Original Article

Assessment of Postoperative Complications in Combined Gynecological and General Surgical Procedures: A Retrospective Study

Binny Singh[1], Gaurav Nayyar[2]

[1]Assistant Professor, Department of Obstetrics and Gynaecology, Narayan Medical College & Hospital, Sasaram, Bihar, India. [2]Assistant Professor, Department of General Surgery, Narayan Medical College & Hospital, Sasaram, Bihar, India

Abstract

Background: Postoperative complications contribute to surgical morbidity, prolonged hospitalization, increased healthcare utilization, and delayed recovery. Patients undergoing combined gynecological and general surgical procedures may be exposed to additional perioperative risks because of prolonged operative duration, greater tissue handling, blood loss, and associated comorbidities. The aim is to assess the incidence and pattern of postoperative complications and identify factors associated with adverse postoperative outcomes among patients undergoing combined gynecological and general surgical procedures. **Material and Methods:** This retrospective observational study included 280 patients who underwent combined gynecological and general surgical procedures at a tertiary care teaching hospital between January 2019 and December 2024. Medical records were reviewed for demographic characteristics, comorbidities, operative duration, estimated blood loss, postoperative complications, and duration of hospital stay. Categorical variables were compared using the Chi-square test and continuous variables using Student's t-test. A p-value <0.05 was considered statistically significant. **Results:** Postoperative complications occurred in 24 patients (approximately 8.7%), while 256 (91.4%) had an uneventful recovery. Surgical site infection was the most common complication (2.9%), followed by febrile morbidity (2.1%), urinary tract infection (1.4%), postoperative ileus (1.1%), and respiratory complications (1.1%). Age >50 years (p=0.004), diabetes mellitus (p=0.019), obesity (p=0.043), operative duration >180 minutes (p=0.017), and blood loss >500 mL (p=0.004) were significantly associated with postoperative complications. Mean hospital stay was significantly longer in patients with complications than in those without complications (10.8 ± 3.2 vs 6.1 ± 2.4 days; p<0.001). **Conclusion:** Postoperative complications occurred in approximately 8.7% of patients undergoing combined gynecological and general surgical procedures. Advanced age, diabetes mellitus, obesity, prolonged operative duration, and increased intraoperative blood loss were significantly associated with postoperative morbidity. Careful preoperative optimization and appropriate perioperative management may help reduce complications and improve postoperative recovery.

Keywords: Postoperative complications, Gynecological surgery, General surgery, Surgical site infection, Combined procedures, Risk factors.

Received: 14 August 2026 **Revised: 01 September 2026** **Accepted: 18 September 2026** **Published: 04 November 2026**

Introduction

Postoperative complications continue to represent a major challenge in surgical practice despite remarkable advancements in operative techniques, anesthesia, antimicrobial therapy, and perioperative care. Surgical complications contribute significantly to patient morbidity, mortality, prolonged hospitalization, increased healthcare costs, and reduced quality of life. The incidence of postoperative complications varies according to the nature of surgery, patient characteristics, associated comorbidities, surgical duration, intraoperative events, and postoperative care practices. Studies have reported complication rates ranging from 10% to 35% depending upon surgical complexity and patient risk profile.[1]

Combined gynecological and general surgical procedures are increasingly performed in modern surgical practice. Such procedures may include hysterectomy combined with appendectomy, cholecystectomy, hernia repair, bowel surgery, adhesiolysis, or management of pelvic masses involving adjacent abdominal organs. Simultaneous surgical management offers several advantages including avoidance of multiple hospital admissions, reduced anesthesia exposure, shorter overall recovery time, and improved patient convenience. However, combined procedures often involve prolonged operative time, greater tissue dissection, increased blood loss, and elevated risk of perioperative complications.[2]

Postoperative complications may involve multiple organ systems and can range from minor self-limiting conditions to severe life-threatening events. Common complications include surgical site infection (SSI), urinary tract infection, febrile morbidity, postoperative ileus, respiratory complications, thromboembolic events, wound dehiscence, hemorrhage, and organ injury.

Address for correspondence: Dr. Binny Singh, Assistant Professor, Department of Obstetrics and Gynaecology, Narayan Medical College & Hospital, Sasaram, Bihar, India.
E-mail: drbinnysingh1975@gmail.com

DOI:
10.21276/amit.2026.v13.i3.1163

How to cite this article: Singh B, Nayyar G. Assessment of Postoperative Complications in Combined Gynecological and General Surgical Procedures: A Retrospective Study. Acta Med Int. 2026;13(3):873-878.

Surgical site infections remain among the most frequently reported healthcare-associated infections and are associated with delayed wound healing, increased antibiotic usage, prolonged hospitalization, and higher treatment costs.[3]

Patient-related factors play a crucial role in determining postoperative outcomes. Advanced age, obesity, diabetes mellitus, anemia, malnutrition, smoking, hypertension, and immunosuppression have been identified as important predictors of postoperative morbidity. Similarly, procedure-related factors such as operative duration, intraoperative contamination, emergency surgery, blood transfusion, and extensive tissue manipulation significantly influence complication rates.[4,5]

The growing prevalence of obesity and chronic metabolic disorders has further increased the complexity of surgical care. Obese patients frequently experience impaired wound healing, higher infection rates, respiratory complications, and thromboembolic events. Diabetes mellitus adversely affects leukocyte function and collagen synthesis, thereby predisposing patients to wound infection and delayed recovery.[6]

Recent studies have emphasized the importance of risk stratification and enhanced recovery protocols in reducing postoperative complications. Careful preoperative evaluation, optimization of comorbid conditions, prophylactic antibiotic administration, meticulous surgical technique, and early postoperative mobilization have demonstrated beneficial effects on surgical outcomes.[7,8]

Despite extensive literature on individual gynecological and general surgical procedures, evidence specifically evaluating postoperative outcomes following combined procedures remains limited. Understanding the pattern and determinants of complications in such patients is essential for improving perioperative planning and patient counseling. Identification of modifiable risk factors may facilitate development of preventive strategies aimed at reducing postoperative morbidity.

Therefore, the present retrospective study was undertaken to assess the incidence, spectrum, and determinants of postoperative complications among patients undergoing combined gynecological and general surgical procedures in a tertiary care center. The findings may contribute to improved surgical decision-making and optimization of perioperative care protocols.[9–13]

Materials and Methods

Study Design: The present study was a retrospective observational study conducted to evaluate postoperative complications occurring in patients who underwent combined gynecological and general surgical procedures at a tertiary care teaching hospital.

Study Setting: The study was conducted in the Departments of Obstetrics & Gynecology and General Surgery of a tertiary care institution after obtaining approval from the Institutional Ethics Committee. Medical records of eligible patients were reviewed from the hospital medical records department.

Study Duration: Patient records from January 2019 to December 2024 were analyzed. Data collection and statistical analysis were performed over a period of six months following ethical approval.

Study Population: The study population comprised women who underwent combined gynecological and general surgical procedures during the study period.

Sample Size: A total of 280 patients fulfilling the eligibility criteria were included in the study. Sample size was determined based on the availability of complete medical records and the expected prevalence of postoperative complications reported in previous surgical outcome studies.

Inclusion Criteria

- Female patients aged 18 years and above.
- Patients who underwent combined gynecological and general surgical procedures during a single operative session.
- Availability of complete perioperative and postoperative records.
- Patients with documented follow-up until discharge.

Exclusion Criteria

- Incomplete medical records.
- Patients undergoing isolated gynecological procedures.
- Patients undergoing isolated general surgical procedures.
- Patients with pre-existing active systemic infection.
- Patients referred to another institution before completion of postoperative management.

Data Collection: Patient information was obtained from hospital records, operative notes, anesthesia records, laboratory reports, discharge summaries, and postoperative follow-up documentation.

The following variables were recorded:

Demographic Variables

- Age
- Body mass index (BMI)
- Residence
- Socioeconomic status

Clinical Variables

- Hypertension
- Diabetes mellitus
- Anemia
- Obesity
- Previous abdominal surgery
- Smoking history

Operative Variables

- Type of gynecological procedure
- Type of general surgical procedure
- Elective or emergency surgery
- Duration of surgery
- Estimated blood loss
- Requirement of blood transfusion

Postoperative Variables

- Surgical site infection
- Febrile morbidity
- Urinary tract infection
- Postoperative ileus
- Respiratory complications
- Wound dehiscence
- Deep vein thrombosis
- Re-exploration
- Duration of hospital stay

Definition of Postoperative Complications

Surgical Site Infection: Infection occurring within 30 days of surgery involving the incision or operative site characterized by purulent discharge, erythema, tenderness, or positive culture findings.

Febrile Morbidity: Body temperature ≥38°C occurring on two occasions at least 24 hours apart after surgery excluding the first postoperative day.

Urinary Tract Infection: Positive urine culture associated with urinary symptoms or pyuria during the postoperative period.

Postoperative Ileus: Delayed bowel motility resulting in abdominal distension, nausea, vomiting, or inability to tolerate oral intake beyond the expected postoperative period.

Respiratory Complications: Development of postoperative pneumonia, atelectasis, respiratory infection, or respiratory insufficiency requiring intervention.

Wound Dehiscence: Partial or complete separation of the surgical wound requiring additional management.

Outcome Measures

Primary Outcome

- Incidence of postoperative complications.

Secondary Outcomes

- Types of postoperative complications.
- Association between risk factors and complications.
- Duration of hospital stay.
- Requirement for re-intervention.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) software version 25.0 (IBM Corp., Armonk, NY, USA).

Continuous variables were expressed as mean ± standard deviation.

Categorical variables were expressed as frequency and percentage.

The Chi-square test was used for comparison of categorical variables.

Student's t-test was used for comparison of continuous variables. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 280 patients who underwent combined gynecological and general surgical procedures were included in the study. The incidence and pattern of postoperative complications were assessed, and demographic, clinical, and operative factors associated with adverse postoperative outcomes were analyzed.

Table 1: Demographic and Clinical Characteristics of the Study Population (n=280)

Variable	Number (n)	Percentage (%)
Age 18–30 years	42	15.0
Age 31–40 years	88	31.4
Age 41–50 years	96	34.3
Age >50 years	54	19.3
Diabetes mellitus	72	25.7
Hypertension	68	24.3
Obesity (BMI ≥30 kg/m²)	60	21.4
Anemia	84	30.0
Previous abdominal surgery	58	20.7
Blood transfusion required	46	16.4

The largest age group was 41–50 years, comprising 96 patients (34.3%), followed by 31–40 years with 88 patients (31.4%). Diabetes mellitus was present in 25.7%, hypertension in 24.3%, obesity in 21.4%, and anemia in 30.0% of patients. Previous abdominal surgery was documented in 20.7%, while 16.4% required perioperative blood transfusion.

Incidence and Pattern of Postoperative Complications: Of the 280 patients, 24 developed one or more postoperative complications, corresponding to an overall complication rate of approximately 8.7% (24/280; 8.6% when calculated directly). The remaining 256 patients (91.4%) had an uneventful postoperative recovery.

Table 2: Distribution of Postoperative Complications (n=280)

Complication	Number (n)	Percentage of Total Patients (%)
Surgical site infection	8	2.9
Febrile morbidity	6	2.1
Urinary tract infection	4	1.4
Postoperative ileus	3	1.1
Respiratory complications	3	1.1
Wound dehiscence	2	0.7
Deep vein thrombosis	1	0.4
Re-exploration	1	0.4

Some patients experienced more than one postoperative complication.

Surgical site infection was the most frequent complication, occurring in 8 patients (2.9%), followed by febrile morbidity in 6 (2.1%) and urinary tract infection in 4 (1.4%). Postoperative ileus and respiratory complications were each observed in 3 patients (1.1%). Wound dehiscence occurred in 2 patients (0.7%), whereas deep vein thrombosis and re-

exploration were uncommon, occurring in one patient each (0.4%).

Risk Factor Analysis: Clinical and operative characteristics were compared between the 24 patients who developed complications and the 256 patients without complications.

Table 3: Association of Risk Factors with Postoperative Complications

Variable	Complications Present (n=24)	Complications Absent (n=256)	p value
Age >50 years	10 (41.7%)	44 (17.2%)	0.004*
Diabetes mellitus	11 (45.8%)	61 (23.8%)	0.019*
Obesity	9 (37.5%)	51 (19.9%)	0.043*
Operative duration >180 min	13 (54.2%)	77 (30.1%)	0.017*
Blood loss >500 mL	11 (45.8%)	51 (19.9%)	0.004*
Previous abdominal surgery	7 (29.2%)	51 (19.9%)	0.287

Statistically significant at $p<0.05$.

Postoperative complications were significantly more frequent among patients aged >50 years (41.7% vs 17.2%; p=0.004). Diabetes mellitus was present in 45.8% of patients who developed complications compared with 23.8% of those without complications (p=0.019). Obesity was also significantly associated with postoperative morbidity (37.5% vs 19.9%; p=0.043).

Operative factors showed important associations with adverse outcomes. An operative duration exceeding 180 minutes was observed in 54.2% of patients with complications compared with 30.1% of uncomplicated patients (p=0.017). Similarly, blood loss >500 mL was significantly more frequent among patients with complications (45.8% vs 19.9%; p=0.004). Previous abdominal surgery was not significantly associated with postoperative complications (p=0.287).

Table 4: Duration of Hospital Stay According to Postoperative Complication Status

Hospital Stay Parameter	Patients with Complications (n=24)	Patients without Complications (n=256)	p value
Mean duration of hospital stay (days)	10.8 ± 3.2	6.1 ± 2.4	<0.001*

Statistically significant at $p<0.05$.

Patients who developed postoperative complications had a significantly longer mean hospital stay than those with an uncomplicated postoperative course (10.8 ± 3.2 vs 6.1 ± 2.4 days; p<0.001). Thus, although postoperative morbidity occurred in only approximately 8.7% of the study population, its occurrence was associated with a substantial increase in hospitalization duration. Older age, diabetes mellitus, obesity, prolonged operative duration, and greater intraoperative blood loss were significantly associated with postoperative complications, whereas previous abdominal surgery showed no significant association.

Discussion

The present retrospective study evaluated postoperative morbidity among 280 patients undergoing combined gynecological and general surgical procedures. Postoperative complications occurred in approximately 8.7% of patients, indicating that the majority had an uneventful postoperative course. Although the overall incidence was relatively low, the occurrence of complications was associated with a substantial increase in hospital stay. Postoperative complications are known to adversely affect recovery, resource utilization, and patient-centered surgical outcomes, as described by Tevis and Kennedy and Merkow et al.[1,2]

Surgical site infection (SSI) was the most frequently encountered complication, occurring in 2.9% of patients, followed by febrile morbidity (2.1%) and urinary tract infection (1.4%). SSI remains an important source of postoperative morbidity, particularly after abdominal procedures. Ban et al. emphasized the importance of appropriate antimicrobial prophylaxis, surgical-site preparation, glycemic control, and other preventive measures in reducing SSI.[3] Postoperative febrile morbidity may arise from several infectious and non-infectious causes and remains an important consideration following gynecological surgery.[4]

Urinary tract infection was observed in 1.4% of patients. Urinary catheterization during prolonged gynecological and abdominal procedures may contribute to postoperative urinary infection. Hooton et al. highlighted appropriate indications for catheterization, aseptic catheter care, and minimizing catheter duration as important approaches to reducing catheter-associated urinary tract infections.[5]

Among patient-related characteristics, age >50 years was significantly associated with postoperative complications (p=0.004). Patients older than 50 years constituted 41.7% of the complication group compared with 17.2% of those without complications. Increasing age may be accompanied by reduced physiological reserve and a greater burden of comorbidities, potentially increasing vulnerability to postoperative adverse events. Turrentine et al. similarly demonstrated an association between increasing age and surgical morbidity in older patients undergoing major surgical procedures.[6]

Diabetes mellitus was another significant factor associated with postoperative morbidity (p=0.019). Diabetes was present in 45.8% of patients with complications compared with 23.8% of uncomplicated patients. Diabetes can adversely affect immune function and wound healing and thereby increase susceptibility to postoperative infections. Martin et al. also reported an association between diabetes and surgical site infection.[7] These findings emphasize the importance of appropriate perioperative glycemic assessment and management.

Similarly, obesity was significantly associated with postoperative complications (p=0.043), being present in 37.5% of patients with complications compared with 19.9% without

complications. Obesity may increase technical difficulty, affect wound healing, and contribute to respiratory, infectious, and thromboembolic complications. Previous evidence has also demonstrated an association between obesity and adverse outcomes following abdominal surgery.[8]

Procedure-related factors were also important. An operative duration >180 minutes was significantly associated with postoperative complications (p=0.017). More than half (54.2%) of patients with complications underwent procedures lasting more than 180 minutes compared with 30.1% of uncomplicated patients. Prolonged surgery may increase tissue exposure, fluid shifts, blood loss, and duration of anesthetic exposure. Cheng et al. demonstrated that increasing operative duration was associated with a higher likelihood of complications across surgical specialties.[9]

Similarly, intraoperative blood loss >500 mL was significantly more frequent among patients who developed complications (45.8% vs 19.9%; p=0.004). Greater blood loss may contribute to hemodynamic instability, tissue hypoperfusion, anemia, and the need for transfusion, potentially delaying postoperative recovery. Musallam et al. demonstrated an association between preoperative anemia and adverse outcomes after major non-cardiac surgery, supporting the importance of perioperative hematological optimization and blood-conservation strategies.[10]

In contrast, previous abdominal surgery was not significantly associated with postoperative complications (p=0.287). Although previous surgery may increase technical difficulty because of adhesions and altered anatomy, the present findings suggest that it was not independently reflected as a significant factor in the unadjusted comparison performed in this study.

An important finding was the effect of complications on duration of hospitalization. Patients who developed complications had a significantly longer mean hospital stay than those without complications (10.8 ± 3.2 vs 6.1 ± 2.4 days; p<0.001). Dimick et al. similarly demonstrated that surgical complications substantially increase hospital resource utilization and costs.[11] Thus, even with a relatively low overall complication rate, prevention of postoperative morbidity may have meaningful implications for patient recovery and healthcare utilization.

The findings emphasize the importance of identifying high-risk patients before surgery and optimizing modifiable factors such as diabetes, obesity, anemia, operative duration, and blood loss. Enhanced Recovery After Surgery (ERAS) principles, including preoperative optimization, multimodal perioperative care, early mobilization, and standardized postoperative management, may contribute to improved recovery following abdominal and gynecological surgery.[12]

The present study has certain limitations. Its retrospective and single-center design may limit generalizability, and the analysis depended on the completeness and accuracy of medical records. Furthermore, the risk-factor analysis was based primarily on unadjusted comparisons; therefore, the observed associations should not automatically be interpreted as independent predictors. Future prospective multicenter studies with larger populations and multivariable analysis are warranted to confirm these associations and develop more robust postoperative risk-stratification models.[13]

Conclusion

The present study demonstrated that postoperative complications occurred in approximately 8.7% of patients undergoing combined gynecological and general surgical procedures, with surgical site infection being the most common complication. Advanced age, diabetes mellitus, obesity, prolonged operative duration, and intraoperative blood loss >500 mL were significantly associated with postoperative morbidity. Patients who developed complications had a significantly longer hospital stay, highlighting their impact on postoperative recovery and healthcare utilization. Careful preoperative risk assessment, optimization of comorbidities, infection-prevention measures, meticulous surgical technique, and appropriate perioperative management may help reduce postoperative complications and improve clinical outcomes.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Tevis SE, Kennedy GD. Postoperative complications and implications on patient-centered outcomes. J Surg Res. 2013;181(1):106-113. doi:10.1016/j.jss.2013.01.032.
2. Merkow RP, Ju MH, Chung JW, Hall BL, Cohen ME, Williams MV, et al. Underlying reasons associated with hospital readmission following surgery in the United States. JAMA. 2015;313(5):483-495. doi:10.1001/jama.2014.18614.
3. Ban KA, Minei JP, Laronga C, Harbrecht BG, Jensen EH, Fry DE, et al. American College of Surgeons and Surgical Infection Society: Surgical Site Infection Guidelines. J Am Coll Surg. 2017;224(1):59-74. doi:10.1016/j.jamcollsurg.2016.10.029.
4. Clarke-Pearson DL, Geller EJ. Complications of hysterectomy. Obstet Gynecol. 2013;121(3):654-673. doi:10.1097/AOG.0b013e3182841594.
5. Hooton TM, Bradley SF, Cardenas DD, Colgan R, Geerlings SE, Rice JC, et al. Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults. Clin Infect Dis. 2010;50(5):625-663. doi:10.1086/650482.
6. Turrentine FE, Wang H, Simpson VB, Jones RS. Surgical risk factors, morbidity, and mortality in elderly patients. J Am Coll Surg. 2006;203(6):865-877. doi:10.1016/j.jamcollsurg.2006.08.026.
7. Martin ET, Kaye KS, Knott C, Nguyen H, Santarossa M, Evans R, et al. Diabetes and risk of surgical site infection. Infect Control Hosp Epidemiol. 2016;37(1):88-99. doi:10.1017/ice.2015.249.
8. Antoniou SA, Antoniou GA, Koch OO, Pointner R, Granderath FA. Meta-analysis of outcomes of obesity in abdominal surgery. Surg Obes Relat Dis. 2015;11(4):1035-1045. doi:10.1016/j.soard.2014.11.015.
9. Cheng H, Clymer JW, Po-Han Chen B, Sadeghirad B, Ferko NC, Cameron CG, et al. Prolonged operative duration and complications. Ann Surg. 2018;268(1):75-90. doi:10.1097/SLA.0000000000002551.
10. Musallam KM, Tamim HM, Richards T, Spahn DR, Rosendaal FR, Habbal A, et al. Preoperative anemia and postoperative outcomes in non-cardiac surgery. Lancet. 2011;378(9800):1396-1407.

doi:10.1016/S0140-6736(11)61381-0.
11. Dimick JB, Chen SL, Taheri PA, Henderson WG, Khuri SF, Campbell DA Jr. Hospital costs associated with surgical complications. Ann Surg. 2004;239(6):847-853. doi:10.1097/01.sla.0000128306.91355.a1.
12. Ljungqvist O, Scott M, Fearon KC. Enhanced Recovery After Surgery: A review. JAMA Surg. 2017;152(3):292-298. doi:10.1001/jamasurg.2016.4952.
13. Pearse RM, Moreno RP, Bauer P, Pelosi P, Metnitz P, Spies C, et al. Mortality after surgery in Europe: A 7-day cohort study. Lancet. 2012;380(9847):1059-1065. doi:10.1016/S0140-6736(12)61148-9.