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Original Research Article

Clinicopathological study of ovarian tumors

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ABSTRACT

Background: Ovarian tumors are a significant gynecological concern with high morbidity and mortality due to late-stage diagnosis. Their deep pelvic location and vague early symptoms, such as abdominal pain and bloating, contribute to diagnostic delays. Understanding the clinicopathological profile of ovarian tumors is essential for timely diagnosis, accurate classification, and optimal treatment planning. The aim of the study is to evaluate the clinical presentation and pathological features of ovarian tumors and assess their implications for diagnosis and patient management through a comprehensive clinicopathological study.
Methods: A prospective observational study was conducted over one year in the Department of Obstetrics and Gynecology, LLRM Medical College and SVBP Hospital. Fifty female patients with histopathologically confirmed ovarian tumors were enrolled. Clinical data, imaging findings, and pathological diagnoses were analyzed. Tumor types, symptomatology, and diagnostic correlations were evaluated using SPSS v21.0, with $p<0.05$ considered statistically significant.
Results: The mean age of patients was 48.3 years. Most belonged to the lower middle socioeconomic class. Abdominal pain (60%) was the most frequent symptom. Benign tumors accounted for 65% of cases, followed by malignant (25%) and borderline (10%). Mean tumor sizes progressively increased from benign to malignant (5.4 cm to 8.9 cm). USG and histopathology findings showed high concordance in malignancy detection but varied slightly for benign and borderline lesions.
Conclusions: Ovarian tumors most commonly present with nonspecific symptoms and are predominantly benign. Tumor size correlates with malignancy. Histopathological confirmation remains essential for accurate diagnosis, reinforcing its role in guiding management.

Keywords: Ovarian tumors, Clinicopathological study, Benign ovarian tumor, Malignant ovarian tumor, Borderline tumor, Tumor size, Ultrasonography, Histopathology, Abdominal pain, Diagnostic correlation, Female reproductive neoplasms, CA-125, Socioeconomic status

INTRODUCTION

Ovarian tumors are a significant health issue worldwide, although less common than cancers like breast or lung cancer. Their location deep in the pelvis makes them difficult to detect early. As a result, many ovarian tumors are diagnosed at an advanced stage, reducing treatment success rates and contributing to high mortality.[1]

These tumors can be benign, borderline, or malignant, with malignant types being the most concerning due to their rapid progression and vague symptoms like bloating, pelvic pain, or menstrual irregularities. These nonspecific symptoms often lead to delays in diagnosis, making early detection a major challenge.[2]

Understanding the clinicopathological features such as clinical symptoms, histological patterns, and genetic mutations is essential for accurate classification, prognosis, and treatment planning. This helps in deciding whether surgery, chemotherapy, or targeted therapy is appropriate for each patient.[3]

The absence of clear early symptoms in most ovarian tumors hampers early diagnosis. Many patients present with vague complaints or none at all, which delays suspicion and diagnostic testing. Improved awareness of early signs and risk factors can aid clinicians in suspecting ovarian tumors earlier, improving chances of timely intervention and better outcomes.[5]

Ovarian tumors are biologically diverse. Advances in molecular pathology, such as next-generation sequencing and immunohistochemistry, have uncovered key mutations and pathways involved in tumor development. These insights have significantly enhanced classification, behavior prediction, and targeted therapy selection.[6]

Clinicopathological evaluation combines clinical, radiological, and pathological data to assess tumor type, grade, stage, location, metastasis, and biomarkers. This integrated approach helps in diagnosis, treatment decisions, and assessing response and recurrence risk.[7]

Findings from these studies are vital for improving survival rates. Most ovarian cancers are diagnosed at later stages, leading to poor prognosis. Understanding features such as tumor histology, grade, and molecular profile enables clinicians to personalize treatment—whether surgical, chemotherapeutic, or targeted therapy. Molecular profiling also identifies biomarkers suitable for precision medicine.[7]

Such studies contribute to research into the molecular and genetic mechanisms of ovarian tumorigenesis. This aids in identifying new diagnostic markers and therapeutic targets, advancing personalized treatment options. Predictive tools developed from these findings support better risk stratification and treatment planning.

Clinicopathological studies enhance diagnostic accuracy, treatment planning, and research into ovarian tumors. They enable personalized care, improve survival, and contribute to ongoing progress in gynecologic oncology.[8]

Aim and objectives

This study aims to conduct a comprehensive clinicopathological investigation of ovarian tumors, focusing on their clinical presentation, pathological features, and their implications for patient management. By integrating clinical data, radiological findings, surgical pathology reports, and ancillary investigations, the study seeks to unravel the intricate web of disease progression and contribute to improved diagnostic strategies and tailored treatment approaches.

METHODS

This prospective observational study was conducted over a period of one year (1st March 2023 to 29th February 2024) in the Department of Obstetrics and Gynecology at LLRM Medical College and its associated SVBP Hospital. The required sample size was calculated using the single population proportion formula, considering parameters such as the Z-score for a 95% confidence level (Z=1.96), the estimated population proportion (P), and a predetermined margin of error (e), ensuring adequate statistical power and precision for the study. The study focused on a clinicopathological evaluation of ovarian tumors, analyzing both clinical presentations and pathological features to gain insights into disease patterns.

Patients diagnosed with ovarian tumors, including both benign and malignant forms, were included in the study. The study encompassed a wide age range, including both adult and pediatric female patients. Only those patients with a confirmed diagnosis based on standardized diagnostic methods—such as histopathological examination, imaging techniques (ultrasound, CT, MRI), or tumor marker analysis (CA-125, HE4)—were enrolled. Availability of complete clinical and pathological data was essential for inclusion. These data encompassed clinical presentation, medical history, laboratory and imaging findings, surgical details, and follow-up records. Participation in the study required written informed consent, with full adherence to ethical norms and regulatory guidelines to protect patient confidentiality and rights.

Exclusion criteria included patients who had undergone previous treatment for ovarian tumors, those with concurrent malignancies, or those whose tumors were confirmed to be metastases from other primary cancers. Additionally, patients with incomplete data, inability to provide consent, or those unwilling or unable to participate in follow-up were excluded. Pregnant women were also excluded in specific cases due to the special considerations involved in managing ovarian tumors during pregnancy.

Statistical analysis involved presenting data in the form of frequencies and percentages. The chi-square test was used to compare categorical variables, while the unpaired t-test was applied to continuous variables. A p value of less than 0.05 was considered statistically significant. All statistical analyses were performed using SPSS software version 21.0.

RESULTS

Table 1 represents the sociodemographic profile of the patients included in the study. All 50 participants were female, accounting for 100% of the sample, with a statistically significant p value of <0.001. The mean age of the patients was 48.3 years with a standard deviation of 12.5 years. The socioeconomic status of the participants, assessed using the Kuppuswamy Scale, showed that the

majority belonged to the lower middle class (35%), followed by the upper lower class (25%), upper middle class (20%), and equal proportions (10% each) from the upper and lower classes. The distribution across different socioeconomic strata was statistically significant, with p values ranging from 0.01 to 0.05.

Table 1: Sociodemographic profile of patients.

Variable	n=50	%	P value
Gender (female)	50	100.0	<0.001
Mean age±SD (years)	48.3±12.5	-	-
Socioeconomic status (Kuppuswamy scale)			
Upper class	5	10.0	0.03
Upper middle	10	20.0	0.02
Lower middle	18	35.0	0.01
Upper lower	12	25.0	0.02
Lower	5	10.0	0.05

Table 2 represents the clinical presentation of ovarian tumors among 50 patients. Abdominal pain was the most common symptom, reported by 60% of the patients, followed by abdominal distension in 50% of cases. Menstrual irregularities were observed in 40% of the patients, while weight loss was noted in 25% of cases. The p-values for all symptoms were statistically significant, with abdominal pain showing the highest level of significance (p<0.001), indicating a strong association between these symptoms and the presence of ovarian tumors.

Table 2: Clinical presentation of ovarian tumors.

Symptoms	n=50	%	P value
Abdominal pain	30	60.0	<0.001
Abdominal distension	25	50.0	0.01
Menstrual irregularities	20	40.0	0.03
Weight loss	13	25.0	0.05

Table 3 represents the distribution of ovarian tumor types among the study population. Out of a total of 50 cases, benign tumors were the most common, accounting for 33 cases (65.0%) with a statistically significant p value of <0.001. Borderline tumors were observed in 5 cases (10.0%) with a p value of 0.02, while malignant tumors were present in 12 cases (25.0%), also showing statistical significance with a p value of 0.01. These findings suggest a predominance of benign ovarian tumors in the study sample, with significant distribution differences among the tumor types.

Table 4 represents the mean±standard deviation (SD) of tumor types in relation to their respective p values. For benign tumors, the mean was 5.4±2.1, with a p value of 0.03, indicating a statistically significant difference. Borderline tumors had a mean of 7.2±3.0 and a p value of 0.02, also showing a significant difference. Malignant tumors exhibited the highest mean of 8.9±3.5, with a p value of <0.001, suggesting a highly significant difference compared to benign and borderline tumor types. These results highlight a clear trend in the increasing tumor type severity from benign to malignant.

Table 3: Distribution of ovarian tumor types.

Type	n=50	%	P value
Benign	33	65.0	<0.001
Borderline	5	10.0	0.02
Malignant	12	25.0	0.01

Table 4: Mean tumor size.

Tumor type (cm)	Mean±SD	P value
Benign	5.4±2.1	0.03
Borderline	7.2±3.0	0.02
Malignant	8.9±3.5	<0.001

Table 5 represents a comparison between the findings of USG diagnosis and pathology diagnosis in terms of benign, borderline, and malignant cases. In the benign category, the USG diagnosis identified 63.0% of cases, while pathology diagnosis identified 65.0%, with a p-value of 0.04. For borderline cases, USG diagnosed 12.0%, while pathology reported 10.0%, with a p-value of 0.02. Both the USG and pathology diagnoses identified 25.0% of malignant cases, with a p-value of 0.05. These results indicate statistically significant differences in the diagnosis of benign and borderline cases, while the identification of malignant cases showed no significant difference between the two methods.

Table 5: Comparison of USG and pathological findings.

Finding	USG diagnosis (%)	Pathology diagnosis (%)	P value
Benign	63.0	65.0	0.04
Borderline	12.0	10.0	0.02
Malignant	25.0	25.0	0.05

DISCUSSION

Our study provides an in-depth clinicopathological evaluation of ovarian tumors, with a focus on the diagnostic utility of ultrasonography and its correlation with histopathological findings. The sociodemographic characteristics of the study population revealed that all patients were female, with a mean age of 48.3±12.5 years. This finding aligns with existing literature, which suggests that ovarian tumors are more commonly observed in middle-aged and postmenopausal women. Socioeconomic status, assessed using the Kuppuswamy Scale, indicated that the majority of patients belonged to the lower middle class (35%), followed by the upper lower class (25%), the

upper middle class (20%), and smaller proportions in the upper class (10%) and lower class (10%). The statistically significant p values for socioeconomic distribution suggest a potential link between financial status and healthcare access, which may influence the stage at which patients seek medical attention. Women from lower socioeconomic backgrounds may experience delays in diagnosis due to limited access to healthcare facilities and financial constraints, which can impact the timely detection and management of ovarian tumors. Clinically, most patients presented with abdominal pain, bloating, menstrual irregularities, and a palpable mass, findings consistent with other studies on ovarian tumors. Ultrasonography (USG) was found to be highly effective in identifying ovarian masses, distinguishing between benign and malignant lesions based on echotexture, cystic or solid nature, and vascular patterns. However, while USG provided valuable initial diagnostic insight, histopathology remained the gold standard for definitive diagnosis, reinforcing the need for tissue confirmation in suspicious cases. The integration of tumor markers such as CA-125 and HE4 played a supplementary role in predicting malignancy, particularly in postmenopausal women. Elevated tumor markers were observed in a significant proportion of patients with histologically confirmed malignant tumors, supporting their role in risk stratification. However, the study also reaffirmed that tumor markers alone are not definitive diagnostic tools, as elevated levels can be seen in benign conditions such as endometriosis and pelvic inflammatory disease. Jamwal G et al9 the age distribution of malignant cases showed a higher prevalence in middle-aged individuals, with the highest frequency observed in the 41–50 years age group, accounting for 24.24% of cases. This was followed by the 31–40 and 51–60 years age groups, each comprising 21.21% of cases. The younger age groups, 21–30 years and 10–20 years, contributed to 18.19% and 12.12% of cases, respectively. The lowest prevalence was noted in the 61–70 years age group, with only 0.03% of cases, while no cases were recorded in individuals above 71 years. These findings suggest that malignant cases predominantly occur in the reproductive and perimenopausal age groups, emphasizing the need for early screening and timely intervention in these populations. The relatively lower frequency in older age groups may be attributed to reduced life expectancy, lower healthcare-seeking behavior, or underreporting in the elderly. Conversely, the presence of malignancy in younger individuals highlights the importance of genetic predisposition, environmental factors, and lifestyle influences as potential risk factors.

In our study, the most common clinical presentation of ovarian tumors was abdominal pain, reported in 60% of cases ($p<0.001$). This aligns with previous studies, which highlight abdominal pain as a frequent symptom due to tumor growth, pressure effects, or torsion in some cases. Abdominal distension was observed in 50% of patients ($p=0.01$), likely resulting from tumor enlargement, ascites, or mass effect on surrounding structures. Menstrual irregularities were noted in 40% of cases ($p=0.03$), reflecting hormonal imbalances often associated with ovarian tumors, particularly those with endocrine activity. Additionally, weight loss was documented in 25% of cases ($p=0.05$), which may indicate an advanced disease stage, metabolic alterations, or malignancy-associated cachexia. In terms of tumor classification, benign ovarian tumors were the most prevalent, accounting for 65% of cases ($p<0.001$). This is consistent with global epidemiological trends, where benign neoplasms, particularly serous and mucinous cystadenomas, are more frequently encountered. Borderline tumors were identified in 10% of cases ($p=0.02$), representing a subset of ovarian neoplasms with uncertain malignant potential. These tumors require careful histopathological assessment and long-term follow-up due to their potential for recurrence and progression. Malignant ovarian tumors comprised 25% of cases ($p=0.01$), a finding that highlights the importance of early detection and timely intervention. The proportion of malignant cases in our study underscores the clinical challenge of diagnosing ovarian cancer in its early stages, as symptoms often overlap with benign conditions. Khound et al observed the clinical presentation of patients with ovarian tumors.[10] The most common symptom was abdominal pain, reported by 80% of the patients (80 out of 100 cases). This finding is consistent with previous literature, where abdominal discomfort is a prominent symptom due to the tumor's pressure on surrounding structures. A small proportion of patients, 7%, reported loss of weight or loss of appetite, which could be attributed to the overall discomfort caused by the neoplasm or the tumor's impact on digestive processes. Regarding the frequency of ovarian neoplasms, our results showed that benign tumors were the most prevalent, accounting for 54% (54 out of 100) of cases. This finding aligns with existing research, which often reports benign ovarian tumors as more common compared to malignant ones. Borderline ovarian tumors, which have characteristics of both benign and malignant lesions, made up 11% of cases in our study. Lastly, malignant ovarian tumors were present in 35% (35 out of 100) of cases, highlighting the significant presence of malignant neoplasms despite the higher frequency of benign types. These findings emphasize the need for careful clinical evaluation of ovarian tumors, as benign cases are more common but malignant tumors still represent a considerable portion of cases, necessitating early detection and intervention.

In our study, we analyzed the mean tumor size across different types of ovarian tumors. The mean tumor size for benign tumors was found to be 5.4 cm, with a standard deviation of 2.1 cm. This suggests that benign tumors tend to be relatively smaller in size compared to other tumor types, a finding that is consistent with general observations in clinical practice. For borderline tumors, the mean size was 7.2 cm, with a standard deviation of 3.0 cm. These tumors, which have features of both benign and malignant lesions, tend to be larger than benign tumors, which may reflect their more aggressive behavior or potential for progression to malignancy. Malignant tumors had the largest mean size at 8.9 cm, with a standard deviation of

3.5 cm. The size difference between benign, borderline, and malignant tumors was statistically significant, with a p-value of less than 0.001, indicating a strong correlation between tumor size and malignancy. This supports the observation that malignant tumors are often diagnosed at larger sizes, which could be a result of more aggressive growth patterns. These findings highlight the importance of considering tumor size in the clinical assessment and management of ovarian tumors. Larger tumor sizes, particularly in the case of malignant lesions, may be indicative of more advanced disease, which underscores the need for early detection and intervention. Tjokroprawiro et al. the mean tumor size in malignant ovarian tumors was 26.61±5.74 mm, while in benign tumors, it was slightly smaller at 24.91±6.1 mm.[11] However, the difference was not statistically significant (p=0.261). This finding suggests that tumor size alone may not be a reliable distinguishing factor between benign and malignant ovarian tumors. While malignant tumors tend to grow larger, significant overlap exists in tumor size between benign and malignant cases, making it essential to incorporate other diagnostic parameters such as imaging characteristics, histopathological features, and biomarker evaluation for accurate differentiation. Previous studies have also reported that although malignant tumors often present with larger sizes, there is considerable variability, and some benign tumors, such as mucinous cystadenomas, can also attain large dimensions. This highlights the importance of a comprehensive assessment, including clinical presentation, radiological findings, and histopathological evaluation, rather than relying solely on size for predicting malignancy. Our findings reinforce the need for cautious interpretation of tumor size in clinical practice. While larger tumors may raise suspicion for malignancy, additional factors such as irregular margins, solid components, and associated symptoms should be considered for a more precise diagnosis.

In our study, we compared the diagnostic findings between ultrasound (USG) and pathology to assess the accuracy of USG in diagnosing ovarian tumors. The results showed that for benign tumors, the USG diagnosis identified 63% of cases, while pathology confirmed 65%. The p value of 0.04 suggests that there is a statistically significant agreement between USG and pathology for benign tumors, with USG being relatively reliable in detecting these types of tumors. For borderline tumors, USG diagnosed 12% of the cases, whereas pathology diagnosed 10%. The p value of 0.02 indicates that there is a minor but statistically significant difference between the two diagnostic methods for borderline tumors. This suggests that while USG can help in detecting borderline tumors, there might be some limitations in accurately distinguishing them from benign or malignant types, which may require further confirmation through pathology. Finally, for malignant tumors, both USG and pathology identified 25% of the cases, with a p-value of 0.05. This indicates that USG was equally effective as pathology in diagnosing malignant tumors, confirming its usefulness in detecting more aggressive neoplasms. We did not find any relevant study which relates to Comparison of USG and Pathological Findings.

Limitation of the study

Patients who had previously received treatment for ovarian tumors, such as chemotherapy, radiation therapy, or surgical intervention, were excluded from the study. Excluding these patients helped establish a more homogeneous study population and avoided potential confounding factors related to prior treatments.

CONCLUSION

In this study, all 50 participants were female, with a mean age of 48.3±12.5 years, highlighting the gender-specific nature of ovarian tumors. The socioeconomic classification using the Kuppuswamy Scale revealed that the majority of patients belonged to the lower middle class (35%), followed by the upper lower class (25%), upper middle class (20%), and equal distribution (10% each) in the upper and lower classes. These distributions were statistically significant, suggesting a possible correlation between socioeconomic status and the presentation of ovarian tumors. Clinically, abdominal pain was the most common symptom, reported by 60% of the patients, followed by abdominal distension in 50%, menstrual irregularities in 40%, and weight loss in 25%, all showing statistically significant p-values, with abdominal pain being the most significant (p<0.001). Pathological analysis showed that benign tumors were predominant, observed in 65% of cases, while malignant and borderline tumors were found in 25% and 10% of patients, respectively, with all tumor types showing statistically significant differences. The average tumor size increased with the severity of the tumor type: benign tumors had a mean size of 5.4±2.1 cm, borderline tumors 7.2±3.0 cm, and malignant tumors 8.9±3.5 cm, with statistically significant p-values indicating a strong correlation between tumor size and malignancy. When comparing ultrasonographic and histopathological diagnoses, USG identified 63% benign, 12% borderline, and 25% malignant cases, while pathological findings confirmed 65% benign, 10% borderline, and 25% malignant tumors. The correlation between the two diagnostic methods was statistically significant for benign and borderline tumors, while malignant cases showed consistent results across both modalities, reinforcing the need for pathological confirmation for accurate diagnosis and treatment planning.

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