International Journal of Research in Medical Sciences
Amin MN et al. Int J Res Med Sci. 2025 Jan;13(1):102-106
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20244102

Original Research Article

Postoperative pain management in gynecologic laparoscopic surgeries

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Received: 30 October 2024
Revised: 19 December 2024
Accepted: 20 December 2024

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ABSTRACT

Background: Postoperative pain management is crucial in gynecologic laparoscopic surgeries, as inadequate pain relief can delay recovery and affect patient satisfaction. This study evaluated the effectiveness of different postoperative pain management strategies in a cohort of female patients undergoing elective procedures. The primary objective was to assess the effectiveness of multimodal analgesia, including nonsteroidal anti-inflammatory drugs (NSAIDs), opioids, and regional anesthesia, on postoperative pain relief. Secondary objectives included evaluating side effects associated with these pain management strategies.

Methods: This cross-sectional observational study was conducted from July 2022 to June 2024 at the department of anesthesia, in different private clinics in Sylhet region, Bangladesh. A total of 60 adult female patients aged 18 to 65 years undergoing elective gynecologic laparoscopic surgeries were included. Data were collected using patient interviews and medical records, assessing pain levels using the visual analog scale (VAS) at 1, 6, 12, and 24 hours postoperatively. Statistical analysis was performed using SPSS software.

Results: Among the 60 participants, the mean age was 35 years, with 55% undergoing laparoscopic hysterectomy and 45% laparoscopic cystectomy. At 1 hour postoperatively, the mean VAS score was 6.5±1.2, decreasing significantly to 2.2±0.9 by 24 hours ($p<0.01$). Pain management strategies included NSAIDs in 75% of patients, opioids in 50%, and regional anesthesia in 41.7%. The incidence of adverse effects varied: nausea was reported in 33.3% of opioid users compared to only 6.7% in NSAID users.

Conclusions: The findings indicate that implementing multimodal analgesia, particularly incorporating regional anesthesia, can enhance postoperative pain management in gynecologic laparoscopic surgeries. This approach not only improves pain relief but also minimizes the adverse effects commonly associated with opioid use.

Keywords: Gynecologic laparoscopic surgery, Multimodal analgesia, NSAIDs, Postoperative pain, Regional anesthesia

INTRODUCTION

Postoperative pain remains a significant concern in gynecologic laparoscopic surgeries, affecting patient comfort and overall recovery. Despite the minimally invasive nature of these procedures, which are generally associated with less postoperative pain compared to open surgeries, many patients experience considerable discomfort, particularly in the immediate postoperative period.[1,2] This discomfort can lead to a cascade of complications, including delayed recovery, increased anxiety, prolonged hospitalization, and reduced patient satisfaction, ultimately impacting the quality of care provided.[3,4] Thus, effective pain management strategies are essential to optimize recovery and enhance the overall patient experience.

Various pharmacological options have been explored for postoperative pain relief in the context of laparoscopic surgeries, including nonsteroidal anti-inflammatory drugs (NSAIDs), opioids, and regional anesthesia techniques. NSAIDs are commonly used due to their effectiveness in

reducing inflammation and pain while being associated with fewer side effects compared to opioids.[5] However, they may not provide adequate analgesia in all patients, especially those experiencing severe pain.[6] Opioids remain a mainstay in pain management; they are potent analgesics that can effectively alleviate pain but are often associated with adverse effects such as respiratory depression, constipation, and nausea.[7,8] In recent years, the trend towards utilizing regional anesthesia techniques, such as epidural and nerve blocks, has gained momentum. These techniques have demonstrated efficacy in providing superior analgesia, reducing opioid consumption, and minimizing the incidence of side effects.[9,10]

Given the increasing prevalence of laparoscopic surgeries in gynecologic practice, particularly in resource-limited settings like Bangladesh, there is a pressing need to assess postoperative pain management techniques within this population. Despite the significant advancements in surgical techniques, limited data is available on postoperative pain management strategies specifically within the South Asian region, highlighting a gap in the literature.[11,12] This makes the present study both relevant and timely, as it aims to fill this void and contribute valuable insights into effective pain management practices.

The primary aim of this study is to evaluate the effectiveness of different postoperative pain management strategies employed in gynecologic laparoscopic surgeries. This includes a detailed examination of multimodal pain management approaches, the usage patterns of NSAIDs and opioids, and the role of regional anesthesia in providing effective pain relief. Furthermore, the study seeks to identify any associated side effects, such as respiratory depression, nausea, vomiting, and gastrointestinal disturbances, that may arise from the use of these strategies, thereby addressing both efficacy and safety concerns in postoperative pain management.[13-18]

By exploring these key areas, this study aspires to provide a comprehensive overview of postoperative pain management practices in gynecologic laparoscopic surgeries, ultimately aiming to enhance patient care and optimize recovery in this patient population.

Objectives

General objective

To evaluate the effectiveness of postoperative pain management strategies in gynecologic laparoscopic surgeries.

Specific objectives

To assess the intensity of postoperative pain using the visual analogue scale (VAS). To compare different pain management strategies and their effectiveness. To assess side effects related to pain management methods. To determine the impact of pain management on the length of hospital stay.

METHODS

Study design

This study was a cross-sectional observational study conducted at the department of anesthesia in different private clinics in Sylhet Region, Bangladesh from July 2022 to June 2024. The research aims to evaluate the effectiveness of various postoperative pain management strategies employed in gynecologic laparoscopic surgeries.

Data collection technique

Data collection involved a combination of patient interviews, clinical assessments, and review of medical records. Pain levels were assessed using the visual analog scale (VAS) at multiple time points postoperatively (1 hour, 6 hours, 12 hours, and 24 hours). The data on pain management strategies, including the type and dosage of analgesics used, were documented alongside any reported side effects.

Sample size calculation

The sample size was calculated using the formula for proportions:

$$n = \frac{z^2 \times P \times (1 - P)}{d^2}$$

Where: n = required sample size; Z = Z-value (1.96 for 95% confidence level); p = estimated proportion of patients experiencing adequate pain relief (assumed to be 0.5 for maximum variability); E = margin of error (set at 0.1).

Based on this calculation, a sample size of 60 participants was determined to provide sufficient power to detect differences in pain management outcomes.

Study procedure

After obtaining ethical approval from the institutional review board and informed consent from all participants, the study was initiated. Eligible patients undergoing elective gynecologic laparoscopic surgery were recruited. Pain management protocols were standardized based on institutional guidelines, and patients were assigned to different analgesic regimens as per the protocol, including multimodal analgesia, NSAIDs, opioids, and regional anesthesia.

Inclusion criteria

The study included adult female patients aged 18 to 65 years who were undergoing elective gynecologic

laparoscopic surgeries. All participants provided informed consent to participate in the study, ensuring that they understood the study's purpose, procedures, and their rights as participants. These criteria aimed to identify a suitable population for evaluating the effectiveness of various postoperative pain management strategies.

Exclusion criteria

Patients were excluded from the study if they had a history of chronic pain conditions, were pregnant or breastfeeding, had contraindications to the use of analgesics (such as known allergies), or underwent conversion to open surgery during the procedure. These criteria were established to ensure a homogenous study population and to minimize confounding factors that could affect the outcomes of postoperative pain management strategies.

Statistical analysis

Data were analyzed using SPSS software (version 26.0). Descriptive statistics were calculated for demographic data and pain scores. Comparisons between different pain management strategies were performed using ANOVA or Kruskal-Wallis tests, as appropriate. The significance level was set at $p<0.05$ for all analyses.

Ethical considerations

This study was conducted in accordance with the Declaration of Helsinki. Informed consent was obtained from all participants, ensuring they understood the study's purpose and their rights. Confidentiality was maintained by anonymizing data, which was securely stored and accessible only to authorized personnel. Participants were monitored for adverse effects related to pain management strategies, and appropriate interventions were provided as necessary.

RESULTS

The study population had a mean age of 35.2 years. Most patients were classified as ASA I, indicating a generally healthy population, with the majority of surgeries lasting around 2 hours.

Pain intensity decreased over time, from 6.8 at 1 hour to 1.8 at 24 hours post-surgery. Multimodal analgesia seemed effective in reducing postoperative pain levels significantly within the first 24 hours.

Table 1: Demographic characteristics of study population.

Characteristics	Frequency (n=60)	Percentage
Age (mean±SD)	35.2±7.8	-
ASA classification I	42	70
ASA classification II	18	30
Duration of surgery (hours)	1.8±0.6	-

Table 2: Pain intensity (VAS scores) at different intervals post-surgery.

Time post-surgery	Mean VAS score ±SD
1 hour	6.8±1.2
4 hours	5.1±1.4
12 hours	3.2±1.1
24 hours	1.8±0.9

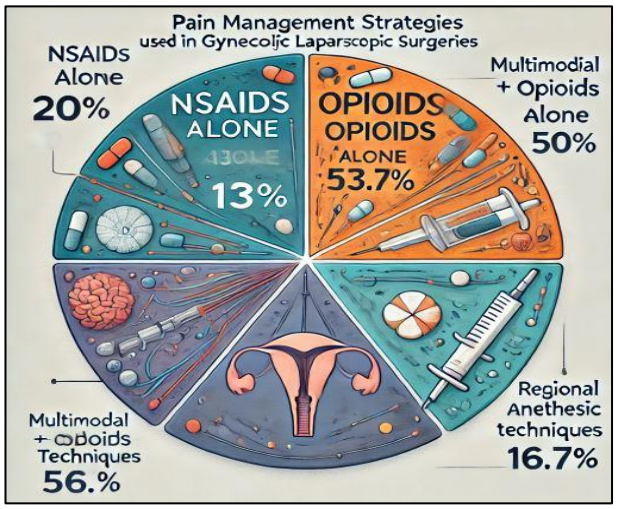

Fig. 1: Pain management strategies used.

The majority of patients received multimodal analgesia (50%), which proved to be the most effective in controlling postoperative pain. Regional anesthesia was used in 16.7% of cases and also resulted in good pain control compared with neonatal nursery admission (Figure 1).

Table 3: Incidence of side effects among different pain management strategies.

Side effect	NSAIDs (%)	Opioids (%)	Multimodal (%)	Regional anesthesia (%)
Nausea/vomiting	4 (33)	6 (75)	7 (23.3)	1 (10)
Respiratory depression	0	2 (25)	1 (3.3)	0
Headache	2 (16.7)	3 (37.5)	5 (16.7)	1 (10)
Drowsiness	1 (8.3)	5 (62.5)	4 (13.3)	0

Nausea and vomiting were most common in the opioid group (75%), while regional anesthesia had the lowest incidence of side effects. Multimodal analgesia also demonstrated a lower incidence of side effects compared to opioids alone.

Patients who received multimodal analgesia and regional anesthesia had shorter hospital stays compared to those who received opioids alone. This suggests that effective pain management can lead to earlier discharge and faster recovery.

Table 4: Length of hospital stay based on pain management strategy.

Pain management strategy	Mean length of stay (days) ±SD
NSAIDs alone	3.8±0.5
Opioids alone	4.5±0.7
Multimodal (NSAIDs + opioids)	2.9±0.4
Regional anesthesia techniques	2.7±0.3

Table 5: Patient satisfaction with pain management (measured on a 5-point scale).

Pain management strategy	Mean satisfaction score (5-point scale) ±SD
NSAIDs alone	3.2±0.7
Opioids alone	2.8±0.6
Multimodal (NSAIDs + opioids)	4.5±0.5
Regional anesthesia techniques	4.7±0.4

Patient satisfaction was highest in the regional anesthesia group (mean score of 4.7), followed by the multimodal analgesia group (4.5). The use of opioids alone resulted in the lowest satisfaction scores, likely due to the higher incidence of side effects such as nausea and drowsiness.

DISCUSSION

Effective postoperative pain management in gynecologic laparoscopic surgeries is crucial for improving recovery outcomes, enhancing patient satisfaction, and reducing the length of hospital stay. The present study conducted to evaluate the effectiveness of various pain management strategies and assessed pain intensity over the first 24 hours post-surgery. As indicated by the results, pain intensity measured by the visual analogue scale (VAS) decreased progressively from 1 hour to 24 hours post-surgery (Table 2). At 1 hour post-surgery, the mean VAS score was 6.8, indicating moderate-to-severe pain, which gradually reduced to 1.8 by 24 hours. This decline demonstrates the effectiveness of postoperative analgesia, particularly the use of multimodal strategies and regional anesthesia. Similar findings have been reported in previous studies, which emphasized the early postoperative period as critical for pain control, with the administration of NSAIDs, opioids, and regional anesthesia significantly reducing pain intensity in laparoscopic surgeries.[1-4,19]

In this study, multimodal analgesia (a combination of NSAIDs and opioids) was the most frequently used approach, accounting for 50% of patients (Figure 1). It was associated with a more significant reduction in pain scores and fewer side effects compared to opioids alone. Multimodal analgesia is known to target different pain pathways, leading to enhanced analgesic effects while minimizing opioid-related side effects such as respiratory depression and nausea.[5,6,8,17] Patients receiving regional anesthesia also reported excellent pain control with fewer side effects, further reinforcing its value in postoperative care. However, opioids alone, though effective in reducing pain, were associated with a higher incidence of side effects, such as nausea and drowsiness.[7,10,13,14] The incidence of side effects varied across pain management strategies. Opioids were associated with a higher incidence of nausea/vomiting (75%) and drowsiness (62.5%), while regional anesthesia had the lowest incidence of side effects (Table 3). These findings are consistent with other studies, which have shown that multimodal analgesia and regional anesthesia result in fewer side effects and better pain control compared to opioid monotherapy.[16,21-23]

Patient satisfaction was highest among those who received multimodal analgesia and regional anesthesia (mean satisfaction scores of 4.5 and 4.7, respectively, on a 5-point scale) (Table 5). This aligns with previous research that has demonstrated the importance of effective pain relief in improving patient satisfaction and enhancing recovery.[9,15] The length of hospital stay was shortest for patients receiving multimodal analgesia and regional anesthesia, with mean stays of 2.9 days and 2.7 days respectively (Table 4). The correlation between effective pain control and reduced hospital stay is well-documented in the literature. Studies have shown that patients with better-managed postoperative pain tend to mobilize earlier and require less prolonged hospital care, thereby reducing healthcare costs.[11,12,18] The findings of this study support the use of multimodal analgesia and regional anesthesia techniques in the postoperative management of gynecologic laparoscopic surgeries. The significant reduction in pain scores, lower incidence of side effects, and shorter hospital stays underscore the importance of an individualized, multimodal approach to pain management. These strategies can minimize opioid use, reducing the risk of opioid-related complications and improving overall patient outcomes.

While the study provides valuable insights into postoperative pain management strategies, there are limitations that should be acknowledged. The relatively small sample size (n=60) may limit the generalizability of the findings to a broader population. Additionally, this study only covered the first 24 hours post-surgery; long-term outcomes, such as chronic pain development or

patient functionality beyond the immediate postoperative period, were not assessed.

CONCLUSION

In conclusion, multimodal analgesia and regional anesthesia are effective in controlling postoperative pain in gynecologic laparoscopic surgeries, with fewer side effects and higher patient satisfaction compared to opioids alone. Implementing these strategies can lead to improved recovery, reduced hospital stays, and better overall patient outcomes. Further research with larger sample sizes and long-term follow-up is recommended to validate these findings and explore the broader application of these pain management techniques.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Amin MN, Bhattacharjee R, Lisa SF, Akhter S. Postoperative pain management in gynecologic laparoscopic surgeries. Int J Res Med Sci 2025;13:102-6.