

ORIGINAL ARTICLE

Zero Complications in 2675 Laparoscopic Gynecological Operations – Reasons for Success

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ABSTRACT

Background: Laparoscopic gynecological surgery, while minimally invasive, carries inherent risks of complications. Achieving a zero-complication rate in a large series is a significant benchmark for surgical safety and quality, yet it is rarely reported in the literature.

Objective: To analyze the factors contributing to the absence of major complications in a large, multicenter cohort of patients undergoing laparoscopic gynecological procedures.

Methods & Materials: A retrospective, multicenter study was conducted from January 2012 to June 2025 at Comilla Trauma Centre, two CMHs, and two other hospitals in Bangladesh. Data from 2,675 consecutive patients were analyzed using MS Office tools. The study cohort comprised women of reproductive age presenting with infertility, pelvic pain, or abnormal bleeding. All patients were managed under a strict, standardized protocol from preoperative assessment through postoperative follow-up.

Results: Analysis of 2,675 procedures demonstrated a 0.0% major complication rate. The cohort (mean age 32.4 ± 6.1 years) most frequently presented with infertility (58.5%) and chronic pelvic pain (25.2%). Procedures were efficient, with a mean operative time of 42.5 ± 18.3 minutes and a mean blood loss of 35.2 ± 22.1 mL, resulting in a 98.1% discharge rate within 24 hours. The surgical distribution was led by Diagnostic Laparoscopy (64.0%), followed by Ovarian Cystectomy (15.8%) and Endometriosis Surgery (12.2%); complex hysterectomies collectively constituted 1.1%.

Conclusion: The zero-complication rate underscores the success of a holistic protocol integrating stringent preoperative assessment, meticulous operative technique with advanced instrumentation, judicious antibiotic use, and systematic postoperative follow-up, ensuring patient safety at every stage.

Keywords: Gynecological surgery, Laparoscopy, Surgical outcomes, Zero complications

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INTRODUCTION

The advent of laparoscopic surgery marked a paradigm shift in gynecological care, moving procedures from large, open incisions to minimally invasive keyhole approaches. This transition has significantly improved the patient experience, offered not only smaller scars but also substantially reduced postoperative pain, shorter hospital stays, and a faster return to daily life and work [1]. From diagnostic investigations to the management of complex conditions like endometriosis and fibroids, laparoscopy has become the cornerstone of modern gynecologic surgery [2, 3]. However, this minimally invasive path is not without its potential pitfalls. The technical demands of laparoscopy—navigating instruments in a confined space, relying on video imagery, and mastering safe entry into the abdomen—introduce a unique spectrum of risks [4]. Catastrophic events such as major blood vessel injury or unintended visceral damage, though rare, remain a sobering reality for laparoscopic surgeons [5, 6]. More common concerns include infections, bleeding, and hernia formation, which collectively contribute to reported major complication rates of 0.5% to 3.0% in large studies, with risk escalating alongside procedural complexity [7, 8]. In response, the gynecological community has increasingly focused on standardizing safety. The development of comprehensive

clinical guidelines underscores a commitment to mitigating risk through meticulous preoperative planning, precise surgical technique, and proactive postoperative care [9, 10]. The adoption of Enhanced Recovery After Surgery (ERAS) protocols exemplifies this, demonstrating that structured, evidence-based care pathways can dramatically improve patient recovery and satisfaction [11]. Furthermore, the centralization of complex procedures in high-volume centers with specialized teams has consistently been linked to superior outcomes, highlighting the importance of both individual skill and systemic support [12]. While analyzing complications is essential for learning, there is profound value in studying exceptional success. A detailed examination of a clinical series that has achieved a flawless safety record offers a unique opportunity to identify and codify the practices that lead to perfect outcomes [13]. Such research moves beyond describing what can go wrong to illuminate a clear path for how to do things right. This study presents a retrospective analysis of 2,675 consecutive laparoscopic gynecological procedures performed with zero major complications. Our objective is to move beyond merely reporting this statistic and to instead delve into the specific protocols, disciplined techniques, and organizational ethos that made this result possible. By doing so, we aim to provide a practical and

replicable framework for safeguarding patient well-being in minimally invasive gynecological surgery.

METHODS & MATERIALS

Study population: This retrospective, multicenter study analyzed 2,675 consecutive patients who underwent laparoscopic gynecological surgery. The procedures were performed at Comilla Trauma Centre, Cumilla, Bangladesh, over 13 years from January 2012 to June 2025. The study cohort represented a diverse patient population seeking care for a wide spectrum of gynecological conditions.

Inclusion criteria: All female patients who underwent an elective or emergency laparoscopic procedure for a benign gynecological indication within the specified study timeframe were included. This encompassed diagnostic and therapeutic interventions, ranging from basic sterilizations and diagnostic laparoscopies to advanced procedures for endometriosis and hysterectomies.

Exclusion criteria: Patients were excluded from the final analysis if their medical records were incomplete, if they were lost to post-operative follow-up before the first scheduled check-up, or if the procedure was converted to laparotomy for reasons other than a complication (e.g., extensive adhesions not manageable via laparoscopy).

Study procedure: A standardized perioperative protocol was uniformly applied. This included comprehensive preoperative assessment, strict adherence to antiseptic and aseptic techniques, strategic patient positioning, utilization of modern laparoscopic equipment, and judicious administration of prophylactic antibiotics. Systematic post-operative follow-up was conducted according to a fixed schedule.

Data analysis: All relevant clinical data were extracted from patient records and compiled using Microsoft Office Excel. Descriptive statistics were primarily employed for data analysis, with results presented as frequencies, percentages, and means with standard deviations where applicable.

RESULT

This analysis of 2,675 patients revealed a complete absence of major intraoperative or postoperative complications, resulting in a 0.0% major complication rate across the entire cohort. The demographic profile of the patients is detailed in the accompanying tables.

Table – I: Distribution of primary presenting complaints by age group

Presenting complaint	≤ 25 years		p-value
	(n=1287)	(n=1388)	
Infertility	745 (57.9%)	820 (59.1%)	0.512
Chronic pelvic pain	330 (25.6%)	344 (24.8%)	0.589
Abnormal uterine bleeding	124 (9.6%)	138 (9.9%)	0.783
Pelvic mass	88 (6.8%)	86 (6.2%)	0.482

Data analysis performed using the Chi-square test

Table II shows the case distribution, as detailed in a separate table, was led by Diagnostic Laparoscopy with D&C, which constituted nearly two-thirds of all procedures (64.0%). This was followed by Laparoscopic Ovarian Cystectomy (15.8%) and Laparoscopic Surgery for Endometriosis (12.2%). More

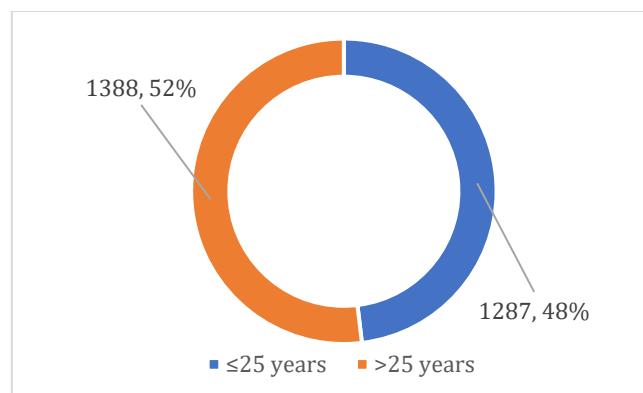


Figure – 1: Age distribution of cases (n=2675)

Figure 1 shows the mean age was 32.4 ± 6.1 years, with a near-equal distribution between women aged 25 years or younger (48.1%) and those over 25 years (51.9%).

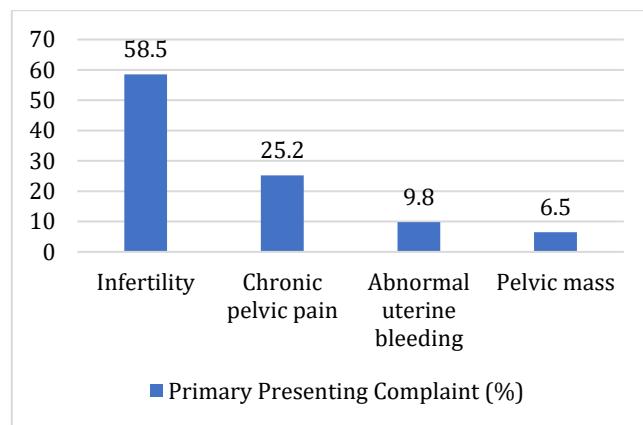


Figure – 2: Primary presenting complaint of the cases

Figure 2 shows the most frequent indications for surgery were infertility (58.5%) and chronic pelvic pain (25.2%), followed by abnormal uterine bleeding (9.8%) and pelvic mass (6.5%).

Table I shows no statistically significant difference was found in the distribution of these primary complaints between the two age groups.

complex procedures, such as various types of hysterectomies, collectively accounted for only 1.1% of the total surgical volume. Intraoperative and postoperative outcomes were consistently favorable.

Table - II: Surgical procedure profile

Procedure type	n	%
Diagnostic laparoscopy (with D&C)	1712	64.0
Laparoscopic ovarian cystectomy	423	15.8
Laparoscopic surgery for endometriosis	327	12.2
Laparoscopic salpingectomy (Ectopic)	124	4.6
Laparoscopic bilateral tubal ligation	30	1.1
Laparoscopic myomectomy/Adenomyomectomy	27	1.0
Laparoscopic-assisted vaginal hysterectomy (LAVH)	20	0.7
Total laparoscopic hysterectomy (TLH)	12	0.4

Table III shows the mean operative time was 42.5 ± 18.3 minutes, and the mean estimated blood loss was minimal at 35.2 ± 22.1 ml. A key indicator of successful minimally

invasive surgery and effective postoperative care was the discharge rate, with 98.1% of all patients being discharged within 24 hours of their procedure.

Table - III: Intraoperative and postoperative outcomes

Outcome measure	Value	
	Mean \pm SD/n (%)	
Operative time (minutes)	42.5 ± 18.3	
Estimated blood loss (mL)	35.2 ± 22.1	
Patients discharged (≤ 24 hours)	2624 (98.1)	

Table IV shows the analysis of outcomes by age group showed no significant difference in operative time, blood loss, or

discharge timing, demonstrating the safety and efficacy of the applied protocol across the reproductive age spectrum.

Table - IV: Comparison of key surgical outcomes by age group

Outcome measure	≤ 25 years	>25 years	p-value
	Mean \pm SD/n (%)		
Operative time (minutes)	41.8 ± 17.9	43.1 ± 18.7	0.061
Blood loss (mL)	34.7 ± 21.5	35.6 ± 22.6	0.214
Discharge (≤ 24 hours)	1265 (98.3)	1359 (97.9)	0.407

Data analysis performed using an independent t-test for continuous variables and a Chi-square test for categorical variables

Table V shows the success of this large series is attributed to the rigorous application of a standardized multi-factorial protocol. The contributing factors have been categorized and are presented in a final summary table, highlighting the

integration of structured patient management, meticulous surgical technique, and comprehensive postoperative care as the cornerstone of achieving these exemplary outcomes.

Table - V: Summary of contributing factors to zero complication rate

Contributing factors	Key components
Structured patient management	Comprehensive preoperative and postoperative care
Meticulous surgical technique	Strategic patient positioning; rigorous asepsis; use of atraumatic trocars.
Advanced instrumentation	Consistent access to modern laparoscopic equipment and energy devices.
Antimicrobial prophylaxis	Judicious administration of antibiotics at the correct dose and timing.
Discharge planning & follow-up	Individualized, proactive recovery management.

DISCUSSION

This retrospective multicenter study, analyzing 2,675 consecutive laparoscopic gynecological operations, achieved a major complication rate of 0.0%. This finding is exceptional when contrasted with the established literature, where major complication rates for benign gynecologic laparoscopy typically range from 0.5% to 3.0% [7, 8, 14]. The sheer volume of this series, encompassing a broad spectrum of procedures from basic diagnostics to advanced hysterectomies, underscores that a zero-complication outcome is an attainable benchmark for surgical safety and quality, rather than a statistical anomaly. The cornerstone of this success lies not in a single revolutionary technique, but in the rigorous, system-wide implementation of a standardized, multi-faceted protocol. Our findings strongly suggest that the synergistic effect of comprehensive preoperative evaluation, meticulous surgical technique, and structured postoperative care creates a robust safety net that effectively mitigates risk [9, 15]. This

holistic approach aligns with the growing emphasis on Enhanced Recovery After Surgery (ERAS) protocols, which have demonstrated significant improvements in patient outcomes by optimizing the entire surgical journey [11, 16]. Our protocol functioned as a de facto ERAS pathway, emphasizing elements like selective bowel preparation, minimized fasting, and proactive pain management, which likely contributed to the remarkably high 24-hour discharge rate of 98.1%. A critical factor was the unwavering adherence to meticulous surgical principles, particularly during the high-risk phase of abdominal entry and throughout the procedure. The consistent use of atraumatic trocars and a minimal-touch technique is postulated to have significantly reduced the risk of vascular and visceral injury, which are among the most feared complications in laparoscopy [4, 17]. Furthermore, the high volume of procedures, particularly diagnostic laparoscopies (64.0%), may have contributed to a highly skilled and efficient surgical team. The volume-outcome

relationship is well-documented in surgery, and a high-volume center with a standardized approach can achieve a level of proficiency and situational awareness that directly enhances patient safety [12, 18]. The demographic profile of our cohort, predominantly consisting of young women presenting with infertility and chronic pelvic pain, is representative of a typical gynecological surgical population in a tertiary care setting. The fact that there were no significant differences in outcomes between women aged ≤ 25 years and those older reinforces the universality and effectiveness of the applied protocol across the reproductive age spectrum. This is a crucial point, as younger patients are often perceived as lower risk, yet our data demonstrates that systematic vigilance is equally critical for all. When contextualized with existing literature, our results provide a powerful argument for the standardization of care. While previous studies have identified individual risk factors and isolated best practices [10, 19], this series demonstrates the tangible outcome of integrating these elements into a single, cohesive system. The findings challenge the perceived inevitability of complications in a large series and posit that a "zero-complication culture" is achievable through disciplined protocol adherence [20]. A primary limitation of this study is its retrospective design, which is inherently susceptible to biases in data collection. Furthermore, the results emanate from a specialized, high-volume trauma center with significant laparoscopic expertise, which may limit the immediate generalizability to low-volume or low-resource settings. Future prospective, multi-institutional studies are warranted to validate this protocol across diverse healthcare environments. This study demonstrates that a major complication rate of zero in laparoscopic gynecology is an achievable reality. The success was not serendipitous but was built upon the foundational pillars of a structured patient management protocol, meticulous surgical technique, and comprehensive postoperative care. These findings offer a replicable framework for surgical teams aiming to elevate their standard of care and prioritize patient safety above all, proving that in the pursuit of surgical excellence, zero is the only acceptable target.

Limitations

The retrospective design and single-center origin of this study may limit generalizability. Potential exists for unrecognized minor complications, and the outcomes reflect a high-volume center with established expertise, which may not be universally replicable.

CONCLUSION

This large series demonstrates that a zero major complication rate in laparoscopic gynecological surgery is an achievable benchmark. This success was not incidental but the direct result of a rigorously applied, holistic protocol encompassing comprehensive preoperative evaluation, meticulous operative technique with modern instrumentation, and systematic postoperative care. The findings provide a replicable framework, affirming that disciplined adherence to integrated safety measures across the entire patient journey is paramount for achieving optimal surgical outcomes and safeguarding patient well-being.

Recommendation

We recommend the widespread adoption of this integrated, multi-factorial safety protocol. Future research should prospectively validate its effectiveness across diverse healthcare settings to further establish its role in standardizing care and minimizing complications in gynecological laparoscopy.

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