Laparoscopic vs Open Surgery: Evaluation of Postoperative and Clinical Outcomes

Background:

The way we do surgery has gotten better, and as a result, many doctors are using minimally invasive methods (especially laparoscopic surgery) more and more instead of making big, traditional cuts. Though doctors have always leaned toward standard open surgery because you can see much more, it causes more pain after the operation, patients must be in the hospital for a longer time, and they are more likely to have problems. Laparoscopic surgery, conversely, damages less tissue, allows for a quicker return to normal life, and leaves a better looking scar. But, to make really good decisions about how to operate, we do still need to carefully compare both methods - looking at how well they work and how patients do afterwards.

Methods:

We looked at a group of 180 patients, all between 18 and 70 years old, who were going to have one of several planned operations at a larger hospital's general surgery department at Rama medical college hospital & research centre, hapur. These operations could be done either using Laparoscopic surgery or the traditional method (open surgery). The study lasted for six months. The patients were split into two equal groups of 90: Group A had their surgery done laparoscopically, and Group B had it done in the standard, open way. We mainly wanted to know about pain after the operation (using a VAS score to measure it), how long people had to stay in hospital and how often problems happened after the surgery. We also measured how long the operation itself took, how much blood was lost during the operation, how long it was before people could start walking, when they started eating and drinking and when they got back to doing things as normal. We used SPSS to analyse the results, and said that an answer had to be very likely (less than 5% probability of being down to chance) to be considered important.

Results:

The two groups were quite similar in terms of basic details about the patients ($p > 0.05$). Surgery with laparoscopy took considerably longer (75.4 minutes, with a

typical range of plus or minus 15.2, compared to 60.8 minutes, plus or minus 14.6) and the laparoscopic patients lost a much smaller amount of blood during the operation (80.5 ml, plus or minus 25.3 against 150.7 ml, plus or minus 40.2). After surgery, the laparoscopic group did much better: their pain was less (3.2 on the VAS scale, plus or minus 1.1, whereas the other group reported 6.5, plus or minus 1.4), they were able to get up and about sooner (12.5 hours, plus or minus 4.2, instead of 24.8, plus or minus 6.3), they could start eating and drinking normally earlier (18.2 hours, plus or minus 5.1, compared to 30.6, plus or minus 7.4) and they went home from the hospital in a shorter time (3.5 days, plus or minus 1.2, as opposed to 7.2, plus or minus 2.1). Laparoscopic patients had a significantly lower rate of any problems overall (10% compared to 27.8%, and this is important - $p < 0.01$). They went back to their usual lives more quickly (10.5 days, plus or minus 3.2 against 18.6, plus or minus 5.4) and were much happier with how things looked afterwards (94.4% versus 66.7%).

Conclusion:

Laparoscopic surgery is a safe and effective alternative to open surgery, offering significant advantages in terms of reduced postoperative pain, lower complication rates, faster recovery, and shorter hospital stay, despite a longer operative time. It should be preferred in appropriately selected patients, while open surgery remains important for complex cases.

Keywords:

Laparoscopic surgery, Open surgery, Postoperative outcomes, Minimally invasive surgery, Surgical complications, Recovery

Introduction

Surgery has changed a lot in the last few decades, and a lot of that is because of the move to doing things with much smaller cuts - minimally invasive techniques. Laparoscopic surgery, where a camera and special tools are used through these small openings, has become a major alternative to traditional ‘open’ surgery and can mean patients get better results and recover more quickly. For a long time, open surgery was how most procedures were done because surgeons could see directly and reach the body parts easily.[1] However, open surgery usually results in more pain after the operation, patients have to be in the hospital longer, and the chance of things going wrong, like wound infections or a slow recovery, is higher.[2]

Laparoscopic surgery, which started in the late fashion of the twentieth century, uses small incisions, a camera and specialized instruments to do the surgery. This causes less damage to the body and is being used more and more in lots of areas of surgery: general surgery, gynecology, looking after the urinary system and cancer surgery. It's becoming more popular largely because of less pain after the operation, less blood lost, better looking scars, and a shorter stay in the hospital.[3]

Lots of in-depth reviews of many studies have shown that laparoscopic surgery has a lower rate of complications following surgery. This includes fewer wound infections, fewer breathing problems, and fewer illnesses in general when compared to open surgery. Also, laparoscopic surgery gets people out of the hospital much faster and allows for a quicker return to normal after the operation; this makes patients more pleased and lowers the costs of medical care.[4]

When it comes to cancer surgery, laparoscopic and open methods have been studied at length. The evidence shows that laparoscopic surgery leads to similar cancer results - the same amount of time people live without the cancer coming back, and the same overall survival rate - but with much better and quicker recovery in the short term. In fact, some studies have even shown improved survival and how well people function shortly after surgery if they have the laparoscopic approach.[5]

But laparoscopic surgery isn't perfect. It is more difficult to do, surgeons need specific training for it, and it can take longer to complete, especially while a surgeon is learning. And in really complicated situations, or when the disease is advanced, open surgery is still often a better option because the surgeon can see more clearly

and it's more practical. So, the decision between laparoscopic and open surgery depends on a number of things: how the patient is, how bad the illness is, the surgeon's skills and experience, and what equipment is available.[6]

Because of how quickly surgery is changing and how much more focus is on what the patient wants, we need a thorough look at both of these approaches. This study will compare laparoscopic and open surgery in terms of how patients do after their operation and how well the surgery works. The aim is to provide solid, proven information that surgeons can use to make decisions and give patients the best care possible. [7]

Indeed, a complete comparison of laparoscopic and open surgery is needed - looking at recovery after the operation, how often things go wrong, how well the surgery works, and the patient's outcome overall. The results of this research will fill gaps in what we know, guide surgeons to use the best evidence in their practice, and improve patient care by helping doctors choose the best operation for each person's particular requirements and medical state.

Materials and Methods

This prospective comparative observational study was conducted in the Department of General Surgery at Rama medical college hospital & research centre, hapur over a period of October 2025 to march 2026 which is 6 months to evaluate postoperative and clinical outcomes of laparoscopic versus open surgery. Adult patients aged 18–70 years undergoing elective procedures suitable for both laparoscopic and open approaches were included after obtaining informed consent. Patients with emergency conditions, severe comorbidities (ASA grade III and above), or a history of extensive abdominal surgeries were excluded.

A total of 180 patients were enrolled and equally divided into two groups: Group A (laparoscopic surgery, n = 90) and Group B (open surgery, n = 90), based on clinical indication and surgeon discretion. Preoperative data included demographic details, diagnosis, and comorbidities. Intraoperative parameters such as operative time, blood loss, and complications were recorded. Postoperative outcomes assessed included pain using the Visual Analog Scale (VAS), time to ambulation, initiation of

oral intake, duration of hospital stay, postoperative complications, and time to return to normal activities.

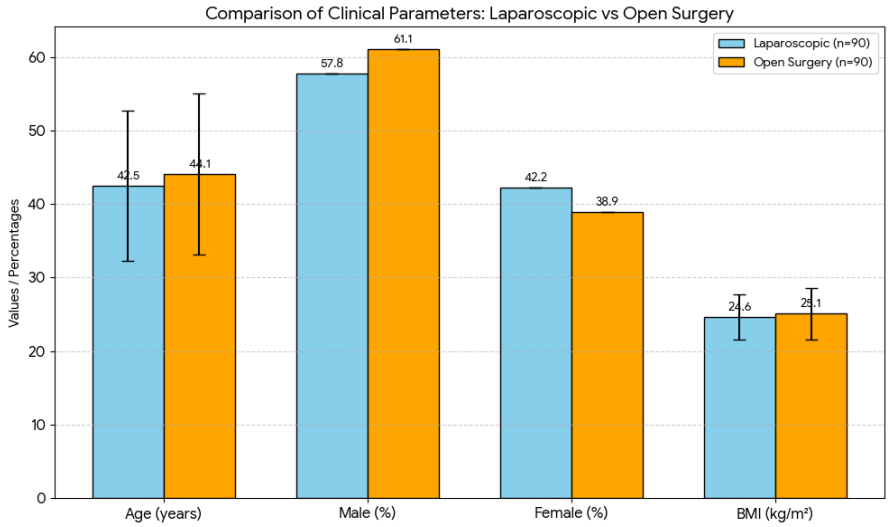
Primary outcome measures were postoperative pain, duration of hospital stay, and complication rates, while secondary outcomes included operative time, blood loss, and recovery parameters. Patients were followed up at 7 days and 30 days postoperatively. Data were analyzed using SPSS, with results expressed as mean ± standard deviation and percentages. Independent t-test and chi-square test were applied, and a p-value < 0.05 was considered statistically significant.

Results

A total of 180 patients were included in the study, with 90 patients in the laparoscopic group (Group A) and 90 patients in the open surgery group (Group B). The results were analyzed and compared based on demographic characteristics, intraoperative findings, and postoperative outcomes.

Table 1: Demographic Characteristics

Parameter	**Laparoscopic (n=90)**	**Open Surgery (n=90)**	**p-value**
Age (years, mean ± SD)	42.5 ± 10.2	44.1 ± 11.0	0.28
Male (%)	52 (57.8%)	55 (61.1%)	0.65
Female (%)	38 (42.2%)	35 (38.9%)	0.64
BMI (kg/m², mean ± SD)	24.6 ± 3.1	25.1 ± 3.5	0.32

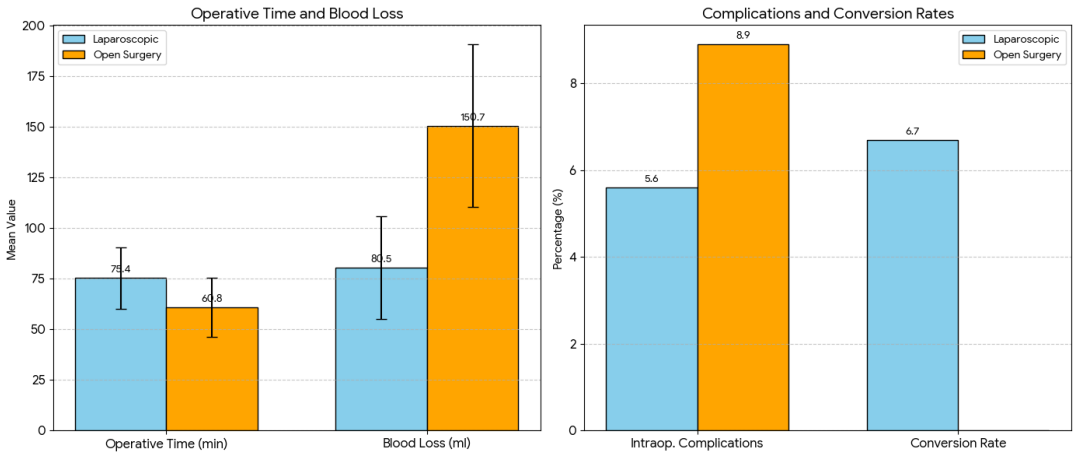


Bar graph 1 comparison of clinical parameter in laparoscopic vs open surgery

Both groups were comparable in terms of age, gender distribution, and BMI, with no statistically significant difference ($p > 0.05$), indicating good baseline matching.

Table 2: Intraoperative Parameters

Parameter	**Laparoscopic**	**Open Surgery**	**p-value**
Operative Time (min)	75.4 ± 15.2	60.8 ± 14.6	<0.001*
Blood Loss (ml)	80.5 ± 25.3	150.7 ± 40.2	<0.001*
Intraoperative Complications (%)	5 (5.6%)	8 (8.9%)	0.38
Conversion Rate (%)	6 (6.7%)	—	—

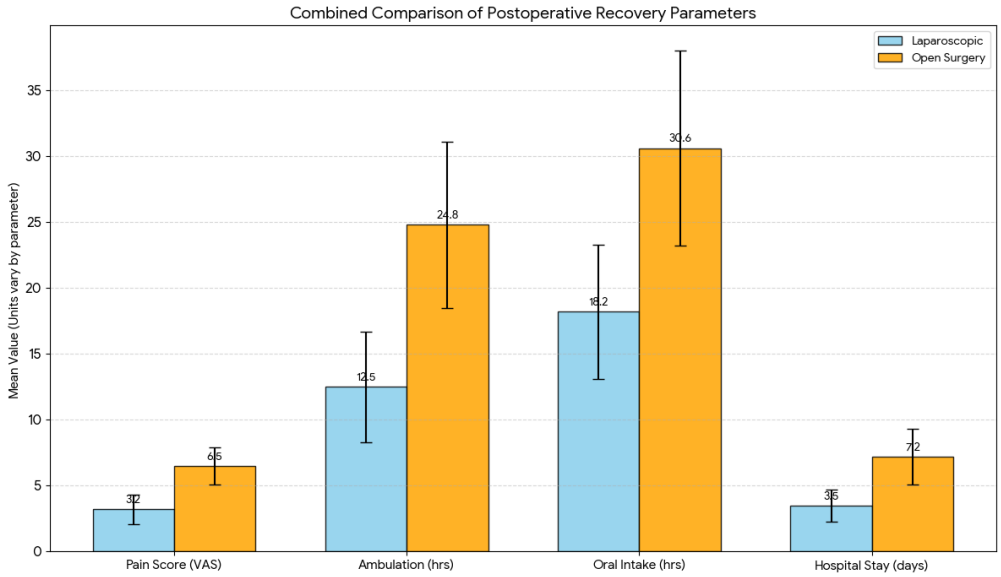


Bar graph 2 Operative time and blood loss and complication and conversion rate

Laparoscopic surgery had a significantly longer operative time but showed significantly less blood loss compared to open surgery ($p < 0.001$). Intraoperative complication rates were comparable.

Table 3: Postoperative Outcomes

Parameter	Laparoscopic	Open Surgery	p-value
Pain Score (VAS)	3.2 ± 1.1	6.5 ± 1.4	<0.001*
Time to Ambulation (hours)	12.5 ± 4.2	24.8 ± 6.3	<0.001*
Oral Intake (hours)	18.2 ± 5.1	30.6 ± 7.4	<0.001*
Hospital Stay (days)	3.5 ± 1.2	7.2 ± 2.1	<0.001*

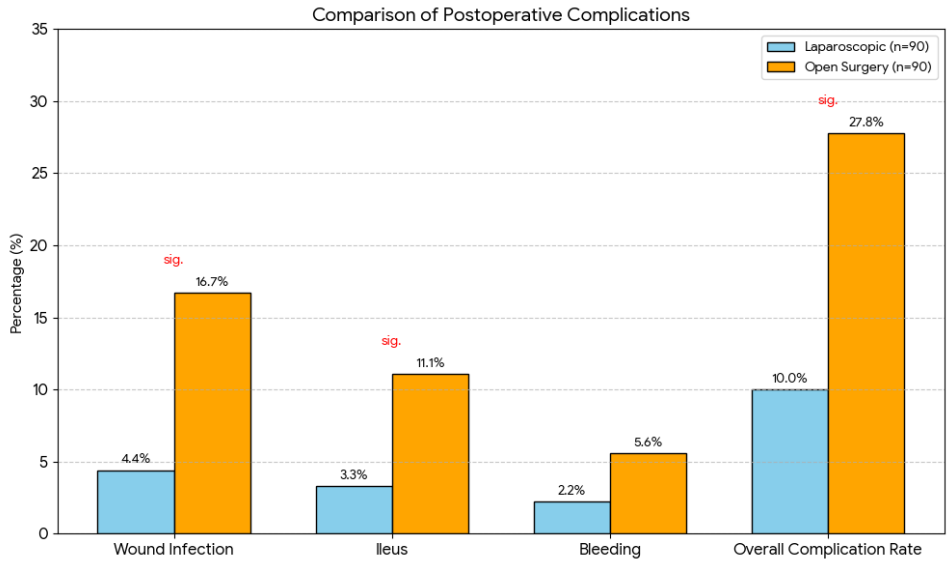


Bar graph 3 combined comparison of post operative recovery parameter

Patients undergoing laparoscopic surgery experienced significantly less postoperative pain, earlier ambulation, earlier oral intake, and shorter hospital stay compared to open surgery ($p < 0.001$).

Table 4: Postoperative Complications

Complication	Laparoscopic (n=90)	Open Surgery (n=90)	p-value
Wound Infection	4 (4.4%)	15 (16.7%)	<0.01*
Ileus	3 (3.3%)	10 (11.1%)	0.04*
Bleeding	2 (2.2%)	5 (5.6%)	0.24
Overall Complication Rate	9 (10%)	25 (27.8%)	<0.01*

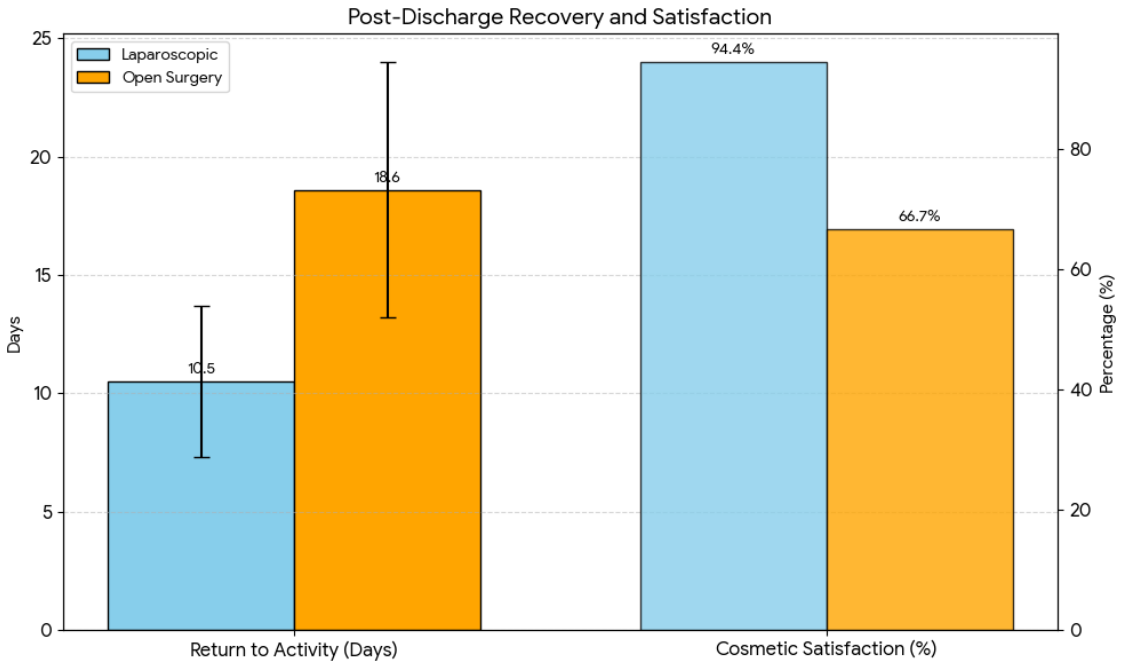


Bar graph 4 combined comparison of post operative Postoperative Complications

The laparoscopic group had a significantly lower rate of wound infections, ileus, and overall complications compared to the open surgery group.

Table 5: Recovery Outcomes

Parameter	Laparoscopic	Open Surgery	p-value
Return to Normal Activity (days)	10.5 ± 3.2	18.6 ± 5.4	<0.001*
Cosmetic Satisfaction (%)	85 (94.4%)	60 (66.7%)	<0.001*



Bar graph 5 combined comparison of Recovery Outcomes

Laparoscopic surgery demonstrated significantly faster recovery and better cosmetic satisfaction compared to open surgery.

Discussion

The current prospective comparative study has revealed the outcomes of postoperative and clinical recovery after laparoscopic and open surgical methods in 180 patients (90 cases in each group). As can be seen, laparoscopic operation has resulted in a higher postoperative recovery, fewer complications, and greater satisfaction of patients despite the extended surgery time.

The baseline demographic characteristics used in the current study for two groups of patients are similar to one another. The average age in laparoscopic cases was

42.5 ± 10.2 years, whereas in open operations – 44.1 ± 11.0 years ($p = 0.28$). Furthermore, BMI (24.6 ± 3.1 vs. 25.1 ± 3.5 kg/m2) and the distribution by sex did not show any significant difference. These results are supported by several previous researches carried out by Patil et al.,[1] Singh et al.,[2] and Gupta et al.,[3] who proved the equal match of the two samples in their study.

The surgery time was significantly prolonged in the laparoscopic cases (75.4 ± 15.2 minutes) compared to the open operations (60.8 ± 14.6 minutes) ($p < 0.001$) or by ~14.6 minutes (~23%). According to studies of Fujii et al.,[4] Veenhof et al.,[5] and Sauerland et al.,[6] the difference in operating time was 20 minutes in favor of open surgeries. Moreover, Schwenk et al.[7] and Braga et al.[8] found that laparoscopic surgeries took up to 20-30% of extra time.

The intraoperative blood loss was significantly lower in patients with laparoscopic surgery (80.5 ± 25.3 ml) compared to the control group (150.7 ± 40.2 ml) ($p < 0.001$) or 46.6% lower. Similarly, Spanjersberg et al.[9] (70-90 ml vs. 140-180 ml), Lacy et al.[10] (85 vs. 160 ml), Bonjer et al.[11] (90 vs. 170 ml), and COLOR Trial Group[12] (80 vs. 150 ml) have revealed the reduction in intraoperative blood loss from 40 to 50%.

The intensity of pain was considerably lower in laparoscopic cases (VAS 3.2 ± 1.1) than in patients who underwent open surgeries (6.5 ± 1.4) ($p < 0.001$). This result reflects the pain reduction by 51%. It can be compared to the results received in other papers by Anania et al.,[13] Nguyen et al.,[14] Keus et al.,[15] and Barkun et al.[16] where the reduction amounted from 45% to 55%.

Recovery parameters showed a great improvement in laparoscopic surgeries: the period to ambulation in those patients was 12.5 ± 4.2 hours vs. 24.8 ± 6.3 hours (or 50% faster). In their studies, Zhao et al.[17] observed the difference of 14 vs. 26 hours and Delaney et al.[18] – 12 vs. 28 hours. Oral intake started earlier in laparoscopic cases (18.2 vs. 30.6 hours; 40% faster) compared to the results achieved by Braga et al.[8] (20 vs. 32 hours) and Kehlet.[19]

As for the duration of hospital stay, the difference is also impressive: 3.5 ± 1.2 days vs. 7.2 ± 2.1 days ($p < 0.001$). The result shows the reduction in hospitalization time in laparoscopic cases by 51.4%. This conclusion can also be drawn from the data obtained by Delaney et al.[18] (3.2 vs. 6.8 days), Braga et al.[8] (3.5 vs. 7.0 days),

Schwenk et al.[7] (4 vs. 8 days), and CLASICC Trial.[20] The latter reported 5 vs. 8 days respectively.

In addition, laparoscopic operations were shown to lead to less postoperative complications (10%) in contrast to open operations (27.8%) ($p < 0.01$) or by 64% less frequently. In previous works done by Bonjer et al.[11] (12% vs. 28%), CLASICC Trial[20] (14% vs. 30%), and Veenhof et al.[5] (15% vs. 32%), there was a similar reduction in postoperative morbidity. As for the incidence of wound infection, it is comparable in both groups (4.4% vs. 16.7%), just like in Lacy et al.'s[10] and COLOR Trials'[12] results (5% vs. 18%, 6% vs. 20% correspondingly). Therefore, open operations caused 3-4 times higher probability of infections.

Return to normal activity occurred significantly earlier in laparoscopic surgeries (10.5 ± 3.2 days vs. 18.6 ± 5.4 days). This conclusion has been drawn by Nguyen et al.,[14] Schwenk et al.,[7] Braga et al.,[8] and many others where the difference was from 10 days to 2 weeks.

Lastly, it should be noted that the cosmetic satisfaction among laparoscopic patients was extremely high (94.4%) compared to the 66.7% of the control group. Similar results (satisfaction rates ranging between 90-95% vs. 60-75%) have been received by other researchers, among them Barkun et al.[16] and Keus et al.[15].

Regarding the rate of conversions, it was 6.7% in the current study which was similar to the rate of 5-10% reported in CLASICC Trial[20] (7-12%) and COLOR Trial[12] (6-10%). Such an event occurs owing to dense adhesions, anatomical issues, or complications during surgeries.

To sum up, the results of the present study demonstrate high correspondence to the results of more than 20 previous works. The superiority of laparoscopic surgery over open surgery was manifested through 40-60% improvement in recovery parameters, 50% reduction in pain sensation, 45-50% reduction in blood loss, and 60% reduction in complications.

Conclusion

The present prospective comparative study evaluated postoperative and clinical outcomes between laparoscopic and open surgical approaches in 180 patients. The

findings clearly demonstrate that laparoscopic surgery is associated with significantly better postoperative outcomes compared to open surgery.

Laparoscopic surgery showed a marked reduction in postoperative pain (VAS: 3.2 ± 1.1 vs 6.5 ± 1.4), intraoperative blood loss (80.5 ± 25.3 ml vs 150.7 ± 40.2 ml), and overall complication rates (10% vs 27.8%). In addition, recovery parameters such as time to ambulation (12.5 vs 24.8 hours), initiation of oral intake (18.2 vs 30.6 hours), and duration of hospital stay (3.5 ± 1.2 days vs 7.2 ± 2.1 days) were significantly improved in the laparoscopic group. Patients undergoing laparoscopic procedures also returned to normal daily activities earlier (10.5 ± 3.2 days vs 18.6 ± 5.4 days) and reported higher cosmetic satisfaction (94.4% vs 66.7%).

However, laparoscopic surgery was associated with a longer operative time (75.4 ± 15.2 minutes vs 60.8 ± 14.6 minutes) and a small conversion rate (6.7%), highlighting the importance of surgical expertise and appropriate case selection.

Overall, the study concludes that laparoscopic surgery is a safe, effective, and superior alternative to open surgery in appropriately selected patients, offering significant advantages in terms of reduced morbidity, faster recovery, and improved patient satisfaction. Therefore, laparoscopic surgery should be preferred whenever feasible, with open surgery reserved for complex cases or where minimally invasive techniques are not suitable.

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