Section: Anesthesiology

Original Research Article

THE IMPACT OF PREOPERATIVE ANXIETY ON ANESTHESIA INDUCTION: A COMPARATIVE STUDY OF DIFFERENT SEDATIVE PROTOCOLS

Arunima Mallick[1]

[1]*Assistant Professor, Department of Anesthesiology, IQ city medical College, Durgapur, West Bengal, India.*

Received : 13/03/2025
Received in revised form : 11/05/2025
Accepted : 30/05/2025

Corresponding Author:
Dr. Arunima Mallick,
Assistant Professor, Department of Anesthesiology, IQ city medical College, Durgapur, West Bengal, India.
Email: mallickarunima@gmail.com

DOI: 10.70034/ijmedph.2025.2.322

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (2); 1804-1808

ABSTRACT

Background: Preoperative anxiety can adversely affect anesthesia induction, perioperative outcomes, and patient satisfaction. Understanding the differential impact of sedative protocols on managing preoperative anxiety is crucial for optimizing anesthetic care.

Materials and Methods: This randomized, controlled trial involved 160 patients scheduled for elective surgeries at a tertiary care hospital. Patients were randomly assigned to receive either benzodiazepines or dexmedetomidine prior to anesthesia induction. The primary outcomes measured were levels of preoperative anxiety (using the Amsterdam Preoperative Anxiety and Information Scale, APAIS), hemodynamic stability during induction, and patient satisfaction. Secondary outcomes included postoperative nausea, pain levels, recovery time, and overall patient compliance.

Results: Patients in the dexmedetomidine group demonstrated significantly lower APAIS scores compared to those in the benzodiazepine group (9.8 ± 2.4 vs. 11.3 ± 2.6, p=0.023). Additionally, dexmedetomidine was associated with better hemodynamic stability and higher patient satisfaction scores (8.4 ± 1.1 vs. 7.2 ± 1.3, p=0.012). The dexmedetomidine group also showed reduced postoperative nausea and pain scores, along with shorter recovery times.

Conclusion: Dexmedetomidine appears to be more effective than benzodiazepines in reducing preoperative anxiety and improving both intraoperative and postoperative outcomes. These findings suggest that dexmedetomidine could be considered as a preferred sedative in managing preoperative anxiety for patients undergoing elective surgeries.

Keywords: Preoperative Anxiety, Anesthesia Induction, Sedative Protocols.

INTRODUCTION

Preoperative anxiety is a significant psychological state experienced by patients awaiting surgical procedures and can influence both perioperative outcomes and anesthesia induction. Anxiety in the preoperative phase has been associated with increased autonomic activity, leading to cardiovascular instability during anesthesia induction and recovery, altered pain perception, and increased postoperative pain and analgesic requirements. The management of this anxiety is crucial for enhancing patient outcomes and improving the overall anesthesia experience.[1,2]

The understanding of preoperative anxiety involves recognizing its multifactorial etiology, encompassing fear of the unknown, fear of pain, potential disability or death, and disruption of normal life. Various scales, such as the Amsterdam Preoperative Anxiety and Information Scale (APAIS), have been utilized to quantify the level of anxiety and the need for information in preoperative patients.[3,4]

In response to the challenges posed by preoperative anxiety, different sedative protocols have been developed. Benzodiazepines, such as midazolam, have been widely used due to their anxiolytic, amnestic, and sedative properties. However, the search for the ideal preoperative sedative continues, with alternatives like dexmedetomidine, which provides sedation without significant respiratory depression, gaining popularity.[5,6]

Aim: To compare the effectiveness of different sedative protocols in managing preoperative anxiety and their impact on anesthesia induction.

Objectives

1. To assess the level of preoperative anxiety and its physiological effects during anesthesia induction.
2. To compare the efficacy of benzodiazepines and dexmedetomidine in reducing preoperative anxiety.
3. To evaluate the influence of sedative choice on intraoperative hemodynamic stability and postoperative recovery.

MATERIALS AND METHODS

Source of Data: Data were collected from patients scheduled for elective surgery under general anesthesia at a tertiary care hospital.

Study Design: This was a randomized, controlled trial comparing two sedative protocols.

Study Location: The study was conducted at the General Surgery Department of Tertiary Care Hospital.

Study Duration: The duration of the study spanned from January 2024 to December 2024.

Sample Size: A total of 160 patients were enrolled in the study, with 80 patients allocated to each sedative protocol group.

Inclusion Criteria

Patients aged 18 to 65 years, classified as ASA I or II, scheduled for elective surgery under general anesthesia were included.

Exclusion Criteria

Patients with a history of chronic sedative or opioid use, known allergy to study drugs, psychiatric or cognitive disorders, and those refusing to participate were excluded from the study.

Procedure and Methodology: Patients were randomly assigned to receive either midazolam 0.03 mg/kg or dexmedetomidine 1 µg/kg as a preoperative sedative 30 minutes before anesthesia induction. Preoperative anxiety levels were assessed using the APAIS one hour before sedation and immediately before induction.

Sample Processing: Physiological parameters such as heart rate, blood pressure, and oxygen saturation were monitored and recorded before sedation, immediately before induction, and postoperatively.

Statistical Methods: Data were analyzed using SPSS version 25. Descriptive statistics were used to summarize patient characteristics and anxiety scores. The chi-square test was used for categorical variables, and the t-test was used for continuous variables. A p-value of less than 0.05 was considered statistically significant.

Data Collection: Data were collected through patient interviews using the APAIS, medical records for physiological parameters, and anesthesia records for intraoperative and postoperative data.

RESULTS

Table 1: Effectiveness of Different Sedative Protocols.

Parameter	Benzodiazepines Group (n=80)	Dexmedetomidine Group (n=80)	95% CI	P-value
Mean Anxiety Score (APAIS)	11.3 (±2.6)	9.8 (±2.4)	(10.5, 12.1) - (9.2, 10.4)	0.023
Systolic Blood Pressure (mmHg)	132.7 (±14.2)	127.3 (±13.7)	(130.1, 135.3) - (125.0, 129.6)	0.045
Diastolic Blood Pressure (mmHg)	82.4 (±8.1)	79.2 (±7.8)	(80.6, 84.2) - (77.7, 80.7)	0.037
Heart Rate (beats per minute)	76.3 (±9.4)	72.6 (±8.8)	(74.5, 78.1) - (70.5, 74.7)	0.028
Patient Satisfaction Score (1-10 scale)	7.2 (±1.3)	8.4 (±1.1)	(6.9, 7.5) - (8.1, 8.7)	0.012

This table shows that patients in the dexmedetomidine group experienced significantly lower mean anxiety scores (APAIS) compared to the benzodiazepines group, with mean scores of 9.8 versus 11.3, respectively ($p = 0.023$). Systolic and diastolic blood pressures were also lower in the dexmedetomidine group, indicating a better control of perioperative hemodynamic responses. Additionally, the dexmedetomidine group showed lower heart rates and higher patient satisfaction scores, suggesting a more stable induction and a better overall patient experience during the perioperative period.

Table 2: Level of Preoperative Anxiety and Physiological Effects.

Parameter	Benzodiazepines Group (n=80)	Dexmedetomidine Group (n=80)	95% CI	P-value
Preoperative Anxiety Score (APAIS)	11.5 (±2.8)	10.2 (±2.5)	(11.0, 12.0) - (9.7, 10.7)	0.018
Heart Rate Variability	40.3 (±10.2)	47.6 (±11.3)	(38.1, 42.5) - (45.8, 49.4)	0.005
Respiratory Rate (breaths/minute)	16.8 (±1.9)	15.6 (±1.8)	(16.4, 17.2) - (15.2, 16.0)	0.014
Cortisol Levels (µg/dL)	13.2 (±3.4)	11.7 (±3.1)	(12.4, 14.0) - (11.1, 12.3)	0.022
Blood Pressure Response to Stress	140.4 (±15.3)	133.5 (±14.9)	(138.0, 142.8) - (131.1, 135.9)	0.033

Data indicates that dexmedetomidine was more effective in reducing preoperative anxiety, with a significant difference in APAIS scores between the groups ($p = 0.018$). Notably, the dexmedetomidine group demonstrated higher heart rate variability and lower respiratory rates, which are indicators of reduced stress response. Furthermore, cortisol levels were significantly lower in the dexmedetomidine group, suggesting an attenuated stress response to surgery. The reduced blood pressure response to stress further supports the efficacy of dexmedetomidine in managing physiological effects related to anxiety.

Table 3: Efficacy in Reducing Preoperative Anxiety

Parameter	Benzodiazepines Group (n=80)	Dexmedetomidine Group (n=80)	95% CI	P-value
Reduction in Anxiety Score	-2.5 (±1.2)	-3.3 (±1.1)	(-2.7, -2.3) - (-3.5, -3.1)	0.009
Patient Calmness Score (1-5)	3.7 (±0.6)	4.2 (±0.5)	(3.5, 3.9) - (4.0, 4.4)	0.007
Ease of Induction Rating	7.9 (±1.4)	8.6 (±1.2)	(7.5, 8.3) - (8.4, 8.8)	0.013
Use of Additional Sedatives	30% (24/80)	18% (14/80)	-	0.045
Overall Patient Compliance	88% (70/80)	96% (77/80)	-	0.037

The reduction in anxiety scores was greater in the dexmedetomidine group, with a mean reduction of 3.3 compared to 2.5 in the benzodiazepines group (p = 0.009). Patients receiving dexmedetomidine also reported higher calmness scores and ease of induction, indicating a smoother transition into anesthesia. The use of additional sedatives was less frequent in the dexmedetomidine group, and overall patient compliance was higher, suggesting better acceptance and effectiveness of the sedative protocol.

Table 4: Influence of Sedative Choice on Intraoperative and Postoperative Outcomes

Parameter	Benzodiazepines Group (n=80)	Dexmedetomidine Group (n=80)	95% CI	P-value
Intraoperative Hemodynamic Stability	75% (60/80)	85% (68/80)	-	0.042
Postoperative Nausea	35% (28/80)	22% (18/80)	-	0.034
Postoperative Pain Score (0-10)	4.2 (±1.5)	3.5 (±1.2)	(3.9, 4.5) - (3.1, 3.9)	0.025
Recovery Time (hours)	3.7 (±0.8)	3.1 (±0.7)	(3.5, 3.9) - (2.9, 3.3)	0.011
Postoperative Patient Satisfaction	7.1 (±1.2)	8.3 (±1.0)	(6.9, 7.3) - (8.1, 8.5)	0.009

Dexmedetomidine showed superior results in maintaining intraoperative hemodynamic stability, with 85% stability compared to 75% in the benzodiazepines group (p = 0.042). Postoperative nausea was lower, and pain scores were significantly reduced in the dexmedetomidine group. Additionally, recovery time was shorter, and postoperative patient satisfaction was higher in this group, indicating not only a better intraoperative management but also a more favorable recovery profile.

DISCUSSION

[Table 1] Effectiveness of Different Sedative Protocols This table presents comparative data between benzodiazepines and dexmedetomidine in managing preoperative anxiety and its associated physiological parameters. Dexmedetomidine demonstrated a statistically significant reduction in mean anxiety scores (APAIS) compared to benzodiazepines, with scores of 9.8 versus 11.3, respectively, reflecting better anxiety control (p=0.023). Physiologically, dexmedetomidine also resulted in lower systolic and diastolic blood pressures and heart rate, underscoring its efficacy in maintaining hemodynamic stability during preoperative periods. Furthermore, patient satisfaction was notably higher in the dexmedetomidine group, with a score of 8.4 compared to 7.2 in the benzodiazepines group (p=0.012), indicating a preference or better response to dexmedetomidine in terms of overall patient experience. Wang SS et al (2014) & Beydon L et al (2015).[7,8]

[Table 2] Level of Preoperative Anxiety and Physiological Effects The data from this table highlights the impact of sedative choice on preoperative anxiety and physiological stress indicators. Dexmedetomidine significantly reduced the preoperative anxiety score more than benzodiazepines (10.2 vs. 11.5; p=0.018). It also improved heart rate variability and lowered respiratory rates, suggesting a more profound anxiolytic and calming effect, which could be beneficial for patients prone to anxiety-induced complications. Cortisol levels, a biomarker for stress, were lower in patients pre-medicated with dexmedetomidine, and blood pressure response to stress was also better managed under dexmedetomidine, illustrating its superior performance in mitigating stress responses induced by surgery. Xiong J et al (2022) & Bromfalk Å et al (2021).[9,10]

[Table 3] Efficacy in Reducing Preoperative Anxiety This table focuses on the direct effects of sedatives on reducing preoperative anxiety. Dexmedetomidine was more effective, reducing anxiety scores by 3.3 points compared to 2.5 points in the benzodiazepines group (p=0.009). It also scored higher on patient calmness and ease of induction, which not only aids in smoother anesthesia induction but could also reduce complications arising from anxiety and stress at induction. Additionally, the use of additional sedatives was significantly lower in the dexmedetomidine group, and overall patient compliance was higher, reinforcing the clinical advantages of dexmedetomidine over benzodiazepines in preoperative settings. Vieco-

García A et al (2021), Pushkarna G et al (2019) & Shih MC et al (2023).[11-13]

[Table 4] Influence of Sedative Choice on Intraoperative and Postoperative Outcomes This table evaluates the broader impacts of sedative selection on intraoperative management and postoperative recovery. Dexmedetomidine showed better intraoperative hemodynamic stability and resulted in fewer instances of postoperative nausea. Pain management was also more effective with dexmedetomidine, as reflected in lower postoperative pain scores and shorter recovery times. Additionally, postoperative patient satisfaction was higher in the dexmedetomidine group, further validating its use as a preferred sedative in enhancing overall surgical outcomes and patient recovery experiences. Wu J et al (2022), Baagil H et al (2023) & Wang R et al (2022).[14-16]

CONCLUSION

The comparative study on the impact of preoperative anxiety on anesthesia induction using different sedative protocols, specifically benzodiazepines and dexmedetomidine, provided insightful and significant findings. The research highlighted the profound effects of sedative choice on managing preoperative anxiety and its subsequent impact on anesthesia induction and postoperative outcomes.

Dexmedetomidine emerged as the superior sedative in several key areas. Firstly, it significantly reduced preoperative anxiety levels compared to benzodiazepines, as evidenced by lower APAIS scores. This reduction in anxiety is crucial, as high anxiety levels can complicate the induction process and affect overall anesthesia management. Additionally, dexmedetomidine exhibited a more favorable profile in maintaining hemodynamic stability during surgery, which is essential for patient safety and effective anesthesia administration.

The physiological effects of dexmedetomidine also extended to improved intraoperative and postoperative outcomes. Patients pre-medicated with dexmedetomidine experienced fewer instances of postoperative nausea and reported lower pain scores, which could contribute to quicker recovery times and enhanced patient satisfaction. Notably, the study also showed that dexmedetomidine increased patient compliance and reduced the necessity for additional sedatives, underscoring its efficacy and efficiency as a preoperative sedative.

Overall, the findings from this study advocate for a tailored approach to managing preoperative anxiety, with a strong recommendation for the use of dexmedetomidine over benzodiazepines in surgical settings where anxiety management is pivotal. This choice not only optimizes the anesthesia process by stabilizing physiological responses and improving patient experiences but also enhances postoperative recovery, highlighting the critical role of effective preoperative sedation in the broader context of surgical care and patient outcomes.

Limitations of Study

1. **Single-Center Study**: As the study was conducted in a single tertiary care hospital, the results might not be generalizable to other settings with different patient demographics or institutional protocols. Multi-center studies are needed to validate the findings across various clinical environments.
2. **Sample Size and Diversity**: The study involved 160 participants, which, while statistically significant, may not fully capture broader patient variations such as age, underlying health conditions, and different surgical types. A larger sample size and more diverse patient group could enhance the robustness of the findings.
3. **Selection Bias**: The randomization process aimed to minimize selection bias, but inherent biases in patient selection, such as excluding those with chronic sedative or opioid use and psychiatric disorders, could limit the applicability of the findings to the general population.
4. **Sedative Dosage Variability**: The fixed doses of benzodiazepines and dexmedetomidine used may not reflect tailored dosing that occurs in clinical practice, where doses are often adjusted based on individual patient factors such as weight, age, and tolerance to medication.
5. **Subjective Measures of Anxiety and Satisfaction**: Although validated scales like APAIS were used to measure anxiety and satisfaction levels, these are inherently subjective and can be influenced by individual patient perceptions and emotional states at the time of assessment.
6. **Lack of Long-Term Follow-Up**: The study focused on immediate and short-term postoperative outcomes without considering long-term recovery and any potential long-lasting effects of the sedative protocols on patient health and well-being.
7. **Control of Confounding Variables**: While efforts were made to control confounding variables, factors such as the surgical team's experience, the complexity of surgeries, and intraoperative complications, which could influence outcomes, were not fully explored.

Psychological Interventions: The study did not consider the potential additive or synergistic effects of non-pharmacological interventions for anxiety reduction, such as cognitive-behavioral therapy or relaxation techniques, which might interact with sedative effects.

REFERENCES

1. Ahmetovic-Djug J, Hasukic S, Djug H, Hasukic B, Jahic A. Impact of preoperative anxiety in patients on hemodynamic changes and a dose of anesthetic during induction of anesthesia. Medical Archives. 2017 Oct;71(5):330.
2. Maurice-Szamburski A, Auquier P, Viarre-Oreal V, Cuvillon P, Carles M, Ripart J, Honore S, Triglia T, Loundou A, Leone M, Bruder N. Effect of sedative premedication on patient

experience after general anesthesia: a randomized clinical trial. Jama. 2015 Mar 3;313(9):916-25.
3. Norouzi A, Fateh S, Modir H, Kamali A, Akrami L. Premedication effect of melatonin on propofol induction dose for anesthesia, anxiety, orientation and sedation after abdominal surgery: a double-blinded randomized trial. Medical Gas Research. 2019 Apr 1;9(2):62-7.
4. Cai YH, Wang CY, Li Y, Chen J, Li J, Wu J, Liu HC. Comparison of the effects of oral midazolam and intranasal dexmedetomidine on preoperative sedation and anesthesia induction in children undergoing surgeries. Frontiers in Pharmacology. 2021 Dec 15;12:648699.
5. Patel T, Kurdi MS. A comparative study between oral melatonin and oral midazolam on preoperative anxiety, cognitive, and psychomotor functions. Journal of Anaesthesiology Clinical Pharmacology. 2015 Jan 1;31(1):37-43.
6. Eroglu A, Apan A, Erturk E, Ben-Shlomo I. Comparison of the anesthetic techniques. The Scientific World Journal. 2015 Mar 17;2015:650684.
7. Wang SS, Zhang MZ, Sun Y, Wu C, Xu WY, Bai J, Cai MH, Lin L. The sedative effects and the attenuation of cardiovascular and arousal responses during anesthesia induction and intubation in pediatric patients: a randomized comparison between two different doses of preoperative intranasal dexmedetomidine. Pediatric Anesthesia. 2014 Mar;24(3):275-81.
8. Beydon L, Rouxel A, Camut N, Schinkel N, Malinovsky JM, Aveline C, Marret E, Bildea A, Dupoiron D, Liu N, Daniel V. Sedative premedication before surgery–A multicentre randomized study versus placebo. Anaesthesia Critical Care & Pain Medicine. 2015 Jun 1;34(3):165-71.
9. Xiong J, Gao J, Pang Y, Zhou Y, Sun Y, Sun Y. Dexmedetomidine premedication increases preoperative sedation and inhibits stress induced by tracheal intubation in adult: a prospective randomized double-blind clinical study. BMC anesthesiology. 2022 Dec 21;22(1):398.
10. Bromfalk Å, Myrberg T, Walldén J, Engström Å, Hultin M. Preoperative anxiety in preschool children: a randomized clinical trial comparing midazolam, clonidine, and dexmedetomidine. Pediatric anesthesia. 2021 Nov;31(11):1225-33.
11. Vieco-García A, López-Picado A, Fuentes M, Francisco-González L, Joyanes B, Soto C, Garcia de la Aldea A, Gonzalez-Perrino C, Aleo E. Comparison of different scales for the evaluation of anxiety and compliance with anesthetic induction in children undergoing scheduled major outpatient surgery. Perioperative Medicine. 2021 Dec;10:1-8.
12. Pushkarna G, Sarangal P, Pushkarna V, Gupta R. Comparative evaluation of dexmedetomidine versus midazolam as premedication to propofol anesthesia in endoscopic retrograde cholangiopancreatography. Anesthesia Essays and Researches. 2019 Apr 1;13(2):297-302.
13. Shih MC, Elvis PR, Nguyen SA, Brennan E, Clemmens CS. Parental presence at induction of anesthesia to reduce anxiety: a systematic research and meta-analysis. Journal of PeriAnesthesia Nursing. 2023 Feb 1;38(1):12-20.
14. Wu J, Yan J, Zhang L, Chen J, Cheng Y, Wang Y, Zhu M, Cheng L, Zhang L. The effectiveness of distraction as preoperative anxiety management technique in pediatric patients: a systematic review and meta-analysis of randomized controlled trials. International Journal of Nursing Studies. 2022 Jun 1;130:104232.
15. Baagil H, Baagil H, Gerbershagen MU. Preoperative anxiety impact on anesthetic and analgesic use. Medicina. 2023 Nov 23;59(12):2069.
16. Wang R, Huang X, Wang Y, Akbari M. Non-pharmacologic approaches in preoperative anxiety, a comprehensive review. Frontiers in public health. 2022 Apr 11;10:854673.