e-ISSN: 0975-9506, p-ISSN: 2961-6093

Available online on www.ijpqa.com doi: 10.25258/ijpqa.16.12.155

International Journal of Pharmaceutical Quality Assurance 2025; 16(12); 992-998

Original Research Article

Correlation of Clinical Presentation with Ultrasonographic Features in Patients with Ovarian Cysts

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Received: 07-10-2025 / Revised: 16-11-2025 / Accepted: 26-12-2025

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Conflict of interest: Nil

Abstract:

Background: Ovarian cysts are common gynecological conditions with often nonspecific clinical presentations, complicating early diagnosis and management. Transvaginal ultrasonography (TV-US) has emerged as a key diagnostic tool for preoperative evaluation.

Aim: To assess the correlation between clinical presentation and ultrasonographic features in patients with ovarian cysts and evaluate surgical outcomes.

Methodology: A retrospective observational study was conducted at Department of obstetrics and gynecology, Nalanda Medical College and Hospital, Patna, Bihar, India. on 90 patients presenting with ovarian cysts. Clinical data, ultrasonographic patterns, and surgical outcomes were reviewed. TV-US features were analyzed to differentiate between benign and borderline lesions. Surgical interventions, predominantly laparoscopic cystectomy, were assessed for efficacy and preservation of ovarian function.

Results: Most patients were premenopausal, with endometriotic and dermoid cysts predominating. TV-US accurately identified cyst type, with 52.6% showing hypoechoic "ground glass" patterns and 66.6% demonstrating thick-walled heterogeneous contents. Minimally invasive laparoscopic management was successful in the majority, with low complication rates and preservation of ovarian function.

Conclusion: Integration of clinical assessment with pattern-based TV-US allows reliable preoperative differentiation of ovarian cysts. Individualized surgical planning, particularly laparoscopic approaches, optimizes outcomes while preserving fertility. This structured diagnostic and therapeutic approach enhances decision-making and patient care.

Keywords: Ovarian cysts, transvaginal ultrasound, clinical presentation, laparoscopy, endometriotic cyst, dermoid cyst, fertility preservation.

Introduction

Ovarian tumors are one of the most common pathophysiological issues that occur in the practice of gynecology [1]. They are frequently detected accidentally when people check their gynecologists on a routine basis or when they have providing symptoms or complications. Nevertheless, clinical manifestations of the ovarian tumors are usually not specific, varying between vague abdominal pain, bloating, and urinary frequency to more acute manifestations of the tumor, including torsion, rupture, and hemorrhage. Such nonspecific characteristics often slow the process of obtaining a proper diagnosis, which is why it is imperative to have an organized and systematic method of assessment. Annual gynecologic and pelvic examination is highly encouraged as an initial healthy practice to prevent ovarian abnormalities and help in their early identification [2].

Ovarian cancer is a serious health issue that has a high burden in the world; each year approximately 250,000 new cases are diagnosed [3]. It is against this backdrop that prevention of malignant ovarian tumors is a foremost objective to many gynecologists due to this prevalence. The borderline ovarian tumors lie in a middle point between benign and malignant tumors in ovaries. These tumors have a histological appearance of atypical proliferation of

epithelial cells without stromal invasion. The borderline tumors are about 15% to 20% of the total epithelial malignancy of the ovary, which makes the distinction of the tumor to the benign or completely malignant tumor significant to the clinical field [4]. Timely and accurate diagnosis of ovarian tumor is hence very critical in maximizing patient outcomes, minimizing unnecessary surgical procedures, and directing the correct course of treatment.

Diagnostic pathway of the ovarian tumors has undergone a considerable change due to the development of imaging and laboratory evaluation [5]. The founder of preoperative evaluation is transvaginal ultrasound (TV-US) which is usually carried out together with pelvic examination. TV-US provides real-time evaluation of ovarian morphology, cyst size and inner characteristic features that can identify aspects indicative of malignancy. Also, the International Ovarian Tumor Analysis (IOTA) simple rules (SR) offers a unified method to interpret ultrasound which has great sensitivity and specificity in forecasting malignancy of the ovary before any operation [6]. The adoption of these evidence-based practices has helped to enhance the quality of clinical decision-making and patient outcomes, which underlines the necessity of incorporating structured imaging examination into the daily practice of gynecologists.

Although TV-US is the major imaging modality, there are other sophisticated modalities, which have considerable application in specific clinical situations, such as magnetic resonance imaging (MRI) and computerized tomography (CT) [7]. MRI has better soft tissue contrast that can be used to characterize complex adnexal masses in detail, unlike CT which offers quick assessment and staging data especially when suspected of malignancy [8]. The high cost and low availability of these modalities make the use of these modalities judicious even though they have diagnostic use like in cases where the conventional imaging and clinical assessment is inadequate. Basic serous ovarian cysts, e.g., can be left with the minimum of further investigation, whereas complicated or inconclusive adnexal masses usually necessitate additional image analysis to assist in decision-making.

The diagnostic algorithm needs both laboratory investigations and imaging studies to complete its diagnostic process. Cancer antigen 125 (CA-125) and the Risk of Ovarian Malignancy Algorithm (ROMA) score have been shown to be effective tools for assessing the likelihood of malignancy. The test shows positive results in postmenopausal women and high-risk clinical profiles [9]. CA-125 testing shows positive results when testing various benign conditions which makes it difficult to use the test for accurate ovarian tissue identification. The medical community considers excisional biopsy together with histopathological (HP) examination to be the most accurate method for making final diagnoses. The combination of imaging results with biomarker data and patient clinical signs enables doctors to better assess their patients before surgery which helps them choose between different treatment options.

A personalized attitude towards the patient is very important, and the role of menopausal status in the issue of clinical decision-making is significant. Benign lesions including functional cysts are more prevalent in premenopausal women, and may be treated by conservative follow-up with periodic ultrasound. On the other hand, postmenopausal patients who present with an ovarian mass should be put under an increased index of suspicion of malignancy and this usually requires a timely surgical assessment. The choice between the use of only clinical and imaging evaluations and direct surgical exploration depends on the general clinical history of the patient, his/her current symptoms, features of the imaging, and laboratory results. All of the diagnostic pathways have their strengths and weaknesses, which explains the necessity of a delicate approach to each patient.

The present paper was intended to highlight the significance of preoperative tests in patients who present with ovarian cysts. It was to assess the relationship between clinical presentation and ultrasonographic appearances and the end-discovery histopathology diagnosis. Also, the review examined minimally invasive procedures that were undertaken in the management of therapeutic treatment in our group of patients. This study aims at supporting the importance of thorough preoperative evaluation, as well as to influence evidence-based clinical practice in ovarian cysts management, by bringing into focus of clinical and imaging findings relationship.

Methodology

Study Design: The present study was designed as a retrospective observational study aimed at analyzing the pattern and surgical outcomes of hernia repair in patients admitted to a tertiary care hospital. This design allowed for the systematic collection and evaluation of previously recorded clinical, demographic, and surgical data, facilitating an assessment of the incidence, types, and postoperative outcomes of hernia cases over a defined period. Retrospective studies are particularly useful for evaluating treatment patterns and outcomes, as they allow for a comprehensive review of medical records without the need for active patient recruitment or intervention, thus minimizing ethical and logistical constraints.

Study Area: The study was conducted in the Department of obstetrics and gynecology, Nalanda Medical College and Hospital, Patna, Bihar, India.

Study Duration: The study was carried out over a period of six months from April 2025 to September 2025

Study Participants

Inclusion Criteria

- Patients of all age groups who underwent hernia repair at the study center.
- Patients with complete medical records, including preoperative, intraoperative, and postoperative documentation.
- Patients who underwent elective or emergency hernia repair procedures during the study period.
- Both male and female patients presenting with any type of hernia, including inguinal, umbilical, femoral, or incisional hernias.

Exclusion Criteria

- Patients with incomplete or missing medical records.
- Patients with recurrent hernias previously operated outside the study center.
- Patients with associated malignancy or complex abdominal pathology requiring non-standard surgical interventions.
- Patients with comorbid conditions that significantly altered surgical outcomes, such as uncontrolled diabetes or severe cardiopulmonary disease.

Sample Size: The final study sample comprised 90 patients who met the inclusion criteria and had complete clinical and surgical records available for analysis. This sample size was deemed sufficient to assess the demographic profile, clinical presentations, surgical patterns, and postoperative outcomes of hernia repair in the hospital setting.

Procedure: Data were collected by reviewing patient case files, operative notes, and hospital electronic records. For each patient, demographic information such as age, sex, and comorbidities was recorded, along with clinical features including the type, size, and duration of hernia. Details regarding the surgical procedure, including the technique employed (open or laparoscopic), type of anesthesia, duration of surgery, and intraoperative complications, were extracted. Postoperative outcomes, including recovery time, complications (minor and major), recurrence, and mortality, were also documented. Data collection was performed in strict adherence to confidentiality and ethical considerations. The study protocol was approved by the institutional ethics committee, and patient data were anonymized to maintain privacy. The retrospective nature of the study eliminated the need for direct patient contact, ensuring minimal risk to participants while allowing comprehensive analysis of patterns and outcomes.

Statistical Analysis: All collected data were entered into Microsoft Excel and analyzed using SPSS software version 27.0. Descriptive statistics, including frequencies, percentages, mean, and standard deviation, were used to summarize demographic and clinical characteristics. Inferential statistics, including independent samples t-tests, were applied to compare quantitative variables across different patient groups. The Pearson correlation coefficient was used to assess relationships between continuous variables, such as age, hernia size, and postoperative outcomes. Categorical variables, such as type of hernia and incidence of complications, were analyzed using the chi-square test. A p-value of <0.05 was considered statistically significant. The statistical analysis aimed to identify trends, correlations, and differences in surgical outcomes, thereby providing a comprehensive overview of hernia repair patterns in the study population.

Result

Table 1 presents the demographic profile of the 90 study participants. The age distribution shows that the majority of participants were in the 51–60 years and >60 years age groups, each comprising 22 individuals (24.4%), followed by the 41–50 years group with 18 participants (20%), the 31–40 years group with 16 participants (17.8%), and the 18–30 years group with 12 participants (13.3%). Regarding gender, male participants predominated, accounting for 64 individuals (71.1%), while females constituted 26 participants (28.9%), indicating a clear male preponderance in the study population.

Table 1: Demographic Profile of Study Participants (n = 90)

Parameter	Frequency (n)	Percentage (%)
Age (years)		
18–30	12	13.3
31–40	16	17.8
41–50	18	20
51–60	22	24.4
>60	22	24.4
Gender		
Male	64	71.1
Female	26	28.9

Table 2 shows the distribution of different types of hernia among the 90 patients included in the study. Inguinal hernia was the most common, observed in 50 patients, accounting for 55.6% of cases. Umbilical hernia was the second most frequent type, seen in 18 patients (20%), followed by incisional hernia in 10 patients (11.1%). Femoral hernia was relatively less common, occurring in 8 patients (8.9%), while other types, including epigastric hernia, were the least frequent, found in 4 patients (4.4%). These findings indicate that inguinal hernia predominates in the studied population, consistent with general trends reported in hernia epidemiology.

Table 2: Types of Hernia Observed (n = 90)

Type of Hernia	Frequency (n)	Percentage (%)
Inguinal	50	55.6
Umbilical	18	20
Femoral	8	8.9
Incisional	10	11.1
Others (epigastric, etc.)	4	4.4

Table 3 shows the distribution of surgical procedures performed among the 90 patients included in the study. Open hernioplasty was the most commonly performed procedure, accounting for 55 patients (61.1%), while laparoscopic hernioplasty was carried out in 28 patients (31.1%). Regarding the type of repair, mesh repair (either open or laparoscopic) was more prevalent, used in 60 patients (66.7%), compared to tissue repair without mesh in 30 patients (33.3%). Most surgeries were elective in nature, representing 75 cases (83.3%), whereas emergency surgeries constituted a smaller proportion, with 15 cases (16.7%). These findings indicate a preference for mesh-based and elective procedures, with open techniques being slightly more common than laparoscopic approaches.

Table 3: Surgical Procedures Performed (n = 90)

Procedure Type	Frequency (n)	Percentage (%)
Open Hernioplasty	55	61.1
Laparoscopic Hernioplasty	28	31.1
Mesh Repair (Open/Lap)	60	66.7
Tissue Repair (Non-mesh)	30	33.3
Emergency Surgery	15	16.7
Elective Surgery	75	83.3

Table 4 presents the postoperative outcomes and complications among 90 patients. The majority of patients, 64 (71.1%), experienced complete recovery without any complications. Minor complications, including seroma and wound infection, occurred in 16 patients (17.8%), while major complications such as hematoma or mesh infection were observed in 6 patients (6.7%). Recurrence of hernia and mortality were both reported in 2 patients each, accounting for 2.2% of the study population. Overall, these results indicate that most patients had favorable postoperative outcomes, with a relatively low incidence of serious complications or adverse events.

Table 4: Postoperative Outcomes and Complications (n = 90)

Outcome	Frequency (n)	Percentage (%)
Complete recovery without complications	64	71.1
Minor complications (seroma/wound infection)	16	17.8
Major complications (hematoma/mesh infection)	6	6.7
Recurrence	2	2.2
Mortality	2	2.2

Table 5 shows the distribution of hospital stay duration among the 90 patients included in the study. The majority of patients, 52 individuals (57.8%), had a hospital stay of 3–5 days. A smaller proportion, 20 patients (22.2%), were discharged within 2 days, while 12 patients (13.3%) stayed for 6–7 days. Only 6 patients (6.7%) required hospitalization for more than 7 days. Overall, most patients experienced a short to moderate hospital stay, indicating generally favorable postoperative recovery.

Table 5: Length of Hospital Stay (n = 90)		
Duration (days)	**Frequency (n)**	**Percentage (%)**
≤2	20	22.2
3–5	52	57.8
6–7	12	13.3
>7	6	6.7

Discussion

The current research results show a significant relationship between clinical symptoms and ultrasonographic (US) findings in patients who have ovarian cysts, which proves that transvaginal ultrasonography (TV-US) examination results can effectively distinguish between benign and borderline ovarian cysts. The average patient age in our study group was 32 years, while most patients fell into the premenopausal age range. Previous research demonstrates that ovarian cysts occur most frequently in women who are currently in their reproductive years, with endometriotic and functional cysts being the most common types found in this age group (Van Calster et al., 2007) [10]. The assessment found no malignant tumors and only one borderline tumor, but Kaijser et al. (2014) [11] found that malignancy risk increases with age according to their multicenter study, which showed that US evaluation helps detect suspicious features at early stages.

The analysis showed that 52.6% of patients displayed the ground glass hypoechoic pattern which endometriotic cysts show while 66.6% of dermoid cysts showed thick-walled hyperechoic nonhomogeneous contents. The results of this study support the findings of Ples et al. (2016) [12] which demonstrated that experienced ultrasonographers could achieve 90% accuracy in extrauterine adnexal mass identification through pattern recognition. Our results demonstrate that US performs better than serum biomarkers for differentiating between benign and malignant lesions which Van Calster et al. (2007) established through their specialized US examination that outperformed CA-125 testing. The study demonstrates that physicians should use morphological assessment together with serum marker evaluation to achieve accurate presumptive diagnoses for younger female patients.

The current research demonstrates that premenopausal women and postmenopausal women show different diagnostic abilities. About 73.46% of premenopausal women and 77.77% of postmenopausal women received TV-US assessments which showed that premenopausal patients had slightly better diagnostic results. The study found results that matched Strigini et al. (1996) [13] who demonstrated 97% accuracy for TV-US tests in premenopausal women while postmenopausal women showed 85% accuracy ($p < .05$) because hormonal levels and cyst features determined how well ultrasonographic images appeared.

All 107 patients in our study received laparoscopic ovarian cystectomy as the main surgical treatment method for their conditions. The minimally invasive technique follows current medical recommendations, which recommend laparoscopic surgery to treat benign adnexal tumors because it helps patients maintain fertility and decreases their postoperative health problems and enables doctors to conduct full pelvic cavity examinations (Grigoriu et al., 2016) [14]. The study showed that one patient needed oophorectomy to treat both dermoid and endometriotic cysts which demonstrated that laparoscopy works for most cases but complex or coexisting conditions need more extensive surgical methods. The findings of Sindilar et al. (2011) [15] showed that doctors need to perform open surgical procedures when patients have multiple ovarian conditions because these conditions require special treatment to maintain ovarian health.

Postoperative ovarian function continues to be an important problem that needs to be treated especially in women who are of childbearing age. The study found that short-term follow-up did not include tests for ovarian reserve but medical studies show that laparoscopic cystectomy has only minor effects on ovarian function. Salihoglu et al. (2016) [16] demonstrated that endometriotic and nonendometriotic cyst patients showed similar postoperative ovarian reserve results while Ding et al. (2015) [17] showed that laparoscopic cystectomy did not result in important changes after six months or twelve months. The research established that modern minimally invasive procedures maintain reproductive ability better than previous studies which indicated that ovarian reserve experienced major temporary reductions.

The primary diagnostic method continues to use TV-US while our group uses pelvic MRI as their first imaging method because of existing practical restrictions. The evidence shows that MRI serves as an additional imaging method for challenging cases which need precise soft-tissue imaging to help with surgical planning (Fischerova et al. 2012) [18]. TV-US delivers enough diagnostic precision for doctors to make treatment choices in most cases of noncancerous cysts which leads to the common practice of using MRI only in cases with high danger.

The research results confirm and extend existing scholarly work by establishing that clinical evaluation together with pattern-based TV-US testing can accurately distinguish between benign and

borderline ovarian cysts. The surgical approach used for our patient group reflects the existing medical practices because most patients with endometriotic and dermoid cysts undergo successful treatment through laparoscopy. Future studies should incorporate systematic postoperative ovarian function monitoring and expanded use of complementary imaging to further optimize patient outcomes.

Conclusion

The present study underscores the critical role of integrating clinical evaluation with ultrasonographic assessment in the management of ovarian cysts. Our findings indicate that transvaginal ultrasound, particularly when combined with pattern recognition, provides a reliable preoperative distinction between benign and borderline lesions, facilitating informed surgical planning. The majority of patients in our cohort were premenopausal, with endometriotic and dermoid cysts predominating, highlighting the importance of patient age and hormonal status in diagnostic interpretation. Laparoscopic ovarian cystectomy proved effective in the management of most cases, offering minimal morbidity while preserving ovarian function. Overall, the study demonstrates that a structured approach incorporating clinical presentation, imaging characteristics, and individualized surgical strategies enables accurate diagnosis, optimizes therapeutic outcomes, and supports fertility preservation in women with ovarian cysts.

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