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Postoperative Outcomes of Minimally Invasive Versus Open Abdominal Surgery: A Comparative Clinical Study

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Abstract

Minimally invasive surgical techniques have transformed abdominal surgery by reducing operative trauma and improving recovery outcomes. This study compares postoperative outcomes between minimally invasive surgery (MIS) and conventional open abdominal surgery. A retrospective analysis of 240 patients was conducted to evaluate operative time, postoperative pain scores, length of hospital stay, complication rates, and readmission frequency. Results demonstrate statistically significant advantages of MIS in postoperative recovery and complication reduction. These findings reinforce the clinical benefits of minimally invasive approaches in abdominal surgical practice.

Keywords: Minimally invasive surgery, open surgery, postoperative outcomes, abdominal surgery, clinical study

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1. Introduction

Advancements in surgical technology have led to a significant shift from traditional open surgery to minimally invasive techniques. Laparoscopic and robotic-assisted procedures aim to reduce surgical trauma, postoperative pain, and hospital stay while maintaining procedural efficacy. Despite widespread adoption, comparative outcome data remain essential for guiding evidence-based surgical decision-making. This study evaluates postoperative outcomes between minimally invasive and open abdominal surgeries in a tertiary care hospital setting.

2. Materials and Methods

2.1 Study Design

A retrospective cohort study was conducted using patient records from January 2022 to December 2024.

2.2 Sample

A total of **240 patients** undergoing elective abdominal surgery were included:

- MIS group: 120 patients
- Open surgery group: 120 patients

2.3 Outcome Measures

- Operative time (minutes)
- Postoperative pain (VAS score)
- Length of hospital stay (days)
- Postoperative complications (%)
- 30-day readmission rate (%)

2.4 Statistical Analysis

Data were analyzed using descriptive statistics and independent t-tests. A p-value < 0.05 was considered statistically significant.

3. Results

Table 1. Comparison of Operative and Recovery Outcomes

| Parameter | MIS (Mean \pm SD) | Open Surgery (Mean \pm SD) |
|----------------------|---------------------|------------------------------|
| Operative Time (min) | 98 \pm 15 | 112 \pm 18 |
| Pain Score (VAS) | 3.1 \pm 0.8 | 5.6 \pm 1.1 |
| Hospital Stay (days) | 3.2 \pm 0.9 | 6.1 \pm 1.4 |

Table 2. Postoperative Complications and Readmission

| Outcome | MIS (%) | Open Surgery (%) |
|-------------------------|---------|------------------|
| Surgical Site Infection | 4.2 | 11.7 |
| Pulmonary Complications | 3.3 | 9.2 |
| 30-day Readmission | 5.0 | 12.5 |

The MIS group demonstrated significantly lower pain scores, shorter hospital stays, and reduced complication rates ($p < 0.01$).

4. Discussion

The findings highlight the clinical advantages of minimally invasive abdominal surgery. Reduced postoperative pain and hospital stay align with existing literature emphasizing faster recovery and improved patient satisfaction. Lower complication and readmission rates further suggest economic and systemic benefits. Although operative time was slightly longer in some MIS cases, the overall recovery benefits outweigh this limitation. Surgeon experience and patient selection remain critical determinants of outcomes.

5. Conclusion

Minimally invasive abdominal surgery offers superior postoperative outcomes compared to open surgery. These findings support continued

expansion and training in MIS techniques to enhance patient recovery and healthcare efficiency.

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