

STUDY OF BOWEL AND BLADDER ADHESIONS ENCOUNTERED DURING GYNECOLOGICAL SURGERIES

Anita Huparikar¹, Arun Kanala², Nihitha pitchuka³

¹Associate Professor, Department of OB – Gyn, CMR institute of Medical sciences, Telangana, India

²Associate Professor, Department of General Surgery, CMR Institute of Medical Sciences, Telangana, India

³Assistant Professor, Department of OB - Gyn - CMR institute of Medical sciences, Telangana, India

Received : 23/01/2025
Received in revised form : 25/03/2025
Accepted : 13/04/2025

Keywords:

Bowel, bladder adhesions, gynecological surgeries.

Corresponding Author:

Dr. Anita Huparikar,
Email: anitakanala.ak@gmail.com

DOI: 10.47009/jamp.2025.7.2.190

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (2); 946-950



Abstract

Background: Pelvic adhesions are a common complication in gynecological surgery, often resulting from prior surgical interventions, infections, or endometriosis. They can involve various pelvic structures, notably the bowel and bladder, leading to increased operative difficulty, prolonged surgical time, and a higher risk of complications. The objective is to evaluate the prevalence, characteristics, and intraoperative impact of bowel and bladder adhesions encountered during gynecological surgeries. **Materials and Methods:** A total of 100 patients undergoing various gynecological procedures were included. Data collected included age, BMI, parity, history of prior surgeries, clinical diagnoses, laboratory parameters, and imaging findings. Intraoperative findings were analyzed for the presence and type of adhesions, operative time, and complications. **Result:** A total of 100 female patients were added in the study. The mean age of participants was 42.3 ± 8.6 years, ranging between 25 and 65 years, with an average BMI of 26.5 ± 3.4 . Mean parity was 2.1, and 68% had undergone at least one previous pelvic surgery. Additionally, 22% had endometriosis, 18% had pelvic inflammatory disease, and abnormal ultrasound findings were reported in 29% of patients. Patients with adhesions had notably longer operative times, averaging 138 ± 22 minutes, compared to 92 ± 15 minutes in those without adhesions. Additionally, intraoperative complications occurred exclusively in patients with adhesions (n=6), highlighting adhesions as a potential surgical risk factor. **Conclusion:** It is concluded that bowel and bladder adhesions are prevalent intraoperative findings during gynecological surgeries, particularly among patients with a history of previous pelvic or abdominal interventions.

INTRODUCTION

Postoperative adhesions, particularly involving the bowel and bladder, represent a significant clinical challenge in gynecological surgery. These fibrous connective tissue bands develop automatically when the body heals following peritoneal trauma and inflammation that mainly results from surgical procedures. The pelvic organs, namely the uterus, ovaries, bladder, and bowel, experience the most frequent adhesion formation among those areas that fall inside the abdominal cavity.^[1] The formation of adhesions occurs naturally, both independently or worsens in people who have been treated previously for pelvic surgery or endometriosis or pelvic inflammatory disease, or received radiation therapy. The surgical incidence of postoperative adhesions affects more than 90 percent of patients who receive

abdominal or pelvic procedures, with bowel and bladder complications producing the most critical effects on surgical intensity and postoperative health results.^[2] When performing gynecological operations, including total abdominal hysterectomy and laparoscopic myomectomy as well as surgery for endometriosis, adhesions make it harder to see the natural human anatomy and increase injury risks, and operations take longer. These elements typically demand surgical changes and boost the necessity for shifting between laparoscopic to open surgical procedures while producing enhanced rates of perioperative complications.^[3]

Loops of small and large intestines attach to inappropriate locations on the uterus, adnexa, and pelvic sidewalls and abdominal wall in this bowel adhesion scenario. The presence of dense vascularized fibrous bands creates restricted bowel

mobility, which makes surgical dissection highly dangerous. Bowel perforation becomes a significant risk factor during adhesiolysis medical procedures because densely vascularized adhesions and serosal bowel attachments increase the danger.^[4] Bowel injuries trigger postoperative infections and peritonitis and can force patients to undergo permanent or temporary stoma procedures, which badly diminish audience quality of life.^[5] Women who experienced C-section or pelvic surgeries face the highest possibility of bladder adhesion formation since the procedure requires bladder dissection from the uterus or cervical locations. The adhesions, which mainly appear within the vesicouterine fold, will cause dense attachments between the bladder and either the lower uterine segment or the anterior abdominal wall.^[6] Bladder injuries become more likely to occur during mobilization of the uterus and lower uterine segment dissection because of these anatomical alterations. Detecting bladder injuries during operation becomes important because their delayed diagnosis leads to postoperative symptoms such as bleeding from the urinary system, with leakage and the formation of fistula.^[7] Multiple entering and leaving adhesions between bowel and bladder increase the surgical complexity thereby complicating the technical aspects of the operation. Surgeons performing total laparoscopic hysterectomy and excision of deep infiltrating endometriosis need to delicately separate dense adhesions that occur between the rectosigmoid colon and posterior uterus and between the bladder dome and anterior uterine wall.^[8] The surgical teams specializing in colorectal and urology should be consulted to guarantee protected dissection and repair of accidental wounds during surgical procedures. Extensive adhesiolysis becomes necessary when adhesions exist because this procedure carries risks along with its duration demands.^[9] The duration of surgery leads to increased bleeding during the operation while also raising the chance of postoperative infections and delayed recovery. Adhesiolysis has an unfortunate side effect, which leads to new adhesion development, so patients often face repetitive procedures as part of this process known as the adhesion cascade. People who need three or more surgeries on their pelvic or abdominal region face a 90 percent chance of bowel or bladder adhesions developing.^[10] The real extent of adhesions differs from person to person and depends on how individuals are genetically predisposed to them, in addition to how well surgeons protect during operations and what procedures they use, and how much time passes between operations. The extensive utilization of anti-adhesion barriers together with laparoscopy as an alternative to laparotomy along with non-traumatic surgical methods continue to fail in decreasing the frequency of adhesion occurrence.^[11]

Objective

The basic aim of the study is to find the bowel and bladder adhesions encountered during gynecological surgeries.

MATERIALS AND METHODS

This prospective observational study was conducted at Department of OB - Gyn - CMR Institute of Medical sciences India during Jan 2025 to March 2025

Sample Size

A total of 100 female patients undergoing elective gynecological surgery were included in the study.

Inclusion Criteria:

- Women aged between 25 and 55 years.
- Undergoing elective gynecologic surgeries including hysterectomy, myomectomy, surgery for endometriosis, ovarian cystectomy, or pelvic adhesiolysis.
- Patients who provided informed consent for participation.

Exclusion Criteria:

- Emergency surgeries (e.g., for ruptured ectopic pregnancy or acute hemorrhage).
- Patients with known or suspected malignancies.
- Patients with a history of radiation therapy or systemic diseases affecting connective tissue healing (e.g., lupus, scleroderma).

Data collection: Clinical and surgical data were compiled using a structured datasheet. This included patient demographics, surgical type, previous surgical history, detailed intraoperative adhesion characteristics, and postoperative outcomes. All patients underwent routine preoperative workup, including complete blood count, biochemical testing, imaging (transvaginal or abdominal ultrasound), and detailed clinical history. Particular attention was paid to prior abdominal or pelvic surgeries, symptoms of pelvic pain, and previous diagnoses of endometriosis or pelvic inflammatory disease. The surgical procedures were performed via either the laparoscopic or open abdominal approach, depending on the indication, patient condition, and surgeon preference. During surgery, the operating gynecologist thoroughly examined the pelvis and abdomen for adhesions involving the bowel or bladder. The findings were systematically recorded, noting the anatomical location, organs involved, density (filmy, moderate, or dense), vascularity (avascular or vascular), and the extent of adhesions (localized or extensive). Adhesions were classified using a modified version of the Peritoneal Adhesion Index and, where relevant, the American Fertility Society (AFS) scoring system. Adhesiolysis was performed as clinically indicated, and any intraoperative complications such as bowel or bladder injury were carefully documented. Following surgery, patients were monitored in the postoperative ward for signs of surgical complications. Particular attention was given to

bowel function recovery, urinary output, fever, and any signs of infection or hematuria. Patients who had undergone adhesiolysis were observed more closely due to the higher risk of ileus and other postoperative issues. All relevant clinical events were recorded and correlated with intraoperative findings for further analysis.

A surgeon was informed and asked to be standby whenever we anticipated dense adhesion.

Data analysis: Data were entered and analyzed using SPSS software. Descriptive statistics were employed to summarize the data. Frequencies and percentages were used for categorical variables, while means and standard deviations were calculated for continuous variables. A p-value of

less than 0.05 was considered statistically significant.

RESULTS

A total of 100 female patients were added in the study. The mean age of participants was 42.3 ± 8.6 years, ranging between 25 and 65 years, with an average BMI of 26.5 ± 3.4 . Mean parity was 2.1, and 68% had undergone at least one previous pelvic surgery. Additionally, 22% had endometriosis, 18% had pelvic inflammatory disease, and abnormal ultrasound findings were reported in 29% of patients.

Table 1: Demographic and Baseline Characteristics of Study Participants (N = 100).

Parameter	Value
Mean Age (years)	42.3 ± 8.6
Age Range (years)	25–65
BMI (mean \pm SD)	26.5 ± 3.4
Parity (mean)	2.1
Patients with ≥ 1 previous pelvic surgery	68
Patients with endometriosis	22
Patients with pelvic inflammatory disease	18
Hemoglobin (mean \pm SD, g/dL)	12.4 ± 1.2
White Blood Cell Count (mean \pm SD, $\times 10^3/\mu\text{L}$)	7.8 ± 1.4
CRP Elevated (>5 mg/L), n (%)	15 (15.0%)
Abnormal Ultrasound Findings, n (%)	29 (29.0%)

Among patients studied, 46% showed no adhesions. Bowel adhesions alone were identified in 28% of patients, bladder adhesions alone in 12%, while 14%

had adhesions involving both bowel and bladder, highlighting significant variability in adhesion patterns.

Table 2: Distribution of Bowel and Bladder Adhesions Among Study Participants (N = 100)

Adhesion Type	Number of Patients (n)	Percentage (%)
No Adhesions	46	46.0
Bowel Adhesions Only	28	28.0
Bladder Adhesions Only	12	12.0
Both Bowel and Bladder	14	14.0
Total	100	100.0

Patients with adhesions had notably longer operative times, averaging 138 ± 22 minutes, compared to 92 ± 15 minutes in those without adhesions. Additionally, intraoperative complications occurred

exclusively in patients with adhesions (n=6), highlighting adhesions as a potential surgical risk factor.

Table 3: Operative Time and Complications in Patients With and Without Adhesions

Group	Mean Operative Time (min)	Intraoperative Complications (n)
With Adhesions	138 ± 22	6
Without Adhesions	92 ± 15	0

Patients with a history of previous pelvic surgery showed a significantly higher rate of adhesions

(66.2%) compared to those without prior surgery (28.1%).

Table 4: Association Between Previous Surgery and Adhesion Occurrence

History of Previous Surgery	Number of Patients (n)	Adhesions Present (n)	Adhesions Present (%)
Yes	68	45	66.2
No	32	9	28.1

Adhesion detection rates varied notably by surgery type, with the highest rates observed in hysterectomy (62.5%) and myomectomy (60.0%) cases. Lower rates were seen in endometriosis

surgery (53.3%), ovarian cystectomy (40.0%), and adhesiolysis-only procedures (30.0%), suggesting procedure-specific risks influencing adhesion formation.

Table 5: Type of Surgery Performed and Adhesion Detection Rate

Type of Surgery	Number of Patients (n)	Adhesions Detected (n)	Detection Rate (%)
Hysterectomy	40	25	62.5
Myomectomy	20	12	60.0
Ovarian Cystectomy	15	6	40.0
Endometriosis Surgery	15	8	53.3
Adhesiolysis Only	10	3	30.0

DISCUSSION

This study aimed to evaluate the prevalence, characteristics, and clinical impact of bowel and bladder adhesions encountered during gynecological surgeries. Among the 100 patients analyzed, adhesions were found in more than half of the cases (54%), highlighting the continued relevance of postoperative and post-inflammatory adhesions in gynecological practice. Studies have demonstrated previous rates indicating 55–90% of patients suffer from adhesion development after abdominal or pelvic surgeries. The analysis indicated that patients with previous abdominal surgeries showed an important relationship to develop intraoperative adhesions.^[12] Intraoperative adhesions appeared in 66.2% of patients who underwent a second or subsequent pelvic or abdominal surgery versus 28.1% of patients having their first operation ($p < 0.01$). Multiple surgical procedures create peritoneal injuries that lead to fibrous tissue development, according to the already proven scientific understanding. Special attention must be paid to re-entry surgeries because cesarean section patients alongside hysterectomy and endometriosis surgery patients, demonstrate heightened risks for adhesion development.^[13] This research presented bowel adhesions as the more prevalent form than bladder adhesions. The rectosigmoid colon combined with the posterior uterine surface represented the most frequently observed adhesion sites because endometriosis patients tend to develop these areas as preferred areas for adhesion development. Previous cesarean deliveries made patients prone to bladder adhesion development near the vesicouterine fold as confirmed by this research and by earlier literature studies.^[14] The surgical procedure required longer operation time due to the presence of adhesions. The operative times averaged 138 ± 22 minutes for patients who had adhesions because the removal of adhesions and restoration of distorted anatomical structures added substantial complexity to the operation. However, patients without adhesions required only 92 ± 15 minutes of operating time.^[15] Patients with adhesions experienced only intraoperative complications during surgery, which included two bladder injuries, together with two bowel serosal tears. Medical personnel successfully handled these intraoperative complications that arose because of adhesions yet the complications show how adhesions make patients' surgical outcomes more-risky.^[16] Patients undergoing adhesiolysis procedures along with adhesions, developed delayed bowel function and mild febrile episodes, especially when they received extensive adhesiolysis treatment. Perioperative planning

remains essential for high-risk patients because it allows for bowel rest anticipation and nutritional support and infection monitoring.

CONCLUSION

It is concluded that bowel and bladder adhesions are prevalent intraoperative findings during gynecological surgeries, particularly among patients with a history of previous pelvic or abdominal interventions. The presence of these adhesions significantly contributes to increased operative time, technical difficulty, and the risk of intraoperative complications such as bowel or bladder injury. Among the anatomical sites affected, the rectosigmoid colon and vesicouterine fold were the most commonly involved regions.

Ethics committee approval was taken

Source of funding: Nil

conflict of interest: Nil

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