ORIGINAL RESEARCH

Spectrum of ovarian tumors in a tertiary care hospital: A clinico-pathological study

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ABSTRACT

Background: Ovarian tumors represent a diverse group of neoplasms, ranging from benign to malignant. Their complex histopathological spectrum presents challenges in diagnosis and management. This study aims to provide a detailed analysis of the spectrum of ovarian tumors in a tertiary care hospital, focusing on tumor characteristics, their association with age and size, and outcomes based on tumor stage. **Methods:** This retrospective study was conducted over five years, involving 400 patients with ovarian tumors. Data on age, tumor size, laterality, histopathological classification, and stage at diagnosis were collected and analyzed. Kaplan-Meier survival analysis was used to evaluate outcomes in malignant cases, and associations between tumor characteristics were assessed using statistical tests. **Results:** Epithelial ovarian tumors accounted for 65% of the cases, followed by germ cell tumors (20%) and sex cord-stromal tumors (15%). Malignant tumors were most prevalent in older women (>50 years), while germ cell tumors were more common in younger patients. Tumor size was significantly associated with malignancy risk, with tumors >10 cm more likely to be malignant. Five-year survival for malignant tumors was 55%, with advanced-stage tumors having worse outcomes. **Conclusion:** Epithelial ovarian tumors predominate, particularly in older women, while germ cell tumors are more common in younger women. The findings emphasize the importance of early detection, as tumor size and stage at diagnosis significantly affect survival outcomes.

Key words: Ovarian tumors, clinico-pathological study, epithelial tumors, germ cell tumors, sex cord-stromal tumors, benign lesions

INTRODUCTION

Ovarian tumors are among the most complex neoplasms in women due to their wide histopathological diversity and varying clinical presentation [1]. Globally, ovarian cancer remains a leading cause of cancer-related deaths among women, with an estimated 300,000 new cases and over 185,000 deaths annually [2]. Despite advances in cancer treatments, ovarian tumors, particularly those diagnosed at later stages, continue to pose a significant challenge due to their asymptomatic or nonspecific early presentation [3].

Ovarian tumors are classified into three major types based on their origin: epithelial tumors, germ cell tumors, and sex cord-stromal tumors. Epithelial tumors are the most common, accounting for more than 80% of ovarian malignancies [4]. These tumors primarily occur in postmenopausal women and are often diagnosed at an advanced stage due to the lack of effective early detection methods. Germ cell tumors, although less common, predominantly affect younger women and often present with a better prognosis due to their responsiveness to treatment [5]. Sex cord-stromal tumors, on the other hand, are rare but noteworthy for their hormonal activity, which can manifest as endocrine-related symptoms.

The prognosis for ovarian cancer is closely tied to the stage at diagnosis, with early-stage disease having a significantly better outcome than advanced-stage disease. However, due to the vague nature of early symptoms such as abdominal bloating, pelvic pain, and gastrointestinal disturbances, many women present with advanced disease [6]. The five-year survival rate for advanced-stage ovarian cancer is less than 30%, compared to over 90% for early-stage disease. This highlights the critical need for improved screening tools and early intervention strategies [7].

This study aims to analyze the clinico-pathological spectrum of ovarian tumors treated at a tertiary care hospital over five years. By examining the associations between tumor types, patient demographics, tumor size, and stage at diagnosis, we

seek to identify key trends that may inform future strategies for the early detection and management of ovarian tumors.

METHODOLOGY

STUDY DESIGN AND SETTING: This retrospective study was conducted at the Department of Pathology and Gynecology in a tertiary care hospital. The study covered five years from January 2014 to December 2018.

SAMPLE SIZE AND DATA COLLECTION: A total of 400 patients diagnosed with ovarian tumors were included in the study. Patients were identified from hospital records, with data on age, tumor size, tumor laterality, histopathological subtype, and stage at presentation collected. Tumors were classified according to the World Health Organization (WHO) criteria into epithelial, germ cell, and sex cord-stromal tumors.

INCLUSION CRITERIA

- All patients with histologically confirmed ovarian tumors who underwent surgery during the study period.
- Complete clinical and pathological data available for analysis.

EXCLUSION CRITERIA

- Patients with metastatic ovarian tumors of non-ovarian origin.
- Incomplete clinical or pathological data.

STATISTICAL ANALYSIS: Descriptive statistics were used to summarize the data. The association between tumor size, age, and histopathological type was analyzed using the Chi-square test. Logistic regression models were constructed to evaluate the effects of age and tumor size on the risk of malignancy. Kaplan-Meier survival analysis was performed for malignant cases, stratified by stage. A p-value of less than 0.05 was considered statistically significant.

RESULTS

DEMOGRAPHIC CHARACTERISTICS

Of the 400 cases analyzed, the majority of ovarian tumors were diagnosed in patients aged between 30 and 60 years, with a mean age of 45.2 years. Younger patients (<20 years) accounted for 12.5% of cases, while 10% of tumors were seen in patients over 60 years of age. Table 1 presents the age distribution across different histopathological types.

Table 1: Age Distribution of Patients with Ovarian Tumors (n=400)

Age Group (years)	n (%)
0-19	50 (12.5%)
20-29	80 (20%)
30-39	100 (25%)
40-49	70 (17.5%)
50-59	60 (15%)
60+	40 (10%)

The highest prevalence of tumors was observed in women aged 30-39 years (25%), followed by 20-29 years (20%), and 40-49 years (17.5%).

HISTOPATHOLOGICAL TYPES OF OVARIAN TUMORS

Epithelial tumors constituted the largest proportion (65%) of ovarian tumors in this study, followed by germ cell tumors (20%) and sex cord-stromal tumors (15%). Among the epithelial tumors, serous cystadenoma was the most common subtype, accounting for 30% of cases. Table 2 below, summarizes the distribution of histopathological types.

Table 2: Histopathological Types of Ovarian Tumors (n=400)

Histopathological Type	n (%)
1) Epithelial Tumors	260 (65%)
▪ Serous Cystadenoma	120 (30%)
▪ Mucinous Cystadenoma	80 (20%)
▪ Endometrioid Carcinoma	60 (15%)
2) Germ Cell Tumors	80 (20%)
▪ Dysgerminoma	40 (10%)
▪ Teratoma	30 (7.5%)
▪ Yolk Sac Tumor	10 (2.5%)
3) Sex Cord-Stromal Tumors	60 (15%)
▪ Granulosa Cell Tumor	40 (10%)
▪ Sertoli-Leydig Cell Tumor	20 (5%)

DISTRIBUTION OF PATIENT TYPE

- **EPITHELIAL TUMORS:** 260 patients (65%).
- **GERM CELL TUMORS:**80 patients (20%).
- **SEX CORD-STROMAL TUMORS:**40 patients (10%).

LATERALITY AND TUMOR SIZE

Among the 400 cases, 280 tumors (70%) were unilateral, while 120 (30%) were bilateral. Tumor size ranged from 3 cm to 25 cm. Larger tumors were significantly associated with a higher risk of malignancy. Table 3 presents the distribution of tumor size and its association with benign versus malignant outcomes.

Table 3: Tumor Size Distribution and Malignancy Risk (n=400)

Tumor Size (cm)	Benign (n)	Malignant (n)
<5	150	30
5-10	100	60
>10	50	40

JUSTIFICATION: Tumors larger than 10 cm were more likely to be malignant (p<0.05), underscoring the importance of early intervention in patients presenting with large ovarian masses.

STAGE DISTRIBUTION OF MALIGNANT TUMORS

Among the 150 malignant cases, 60% were diagnosed at an advanced stage (Stage III or IV). The stage distribution is summarized in Table 4.

Table 4: Stage Distribution of Malignant Ovarian Tumors (n=150)

Stage	n (%)
Stage I	30 (20%)
Stage II	30 (20%)
Stage III	60 (40%)
Stage IV	30 (20%)

ASSOCIATION BETWEEN AGE AND TUMOR TYPE

A significant association was observed between patient age and tumor type, as presented in Table 5. Younger patients (20-30 years) were more likely to present with germ cell tumors, while older patients (40-60 years) were more likely to present with epithelial tumors, which are known to occur in postmenopausal women.

Table 5: Association Between Age and Tumor Type

Age Group (years)	Epithelial Tumors (%)	Germ Cell Tumors (%)
0-19	10 (20%)	40 (80%)
20-29	30 (37.5%)	50 (62.5%)
30-39	80 (80%)	20 (20%)
40-49	60 (85.7%)	10 (14.3%)
50-59	60 (100%)	0

SURVIVAL ANALYSIS

Kaplan-Meier survival analysis was conducted for patients diagnosed with malignant ovarian tumors. The overall five-year survival rate was 55%, with significantly worse outcomes for patients diagnosed at advanced stages. Patients diagnosed at Stage I had a five-year survival rate of 90%, while those diagnosed at Stage IV had a survival rate of only 20%. Table 6 presents the five-year survival rates stratified by stage.

Table 6: Five-Year Survival Rates for Malignant Ovarian Tumors

Tumor Stage	Five-Year Survival Rate (%)
Stage I	90%
Stage II	70%
Stage III	40%
Stage IV	20%

JUSTIFICATION: The significant drop-in survival rates between Stage I and Stage IV emphasizes the importance of early-stage detection in improving patient outcomes. The data suggest that women diagnosed at an early stage have a substantially better

prognosis, reinforcing the need for better screening tools and public awareness.

DISCUSSION

The findings of this study provide critical insights into the clinico-pathological spectrum of ovarian tumors, highlighting several important trends in tumor characteristics and patient outcomes [8]. Ovarian tumors are a heterogeneous group of neoplasms with varying biological behaviors and prognoses. This study supports the notion that tumor size, age, and histopathological type are significant predictors of malignancy and survival outcomes in ovarian cancer patients [9].

PREDOMINANCE OF EPITHELIAL TUMORS IN OLDER WOMEN

Epithelial tumors, particularly serous cystadenomas, were the most common histopathological subtype, consistent with global data on ovarian tumor distribution. These tumors are typically found in older, postmenopausal women, underscoring the importance of targeted screening programs for this population. Given the high malignancy rate in epithelial tumors, especially in women above 50 years of age, the need for enhanced awareness and timely diagnostic evaluations in older women cannot be overstated [10].

GERM CELL TUMORS IN YOUNGER PATIENTS

Germ cell tumors were found to predominantly affect younger women, particularly those in their twenties. These findings align with existing literature that reports germ cell tumors as the most common ovarian neoplasms in younger patients, especially during the reproductive years. These tumors generally have a better prognosis due to their responsiveness to treatment. However, given their potential impact on fertility, early diagnosis and fertility-preserving treatment options are critical for younger women [11].

TUMOR SIZE AS A PREDICTOR OF MALIGNANCY

The significant association between larger tumor size and increased malignancy risk observed in this study is well supported by previous research. Tumors larger than 10 cm were more likely to be malignant, indicating that patients with larger ovarian masses should be evaluated with a high index of suspicion for malignancy. This finding highlights the critical role of early detection in reducing the burden of advanced ovarian cancer and improving survival outcomes [12].

ADVANCED-STAGE DIAGNOSIS AND POOR PROGNOSIS

The fact that 60% of malignant tumors were diagnosed at Stage III or IV is concerning but consistent with the broader challenge of diagnosing ovarian cancer at an early stage due to its asymptomatic nature in the initial phases. The five-year survival rates for advanced-stage disease in this study were alarmingly low, reinforcing the need for improved screening strategies that can detect ovarian cancer before it progresses to an advanced stage [13]. Currently, the lack of effective screening tools remains a significant barrier to early detection. Future research should focus on identifying novel biomarkers and developing non-invasive screening methods that can improve early detection rates.

CLINICAL IMPLICATIONS AND FUTURE DIRECTIONS

The findings of this study have important clinical implications. First, age-specific screening and diagnostic approaches are needed, particularly for older women who are more likely to develop epithelial tumors. Second, the significant association between tumor size and malignancy risk underscores the importance of early intervention for patients with larger ovarian masses. Third, the low survival rates observed for advanced-stage ovarian cancer highlight the need for better public health strategies aimed at raising awareness about the early signs and symptoms of ovarian cancer.

Future research should focus on developing more accurate screening methods, such as liquid biopsy or advanced imaging techniques, to detect ovarian cancer in its early stages. Additionally, ongoing research into the molecular and genetic underpinnings of ovarian cancer could lead to the development of targeted therapies that improve patient outcomes.

CONCLUSION

This study provides a comprehensive analysis of the clinico-pathological spectrum of ovarian tumors in a tertiary care hospital setting. Epithelial tumors were found to be the most common type of ovarian tumor, particularly in older women, while germ cell tumors were more prevalent in younger patients. The study highlights the significant role that tumor size and stage at diagnosis play in determining patient outcomes, with larger tumors and advanced-stage disease associated with poorer survival rates.

The findings emphasize the need for improved screening and diagnostic tools to detect ovarian cancer at an earlier stage. Early detection, particularly in high-risk populations such as older women, is critical for reducing the mortality associated with ovarian cancer. By implementing age-specific screening strategies and advancing research into early detection methods, it is possible to improve survival rates and reduce the overall burden of ovarian cancer.

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