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POST-OPERATIVE NAUSEA AND VOMITING, COMPARISON OF GENERAL ANESTHESIA AND SUBARACHNOID BLOCK

Original Article

Meerab Ilyas[1], Maidah Mehtab[1], Moazzam Farooq[2], Shams Zaman[3], Namrah Riaz[4], Sana Fatima[1], Shahzad Mahmood[5]*

[1]Department of Anaesthesia, Mayo Hospital / King Edward Medical University, Lahore, Pakistan.
[2]Ennis General Hospital, Ireland.
[3]Rawalpindi Medical University, Pakistan.
[4]Department of Anaesthesia, DHQ Hospital, Hafizabad, Pakistan.
[5]MBBS, Allama Iqbal Medical College, M.Phil Public Health, University of the Punjab, Lahore, Pakistan.

Corresponding Author: Shahzad Mahmood, MBBS, Allama Iqbal Medical College, M.Phil Public Health, University of the Punjab, Lahore, Pakistan, Shahzadgill.990@gmail.com

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ABSTRACT

Background: Postoperative nausea and vomiting (PONV) are common complications following surgery, significantly affecting patient recovery and satisfaction. Multiple factors, including anesthesia type, patient history, and surgical characteristics, influence its occurrence. General anesthesia (GA) is frequently associated with a higher risk of PONV due to systemic exposure to emetogenic agents. In contrast, subarachnoid block (SAB), a regional anesthetic technique, is considered to have a more favorable postoperative profile with fewer gastrointestinal side effects.

Objective: To compare the incidence of postoperative nausea and vomiting among patients undergoing surgery under general anesthesia versus subarachnoid block.

Methods: A cross-sectional comparative study was conducted at Gulab Devi Teaching Hospital over six months. A total of 100 surgical patients aged 20 to 60 years were enrolled using purposive sampling and allocated into two groups: Group A (n=50) received general anesthesia, and Group B (n=50) received subarachnoid block. Inclusion criteria included ASA physical status I–III. Data on age, gender, motion sickness history, smoking, surgical type, opioid use, and PONV within 24 hours postoperatively were collected using a structured questionnaire. Statistical analysis was performed using SPSS version 26, applying Chi-square tests for associations.

Results: The incidence of PONV was significantly higher in the GA group, with 45 out of 50 patients (90%) experiencing PONV, compared to 20 out of 50 patients (40%) in the SAB group ($p < 0.005$). Among GA patients, 62% reported vomiting 1–2 times and 28% reported ≥3 episodes, while only 10% of SAB patients experienced vomiting ≥3 times. Nausea was constant in 34% of GA patients versus 18% in SAB patients. Risk factors such as motion sickness (60%), smoking (24%), and opioid use (76%) were also more prevalent in the GA group and significantly associated with PONV.

Conclusion: Subarachnoid block is associated with a substantially lower incidence of postoperative nausea and vomiting compared to general anesthesia, suggesting it as a preferable anesthetic technique, particularly in patients at higher risk of PONV.

Keywords: Anesthesia, General; Nausea; Opioid Analgesics; Postoperative Complications; Postoperative Nausea and Vomiting; Risk Factors; Spinal Anesthesia.

INTRODUCTION

Surgical interventions necessitate the use of anesthetic techniques tailored to the patient's condition and the nature of the procedure. Among the various modalities, general anesthesia, spinal anesthesia, epidural anesthesia, and regional nerve blocks are commonly employed, each with its own set of indications and advantages (1). Subarachnoid block, a form of spinal anesthesia, has gained widespread acceptance, particularly for lower limb surgeries, due to its clinical efficacy and safety profile (2). Compared to general anesthesia, subarachnoid block offers significant perioperative benefits, including superior postoperative analgesia, reduced intraoperative blood loss, better cardiopulmonary stability, fewer systemic side effects, and expedited recovery in the post-anesthesia care unit (3). Despite the broad use of general anesthesia, it is frequently associated with postoperative complications, the risk of which increases in the presence of comorbidities such as obesity, smoking, diabetes, and cardiovascular diseases, as well as depending on the type and duration of surgery (4). Patients undergoing general anesthesia often report adverse effects such as nausea, vomiting, sore throat, dry mouth, and disturbed sleep, which can hinder recovery and diminish overall satisfaction with the surgical experience (5). Among these, postoperative nausea and vomiting (PONV) remains one of the most distressing and prevalent complications encountered in the early postoperative period (6,7). The occurrence of PONV not only affects patient comfort but also delays mobilization, prolongs hospital stay, and increases healthcare costs.

PONV is a multifactorial phenomenon influenced by anesthetic agents, surgical procedures, and individual patient characteristics, including age, sex, and smoking status (8). Effective prevention and management of PONV are therefore essential to enhance recovery, improve clinical outcomes, and ensure patient-centered care (9). Notably, subarachnoid block has been associated with a lower incidence of PONV in comparison to general anesthesia, likely due to its localized action and minimal systemic involvement (10). This advantage has made it a preferred choice in surgeries involving the lower extremities, where minimizing postoperative discomfort is paramount (11). Given the clinical significance of PONV and the evolving preference for anesthetic techniques that enhance patient recovery, it is important to identify the approach that offers the greatest reduction in postoperative complications. This study aims to assess and compare the incidence of postoperative nausea and vomiting in patients receiving general anesthesia versus those undergoing surgery under subarachnoid block, thereby determining the more effective anesthetic strategy in minimizing this common yet impactful postoperative complication.

METHODS

This study adopted a cross-sectional comparative design to investigate the incidence of postoperative nausea and vomiting (PONV) in patients undergoing surgery under general anesthesia versus subarachnoid block. The research was carried out over a six-month period across all surgical units of Gulab Devi Teaching Hospital, a tertiary care center where both anesthetic techniques are regularly utilized in clinical practice. Ethical approval for the study was obtained from the Institutional Review Board of the hospital prior to data collection, and written informed consent was obtained from all participants in line with the ethical standards of the Declaration of Helsinki. The study population consisted of adult male and female patients aged 20 to 60 years who underwent elective surgical procedures under general anesthesia or subarachnoid block. Only patients classified as American Society of Anesthesiologists (ASA) physical status I to III were included. Patients were excluded if they were younger than 20 or older than 60 years, were critically ill, or demonstrated uncooperative behavior at the time of data collection, to ensure data consistency and reduce confounding factors. The sample size was initially calculated to be 150 participants using a standard formula for comparative studies, with a 95% confidence level, 80% power, and expected proportions for both groups. However, due to time constraints and resource limitations, the final sample included 100 patients, divided equally into two groups: Group A (n=50) receiving general anesthesia and Group B (n=50) receiving subarachnoid block. Although the reduced sample size may slightly impact the statistical power of the findings, equal group distribution was maintained to preserve the comparative integrity of the study (12).

Participants were selected using a non-probability purposive sampling method. While this approach facilitated targeted recruitment, it may limit the generalizability of the findings due to potential sampling bias. Data were collected using a structured questionnaire designed by the researchers, which captured demographic and clinical variables such as age, gender, blood pressure, smoking history, history of motion sickness, type of surgery, and the presence or absence of PONV. It is important to note that the questionnaire had not undergone prior psychometric validation, which may affect the reliability and external reproducibility of the tool. Future studies should aim to utilize validated instruments to enhance methodological rigor. Data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics were used to summarize patient characteristics and clinical variables. Inferential statistical tests, including the Chi-

square test for categorical variables and independent t-tests for continuous variables, were applied to compare outcomes between the two groups. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The study enrolled 100 patients who underwent surgical procedures under either general anesthesia or subarachnoid block, with both groups comprising 50 participants each. The mean age in the general anesthesia group was 45.3 ± 8.2 years, while the subarachnoid block group had a mean age of 44.7 ± 7.9 years. The age distribution across both groups was similar, with approximately half of the patients in each group falling within the 21–39 and 40–60-year ranges. The gender distribution revealed a predominance of females in the general anesthesia group (66.0%) and males in the subarachnoid block group (60.0%). Variation in the type of surgery was observed between the groups. Among those receiving general anesthesia, 50.0% underwent abdominal surgeries, 24.0% gynecological, 20.0% urologic, and 6.0% orthopedic procedures. In contrast, the subarachnoid block group primarily underwent gynecological (38.0%) and urologic surgeries (30.0%), followed by orthopedic (20.0%) and abdominal surgeries (12.0%). A history of previous anesthesia exposure was reported by 46.0% of patients in the general anesthesia group and 60.0% in the subarachnoid block group. Blood pressure readings varied within and across the groups. In the general anesthesia group, 34.0% had normal readings, while 34.0% were hypotensive and 32.0% hypertensive. Comparatively, in the subarachnoid block group, 32.0% had normal blood pressure, 46.0% low, and 22.0% high. Motion sickness history was notably higher in the general anesthesia group (60.0%) compared to the subarachnoid block group (20.0%), while smoking history was reported by 24.0% and 34.0% of patients in the general and subarachnoid block groups, respectively. The administration of postoperative opioids was more common in the general anesthesia group (76.0%) than in the subarachnoid block group (66.0%).

A significant difference was observed in the incidence of postoperative vomiting. Among patients who received general anesthesia, 10.0% reported no vomiting, 62.0% experienced vomiting 1–2 times, and 28.0% had vomiting three or more times. In contrast, 60.0% of patients in the subarachnoid block group did not experience vomiting, while 30.0% had 1–2 episodes, and only 10.0% experienced vomiting three or more times. Similar patterns were found for postoperative nausea: 60.0% of patients in the subarachnoid block group reported no nausea compared to only 10.0% in the general anesthesia group. Constant nausea was observed in 34.0% of patients under general anesthesia, while only 18.0% of those under subarachnoid block experienced persistent nausea. Statistical analysis using the Chi-square test showed a significant association between the type of anesthesia and the presence of PONV ($p < 0.005$). PONV was present in 90.0% of patients who received general anesthesia, compared to only 40.0% in the subarachnoid block group, clearly indicating a higher incidence among patients administered general anesthesia. Further analysis of patient-related risk factors revealed significant associations with the occurrence of postoperative nausea and vomiting (PONV). Among patients with a history of motion sickness, 100% experienced PONV, suggesting a strong predictive link. Additionally, smoking history and the use of postoperative opioids were both associated with higher PONV incidence. Specifically, 62.1% of smokers developed PONV compared to 37.9% of non-smokers, and 75.8% of those receiving opioids postoperatively reported PONV symptoms. Chi-square tests demonstrated statistically significant associations between all three risk factors—motion sickness, smoking, and opioid administration—and the development of PONV, reinforcing their importance as potential contributors to postoperative discomfort. These findings highlight the need for tailored perioperative care in individuals with these risk profiles to mitigate the risk of PONV.

Table 1: Demographic and Clinical Characteristics of Study Participants

Variable	Group A (GA) (n=50)	Group B (SAB) (n=50)
Age (Mean ± SD)	45.3 ± 8.2	44.7 ± 7.9
21-39	26 (52.0%)	27 (54.0%)
40-60	24 (48.0%)	23 (46%)
Gender		
Male	17 (34.0%)	30 (60.0%)
Female	33 (66.0%)	20 (40.0%)
Type of Surgery		
Abdominal	25 (50.0%)	6 (12.0%)
Orthopedic	3 (6.0%)	10 (20.0%)
Gynecological	12 (24.0%)	19 (38.0%)

Variable	Group A (GA) (n=50)	Group B (SAB) (n=50)
Urologic	10 (20.0%)	15 (30.0%)
Previous Anesthesia		
Yes	23 (46.0%)	30 (60.0%)
Blood Pressure		
Normal	17 (34.0%)	16 (32.0%)
Low	17 (34.0%)	23 (46.0%)
High	16 (32.0%)	11 (22.0%)
Previous anesthesia		
Yes	23(46%)	30 (60.0%)
Incidence of vomiting	5(10%)	
No	31(62%)	30 (60.0%)
1-2 times	14(28%)	15 (30.0%)
3 or more		5(10.0%)
Incidence of nausea		
Never	5(10%)	30 (60.0%)
Varying	27(54%)	11 (22.0%)
Constant	18(34%)	9(18%)
Motion sickness		
Yes	30 (60.0%)	10 (20.0%)
History of smoking		
Yes	12(24%)	17(34%)
Opioids given in post op		
Yes	38(76%)	33(66%)

Table 2: Association Between PONV and Type of Anesthesia (Chi-Square Test)

Type of Anaesthesia	PONV (Present)	PONV (Absent)	Total
General (GA)	45(90%)	5(10%)	50
Subarachnoid block (SAB)	20 (40.0%)	30 (60%)	50
Total	65	35	100

P value=<0. 005

Table 3: Association of Risk Factors with PONV

Risk Factor	PONV Present	PONV Absent	p-value
Motion Sickness	40	0	0
Smoking History	18	11	0.8715
Postoperative Opioids	50	16	0.0035

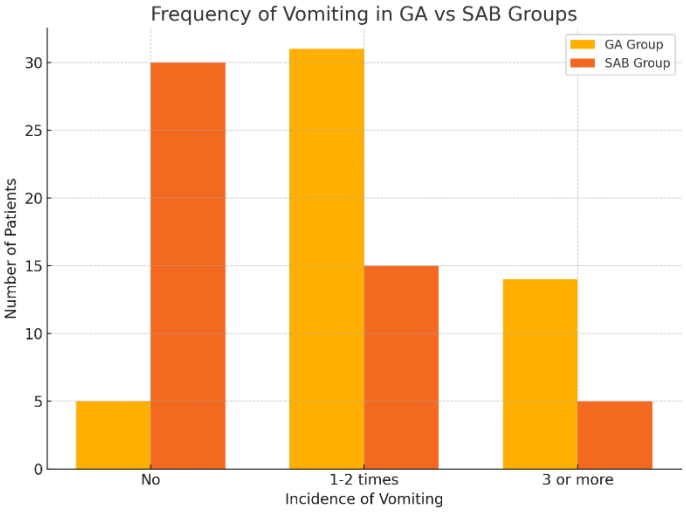

Figure 1 Frequency of Vomiting in GA vs SAB Groups

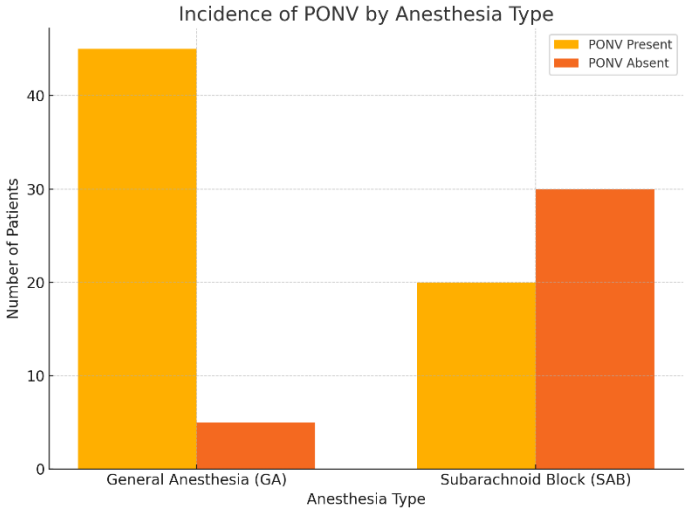

Figure 2 Incidence of PONV by Anesthesia Type

DISCUSSION

The present study highlighted a markedly higher incidence of postoperative nausea and vomiting (PONV) among patients who received general anesthesia compared to those who underwent surgery under subarachnoid block, reinforcing the evidence that anesthesia type significantly influences PONV outcomes. These findings are consistent with previous literature, which has repeatedly demonstrated a greater prevalence of PONV following general anesthesia, largely attributed to the emetogenic effects of volatile anesthetics and opioids, as well as their systemic impact on the central nervous system (13). In contrast, the localized nature of subarachnoid block, which bypasses the systemic administration of these agents, appears to offer a protective effect against the development of PONV. The study also observed that female patients experienced PONV more frequently than males, which aligns with existing research attributing this trend to hormonal fluctuations and gender-based differences in gastrointestinal motility (14). Similarly, a history of motion sickness was shown to have a strong association with increased PONV incidence. This confirms earlier observations that pre-existing vestibular sensitivity may predispose individuals to postoperative nausea, although large-scale studies have noted that many patients without such history can also experience PONV, indicating a multifactorial etiology (15,16). Interestingly, smoking history was inversely associated with PONV occurrence, a pattern also documented in prior research, which suggests that chronic exposure to nicotine may lead to desensitization of central emetogenic pathways and modulation of receptor sensitivity (17). While this paradoxical protective effect has been reported in several studies, it should not be interpreted as a clinical recommendation but rather as a contributing factor in risk stratification. Likewise, patients who received postoperative opioids had higher rates of PONV, reinforcing the well-established emetogenic potential of these medications and supporting the need for opioid-sparing analgesic strategies in high-risk individuals (18). Variation in PONV incidence across surgical types observed in this study also mirrored trends documented in previous literature. Procedures such as gynecological and urological surgeries showed comparatively higher rates of nausea and vomiting, likely due to the extent of tissue manipulation, patient positioning, and duration of anesthesia—all of which are known contributors to PONV (19). These findings underscore the importance of tailoring anesthetic plans and prophylactic antiemetic strategies based on the nature of the surgical procedure. A key strength of this study lies in its comparative design and focused assessment of multiple PONV-related risk factors within a clinical setting that regularly utilizes both general and regional anesthesia. The balanced group sizes and standardized data collection instruments added methodological consistency, although the questionnaire used was not psychometrically validated, which could affect reliability. Furthermore, the purposive sampling technique, while practical for time-bound studies, may introduce selection bias and limit generalizability. The reduced final sample size, a deviation from the initially calculated figure, may also have constrained the study's statistical power to detect subtler associations. Notably, some potentially relevant variables—such as detailed medication profiles, intraoperative events, and patient anxiety levels—were not explored in this study. Including these factors in future research could provide a more comprehensive understanding of PONV pathophysiology. In addition, while associations between PONV and individual risk factors such as motion sickness, smoking, and opioid use were established, multivariate analysis would have allowed for adjustment of potential confounders and a clearer estimation of independent risk contributions.

The findings reaffirm the need for individualized preoperative risk assessment using standardized scoring tools that incorporate patient history, anesthesia type, and surgical procedure. Multimodal PONV prevention strategies, combining pharmacologic and non-pharmacologic measures, remain essential in reducing the burden of this complication (20). Future studies should focus on validating such tools across diverse populations, examining long-term outcomes, and assessing the cost-effectiveness of various prophylactic approaches in routine perioperative care. Postoperative nausea and vomiting (PONV) remain a prevalent and distressing complication, with this study reaffirming the significantly higher risk associated with general anesthesia compared to subarachnoid block. The findings emphasize the importance of individualized anesthetic planning and proactive management of known risk factors such as motion sickness, smoking status, and opioid use. By identifying anesthesia type as a key determinant in PONV occurrence, the study underscores the need for tailored approaches that prioritize both patient comfort and clinical outcomes. These insights contribute meaningfully to enhancing perioperative care, particularly for high-risk populations, and support the adoption of multimodal strategies to effectively reduce the burden of PONV.

CONCLUSION

This study concluded that subarachnoid block is associated with a noticeably lower incidence of postoperative nausea and vomiting compared to general anesthesia, highlighting its practical advantage in surgical settings, especially for patients at elevated risk of PONV. These findings emphasize the value of selecting anesthetic techniques not only based on surgical requirements but also considering patient comfort and recovery outcomes. The study underscores the importance of integrating personalized anesthetic planning with proactive antiemetic strategies to enhance postoperative care and reduce the burden of PONV on both patients and healthcare systems.

Author Contribution

Author	**Contribution**
Meerab Ilyas	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Maidah Mehtab	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Moazzam Farooq	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Shams Zaman	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Namrah Riaz	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Sana Fatima	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Shahzad Mahmood*	Contributed to study concept and Data collection Has given Final Approval of the version to be published

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