

Clinical Features and Histopathological Spectrum of Ovarian Tumors in Different Age Groups: A Retrospective Study

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Abstract:

Background: Ovarian tumors comprise a heterogeneous group of neoplasms with diverse clinical manifestations and histopathological patterns. Their biological behavior varies with age, making early diagnosis and histopathological evaluation essential for appropriate management.

Aim: To evaluate the clinical features and histopathological spectrum of ovarian tumors across different age groups.

Methodology: This retrospective observational study included 90 histopathologically confirmed ovarian tumor cases managed surgically at the Department of Obstetrics and Gynaecology, Jan Nayak Karpoori Thakur Medical College and Hospital, Madhepura, Bihar. Clinical records and histopathological reports were reviewed, and data were analyzed using SPSS version 27.0.

Results: Most patients belonged to the 21–30 years age group (28.9%). Abdominal pain was the commonest presenting symptom (60%). Benign tumors predominated (80%), followed by malignant (16.7%) and borderline tumors (3.3%). Serous cystadenoma was the most frequent histopathological diagnosis (31.1%), followed by mucinous cystadenoma (20%). Malignant tumors increased with advancing age, accounting for 41.7% of cases in women older than 50 years.

Conclusion: Ovarian tumors predominantly affected women of reproductive age and were mainly benign. Serous cystadenoma was the most common lesion, while malignancy increased significantly with age. Early clinical evaluation and histopathological assessment are essential for timely diagnosis, appropriate treatment, and improved patient outcomes.

Keywords: Ovarian Tumors; Histopathology; Benign Ovarian Tumors; Malignant Ovarian Tumors; Clinical Presentation; Age Distribution.

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Introduction

Ovarian tumours are one of the most significant and heterogeneous category of gynaecological tumours seen in everyday practice [1]. These include various hyperplastic, dysplastic and malignant processes of various cell types of the ovary, such as the surface epithelium, germ cells, sex cord-stromal tissue, and metastatic deposits. The ovarian masses are one of the most difficult lesions to diagnose in gynecology due to their diverse clinical presentation, biological behaviour and histopathological features [2]. The biological nature of ovarian tumors is greatly influenced by age, with most occurring during the reproductive age group being benign, and about 30% of those found in postmenopausal women being malignant. Ovarian tumors are not to be taken lightly especially in the case of malignant ovarian neoplasms, which are often detected at an advanced stage,

despite improvements in diagnosis and therapy techniques, and are associated with poor survival rates [3].

Ovarian cancer is one of the most prevalent gynecological cancers among the women of India and it is a significant public health problem due to its high mortality [4]. Presents often in the middle to late stages of disease because of the lack of specific symptoms in the early stages. Ovarian cancer rates in Asian countries range from 2-6.5 cases per 100,000 females per year [5]. Ovarian cancer is the sixth most frequent cancer in women worldwide and the fourth biggest cause of death from cancer in females. This is because most ovarian malignancies are diagnosed very late and there is no effective screening available for women who are not

experiencing symptoms [6], as well as because of the aggressive behaviour of many epithelial ovarian cancers. Therefore, knowledge of the demography, clinical features and histopathology spectrum of ovarian tumors continues to be important for better early detection and patient outcome.

The clinical effect of ovarian tumors is very variable and is influenced by several factors including patient age, tumor size, tumor histopathology, tumor hormone activity, and disease stage [7]. Many ovarian tumors are asymptomatic during early diagnosis, but some have vague symptoms like abdominal pain, distention, irregular periods, gastrointestinal discomfort, urinary symptoms, infertility, and/or a palpable pelvic mass. Unfortunately, these symptoms are often non-specific and can be seen in a number of non-specific gynecological and gastrointestinal conditions, which can lead to delayed diagnosis [8]. This often means that many malignant ovarian tumours are only diagnosed when they have spread out of the ovary and therefore may not be curable."

"The initial evaluation of ovarian masses has benefited from advances in imaging modalities [9]. Pelvic ultrasonography (USG) is the most frequently used imaging investigation which is accessible, non-invasive and very sensitive to adnexal lesions. Pelvic ultrasound is used to detect 90% of adnexal masses. Other imaging modalities, such as computed tomography (CT) and magnetic resonance imaging (MRI) can also help assess the severity of the disease and surgical planning. Although a great deal has been done to improve the radiologic assessment, however, radiological data is not helpful enough to make the definitive diagnosis in the case of ovarian tumor. Although molecular and immunologic assays are becoming more widely available, the gold standard for diagnosis remains histopathology, which allows for accurate classification according to the basis of cellular origin, architectural patterns, degree of differentiation, and/or malignant potential.

The spectrum of ovarian tumors is very wide, and is a reflection of the embryological complexity of the ovarian tissue [10]. Ovarian surface epithelial tumors are the most common, followed by germ cell tumors, sex cord-stromal tumors and metastatic lesions. These histological subtypes have different prevalence in different age groups. Benign cystic lesions tend to occur in a woman's reproductive years, while malignant epithelial tumors occur more often in older women and women who have stopped menstruating. Germ cell tumors are more common in younger females and sex cord-stromal tumors can occur over a broader age range. Thus, age is a determinant of histopathological information, which helps to guide the clinician in adopting the most suitable diagnostic and therapeutic approach and gives an indication of the epidemiology of the disease.

The histopathological study not only helps in diagnosis but also helps in giving the prognosis. Histological subtyping of the tumor, grading and degree of differentiation are very important indicators of response to therapy, likelihood of recurrence, tumor behavior and overall survival [11]. Stage and laterality, in addition, play a key role in understanding the progression of the disease and in planning an individualized approach to management, which is why accurate histopathological classification is essential for appropriate selection of surgical procedures, consideration of adjuvant chemotherapy and prognosis.

One of the best factors that affects the occurrence, clinical behaviour and histopathological distribution of ovarian tumours is age. There are significant differences in the prevalence of particular tumor types in the pediatric population, the reproductive and perimenopausal population and the postmenopausal population. Age-specific diagnosis of ovarian tumours can help to better characterize the tumour, to grasp age-specific risk factors, and to increase diagnostic accuracy. This information is especially useful to guide evidence-based management protocols and counseling patients about prognosis and fertility preservation, when applicable.

Retrospective analysis of demographic and pathological features of ovarian tumors is an important epidemiological tool, because of the wide histopathological spectrum of ovarian tumors and their diverse clinical presentation. The present study was therefore conducted to determine the clinical presentation and histopathology of ovarian tumors in different age groups. The results may help expand the knowledge base on the demographic characteristics, clinical presentation and pathological distribution of ovarian tumors, which will lead to better diagnosis, prognosis and management of ovarian tumors.

Methodology

Study Design: The present study was conducted as a retrospective observational study to evaluate the clinical features and histopathological spectrum of ovarian tumors across different age groups.

Study Area: The study was conducted in the Department of Obstetrics and Gynaecology, Jan Nayak Karpoori Thakur Medical College and Hospital, Madhepura, Bihar, India, in collaboration with the Department of Pathology, where histopathological examination of the ovarian specimens was performed.

Study Duration: The study was carried out over a period of one year from January 2025 to December 2025. Medical records and histopathological reports of eligible patients diagnosed during the study period were reviewed retrospectively.

Study Participants: A total of 90 patients with histopathologically confirmed ovarian tumors who

underwent surgical management during the study period were included in the study.

Inclusion Criteria

- Women of all age groups diagnosed with ovarian tumors.
- Patients who underwent surgical management (ovarian cystectomy, oophorectomy, salpingo-oophorectomy, or hysterectomy with oophorectomy).
- Patients with complete clinical records and histopathological reports.
- Histopathologically confirmed benign, borderline, or malignant ovarian tumors.
- Patients admitted and treated during the study period.

Exclusion Criteria

- Patients managed conservatively without surgery.
- Patients with incomplete medical records or missing histopathological reports.
- Patients with recurrent ovarian tumors previously treated elsewhere.
- Non-neoplastic ovarian lesions without histopathological confirmation.
- Cases with inadequate tissue specimens or inconclusive histopathological findings.

Sample Size: The study included a sample size of 90 patients who fulfilled the inclusion criteria."

Procedure: The retrospective study was conducted by reviewing the medical records of eligible patients admitted to the Department of Obstetrics and Gynaecology during the study period. Case records were identified from hospital admission registers, operation theatre records, and pathology registers. Demographic characteristics, including age, were recorded for all patients. Clinical information such as presenting complaints, duration of symptoms, menstrual history, menopausal status, laterality of the tumor, and relevant clinical findings was extracted from the medical records. Details regarding radiological investigations, operative findings, and the type of surgical procedure performed were also documented.

All surgically excised ovarian specimens had been preserved in 10% buffered formalin and processed

according to standard histopathological laboratory protocols. Tissue sections had been stained using Hematoxylin and Eosin (H&E) stain, and microscopic examination had been carried out by experienced pathologists. Histopathological diagnosis of ovarian tumors had been established according to the World Health Organization (WHO) classification of ovarian tumors. Tumors were categorized as benign, borderline, or malignant and further classified according to their histopathological type. The patients were also grouped into different age categories to assess the age-wise distribution of clinical presentation and histopathological patterns. All relevant clinical and pathological data were entered into a structured data collection proforma, verified for completeness and accuracy, and subsequently transferred into a computerized database for statistical analysis.

Statistical Analysis: The collected data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for the Social Sciences (SPSS) version 27.0 (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as frequencies and percentages, whereas continuous variables were summarized as mean $\pm$ standard deviation (SD). Appropriate statistical tests, including the Chi-square test or Fisher's exact test, were applied to determine the association between age groups, clinical features, and histopathological types of ovarian tumors. A p-value of less than 0.05 was considered statistically significant throughout the analysis.

Result

Table 1 shows the distribution of patients according to age group among the 90 study participants. The highest proportion of patients belonged to the 21–30 years age group, comprising 26 (28.9%) participants, followed by 31–40 years with 24 (26.7%) participants. Patients aged 41–50 years accounted for 18 (20%), while those older than 50 years represented 12 (13.3%) of the study population. The smallest proportion was observed in the ≤ 20 years age group, with 10 (11.1%) participants. Overall, the findings indicate that the majority of patients were young to middle-aged adults, with the greatest representation in the 21–30 years age group.

Table 1: Distribution of Patients According to Age Group (n = 90)		
Age Group (Years)	Frequency (n)	Percentage (%)
≤ 20	10	11.1
21–30	26	28.9
31–40	24	26.7
41–50	18	20
> 50	12	13.3
Total	90	100

Table 2 presents the distribution of patients according to their clinical presentation among the 90 study participants. Abdominal pain was the most common presenting complaint, reported in 54 (60%) patients. This was followed by abdominal mass or distension, observed in 18 (20%) patients. Menstrual irregularities were noted in 8 (8.9%) patients, while ovarian tumors were detected incidentally in 6 (6.7%)

patients during routine evaluation or imaging. Gastrointestinal symptoms were the least common presentation, occurring in 4 (4.4%) patients. Overall, abdominal pain emerged as the predominant clinical feature, highlighting its importance as the most frequent symptom associated with ovarian tumors in this study population.

Table 2: Distribution of Patients According to Clinical Presentation (n = 90)		
Clinical Feature	Frequency (n)	Percentage (%)
Abdominal pain	54	60
Abdominal mass/distension	18	20
Menstrual irregularities	8	8.9
Incidental finding	6	6.7
Gastrointestinal symptoms	4	4.4
Total	90	100

Table 3 presents the histopathological spectrum of ovarian tumors among the 90 study participants. Serous cystadenoma was the most common histopathological diagnosis, identified in 28 (31.1%) patients, followed by mucinous cystadenoma in 18 (20%) and mature cystic teratoma in 16 (17.8%) patients. Endometriotic cysts accounted for 10 (11.1%) cases. Among the malignant tumors, serous

cystadenocarcinoma was the most frequent, occurring in 8 (8.9%) patients, followed by mucinous cystadenocarcinoma in 5 (5.6%) patients. Borderline ovarian tumors and dysgerminomas were relatively uncommon, reported in 3 (3.3%) and 2 (2.2%) patients, respectively. Overall, benign ovarian tumors predominated, with serous cystadenoma being the most frequently diagnosed lesion.

Table 3: Histopathological Spectrum of Ovarian Tumors (n = 90)		
Histopathological Diagnosis	Frequency (n)	Percentage (%)
Serous cystadenoma	28	31.1
Mucinous cystadenoma	18	20
Mature cystic teratoma	16	17.8
Endometriotic cyst	10	11.1
Serous cystadenocarcinoma	8	8.9
Mucinous cystadenocarcinoma	5	5.6
Borderline ovarian tumor	3	3.3
Dysgerminoma	2	2.2
Total	90	100

Table 4 presents the distribution of ovarian tumors according to their biological behavior among the 90 study participants. Benign tumors constituted the majority of cases, accounting for 72 (80%) patients. Malignant tumors were identified in 15 (16.7%) patients, representing the second most common category. Borderline ovarian tumors were relatively

uncommon, with only 3 (3.3%) cases reported. These findings indicate that benign ovarian tumors were far more prevalent than malignant and borderline lesions in the study population, highlighting the predominance of non-malignant ovarian neoplasms among patients undergoing histopathological evaluation."

Table 4: Distribution of Ovarian Tumors According to Biological Behavior (n = 90)		
Biological Behavior	Frequency (n)	Percentage (%)
Benign	72	80
Borderline	3	3.3
Malignant	15	16.7
Total	90	100

"Table 5 presents the age-wise distribution of benign, borderline, and malignant ovarian tumors among the 90 study participants. Benign tumors predominated across all age groups, with the highest proportions observed in patients aged ≤20 years

(90.0%), followed by 21–30 years (88.5%) and 31–40 years (87.5%). The proportion of malignant tumors increased with advancing age, accounting for 27.7% of cases in the 41–50 years age group and reaching 41.7% among patients older than 50 years.

Borderline tumors were uncommon, with only one case each reported in the 21–30, 31–40, and 41–50 years age groups. Overall, benign tumors were more

frequent in younger women, whereas malignant tumors were relatively more common in older age groups.

Table 5: Age-wise Distribution of Benign, Borderline, and Malignant Ovarian Tumors (n = 90)				
Age Group (Years)	Benign n (%)	Borderline n (%)	Malignant n (%)	Total
≤20	9 (90.0)	0 (0.0)	1 (10.0)	10
21–30	23 (88.5)	1 (3.8)	2 (7.7)	26
31–40	21 (87.5)	1 (4.2)	2 (8.3)	24
41–50	12 (66.7)	1 (5.6)	5 (27.7)	18
>50	7 (58.3)	0 (0.0)	5 (41.7)	12
Total	72 (80.0)	3 (3.3)	15 (16.7)	90

Discussion

A retrospective analysis of the clinical profile and histopathological spectrum of ovarian tumors in 90 patients was performed in the present study, which showed that the ovarian tumors were most common in reproductive age group females. The most frequent age group was women aged 21–30 years (28.9 %), and then 31–40 years (26.7 %), suggesting that the most common age of presentation of ovarian neoplasms is the active reproductive age. These statements were also echoed by Sheikh et al., 2017 [12] who reported 43.5% of the ovarian tumors in women aged between 21 and 30 years and 22.3% in the 31 to 40 years age group, indicating a higher prevalence of benign ovarian lesions in reproductive age group. Similarly, Wills and Mathew (2016) [13] reported that benign ovarian tumours were detected mainly between 21–40 years while malignant tumours were found mostly after 40 years. A similar study was also conducted by Sharadha et al. (2015) [14] who observed that almost 90% of ovarian neoplasms occurred in the reproductive years, thus confirming earlier observation that ovarian Tumors primarily affect younger women before menopause.”

“Clinical presentation of the present study included abdominal pain (55.6%), abdominal mass or distention (23.3%), incidental detection (6.7%) and gastrointestinal symptoms (4.4%). The present findings were found to be similar to the study conducted by Yogambal et al. (2014) [51] which mentioned that pain was the most common symptom that prompted medical consultation (66.9%) while abdominal mass was reported in 28.1%). In the same way Kanthikar et al. 2014 [16] noted that abdominal pain and abdominal swelling were the most frequently reported symptoms but menstrual disturbances were also reported in some patients. Conversely, Wills and Mathew (2016) reported that the most common presentation was menstrual complaints in 27.6% and nearly 26% of the ovarian lesions were found serendipitously during an operation or ultrasonography, suggesting possibly that the clinical presentation of ovarian tumors can be diverse based on patient demographics and clinical practices. These differences notwithstanding, abdominal pain is the commonest symptom in most of the published studies.

The biological behaviour seen in the present study also corroborates this benign prevalence of ovarian tumours. Of the 90 tumors, 72 (80.0%) were benign, 3 (3.3%) were borderline, and 15 (16.7%) were malignant. These results are similar to those reported by Sheikh et al. (2017) who reported 80.3% benign, 15.5% malignant and 4.1% borderline. Similarly, in a study by Yogambal et al. (2014), 78.6% of the ovarian neoplasms were benign, 20.7% malignant and 0.8% borderline, and approximately 72% benign and 23% malignant were encountered in another study by Gupta et al. (2007) [17]. On the other hand, Wills and Mathew (2016) reported a higher percentage of tumors (96.4%) with only 2.8% malignant tumors, as compared to the present study. The differences could be due to sample size, varying referral patterns, regional demographics and tertiary care patients. However, all the studies have consistently shown that benign ovarian tumors are more prevalent as compared to malignant and borderline tumors and hence the importance of histopathological examination for the definite diagnosis and appropriate management (Gupta et al., 2007; Wills & Mathew, 2016; Sheikh et al., 2017).

Conclusion

The present retrospective study demonstrates that ovarian tumors occur predominantly in women of reproductive age, with the highest incidence observed in the 21–30 years age group. Abdominal pain was the most frequent presenting symptom, emphasizing the importance of careful clinical evaluation in women presenting with nonspecific pelvic complaints. Histopathological examination revealed that benign tumors, particularly serous cystadenoma, constituted the majority of ovarian neoplasms, while malignant tumors were relatively less common but showed a clear increase with advancing age. The findings highlight a distinct age-related variation in the biological behavior of ovarian tumors, with benign lesions predominating in younger women and malignant lesions occurring more frequently in older patients. Therefore, early diagnosis, timely surgical intervention, and accurate histopathological assessment remain essential for appropriate management, prognostic evaluation, and

improved clinical outcomes in patients with ovarian tumors.”

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