



CLINICAL OUTCOMES OF EARLY LAPAROSCOPIC MANAGEMENT IN PATIENTS WITH OVARIAN CYSTS: A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Background: Ovarian cysts are among the most common gynecological disorders affecting women of reproductive age. Early laparoscopic management has emerged as a preferred minimally invasive approach due to reduced postoperative morbidity, shorter hospital stay, and faster recovery. The present study evaluated the outcomes of early laparoscopic management in patients with ovarian cysts.

Methods: This prospective observational study was conducted in the Department of Obstetrics and Gynecology of a tertiary care teaching hospital over a period of 18 months. A total of 75 patients diagnosed with benign ovarian cysts and fulfilling the inclusion criteria were enrolled. Detailed clinical evaluation, ultrasonographic assessment, and laboratory investigations were performed preoperatively. All patients underwent laparoscopic management, including cystectomy, oophorectomy, or salpingo-oophorectomy depending on intraoperative findings. Intraoperative and postoperative outcomes such as duration of surgery, blood loss, postoperative pain, hospital stay, complications, and recovery time were assessed and analyzed statistically.

Results: The mean age of the study participants was 31.8 ± 7.2 years, with the majority belonging to the 26–35 years age group. Abdominal pain was the most common presenting symptom (69.3%). Laparoscopic cystectomy was performed in 74.7% of patients. Conversion to laparotomy was required in only 4% of cases. Most patients experienced minimal blood loss and mild postoperative pain. Hospital stay of ≤ 3 days was observed in 77.3% of patients, while 89.3% had no postoperative complications. Serous cystadenoma was the most common histopathological diagnosis.

Conclusion: Early laparoscopic management of ovarian cysts is a safe and effective treatment modality associated with minimal complications, shorter hospital stay, faster recovery, and favorable surgical outcomes.

KEYWORDS: Ovarian Cyst, Laparoscopy, Minimally Invasive Surgery, Ovarian Cystectomy, Surgical Outcomes, Benign Ovarian Tumors.

Introduction

Ovarian cysts are one of the most frequently encountered gynecological conditions among women of reproductive and perimenopausal age groups. They represent a heterogeneous

group of lesions ranging from simple functional cysts to complex benign and malignant neoplasms. Most ovarian cysts are benign in nature and may remain asymptomatic; however, larger or persistent cysts can present with

abdominal pain, menstrual disturbances, infertility, abdominal distension, or acute complications such as torsion and rupture. Advances in imaging modalities, particularly ultrasonography, have contributed to increased detection of ovarian cysts even in asymptomatic women[1].

Globally, ovarian cysts account for a significant proportion of gynecological hospital admissions and surgical interventions. Functional ovarian cysts are particularly common in women of reproductive age, while benign neoplastic cysts such as serous cystadenoma, mucinous cystadenoma, dermoid cysts, and endometriotic cysts are also frequently encountered. Studies have shown that nearly 5–10% of women undergo surgical treatment for an adnexal mass during their lifetime. The prevalence of benign ovarian cysts is reported to be higher in reproductive-aged women due to cyclical ovarian activity and hormonal influences. Early diagnosis and timely intervention are important to prevent complications and preserve reproductive function[2].

Traditionally, laparotomy was considered the standard surgical approach for ovarian cyst management. However, over the past few decades, laparoscopy has emerged as the preferred treatment modality because of its minimally invasive nature and better postoperative outcomes. Laparoscopic management offers several advantages including reduced postoperative pain, minimal blood loss, shorter hospital stay, early mobilization, faster recovery, improved cosmetic results, and lower postoperative adhesion formation[3]. With improved surgical expertise and technological advancements, laparoscopy is now widely used for the management of benign ovarian cysts.

Several studies in the literature have demonstrated the effectiveness and safety of laparoscopic surgery in ovarian cyst management. Medeiros et al[4]. reported that laparoscopic surgery for benign ovarian tumors was associated with significantly reduced postoperative morbidity and shorter hospital stay when compared with conventional laparotomy. Chapron et al[5]. also observed lower complication rates and improved recovery among women undergoing laparoscopic cystectomy. Furthermore, studies by Yuen et al[6] adnexal adhesion score, or frequency of bilateral disease. All the ovarian masses were benign. Endometriotic cysts and dermoid cysts were the most common disorder in the two groups. Cystectomy was performed in > 70% of cases in each group. Operating time was not increased with the laparoscopic approach, and the frequency of inadvertent rupture of the ovarian masses was just as high as in laparotomy. The laparoscopic approach was associated with a significant reduction in operative morbidity (odds ratio 0.34, 95% confidence interval 0.13 to 0.88. and Canis et al[7]. Gynecology, and Reproductive Medicine of the Clermont-Ferrand University Hospital between January 1980 and December 1991. The preoperative workup included routine clinical and ultrasonographic examinations. At laparoscopy, the technique involved peritoneal cytology, ovarian and peritoneal inspection,

cyst puncture, and endocystic examination. If a malignant mass was encountered or suspected, the patients were treated by immediate laparotomy with a vertical midline incision. The laparoscopic and pathologic diagnoses were compared. Long-term follow-up was studied using data obtained either clinically or by mail using a standardized questionnaire. Results: A total of 757 patients with 819 masses were managed by laparoscopy. The mean age was 35.8 ± 12.6 years and the mean diameter of the cysts was 6.0 ± 2.7 cm (range 1-20. highlighted the fertility-preserving benefits and reduced postoperative adhesions associated with minimally invasive surgery. Despite these advantages, the outcomes of early laparoscopic management may vary depending on patient characteristics, cyst size, surgical expertise, and available healthcare facilities.

In developing countries, including India, there remains limited institutional data regarding the clinical outcomes and safety profile of early laparoscopic intervention for ovarian cysts. Evaluation of surgical outcomes in local populations is essential to optimize patient care and strengthen evidence regarding minimally invasive gynecological surgery. Hence, the present study was undertaken to assess the outcomes of early laparoscopic management in patients with ovarian cysts and to evaluate its effectiveness and postoperative benefits in a tertiary care setting.

Aim and Objectives

Aim of the Study

To evaluate the clinical and surgical outcomes of early laparoscopic management in patients diagnosed with ovarian cysts.

Objectives of the Study

1. To assess the intraoperative and postoperative outcomes of laparoscopic management in patients with ovarian cysts.
2. To evaluate the postoperative recovery parameters such as duration of hospital stay, postoperative pain, and complications following laparoscopic surgery.
3. To analyze the effectiveness and safety of early laparoscopic intervention in the treatment of benign ovarian cysts.

Materials and Methods

Study Design and Setting

This prospective observational study was conducted in the Department of Obstetrics and Gynecology at a tertiary care teaching hospital over a period of 18 months from January 2024 to June 2025. The study was undertaken after obtaining approval from the Institutional Ethics Committee. Written informed consent was obtained from all participants prior to enrollment in the study.

Study Population

The study included women diagnosed with ovarian cysts who underwent early laparoscopic management during

the study period.

Inclusion Criteria

- Women aged between 18 and 50 years
- Patients diagnosed with benign ovarian cysts based on clinical examination and ultrasonographic findings
- Cysts measuring more than 5 cm in diameter or symptomatic cysts requiring surgical intervention
- Patients willing to undergo laparoscopic surgery and provide informed consent

Exclusion Criteria

- Suspected malignant ovarian tumors based on imaging or tumor markers
- Pregnancy-associated ovarian masses
- Patients unfit for general anesthesia
- Patients with severe cardiopulmonary illness
- Cases requiring emergency laparotomy due to torsion, rupture, or hemodynamic instability
- Patients with previous extensive abdominal surgeries causing dense adhesions

Sample Size Calculation

The sample size was calculated using the standard formula for estimating a single population proportion:

$$n = \frac{Z^2 pq}{d^2}$$

Where:

- n = Minimum required sample size
- Z = Standard normal deviate corresponding to 95% confidence interval (1.96)
- p = Expected proportion of favorable outcome from previous literature
- q = 1 – p
- d = Absolute precision

A previous study by Medeiros LR et al[8]. reported successful postoperative recovery following laparoscopic management of benign ovarian cysts in approximately 85% of patients. Therefore:

- p = 0.85
- q = 1 – 0.85 = 0.15
- d = 10% of p = 0.085

Substituting these values:

$$n = \frac{(1.96)^2 \times 0.85 \times 0.15}{(0.085)^2}$$

The calculated sample size was:

$$n \approx 68$$

After accounting for a 10% non-response and dropout rate, the final sample size was rounded to 75 patients.

Study Procedure

All eligible patients underwent detailed history taking and

clinical examination at the time of admission. Baseline demographic data including age, parity, menstrual history, presenting symptoms, and relevant medical history were recorded using a structured proforma.

Routine laboratory investigations including complete blood count, blood sugar, renal function tests, liver function tests, coagulation profile, and urine analysis were performed. Ultrasonography of the abdomen and pelvis was carried out in all patients to assess the size, laterality, morphology, and characteristics of the ovarian cyst. Tumor markers such as CA-125 were evaluated in selected patients where clinically indicated to exclude malignancy.

Patients were admitted prior to surgery and pre-anesthetic evaluation was completed. All laparoscopic procedures were performed under general anesthesia by experienced gynecologic surgeons using standard laparoscopic techniques.

Creation of pneumoperitoneum was achieved using a Veress needle or open Hasson technique depending on the clinical situation. A primary umbilical trocar and accessory ports were inserted under direct visualization. The ovarian cyst was carefully evaluated intraoperatively for size, appearance, adhesions, and associated pelvic pathology.

Depending on the nature and extent of the lesion, laparoscopic cystectomy, oophorectomy, or salpingo-oophorectomy was performed. Care was taken to minimize spillage of cyst contents. Excised specimens were retrieved using an endobag whenever necessary and sent for histopathological examination.

Intraoperative parameters such as duration of surgery, blood loss, intraoperative complications, and need for conversion to laparotomy were recorded. Postoperative parameters including pain assessment, duration of hospital stay, postoperative complications, and recovery period were documented.

Pain was assessed using the Visual Analog Scale (VAS) at 24 hours following surgery. Patients were followed up during the postoperative period and subsequent outpatient visits for evaluation of recovery and complications.

Outcome Measures

Primary Outcome

- Successful laparoscopic management without conversion to laparotomy

Secondary Outcomes

- Duration of surgery
- Intraoperative blood loss
- Postoperative pain score
- Length of hospital stay
- Postoperative complications
- Time taken for return to normal activities

Statistical Analysis

The collected data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) software version 25.0. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were presented as frequencies and percentages.

Results

Table 1: Demographic Characteristics of Study Participants (n = 75)

Variable	Number (n)	Percentage (%)
Age Group (years)		
18–25	18	24.0
26–35	34	45.3
36–45	17	22.7
>45	6	8.0
Mean Age $\pm$ SD	31.8 $\pm$ 7.2 years	
Parity		
Nulliparous	29	38.7
Multiparous	46	61.3
Body Mass Index (BMI)		
Normal (18.5–24.9 kg/m ²)	41	54.7
Overweight (25–29.9 kg/m ²)	25	33.3
Obese (≥ 30 kg/m ²)	9	12.0

Most patients belonged to the age group of 26–35 years, with a mean age of 31.8 $\pm$ 7.2 years. Multiparous women constituted the majority of the study population.

Table 2: Clinical Presentation and Ultrasonographic Findings of Ovarian Cysts (n = 75)

Variable	Number (n)	Percentage (%)
Presenting Symptoms		
Abdominal pain	52	69.3
Menstrual irregularities	18	24.0
Abdominal distension	11	14.7
Infertility	9	12.0
Incidental finding	15	20.0
Laterality of Cyst		
Right ovary	39	52.0
Left ovary	31	41.3
Bilateral	5	6.7
Size of Cyst		
5–7 cm	33	44.0
7.1–10 cm	29	38.7
>10 cm	13	17.3
Type of Cyst (USG Diagnosis)		
Serous cystadenoma	24	32.0
Dermoid cyst	18	24.0
Endometriotic cyst	15	20.0
Functional cyst	10	13.3
Mucinous cystadenoma	8	10.7

Abdominal pain was the most common presenting complaint. Serous cystadenoma was the predominant ultrasonographic diagnosis.

Table 3: Intraoperative Findings and Surgical Outcomes (n = 75)

Variable	Number (n)	Percentage (%)
Type of Procedure Performed		
Laparoscopic cystectomy	56	74.7
Oophorectomy	12	16.0
Salpingo-oophorectomy	7	9.3
Duration of Surgery		
<60 minutes	28	37.3
60–90 minutes	39	52.0
>90 minutes	8	10.7
Estimated Blood Loss		
<50 mL	48	64.0
50–100 mL	22	29.3
>100 mL	5	6.7
Conversion to Laparotomy		
Yes	3	4.0
No	72	96.0
Intraoperative Complications		
Present	4	5.3
Absent	71	94.7

Laparoscopic cystectomy was the most commonly performed procedure. Conversion to laparotomy was required in only 4% of patients.

Table 4: Postoperative Recovery and Complications (n = 75)

Variable	Number (n)	Percentage (%)
Postoperative Pain Score (VAS at 24 hours)		
Mild (1–3)	49	65.3
Moderate (4–6)	22	29.3
Severe (7–10)	4	5.3
Duration of Hospital Stay		
≤3 days	58	77.3
4–5 days	14	18.7
>5 days	3	4.0
Postoperative Complications		
Fever	5	6.7
Surgical site infection	2	2.7
Ileus	1	1.3
No complications	67	89.3
Return to Normal Activities		
≤7 days	51	68.0
8–14 days	20	26.7
>14 days	4	5.3

Most patients experienced mild postoperative pain and shorter hospital stay. Postoperative complications were minimal.

Table 5: Histopathological Examination of Ovarian Cysts (n = 75)

Histopathological Diagnosis	Number (n)	Percentage (%)
Serous cystadenoma	26	34.7
Mature cystic teratoma	17	22.7
Endometriotic cyst	14	18.7
Functional cyst	9	12.0
Mucinous cystadenoma	7	9.3
Borderline tumor	2	2.6

Serous cystadenoma was the most common histopathological diagnosis observed in the study population.

Discussion

The present study evaluated the outcomes of early laparoscopic management in patients with ovarian cysts and demonstrated favorable surgical and postoperative outcomes with minimal complications. The majority of patients in the present study belonged to the 26–35 years age group, with a mean age of 31.8 ± 7.2 years. Similar findings were reported by Yuen PM et al[6] adnexal adhesion score, or frequency of bilateral disease. All the ovarian masses were benign. Endometriotic cysts and dermoid cysts were the most common disorder in the two groups. Cystectomy was performed in > 70% of cases in each group. Operating time was not increased with the laparoscopic approach, and the frequency of inadvertent rupture of the ovarian masses was just as high as in laparotomy. The laparoscopic approach was associated with a significant reduction in operative morbidity (odds ratio 0.34, 95% confidence interval 0.13 to 0.88., who observed that benign ovarian cysts were more commonly encountered among women in the reproductive age group. The higher prevalence in younger women may be attributed to active ovarian function and hormonal influences during reproductive years.

In the current study, abdominal pain was the most common presenting complaint, observed in 69.3% of patients. Comparable observations were made by Chapron C et al[5]., who reported pelvic pain as the predominant symptom among women undergoing laparoscopic management of ovarian masses. Similarly, menstrual irregularities and abdominal distension were less common symptoms in both studies. The increased detection of asymptomatic cysts in the present study may be related to the widespread use of ultrasonography during routine gynecological evaluation.

Serous cystadenoma was the most common ovarian cyst identified both radiologically and histopathologically in the present study. This finding was consistent with the study conducted by Canis M et al[7]. Gynecology, and Reproductive Medicine of the Clermont-Ferrand University Hospital between January 1980 and December 1991. The preoperative workup included routine clinical and ultrasonographic examinations. At laparoscopy, the technique

involved peritoneal cytology, ovarian and peritoneal inspection, cyst puncture, and endocystic examination. If a malignant mass was encountered or suspected, the patients were treated by immediate laparotomy with a vertical midline incision. The laparoscopic and pathologic diagnoses were compared. Long-term follow-up was studied using data obtained either clinically or by mail using a standardized questionnaire. Results: A total of 757 patients with 819 masses were managed by laparoscopy. The mean age was 35.8 ± 12.6 years and the mean diameter of the cysts was 6.0 ± 2.7 cm (range 1–20., who also reported serous cystadenoma as the predominant benign ovarian neoplasm managed laparoscopically. Dermoid cysts and endometriotic cysts constituted the next common lesions in both studies.

Laparoscopic cystectomy was the most frequently performed surgical procedure in the present study, accounting for 74.7% of cases. Similar results were documented by Medeiros LR et al[4]., who concluded that cystectomy remains the preferred fertility-preserving procedure for benign ovarian cysts. Preservation of ovarian tissue is particularly important in women of reproductive age and contributes to improved reproductive outcomes.

The present study demonstrated low intraoperative morbidity, with conversion to laparotomy required in only 4% of patients. This finding was comparable to the study by Yuen PM et al[6], adnexal adhesion score, or frequency of bilateral disease. All the ovarian masses were benign. Endometriotic cysts and dermoid cysts were the most common disorder in the two groups. Cystectomy was performed in > 70% of cases in each group. Operating time was not increased with the laparoscopic approach, and the frequency of inadvertent rupture of the ovarian masses was just as high as in laparotomy. The laparoscopic approach was associated with a significant reduction in operative morbidity (odds ratio 0.34, 95% confidence interval 0.13 to 0.88., where conversion rates ranged from 3% to 6%. The low conversion rate observed in the present study may be attributed to careful patient selection, preoperative evaluation, and improved laparoscopic expertise. Intraoperative complications were minimal, further supporting the safety of early laparoscopic intervention.

Postoperative recovery outcomes in the present study were favorable. Most patients experienced mild postoperative pain and short hospital stay, with 77.3% discharged within three days. These findings were in agreement with the observations made by Medeiros LR et al[4], who reported reduced postoperative pain, faster ambulation, and shorter hospitalization following laparoscopic surgery compared to conventional laparotomy. Early return to normal activities observed in the present study also highlights the advantages of minimally invasive surgery in improving patient quality of life and reducing economic burden.

The overall postoperative complication rate in the present study was low, with fever and surgical site infection occurring in a small proportion of patients. Similar low complication rates were reported by Chapron C et al[5], supporting the effectiveness and safety profile of laparoscopic management for benign ovarian cysts. The reduced tissue trauma, smaller incisions, and shorter operative recovery associated with laparoscopy contribute to lower postoperative morbidity.

Overall, the findings of the present study are consistent with existing literature supporting laparoscopic management as a safe, effective, and minimally invasive approach for benign ovarian cysts. Early laparoscopic intervention provides significant benefits including reduced postoperative pain, shorter hospital stay, minimal complications, rapid recovery, and preservation of reproductive potential. The study further emphasizes the importance of adopting minimally invasive gynecological surgery in routine clinical practice, particularly in tertiary care settings.

Limitations

The present study had certain limitations that should be considered while interpreting the findings. The study was conducted at a single tertiary care center with a relatively limited sample size of 75 patients, which may affect the generalizability of the results to the wider population. The study primarily included patients with benign ovarian cysts, and therefore the findings cannot be extrapolated to malignant ovarian masses or emergency gynecological conditions.

Conclusion

The present study demonstrated that early laparoscopic management of ovarian cysts is a safe, effective, and minimally invasive surgical approach associated with favorable clinical outcomes. Most patients experienced minimal intraoperative blood loss, reduced postoperative pain, shorter hospital stay, early return to normal activities, and low complication rates. Laparoscopic cystectomy was the most commonly performed procedure and was successful in preserving ovarian tissue in the majority of reproductive-aged women. The low conversion rate to laparotomy and minimal postoperative morbidity observed in the study further support the advantages of laparoscopic surgery over conventional open procedures.

Early laparoscopic intervention not only improves patient recovery and cosmetic outcomes but also contributes to reduced healthcare burden and enhanced quality of life. Therefore, laparoscopic management should be considered the preferred treatment modality for appropriately selected patients with benign ovarian cysts in modern gynecological practice.

Conflicts of interest

The authors declare no conflicts of interest.

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