epithelial tumor.

CONFLICTS OF INTEREST: None reported

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REFERENCES

1. Misra RK, Sharma SP, Gupta U, Gaur R, Mishra SD. Pattern of ovarian neoplasm in eastern UP. *J Obstet Gynecol India*. 1991;30:242–46.
2. Sikdar K, Kumar P, Roychowdhary NN. A study of ovarian malignancy: A review of 149 cases. *J Obstet Gynaecol India*. 1981;30:478–80.
3. GLOBOCAN 2008. Estimated cancer Incidence, Mortality, Prevalence and Disability-adjusted life years (DALYs) Worldwide in 2008. <http://globocan.iarc.fr/>.
4. ICMR Consensus Document for Management of Epithelial Ovarian CANCER. https://main.icmr.nic.in/sites/default/files/guidelines/Ovarian_Cancer.pdf
5. Murthy NS, Shalini S, Suman G, et al. Changing trends in incidence of ovarian cancer – the Indian scenario. *Asian Pac J Cancer Prev*. 2009;10:1025-30.
6. Gupta N, Yadav M, Gupta V, Chaudhary D, Patne SCU. Distribution of various histopathological types of ovarian tumors: A study of 212 cases from a tertiary care center of Eastern Uttar Pradesh. *J Lab Physicians*. 2019 Jan-Mar;11(1):75-81. doi: 10.4103/JLP.JLP_117_18. PMID: 30983807; PMCID: PMC6437827.
7. Yousif HM, Mohammed RA, Missawi HM, Elsayaf ZM, Albasri AM. Histopathological patterns of primary malignant ovarian neoplasms in different age groups in Almadinah

- Almunawwarah region, KSA. *J Taibah Univ Med Sci.* 2018 Dec 11;14(1):73-78. doi: 10.1016/j.jtumed.2018.11.005. PMID: 31435393; PMCID: PMC6694935.
8. Batool A, Rathore Z, Jahangir F, et al. Histopathological Spectrum of Ovarian Neoplasms: A Single-Center Study. *Cureus.* 2022;14(7): e27486. doi:10.7759/cureus.27486
 9. Gadducci A, Guarneri V, Peccatori FA, et al. Current strategies for the targeted treatment of ovarian cancer and relevance of BRCA mutational status. *J Ovarian Res.* 2019;12(1):9. Published 2019 Jan 28. doi:10.1186/s13048-019-0484-6.
 10. Kanthilkar A M N. Clinico-histopathological analysis of neoplastic and non-neoplastic lesions of the ovary: a 3-year prospective study in dhule, north maharashtra, India. *J Clin Diagn Res.* 2014;8(8):FC04-FC7. doi:10.7860/JCDR/2014/8911.4709
 11. Prakash A, Akiana S, Duraiswami R, Indira.V. Histopathological study of ovarian lesions in a tertiary care center in Hyderabad, India-a retrospective five-year study. *Int J Adv Med* 2017;4:745-9.
 12. 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.
 13. Tejani AS, He L, Zheng W, Kanupriya k. Concurrent, Bilateral Presentation of Immature and Mature Ovarian Teratomas with Refractory Hyponatremia: A Case Report. *J Clin Imaging Sci.* 2020; 10:23.
 14. Pradhan HK et al. *Int J Reprod Contracept Obstet Gynecol.* International Journal of Reproduction, Contraception, Obstetrics and Gynecology 2018 Apr;7(4):1571-1578.
 15. Mondal SK, Banyopadhyay R, Nag DR, Roychowdhury S, Mondal PK, Sinha SK. 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):433-437.