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Original Research Article

Histopathological Spectrum of Ovarian Lesions: A Retrospective Analysis in a Tertiary Care Center

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Abstract:

Background: Ovarian lesions encompass a wide spectrum of non-neoplastic and neoplastic conditions. As ovaries are a common site for both benign and malignant tumors, histopathological evaluation plays a vital role in diagnosis, management, and prognosis.

Aim: This study aims to analyze the histopathological spectrum of ovarian lesions in a tertiary care center, focusing on their distribution and frequency across age groups.

Methods: A retrospective study was conducted in the Department of Pathology, Netaji Subhas medical College and Hospital, Amhara, Bihta, Patna, Bihar. A total of 94 ovarian specimens with Histo-pathologically proven lesions were included. Data were collected, reviewed, and analyzed for clinical and histopathological correlation using SPSS version 27.0.

Results: Non-neoplastic lesions were the most common (68.1%), particularly in younger women. Benign tumors (13.8%) peaked in the 41-50 years age group, while malignant tumors (7.4%) were most frequent in women aged 61-70 years. Surface epithelial tumors dominated the neoplastic lesions, with serous tumors being the most common (59.2%). Among germ cell tumors, mature teratomas accounted for 80%, whereas immature teratomas contributed 20%.

Conclusion: The study highlights the predominance of non-neoplastic ovarian lesions in reproductive-age women and the increasing incidence of malignancy in older women. Surface epithelial tumors, especially serous tumors, are the most frequent neoplastic lesions. Histopathological examination remains the cornerstone for accurate diagnosis and management. The findings emphasize the importance of early detection and screening programs, particularly for postmenopausal women, to improve patient outcomes.

Keywords: Histopathology, Non-Neoplastic Cysts, Ovarian Lesions, Ovarian Tumors, Surface Epithelial Tumors.

Introduction

The ovaries are paired organs situated on either side of the uterus, near the lateral pelvic wall. Their key roles include producing oocytes and synthesizing essential reproductive hormones. Despite being small in size, the ovaries have complex anatomy and are a common site for both benign and malignant tumors [1]. Interestingly, about 80% of ovarian tumors are benign. While ovaries are frequently affected by primary malignancies, they can also be involved in metastatic cancers originating from other organs [2].

Ovarian lesions of surgical importance are broadly classified into non-neoplastic cysts and neoplasms. Non-neoplastic cysts are especially common during the reproductive years, whereas neoplastic lesions can range from benign to borderline to malignant [3]. Ovarian tumors are further categorized based on their tissue of origin into surface epithelial tumors (including serous, mucinous, clear cell, endometrioid, Brenner, and seromucinous), germ cell tumors, sex cord-stromal tumors, metastatic tumors, and other rare types [4].

Globally, ovarian cancer is the seventh most common cancer and the eighth leading cause of cancer-related deaths among women. In India, it is the third most common cancer among women, following breast and cervical cancers, contributing to approximately 6% of all female cancer cases, with a notably high mortality rate [5].

The diverse clinical presentations, imaging findings, and morphological features of ovarian tumors can often pose diagnostic challenges for pathologists. Additionally, certain non-neoplastic ovarian lesions may present as pelvic masses and mimic ovarian neoplasms due to associated abnormal hormonal manifestations. In such cases, gross examination can

provide helpful clues — for instance, benign epithelial tumors and non-neoplastic cysts are typically cystic, while the presence of solid areas and papillary projections raises suspicion for malignancy [1].

Ultimately, accurate diagnosis relies heavily on microscopic features, as the histological type of ovarian tumors plays a pivotal role in determining prognosis and guiding treatment decisions. Therefore, understanding the histological spectrum of ovarian lesions is crucial for optimizing patient care. This study aims to analyze the histopathological spectrum of ovarian lesions encountered at a tertiary care center, with a focus on their distribution, prevalence, and key characteristics through retrospective analysis.

Methodology

Study Setting: A retrospective study was conducted in the Department of Pathology, Netaji Subhas medical College and Hospital, Amhara, Bihta, Patna, Bihar, India for one year

Sample size: The study had a total of 94 patients.

Inclusion Criteria: All ovarian specimens, including single ovarian specimens and those obtained from hysterectomy specimens, with histopathologic ally confirmed non-neoplastic and neoplastic lesions were included.

Exclusion Criteria: Normal ovaries, post-chemotherapy tissues, and metastatic ovarian cancers were omitted from the research.

Data Collection: Clinical data and histopathology slides, together with requests, were retrospectively gathered via a simple random selection method. H&E slides were examined, histological features documented, and comparisons with clinical data conducted.

Histopathological Examination: Tissue specimens were preserved in 10% formalin, processed, and embedded in paraffin. Sections of 4–5 µm in thickness were excised and stained with Hematoxylin and Eosin (H&E). Special stains and immunohistochemistry were conducted when required for further categorization.

Ovarian lesions were classified into non-neoplastic and cancerous categories. Neoplastic lesions were subsequently categorized according to the WHO classification of ovarian malignancies into epithelial, germ cell, sex cord-stromal, metastatic, and miscellaneous tumors.

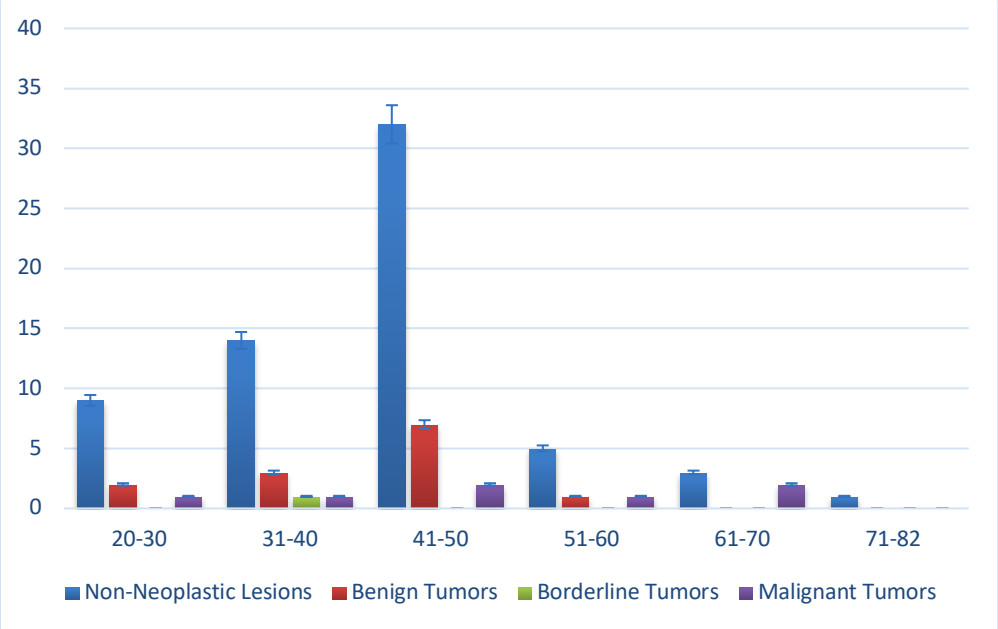
Statistical Analysis: Statistical analysis was conducted utilizing SPSS version 27.0. The prevalence and distribution of various ovarian lesions were examined. Descriptive statistics were employed to ascertain the percentage distribution of each histological class. The relationship between clinical characteristics and histological results was evaluated.

Results

Table 1 shows the age-wise distribution of ovarian lesions, indicating that the largest prevalence occurs in the 41-50 years age range (56.1%), with non-neoplastic lesions being the most prevalent (68.1%), especially among younger age cohorts. Benign tumors (13.8%) are most prevalent in the 41-50 age range, but malignant tumors (7.4%) occur more frequently in older populations, particularly among those aged 61-70 years. Borderline tumors are few, comprising 1.1%, with a solitary occurrence identified in the 31-40 age group. The findings demonstrate that ovarian lesions are predominantly seen in middle-aged women, with the probability of malignancy escalating beyond the age of 50.

Table 1: Age-wise Distribution of Ovarian Lesions

Age Group (years)	Non-Neoplastic Lesions (%)	Benign Tumors (%)	Borderline Tumors (%)	Malignant Tumors (%)	Total (%)
20-30	9 (12.3)	2 (2.7)	0 (0)	1 (1.3)	16.3
31-40	14 (19.2)	3 (4.1)	1 (1.3)	1 (1.3)	25.9
41-50	32 (43.8)	7 (9.6)	0 (0)	2 (2.7)	56.1
51-60	5 (6.8)	1 (1.3)	0 (0)	1 (1.3)	9.4
61-70	3 (4.1)	0 (0)	0 (0)	2 (2.7)	6.8
71-82	1 (1.3)	0 (0)	0 (0)	0 (0)	1.3
Total	64 (68.1)	13 (13.8)	1 (1.1)	7 (7.4)	94



Graph 1: Age-wise Distribution of Ovarian Lesions

Table 2 shows the distribution of surface epithelial tumors, indicating that serous tumors are the predominant type (16 benign, 6 malignant), constituting the majority (22 out of 27 cases). Mucinous tumors rank as the second most prevalent, with 6 cases: 3 benign, 2 malignant, and 1 borderline. Endometrioid and clear cell tumors are few, with just one malignant incidence of each kind. Sero-mucinous tumors represent 2 benign instances, whereas Brenner tumors are the rarest, with just 1 benign example. Benign tumors (16 instances) are more common than malignant tumors (10 cases), although borderline tumors are the least widespread, with only 1 case.

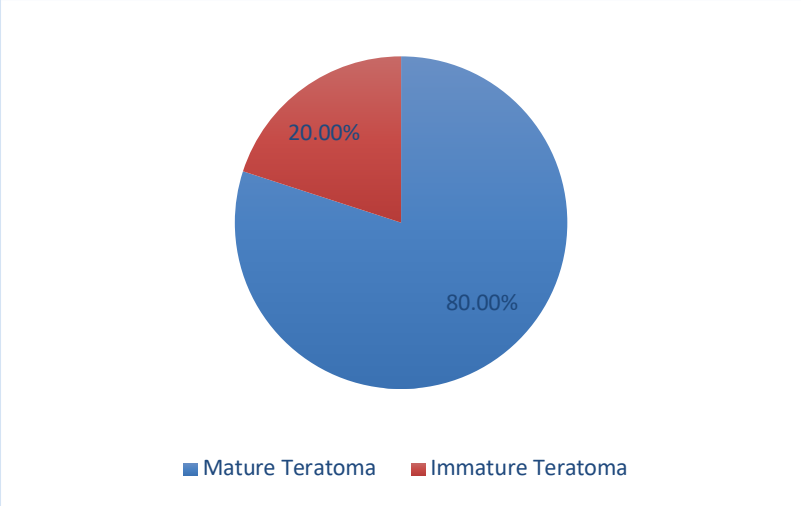
Table 2: Distribution of Surface Epithelial Tumors

Tumor Type	Serous	Mucinous	Endometrioid	Clear Cell	Sero-mucinous	Brenner	Total
Benign	10	3	0	0	2	1	16
Borderline	0	1	0	0	0	0	1
Malignant	6	2	1	1	0	0	10
Total	16	6	1	1	2	1	27

Table 3 illustrates the distribution of germ cell tumors, indicating that mature teratomas are the predominant kind, accounting for 80% (4 out of 5 instances). These tumors are predominantly benign and constitute the majority of germ cell tumors identified in the research. Conversely, juvenile teratomas, which are rarer and possess malignant potential, comprise just 20% (1 instance). The statistics indicate that benign germ cell tumors are far more common than malignant variants, underscoring the fact that the majority of germ cell tumors identified in clinical settings are mature teratomas. This distribution corresponds with the prevailing tendency seen in ovarian germ cell tumors, wherein the majority are benign, while malignant forms are less common.

Table 3: Distribution of Germ Cell Tumors

Tumor Type	Frequency	Percentage
Mature Teratoma	4	80.00%
Immature Teratoma	1	20.00%
Total	5	100%



Graph 2: Distribution of Germ Cell Tumors

Discussion

This study offers a comprehensive examination of ovarian lesions among various age demographics, highlighting their distribution and histological categorization. The results demonstrate that ovarian lesions are predominantly found in middle-aged women, particularly peaking in the 41–50-year age bracket. Non-neoplastic lesions represented the predominant group, especially among younger women, accounting for 68.1% of all cases. This tendency corresponds with prior research indicating that functional cysts and other non-neoplastic ovarian lesions are more prevalent in women of reproductive age due to hormonal variations. Similarly, Sawant et al. (2017) revealed that the predominant age group for ovarian lesions, encompassing malignant, benign, and borderline forms, was 40-59 years, representing 53.5% of cases [6]. Further research revealed that ovarian lesions predominantly occurred in women aged 31 to 50 years, accounting for 76.3% of the cases [7].

Benign tumors, accounting for 13.8% of instances, were mostly observed in the 41-50 age range, but malignant tumors were more prevalent among older women, particularly in the 61-70 age group (2.7%). This discovery substantiates the established association between advancing age and the incidence of ovarian cancers. The infrequent prevalence of borderline tumors (1.1%) indicates that these tumors constitute a rather uncommon category, with just one instance identified in the 31-40 age range [8]. The heightened prevalence of malignant tumors in older women, particularly those aged 61-70 years (2.7%), underscores the documented association between increasing age and the risk of ovarian malignancies. The histology investigation indicated that 73.1% of malignant tumors were identified in individuals aged above 40 years.

Serous tumors were the predominant subtype among surface epithelial tumors, including 22 of 27 cases (81.5%). This aligns with current literature, which classifies serous tumors as the most prevalent epithelial ovarian tumors. Mucinous tumors were the second most common kind, accounting for 6 instances (22.2%), predominantly benign in nature. Endometrioid and clear cell tumors were few, with only one malignant instance of each. Sero-mucinous tumors were only identified within the benign category, whereas Brenner tumors exhibited the lowest incidence, underscoring their classification as rare ovarian neoplasms. A meta-analysis of 98,099 women across 41 studies published from 1992 to 2012 revealed that serous tumors represented a substantial fraction of epithelial ovarian malignancies [9].

The analysis of germ cell tumors indicated that mature teratomas were the predominant category, representing 80% of cases. These findings align with prior research, which consistently identify mature teratomas as the predominant benign germ cell tumors. Conversely, juvenile teratomas, recognized for their malignant potential, constituted under 20% of cases. This underscores the prevalence of benign germ cell tumors compared to malignant ones in clinical manifestations. Conversely, immature teratomas are uncommon, accounting for around 2.5% of ovarian germ cell tumors. Although rare, they are significant due to their malignant potential, highlighting the prevalence of benign over malignant germ cell tumors in clinical contexts [10].

The study underscores notable age-related patterns in the location of ovarian lesions and tumor histology. The results emphasize the significance of early identification and consistent screening, especially in postmenopausal women, where the risk of cancer escalates. Subsequent research with bigger cohorts and molecular characterization of tumors may yield more understanding of the pathophysiology and course of ovarian neoplasms.

These findings enhance the existing knowledge base focused on refining diagnostic and treatment approaches for ovarian cancers.

Conclusion

This study represented a significant fraction of ovarian pathology, especially in women of reproductive age. Benign tumors are considerably more common than malignant or borderline tumors among ovarian neoplasms. Surface epithelial tumors, particularly serous cystadenomas, are the predominant histological subtype. The incidence of malignant ovarian neoplasms significantly increases in the postmenopausal demographic, highlighting the necessity for age-specific monitoring measures. Routine histological assessment is essential for the precise diagnosis, categorization, and management of ovarian lesions, enabling early identification and suitable therapeutic measures.

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