Section: Anaesthesiology / General Surgery

Original Research Article

# A CROSS-SECTIONAL STUDY ON POSTOPERATIVE NAUSEA AND VOMITING ACROSS DIFFERENT TYPES OF ANESTHESIA

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ABSTRACT

**Background:** Postoperative nausea and vomiting (PONV) is a common complication following surgery, with varying incidence across different types of anesthesia. This cross-sectional study evaluates the incidence, severity, duration, and management of PONV in patients undergoing surgery under general, regional, or local anesthesia with sedation.

**Material and Methods:** A total of 100 patients undergoing various surgical procedures were grouped based on the anesthesia received: general anesthesia (n=50), regional anesthesia (n=30), and local anesthesia with sedation (n=20). Incidence, severity (mild, moderate, or severe), duration, and antiemetic management of PONV were assessed. Descriptive statistics were used to analyze the data.

**Results:** PONV incidence was highest in the general anesthesia group, with 28 out of 50 patients (56%) experiencing PONV, compared to 9 out of 30 (30%) under regional anesthesia and 4 out of 20 (20%) under local anesthesia with sedation. The severity of PONV varied, with 18 cases of mild nausea, 7 moderate, and 3 severe vomiting reported in the general anesthesia group. Regional anesthesia yielded 6 mild and 3 moderate cases, while local anesthesia with sedation reported only 4 mild cases. The duration of PONV averaged 6 hours under general anesthesia (range: 2-12 hours), 4 hours under regional anesthesia (range: 1-7 hours), and 2 hours under local anesthesia (range: 1-4 hours). Antiemetics were administered to 34% of patients experiencing PONV under general anesthesia, 22% under regional anesthesia, and none under local anesthesia.

**Conclusion:** General anesthesia is associated with the highest incidence and severity of PONV. Choosing appropriate anesthesia methods and managing risk factors is critical to reducing PONV.

**Keywords:** Postoperative nausea and vomiting, PONV, anesthesia, general anesthesia, regional anesthesia, local anesthesia with sedation.

## INTRODUCTION

Postoperative nausea and vomiting (PONV) remains a significant challenge for patients and healthcare professionals following surgical procedures.[1] It is characterized by nausea, retching, and vomiting that can occur within the first 24 to 48 hours post-surgery.[2] Despite advancements in anesthesia and perioperative care, PONV continues to affect approximately 20-30% of patients undergoing routine surgery, with incidence rates exceeding 70% in high-risk patients.[3] The persistence of this complication can lead to increased postoperative discomfort, delayed recovery, prolonged hospital stays, and additional healthcare costs.[4]

The incidence and severity of PONV can vary based on several factors, including patient characteristics, type of surgery, and anesthetic technique. Among these, the type of anesthesia plays a crucial role.[5] General anesthesia is commonly associated with a higher risk of PONV compared to regional or local anesthesia. Anesthetic agents, such as volatile anesthetics and opioids, often contribute to the emetic potential during and after surgery.[6]

This cross-sectional study aims to provide an updated perspective on the incidence, severity, duration, and management of PONV across different anesthesia types. By comparing general anesthesia with regional anesthesia and local anesthesia with sedation, this study seeks to identify the patterns and predictors that could assist anesthesiologists and surgical teams in developing tailored strategies for reducing PONV risk.

## MATERIAL AND METHODS

**Study Design and Setting**

The study was conducted as a cross-sectional analysis at Maharajah's Institute of Medical Sciences, Vizianagaram. The study period spanned from February 2023 to January 2024.

**Sample Size and Inclusion Criteria**

A total of 100 patients undergoing elective surgical procedures were recruited for this study. The inclusion criteria required patients to be adults aged 18 to 65 years and to receive general anesthesia, regional anesthesia, or local anesthesia with sedation. Patients with known postoperative nausea and vomiting (PONV) or motion sickness, pregnancy, or medications that could impact PONV incidence were excluded to ensure data consistency.

**Grouping and Data Collection**

Patients were grouped according to the type of anesthesia received:

**General Anesthesia (n=50):** Patients were administered inhalation or intravenous general anesthetics.

**Regional Anesthesia (n=30):** Patients received spinal, epidural, or nerve block anesthesia.

**Local Anesthesia with Sedation (n=20):** Patients received local anesthetics combined with adjunctive sedatives.

**PONV Assessment**

Incidence of PONV was assessed within the first 24 hours postoperatively, while severity was categorized as mild, moderate, or severe based on patient self-reports and clinical evaluation. The duration was measured as the time interval from the onset to cessation of symptoms. The administration of antiemetics was documented, including the type of medications used.

**Ethical Considerations**

Ethical Approval: The Institutional Ethics Committee of Maharajah's Institute of Medical Sciences, Vizianagaram, approved the study protocol.

Informed Consent: All participants provided written informed consent after receiving detailed information about the study's purpose, procedures, risks, and benefits.

**Confidentiality:** Patient information was anonymized and securely stored to maintain confidentiality.

**Voluntary Participation:** Patients had the right to withdraw from the study without affecting their medical care.

**Data Analysis**

Descriptive statistics were used to calculate the incidence rates, severity, and duration of PONV across anesthesia groups. Comparative analysis using chi-square tests and ANOVA was conducted across groups, with a p-value of $<0.05$ considered statistically significant.

## RESULTS

The cross-sectional study included a total of 100 patients who underwent surgical procedures under different types of anesthesia. The study aimed to assess the incidence, severity, duration, and management of postoperative nausea and vomiting (PONV) across these anesthesia types.

**Incidence of Postoperative Nausea and Vomiting**

The incidence of PONV varied significantly among the different anesthesia groups. Table 1 summarizes the incidence across the anesthesia types:

General Anesthesia: PONV was reported in 28 out of 50 patients (56%).

Regional Anesthesia: 9 out of 30 patients (30%) experienced PONV.

Local Anesthesia with Sedation: PONV was reported in 4 out of 20 patients (20%).

Overall, the total incidence across all groups was 41% (Table 1).

**Severity of PONV**

The severity of PONV was categorized into mild, moderate, and severe cases (Table 2). The highest severity levels were observed in the general anesthesia group, with 18 patients reporting mild nausea, 7 reporting moderate nausea, and 3 experiencing severe vomiting. In the regional anesthesia group, 6 patients experienced mild nausea, and 3 reported moderate nausea. In the local anesthesia with sedation group, all 4 patients reported mild nausea, with no cases of moderate or severe vomiting.

**Duration of PONV**

The average duration of PONV and its range are detailed in Table 3. Patients who underwent surgery under general anesthesia experienced the longest average duration, around 6 hours, with a range between 2 and 12 hours. Patients under regional anesthesia had an average PONV duration of 4 hours (range: 1-7 hours), and those with local anesthesia plus sedation had the shortest average duration of 2 hours (range: 1-4 hours).

**Management and Antiemetic Use**

Table 4 shows the management of PONV in each anesthesia group. In the general anesthesia group, 10 of the 28 patients (34%) who experienced PONV received antiemetic treatment, while 2 out of 9 patients (22%) in the regional anesthesia group were treated with antiemetics. None of the 4 patients in the local anesthesia with sedation group required antiemetic medication.

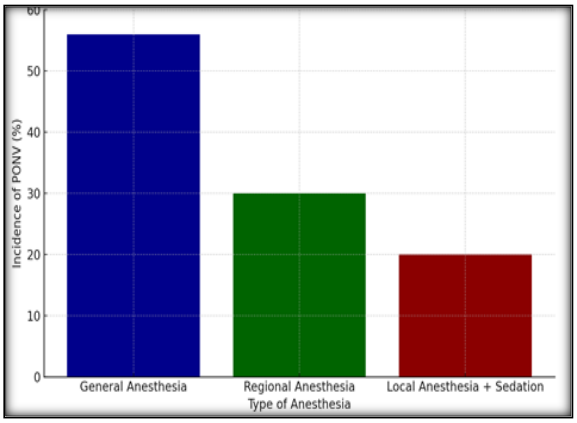


**Figure 1: Incidence of Postoperative Nausea and Vomiting Across Different Types of Anesthesia**

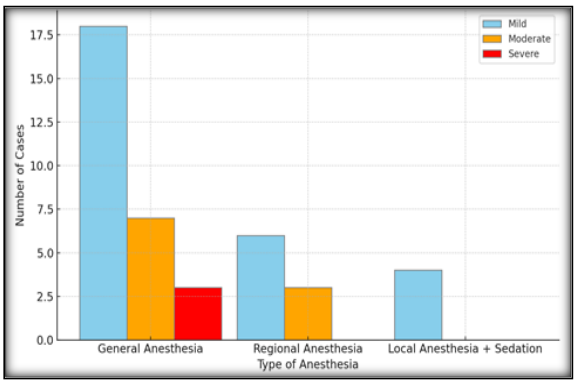


**Figure 2: Severity of Postoperative Nausea and Vomiting Across Different Types of Anesthesia**

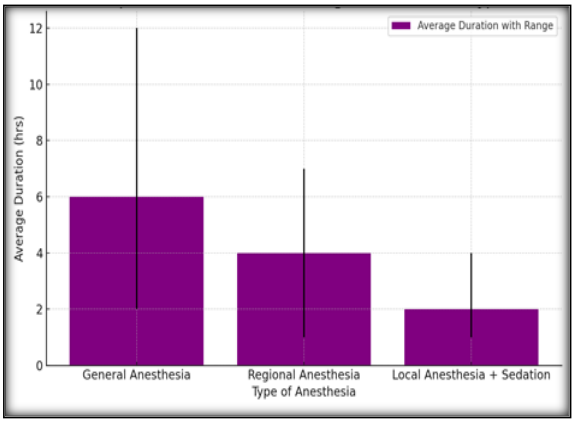


**Figure 3 Duration of Postoperative Nausea and Vomiting (Average and Range in Hours)**

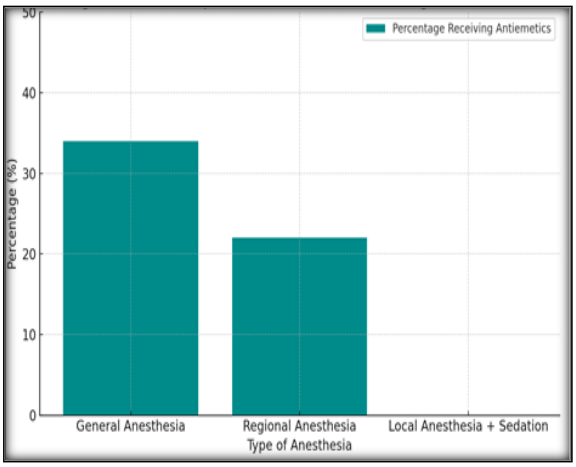


**Figure 4: Management of Postoperative Nausea and Vomiting with Antiemetics**

**Table 1: Incidence of Postoperative Nausea and Vomiting Across Different Types of Anesthesia**

| Anesthesia Type | Total Patients (n) | Patients with PONV (n) | Incidence (%) |
|---|---|---|---|
| General Anesthesia | 50 | 28 | 56% |
| Regional Anesthesia | 30 | 9 | 30% |
| Local Anesthesia + Sedation | 20 | 4 | 20% |
| Total | 100 | 41 | 41% |

**Table 2: Severity of Postoperative Nausea and Vomiting Across Different Types of Anesthesia**

| Anesthesia Type | Mild (n) | Moderate (n) | Severe (n) |
|---|---|---|---|
| General Anesthesia | 18 | 7 | 3 |
| Regional Anesthesia | 6 | 3 | 0 |
| Local Anesthesia + Sedation | 4 | 0 | 0 |

**Table 3: Duration of Postoperative Nausea and Vomiting (Average and Range in Hours)**

| Anesthesia Type | Average Duration (hrs) | Range (hrs) |
|---|---|---|
| General Anesthesia | 6 | 2 - 12 |
| Regional Anesthesia | 4 | 1 - 7 |
| Local Anesthesia + Sedation | 2 | 1 - 4 |

**Table 4: Management of Postoperative Nausea and Vomiting with Antiemetics**

| Anesthesia Type | Patients with PONV (n) | Received Antiemetics (n) | Percentage (%) |
|---|---|---|---|
| General Anesthesia | 28 | 10 | 34% |
| Regional Anesthesia | 9 | 2 | 22% |
| Local Anesthesia + Sedation | 4 | 0 | 0% |

## DISCUSSION

This cross-sectional study aimed to evaluate the incidence, severity, duration, and management of postoperative nausea and vomiting (PONV) across different anesthesia types. The findings reveal significant variations in PONV occurrence and characteristics based on the anesthesia type used.

**Incidence and Severity of PONV**

The study demonstrated that general anesthesia was associated with the highest incidence of PONV, affecting 56% of the patients. This is consistent with existing literature, which identifies general anesthesia as a leading risk factor due to the emetogenic properties of volatile anesthetics and opioids commonly used in this technique[7,8,9]. In contrast, regional anesthesia and local anesthesia with sedation had lower incidence rates of 30% and 20%, respectively. This can be attributed to the limited systemic effects of these anesthesia types, reducing the likelihood of triggering the chemoreceptor trigger zone in the brain.[10]

**Duration of PONV**

Patients who received general anesthesia also experienced the longest average duration of PONV symptoms at 6 hours. The relatively shorter durations observed with regional (4 hours) and local anesthesia with sedation (2 hours) suggest that these methods may be better suited for reducing postoperative discomfort and minimizing hospital stays.[11,12] This finding emphasizes the importance of anesthesia choice in patients at a higher risk of PONV.

**Management of PONV**

Antiemetic administration varied across anesthesia types, with 34% of affected patients under general anesthesia receiving antiemetic medications compared to 22% under regional anesthesia.[13] The absence of antiemetic use in the local anesthesia group is likely due to the lower incidence and severity of symptoms. Despite these differences, there is an evident need for improved management protocols to ensure timely and adequate relief of symptoms, especially for patients undergoing general anesthesia.[14]

**Clinical Implications**

These findings underscore the significance of personalized anesthesia strategies and risk assessments to minimize PONV. Strategies like modifying anesthesia types for high-risk patients, using antiemetic prophylaxis, and employing non-pharmacological interventions could further reduce the burden of PONV.

**Limitations and Future Research**

While this study provides valuable insights, it is limited by its sample size and single-center design. Future multicenter studies with larger patient cohorts are needed to validate these results. Additionally, exploring the influence of patient-related factors such as age, gender, and comorbidities could provide a more comprehensive understanding of PONV risk factors.

## CONCLUSION

This study reaffirms that general anesthesia is associated with the highest incidence and severity of postoperative nausea and vomiting (PONV), highlighting the importance of tailored anesthesia selection for high-risk patients. Regional and local anesthesia with sedation offer lower PONV rates and reduced symptom duration, presenting viable alternatives for risk mitigation. Improved prophylactic and management strategies are essential for optimizing patient recovery and minimizing postoperative discomfort. These findings emphasize the importance of proactive PONV management to enhance patient outcomes following surgery.

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