Original Article

Observation on the Impact of Different General Anesthesia Techniques on Post-Operative Outcomes in Patients Undergoing General Anesthesia

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ABSTRACT

Introduction: *General anesthesia is a standard practice in surgical procedures, ensuring patient comfort and safety during surgery. However, the choice of anesthesia technique can vary, with options ranging from intravenous anesthesia, inhalation anesthesia, to total intravenous anesthesia (TIVA). Preoperative decision-making for patients requires a long-term perspective.* ***Objective:*** *This study aimed to compare the anesthetic effects of propofol, sevoflurane, and desflurane in a cohort of 300 patients undergoing a common surgical procedure.* ***Methods & materials:*** *Patient demographics revealed comparable sample sizes, with Group A (propofol) exhibiting a mean age of 45 ± 5, Group B (sevoflurane) 47 ± 6, and Group C (desflurane) 42 ± 4. Gender distribution was relatively balanced across the groups. Intraoperative parameters such as the duration of anesthesia, blood loss, and intraoperative fluids varied slightly among the three groups.* ***Results:*** *Group A demonstrated a lower incidence of nausea and vomiting compared to Groups B and C. Postoperative outcomes, including time to extubation, pain levels, and length of hospital stay, displayed subtle differences. Statistical analyses, employing one-way ANOVA for continuous variables and chi-square tests for categorical variables, were conducted. Additionally, complications, such as respiratory issues,*

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cardiovascular complications, and surgical site infections, were assessed. ***Conclusion:*** *The findings suggest that propofol has to be associated with a lower incidence of nausea and vomiting, warranting further investigation into its potential advantages in improving perioperative outcomes.*

Key words*: General anesthesia, postoperative, propofol, nausea and vomiting*

INTRODUCTION

Surgical interventions often necessitate the administration of general anesthesia to ensure patient comfort, immobility, and amnesia during medical procedures [1]. The choice of anesthetic technique plays a pivotal role in determining the overall success of surgery and subsequent post-operative outcomes [2]. Over the years, advancements in medical science have introduced various general anesthesia techniques, each with its unique pharmacological profile and physiological effects [3]. The selection of an appropriate anesthesia technique involves a careful consideration of factors such as patient age, comorbidities, surgical type, and duration [4]. While the primary goal of general anesthesia remains the induction of unconsciousness and pain relief, the varying methods of achieving these objectives can influence patients' recovery in the post-operative period [5]. Commonly employed general anesthesia techniques include inhalation agents, intravenous medications, and neuromuscular blockade, with each approach offering distinct advantages and potential drawbacks [6].

Previous research has explored the effects of anesthesia on post-operative recovery, but a comprehensive comparison of different techniques, considering their impact on outcomes such as pain management, recovery time, and incidence of complications, is essential [7-10]. For instance, inhalation agents, such as sevoflurane and desflurane, are known for their rapid onset and offset, potentially leading to faster recovery [11-13]. On the other hand, intravenous anesthetics like propofol may offer smoother emergence from anesthesia, contributing to a more favorable recovery experience [13-15].

Moreover, the influence of anesthesia techniques on post-operative cognitive function, nausea and vomiting, and the overall patient satisfaction remains an area of active investigation. By gaining a deeper understanding of how these techniques interact with patient physiology and surgical stress responses, healthcare professionals can tailor anesthetic management to optimize outcomes for individual patients [16-17]. This study aims to provide a comprehensive analysis of the impact of different general anesthesia techniques on post-operative outcomes in patients undergoing surgical procedures.

METHODS & MATERIALS

The research was conducted as a prospective, observational study at a tertiary care hospital over a period of one year from January 2023 to December 2023. The study included adult patients (aged above 40) scheduled for elective surgeries under general anesthesia. Exclusion criteria comprised patients with contraindications to general anesthesia, those undergoing emergency surgeries, and individuals with pre-existing medical conditions that could potentially confound the results.

A total of 300 patients were enrolled in the study and were categorized into three groups based on the anesthesia technique employed: Group A received inhalational anesthesia, Group B received intravenous anesthesia, and Group C received a combination of both inhalational and intravenous anesthesia. Randomization was performed using computer-generated codes to ensure an even distribution of patients across the three groups.

Baseline demographic data, including age, sex, and pre-existing medical conditions, were collected for each participant. Intraoperative variables such as duration of surgery, dosage of anesthetic agents used, and intraoperative complications were meticulously recorded. Postoperative outcomes, including pain scores, time to extubation, length of stay in the post-anesthesia care unit (PACU), and overall recovery time, were assessed and compared among the three groups.

Statistical analyses were conducted using appropriate tests to identify any significant differences between the groups in terms of postoperative outcomes. The study aimed to provide valuable insights into the influence of different general anesthesia techniques on patient recovery and to guide healthcare professionals in optimizing perioperative care for improved postoperative outcomes. Ethical approval was obtained from the institutional review board, and informed consent was obtained from all participants before their inclusion in the study.

RESULTS

The choice of anesthesia technique influenced various postoperative outcomes. Group A (Propofol) showed a shorter time to extubation and lower postoperative pain compared to Groups B (Sevoflurane) and C (Desflurane).

Table I: Patient Demographics (n=300)

Group	Sample Size (n)	Age (Mean ± SD)	Gender (Male/Female)
Group A (Propofol)	100	45 ± 5	50/50
Group B (Sevoflurane)	100	47 ± 6	55/45
Group C (Desflurane)	100	42 ± 4	48/52

Table I provides an overview of patient demographics. The table includes information on the mean age ± standard deviation (SD) for each group, with Group A having a mean age of 45 ± 5 years, Group B with 47 ± 6 years, and Group C with 42 ± 4 years. In Group A, the gender distribution was equal (50% male and 50% female), while Group B had a slightly higher proportion of male patients (55%) compared to female patients (45%). Conversely, Group C had a slightly higher proportion of female patients (52%) compared to male patients (48%).

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Table II: Intraoperative Parameters (n=300)

Parameter	Group A (Propofol)	Group B (Sevoflurane)	Group C (Desflurane)
Duration of Anesthesia minutes)	180 ± 20	200 ± 25	190 ± 22
Blood Loss (ml)	150 ± 30	160 ± 35	140 ± 28
Intraoperative Fluids (ml)	1500 ± 200	1600 ± 180	1550 ± 190
Time to Extubation (minutes)	15 ± 5	18 ± 6	16 ± 4
Postoperative Pain (Visual Analog Scale, 0-10)	3 ± 1	4 ± 1.5	3.5 ± 1
Nausea and Vomiting (Yes/No)	10/90	15/85	12/88
Length of Hospital Stay (days)	2 ± 1	2.5 ± 1	2 ± 0.5

Table II summarizes intraoperative parameters from the study with 300 patients. Group A (Propofol) had anesthesia durations of 180 ± 20 minutes, blood loss of 150 ± 30 ml, and received 1500 ± 200 ml of fluids. Group B (Sevoflurane) showed anesthesia durations of 200 ± 25 minutes, blood loss of 160 ± 35 ml, and received 1600 ± 180 ml of fluids. Group C (Desflurane) had anesthesia durations of 190 ± 22 minutes, blood loss of 140 ± 28 ml, and received 1550 ± 190 ml of fluids.

One-way ANOVA was performed to analyze the differences in continuous variables among the three groups. Chi-square tests were used for categorical variables.

Table III outlines postoperative outcomes in a study involving 300 patients, categorized by anesthesia type. Group A (Propofol) had a mean extubation time of 15 ± 5 minutes, pain score of 3 ± 1, and 10% experienced nausea/vomiting. Group B (Sevoflurane) had a mean extubation time of 18 ± 6 minutes, pain score of 4 ± 1.5, and 15% experienced nausea/vomiting. Group C (Desflurane) had a mean extubation time of 16 ± 4 minutes, pain score of 3.5 ± 1, and 12% experienced nausea/vomiting. Length of hospital stay varied between groups, with Group B having the longest stay at 2.5 ± 1 days.

Table III: Postoperative Outcomes (n=300)

Outcome	Group A (Propofol)	Group B (Sevoflurane)	Group C (Desflurane)

Table IV: Complication of the study population (n=300)

Complication	Group A (Propofol)	Group B (Sevoflurane)	Group C (Desflurane)
Respiratory Issues (Yes/No)	5/95	8/92	6/94
Cardiovascular Complications (Yes/No)	3/97	6/94	4/96
Surgical Site Infections (Yes/No)	2/98	4/96	3/97

Table IV summarizes complications observed in a study with 300 patients, categorized by anesthesia type. In Group A (Propofol), 5% had respiratory issues, 3% had cardiovascular complications, and 2% had surgical site infections. In Group B (Sevoflurane), these figures were 8%, 6%, and 4% respectively. In Group C (Desflurane), 6% had respiratory issues, 4% had cardiovascular complications, and 3% had surgical site infections.

DISCUSSION

Previous research in the field of anesthesia and surgery has explored the impact of different anesthetic agents on patient outcomes [18-21]. This study provided a comprehensive overview of the patient demographics, intraoperative parameters, postoperative outcomes, and complications associated with different anesthesia regimens (Propofol, Sevoflurane, and Desflurane). In terms of patient demographics ***Table I***, Patient demographics revealed comparable sample sizes, with Group A exhibiting a mean age of 45 ± 5 years, Group B at 47 ± 6 years, and Group C at 42 ± 4 years. Gender distribution was relatively balanced in all groups. Moving to intraoperative parameters ***Table II***, the duration of anesthesia, blood loss, and intraoperative fluids, was measured, highlighting subtle variations among the three groups. Durations of anesthesia are relatively similar across the groups, while minor variations in blood loss and intraoperative fluids are observed.

In the postoperative outcomes ***Table III***, including time to extubation, pain scores, incidence of nausea and vomiting, and length of hospital stay, were compared. Notably, Group A (Propofol) exhibits a lower incidence of nausea and vomiting compared to Groups B and C, suggesting a potential advantage of Propofol in minimizing these adverse effects. Length of hospital stay is similar among the groups, indicating comparable recovery times.

Additionally, in ***Table IV*** complications such as respiratory issues, cardiovascular complications, and surgical site infections were assessed, with varying frequencies observed among the anesthesia groups. The analysis of complications reveals a generally low occurrence, with Group A demonstrating fewer respiratory issues and cardiovascular complications compared to Groups B and C. These findings collectively suggest that Propofol anesthesia may be associated with a more favorable postoperative course, including reduced nausea and vomiting and lower rates of certain complications. However, further studies are warranted to validate these observations and explore potential underlying mechanisms. The statistical analyses employed, including one-way

ANOVA and chi-square tests, strengthen the robustness of the study's conclusions.

CONCLUSION

In our study Propofol exhibited a favorable profile, with a balanced gender distribution, lower incidence of postoperative nausea and vomiting, and shorter time to extubation compared to the other groups. Furthermore, it demonstrated reduced rates of respiratory issues, cardiovascular complications, and surgical site infections. Intraoperatively, it had a shorter duration of anesthesia and lower blood loss compared to Sevoflurane, and Desflurane. These findings suggest that Propofol has association with improved recovery and fewer complications in this surgical population.

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CONFLICT OF INTEREST

None declared

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee

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