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The Effect of Preoperative Anxiety on Anesthetic Requirements and Postoperative Recovery: A Prospective Cohort Study.

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ABSTRACT

Preoperative anxiety is a common phenomenon among surgical patients, significantly influencing anesthetic requirements and postoperative recovery. Despite its prevalence, the impact of preoperative anxiety on these outcomes remains inadequately explored. To investigate the effect of preoperative anxiety on anesthetic requirements and postoperative recovery in patients undergoing elective surgeries. This prospective cohort study included 40 patients aged 18–65 years undergoing elective surgeries under general anesthesia. Preoperative anxiety levels were assessed using the State-Trait Anxiety Inventory (STAI) and categorized into high- and low-anxiety groups. Intraoperative anesthetic doses, including induction (propofol), maintenance (isoflurane), and opioid (fentanyl) requirements, were recorded. Postoperative recovery outcomes, including PACU stay duration, pain scores, and analgesic requirements, were analyzed. Patients in the high-anxiety group demonstrated significantly higher anesthetic requirements for induction ($p<0.01$), maintenance ($p<0.01$), and opioids ($p<0.01$). Postoperative outcomes were poorer in the high-anxiety group, with prolonged PACU stay ($p<0.01$), higher pain scores ($p<0.01$), and increased analgesic needs ($p<0.01$). Preoperative anxiety is associated with increased anesthetic requirements and delayed recovery. Targeted anxiety management strategies could enhance perioperative care and improve outcomes for surgical patients.

Keywords: Preoperative anxiety, anesthetic requirements, postoperative recovery

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INTRODUCTION

Preoperative anxiety is a common psychological response experienced by patients awaiting surgical procedures. It stems from fear of the unknown, potential complications, and concerns about pain and recovery [1]. This anxiety not only affects the psychological well-being of patients but also has significant implications for anesthetic management and postoperative outcomes [2-4]. Studies suggest that heightened anxiety levels may alter physiological parameters, including heart rate and blood pressure, which can influence anesthetic drug requirements and perioperative stability. Furthermore, preoperative anxiety has been linked to delayed recovery, increased postoperative pain perception, and longer hospital stays [5].

Understanding the relationship between preoperative anxiety, anesthetic requirements, and recovery outcomes is essential for optimizing patient care. Addressing anxiety through preoperative interventions could potentially reduce anesthetic dosages, improve patient comfort, and enhance recovery trajectories. Despite growing recognition of this relationship, there remains a paucity of prospective studies examining these interactions in detail [6, 7].

This study aims to investigate the effect of preoperative anxiety on anesthetic requirements and postoperative recovery outcomes in patients undergoing elective surgery. By identifying correlations between anxiety levels, intraoperative drug use, and recovery profiles, this research seeks to inform strategies to improve perioperative care and patient satisfaction, ultimately contributing to better surgical outcomes.

STUDY METHODOLOGY

This prospective cohort study was conducted at a tertiary care hospital to evaluate the effect of preoperative anxiety on anesthetic requirements and postoperative recovery. Ethical approval was obtained from the institutional ethics committee, and informed consent was secured from all participants. Patients aged 18–65 years undergoing elective surgeries under general anesthesia were included. Exclusion criteria comprised those with a history of psychiatric disorders, chronic pain conditions, or prior surgeries within the last six months, as well as those on long-term anxiolytics or sedatives. A total of 40 patients were enrolled for the study based on eligibility criteria.

Preoperative anxiety levels were assessed one day before surgery using the State-Trait Anxiety Inventory (STAI). Patients were categorized into two groups based on their anxiety scores: high-anxiety and low-anxiety groups. Baseline demographic and clinical data, including age, gender, body mass index (BMI), and comorbidities, were recorded. All participants underwent standardized anesthetic protocols, including premedication, induction, maintenance, and reversal agents, tailored to the surgical procedure.

Intraoperative anesthetic requirements, including doses of induction agents (propofol) and maintenance drugs (volatile anesthetics and opioids), were meticulously documented. Hemodynamic parameters such as heart rate and blood pressure were monitored continuously to evaluate physiological responses. Postoperative recovery was assessed in the post-anesthesia care unit (PACU) using a standardized recovery score, duration of PACU stay, pain scores using a visual analog scale (VAS), and the requirement for postoperative analgesics.

Data were analyzed using statistical software. Descriptive statistics summarized demographic and clinical characteristics. Comparative analysis between the high- and low-anxiety groups was performed using independent t-tests and chi-square tests. A p-value of <0.05 was considered statistically significant. The findings aimed to explore the relationship between preoperative anxiety, anesthetic use, and postoperative recovery outcomes, providing insights for better perioperative care.

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RESULTS

Table 1: Demographic and Clinical Characteristics of Study Participants

Variable	High-Anxiety Group (n=20)	Low-Anxiety Group (n=20)	p-value
Age (years, mean ± SD)	40.2 ± 10.5	38.6 ± 9.8	0.52
Gender (Male: Female)	8:12	10:10	0.58
BMI (kg/m^2, mean ± SD)	25.8 ± 3.1	24.9 ± 2.8	0.42
ASA Grade I/II (n)	12/8	14/6	0.43

Table 2: Preoperative Anxiety Levels (STAI Scores)

Anxiety Level (STAI Score)	High-Anxiety Group (n=20)	Low-Anxiety Group (n=20)	p-value
Mean ± SD	45.3 ± 5.8	28.7 ± 4.6	<0.001
Range	40–55	22–36	-

Table 3: Intraoperative Anesthetic Requirements

Variable	High-Anxiety Group (n=20)	Low-Anxiety Group (n=20)	p-value
Induction Dose (Propofol, mg)	150.8 ± 20.3	130.5 ± 15.8	<0.01
Maintenance Dose (Isoflurane	1.4 ± 0.2	1.2 ± 0.2	<0.01
Opioid Dose (Fentanyl, µg)	110.5 ± 10.5	95.2 ± 12.1	<0.01

Table 4: Postoperative Recovery Outcomes

Variable	High-Anxiety Group (n=20)	Low-Anxiety Group (n=20)	p-value
PACU Stay (minutes, mean ± SD)	65.2 ± 15.3	50.1 ± 10.2	<0.01
Pain Score (VAS, mean ± SD)	6.2 ± 1.3	4.8 ± 1.0	<0.01
Analgesic Requirement (mg)	80.5 ± 15.2	60.3 ± 10.8	<0.01

DISCUSSION

This study aimed to explore the effect of preoperative anxiety on anesthetic requirements and postoperative recovery outcomes in patients undergoing elective surgery. The findings highlight a significant relationship between elevated preoperative anxiety levels, increased anesthetic doses, and delayed postoperative recovery. These results emphasize the importance of addressing psychological factors to optimize perioperative care [6, 7].

Preoperative Anxiety Levels and Demographics

The study revealed a clear demarcation in preoperative anxiety levels between the high-anxiety and low-anxiety groups, as evidenced by the significantly higher State-Trait Anxiety Inventory (STAI) scores in the high-anxiety group (45.3 ± 5.8 vs. 28.7 ± 4.6, $p<0.001$). This distinction indicates that certain patients are predisposed to higher levels of preoperative anxiety, which could stem from individual psychological traits, fear of surgery, or lack of preoperative counseling. Interestingly, there were no statistically significant differences in demographic factors such as age, gender, BMI, or ASA grade between the two groups, suggesting that preoperative anxiety may occur independently of these variables.

Impact of Preoperative Anxiety on Intraoperative Anesthetic Requirements

The study showed that patients in the high-anxiety group required significantly higher doses of anesthetic agents during surgery. For instance, the induction dose of propofol was higher in the high-anxiety group compared to the low-anxiety group (150.8 ± 20.3 mg vs. 130.5 ± 15.8 mg, $p<0.01$). Similarly, maintenance doses of isoflurane (1.4 ± 0.2 vs. 1.2 ± 0.2, $p<0.01$) and opioids like fentanyl (110.5 ± 10.5 µg vs. 95.2 ± 12.1 µg, $p<0.01$) were also increased in the high-anxiety group.

These findings align with existing literature that links heightened anxiety to increased physiological stress responses, such as elevated heart rate, blood pressure, and cortisol levels, which necessitate higher doses of anesthetic agents to achieve the desired level of sedation and analgesia. This increased requirement may pose challenges for anesthesiologists in maintaining hemodynamic stability during surgery and highlights the need for preoperative strategies to mitigate anxiety.

Postoperative Recovery Outcomes

Postoperative recovery outcomes also differed significantly between the high-anxiety and low-anxiety groups. Patients in the high-anxiety group had a longer stay in the post-anesthesia care unit (PACU) (65.2 ± 15.3 minutes vs. 50.1 ± 10.2 minutes, $p<0.01$), higher pain scores (6.2 ± 1.3 vs. 4.8 ± 1.0, $p<0.01$), and increased postoperative analgesic requirements (80.5 ± 15.2 mg vs. 60.3 ± 10.8 mg, $p<0.01$). These findings suggest that preoperative anxiety extends its impact beyond the intraoperative period, adversely affecting recovery.

The longer PACU stay may be attributed to delayed emergence from anesthesia and a heightened stress response, which could prolong the time required for physiological parameters to stabilize. Similarly, higher pain scores in the high-anxiety group could reflect an amplified perception of pain, as anxiety is known to lower pain thresholds and increase pain sensitivity. The increased need for postoperative analgesics further supports this observation and indicates a potentially higher risk of opioid-related adverse effects in anxious patients [8-10].

The results of this study underscore the importance of addressing preoperative anxiety as part of routine perioperative care. Effective interventions, such as preoperative counseling, relaxation techniques, or pharmacological anxiolysis, could potentially reduce anxiety levels, leading to decreased anesthetic requirements and improved recovery outcomes. Identifying high-anxiety patients through screening tools like the STAI can help clinicians tailor interventions to individual needs.

Moreover, these findings highlight the need for interdisciplinary collaboration between anesthesiologists, surgeons, and psychologists to develop comprehensive perioperative care plans. Incorporating psychological support and education into preoperative preparation may help alleviate anxiety and improve patient satisfaction.

While this study provides valuable insights, it has several limitations. First, the sample size was relatively small (n=40), which may limit the generalizability of the findings. A larger sample size would enhance the statistical power and provide a more robust basis for subgroup analyses. Second, the study focused solely on elective surgeries under general anesthesia; the findings may not be applicable to emergency surgeries or other types of anesthesia. Third, the use of a single anxiety assessment tool (STAI) may not capture the full spectrum of preoperative anxiety, and additional psychological assessments could provide a more comprehensive understanding.

Building on the findings of this study, future research could explore the long-term effects of preoperative anxiety on postoperative recovery, including the risk of chronic pain and functional outcomes. Additionally, randomized controlled trials evaluating the efficacy of different anxiety-reducing interventions in improving perioperative outcomes would provide stronger evidence for clinical practice. Investigating the role of patient education, mindfulness-based stress reduction, and cognitive-behavioral therapy in reducing preoperative anxiety could also be valuable.

CONCLUSION

In conclusion, this study demonstrates that preoperative anxiety significantly affects anesthetic requirements and postoperative recovery. Patients with high anxiety require higher doses of anesthetic agents and experience delayed recovery, higher pain levels, and greater postoperative analgesic needs. These findings highlight the critical role of preoperative anxiety management in optimizing perioperative care. Addressing anxiety through targeted interventions could improve patient outcomes, reduce healthcare costs, and enhance overall surgical experiences.

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