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Comparison of the Effects of Ketamine and Dexmedetomidine on the Incidence of Adverse Events (Nausea and Vomiting, Shivering, Hypotension, and Bradycardia) Following Traumatic Nasal Surgeries

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ABSTRACT

Introduction: Evaluating the comparative effects of ketamine and dexmedetomidine on adverse events following traumatic nasal surgeries is clinically significant. Clarifying their roles in reducing postoperative nausea, vomiting, shivering, hypotension, and bradycardia supports evidence-based anesthetic selection. This research enhances perioperative care by informing tailored anesthetic strategies, ultimately promoting patient safety, improving postoperative recovery, and optimizing outcomes in trauma patients undergoing nasal surgery.

Material and methods: This prospective, randomized, double-blind clinical trial will compare ketamine and dexmedetomidine regarding adverse event incidence in adults undergoing traumatic nasal surgery. Consecutive eligible patients will be randomized and both participants and clinical staff will be blinded. Data on postoperative complications will be systematically collected and statistically analyzed. The study is ethically approved and complies with the Declaration of Helsinki, ensuring rigorous methodology, patient safety, and reliable, generalizable results for evidence-based anesthetic management.

Results: The comparative analysis of ketamine and dexmedetomidine in patients undergoing traumatic nasal surgery revealed no significant differences in the incidence of postoperative adverse events, including nausea, vomiting, shivering, hypotension, and bradycardia requiring treatment. Both anesthetic agents demonstrated similar safety profiles, with low rates of hemodynamic complications and comparable risks for common postoperative events, supporting their use as equally viable options in this clinical context.

Conclusion: This study demonstrates that ketamine and dexmedetomidine provide comparable safety profiles for patients undergoing traumatic nasal surgery, with no significant difference in the incidence of nausea, vomiting, shivering, hypotension, or bradycardia requiring intervention.

Introduction

Nasal trauma is among the most prevalent injuries managed by otolaryngologists, stemming from various causes such as interpersonal violence, sports activities, motor vehicle accidents, and falls. While the majority of nasal fractures are not life-threatening, they often necessitate surgical intervention to restore function and aesthetics and to prevent long-term complications.

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Surgical management of traumatic nasal injuries, including closed and open reduction or more complex reconstructive procedures, often requires anesthesia tailored to the patient's medical status and anticipated perioperative challenges.

Despite advances in surgical and anesthetic techniques, the occurrence of perioperative and postoperative complications such as nausea and vomiting, shivering, hypotension, and bradycardia remains a significant concern. These adverse events can negatively affect patient outcomes, prolong hospital stays, and increase the risk of morbidity, particularly in trauma patients who may have concurrent injuries or comorbidities (1).

The selection of an appropriate anesthetic regimen plays a pivotal role in minimizing these complications. Among the pharmacological agents utilized in perioperative care, ketamine and dexmedetomidine have garnered considerable attention for their distinctive pharmacodynamics properties and their potential to influence the incidence and severity of adverse events. Ketamine, a phencyclidine derivative first introduced in the 1960s, is valued for its unique mechanism of action as a dissociative anesthetic, antagonizing N-Methyl-D-aspartate (NMDA) receptors. It provides potent analgesia, amnesia, and sedation while maintaining airway reflexes and cardiovascular stability, attributes particularly beneficial in trauma settings. However, ketamine's sympathomimetic effects, while generally protective against hypotension and bradycardia, may sometimes result in tachycardia and hypertension. Other side effects, such as emergence delirium, nausea, and vomiting, must be weighed carefully, especially in surgical contexts where postoperative comfort and rapid recovery are priorities (2, 3).

Dexmedetomidine, on the other hand, is a highly selective alpha-2 adrenergic agonist, producing sedative, anxiolytic, and analgesic effects without significant respiratory depression. Its introduction into clinical practice has revolutionized perioperative and critical care sedation protocols, offering a profile characterized by hemodynamic stability, opioid-sparing effects, and a lower incidence of postoperative delirium. Dexmedetomidine's ability to attenuate the sympathetic response to surgical stimuli makes it especially valuable in circumstances where hemodynamic fluctuations are undesirable. However, its use is sometimes associated with bradycardia and hypotension, particularly in patients with compromised cardiovascular function or when administered at higher doses or in conjunction with other depressant agents. Moreover, dexmedetomidine's anti-shivering and antiemetic effects have led to its increasing use as an adjunct in various surgical settings, including nasal and craniofacial procedures (4, 5).

Postoperative nausea and vomiting (PONV) remains one of the most predictable and distressing complications following general anesthesia and is particularly common after nasal surgery, where blood ingestion, pain, and opioid consumption contribute to its prevalence. PONV can delay recovery, increase unplanned hospital admissions, and reduce patient satisfaction. Comparative studies examining ketamine and dexmedetomidine have demonstrated varying effects on PONV. While ketamine is typically associated with an increased likelihood of PONV due to direct stimulation of the chemoreceptor trigger zone and indirect activation via sympathetic nervous system stimulation, dexmedetomidine appears to exert antiemetic effects through attenuation of sympathetic tone and reduction of opioid requirements. The nuances of these effects, however, depend on dosing regimens, concurrent medications, and individual patient susceptibilities, necessitating further investigation in the specific context of traumatic nasal surgeries (6, 7).

Shivering is another significant postoperative complication, particularly in the recovery phase following anesthesia. Perioperative shivering is not only uncomfortable but may also increase metabolic demand, oxygen consumption, and risk of cardiopulmonary complications issues of particular relevance in trauma patients who may have limited cardiorespiratory reserve. Ketamine has demonstrated anti-shivering properties, possibly owing to its action on NMDA receptors and its ability to modulate central thermoregulatory pathways. Dexmedetomidine, via its action on alpha-2 adrenergic receptors, has also been shown to effectively reduce the incidence of perioperative shivering, likely by suppressing central thermogenic responses. Direct comparative studies in trauma populations, however, remain sparse, and the interplay of these pharmacological effects with the pathophysiological changes following nasal trauma is not fully clarified in the current literature (8,9).

Hemodynamic instability, most commonly manifesting as hypotension or bradycardia in the perioperative setting, is another major concern in nasal trauma surgery.

The maintenance of stable blood pressure and heart rate is crucial in ensuring adequate tissue perfusion and oxygen delivery, particularly in trauma patients who may be volume depleted or hemodynamically labile due to associated injuries or blood loss. Dexmedetomidine, by virtue of its sympatholytic effect, may predispose patients to hypotension and bradycardia, occasionally requiring pharmacological intervention or dose adjustments. In contrast, ketamine's sympathomimetic properties generally maintain or even increase systemic vascular resistance and cardiac output; this effect can be highly advantageous in trauma settings with hemodynamic compromise. Nevertheless, the

hypertensive and tachycardic responses associated with ketamine may not be suitable for all patients especially those with underlying cardiovascular pathology or when increased bleeding is a concern during nasal surgery (10, 11).

Given the heterogeneity of the trauma population, careful patient selection and tailoring of anesthetic techniques are paramount. Trauma patients often present with varying degrees of physiological derangement, pain, anxiety, and risk factors for perioperative morbidity, factors which may influence both the choice and effects of anesthetic agents. Anesthetic management must balance the goals of effective sedation and analgesia, attenuation of adverse events, maintenance of airway integrity, and rapid recovery while minimizing the risk of further trauma-related complications. In this context, the evaluation of ketamine and dexmedetomidine, both as primary agents and as adjuncts to other anesthetic techniques, is of particular scientific and clinical interest. Their differential effects on postoperative nausea and vomiting, shivering, hypotension, and bradycardia require systematic and rigorous assessment in traumatic nasal surgery, where procedural complexity, the risk of airway compromise, and the underlying trauma physiology intersect (12).

The literature to date offers insight into the individual profiles of ketamine and dexmedetomidine but lacks consensus on their comparative efficacy in the unique environment of traumatic nasal surgery. Existing studies frequently focus on elective nasal procedures, pediatric populations, or non-trauma settings, and while these findings can inform clinical practice, the extrapolation to trauma patients is not straightforward. Variability in dosing protocols, anesthetic techniques, surgical approaches, and patient-specific factors further complicates the picture. Additionally, much of the comparative data is derived from small-scale or retrospective studies, underscoring the need for larger, prospective, controlled investigations (13, 14).

A fundamental challenge in evaluating and comparing the two agents lies in their multifaceted effects. The antiemetic, anti-shivering, and hemodynamic properties of each drug result from different modes of action and receptor targets, and these effects may interact synergistically or antagonistically with other medications such as opioids, benzodiazepines, and volatile anesthetics administered during surgery. The possibility of combining or sequencing ketamine and dexmedetomidine in a multimodal anesthesia regimen further expands the landscape of perioperative management but also necessitates a deeper understanding of pharmacological interactions and patient-specific risk profiles (15).

Patient-reported outcomes, such as perioperative discomfort, satisfaction with care, and functional recovery, are increasingly recognized as critical metrics in surgical research.

Adverse events like nausea, vomiting, shivering, hypotension, and bradycardia can significantly disadvantage the recovery trajectory and overall patient experience, even when objectively mild. Beyond the immediate perioperative period, these complications may influence the risk of readmission, require further intervention, or contribute to secondary complications such as wound dehiscence, aspiration pneumonia, or cardiovascular events particularly in medically vulnerable trauma cohorts. Therefore, the pursuit of an ideal anesthetic strategy encompasses not only efficacy in sedation and analgesia but also a nuanced approach to side effect minimization and patient-centric outcomes (16).

The societal and economic impacts of perioperative complications must also be considered. Increased length of hospital stay, resource utilization, and the potential for litigation in the wake of avoidable adverse events all contribute to the healthcare burden associated with surgical care. The optimization of anesthetic protocols to minimize the risk of common adverse events is thus of paramount importance not only for direct patient care but also for the sustainability of health systems burdened by trauma caseloads (17).

Advancements in monitoring technology, pharmacogenomics, and perioperative risk assessment have enabled more personalized approaches to anesthetic management, yet the evidence base specific to trauma-related nasal surgery remains incomplete. Future research agendas must therefore embrace comprehensive, interdisciplinary investigations that integrate clinical, pharmacological, and patient-reported data. High-quality, head-to-head comparisons of ketamine and dexmedetomidine, utilizing robust methodological designs and inclusive patient populations, are essential to refine current guidelines and optimize care for trauma patients undergoing nasal surgery (18).

In summary, the comparison of ketamine and dexmedetomidine in the context of traumatic nasal surgery is a clinically relevant and timely area of inquiry. Their respective profiles characterized by divergent mechanisms of action, side effect spectra, and impacts on perioperative recovery underscore the need for careful, evidence-based selection tailored to the individual trauma patient. As surgical and anesthetic techniques continue to evolve, and as the demands of patient-centered care grow more complex, clinicians must remain vigilant in appraising new evidence and integrating it into practice in order to achieve optimal surgical outcomes with minimal adverse events. Continued investigation will not only benefit individual patients but will also enhance the quality and efficiency of trauma care at a systems level (19).

Material and methods

Study Design: This study will be conducted as a prospective, randomized, double-blind controlled clinical trial comparing the effects of ketamine and dexmedetomidine on the incidence of adverse events following traumatic nasal surgery. The design aims to rigorously evaluate causality and minimize bias, ensuring reliable and generalizable findings for anesthetic management in this patient population.

Eligibility Criteria: Participants will include adult patients aged 18-65 years scheduled for traumatic nasal surgery under general anesthesia. Exclusion criteria comprise ASA physical status III or higher, history of significant cardiac, hepatic, or renal dysfunction, known allergies to study medications, psychiatric disorders, pregnancy, and refusal to consent. This strict inclusion and exclusion framework aims to minimize confounding factors and ensure patient safety.

Sampling: Eligible patients will be recruited consecutively from the otolaryngology trauma surgery list at the participating hospital. Preoperative assessments will confirm eligibility, and all eligible and willing patients will be included until the predetermined sample size, calculated based on power analysis, is reached to ensure statistical validity.

Randomization: Participants will be randomly assigned in a 1:1 ratio to receive either ketamine or dexmedetomidine. Allocation sequences will be generated using a computer-based randomization program with block randomization to ensure balanced group sizes throughout enrollment. Concealed allocation will prevent selection bias.

Blinding: This study will be double-blinded. Both the patients and all medical staff involved in perioperative care, data collection, and outcome assessment will be unaware of group assignments. Study medications will be prepared in identical syringes by an independent anesthesiologist not involved in patient management or data evaluation, preserving blinding integrity.

Procedure: After obtaining informed consent, eligible patients will undergo standard monitoring and anesthesia induction according to institutional protocols. The study drugeither ketamine or dexmedetomidine will be administered according to standardized dosing regimens prior to surgical incision. Perioperative and postoperative parameters including nausea, vomiting, shivering, blood pressure, and heart rate will be carefully monitored and recorded at defined intervals.

Data Analysis: Statistical analyses will be performed using appropriate software. Descriptive statistics will summarize baseline characteristics. The incidence of each adverse event will be compared between groups using chi-square or Fisher's exact test, while continuous variables will be analyzed using t-tests or Mann-Whitney U tests as appropriate. A p-value of less than 0.05 will be considered statistically significant. Multivariate logistic regression may be used to adjust for potential confounders.

Ethical: The study protocol will be reviewed and approved by the Institutional Review Board (IRB) prior to commencement (IR.TBZMED.REC.1402.971). All participants will provide written informed consent before enrollment, and patient confidentiality will be strictly maintained. The research will adhere to the principles of the Declaration of Helsinki and local ethical regulations to ensure the highest ethical standards throughout the study.

Results

The incidence of postoperative nausea was observed in both groups of the study. In the ketamine group, 7 patients (21.87%) experienced nausea, while in the dexmedetomidine group, 5 patients (15.62%) reported this complication. Statistical analysis revealed no significant difference between the two groups regarding postoperative nausea (p=0.552), indicating that both anesthetics had a comparable impact on this adverse event in patients undergoing traumatic nasal surgery (table1).

Table 1. Incidence of postoperative nausea between the ketamine and dexmedetomidine groups

Group	Nausea, n (%)	p-value
Ketamine	7 (21.87%)	
Dexmedetomidine	5 (15.62%)	0.552

The occurrence of postoperative vomiting was evaluated between the ketamine and dexmedetomidine groups. In the ketamine group, 4 patients (12.50%) experienced vomiting, compared to 2 patients (6.25%) in the dexmedetomidine group. Statistical analysis showed no significant difference between the groups (p = 0.663). This suggests that both medications have a similar profile regarding the risk of postoperative vomiting in patients after traumatic nasal surgery (table2).

Table 2. Postoperative vomiting between the ketamine and dexmedetomidine groups

Group	Vomiting, n (%)	p-value
Ketamine	4 (12.50%)	
Dexmedetomidine	2 (6.25%)	0.663

Shivering was assessed as a postoperative complication in both treatment groups. Among patients receiving ketamine, 3 individuals (9.37%) experienced shivering, while in the dexmedetomidine group, shivering occurred in 5 patients (15.62%). Statistical analysis indicated no significant difference in the incidence of shivering between the two groups (p = 0.705), suggesting that both anesthetic agents have a comparable effect on the occurrence of postoperative shivering in traumatic nasal surgery (table3).

Table 3. Shivering between the ketamine and dexmedetomidine groups

Group	Shivering, n (%)	p-value
Ketamine	3 (9.37%)	
Dexmedetomidine	5 (15.62%)	0.705

The incidence of hypotension requiring treatment was very low in both study groups. In the ketamine group, no patients (0%) experienced hypotension that required intervention, whereas in the dexmedetomidine group, 1 patient (3.12%) developed this complication. Statistical analysis demonstrated no significant difference between the two groups (p=0.884), indicating that both ketamine and dexmedetomidine are comparably safe regarding the risk of hypotension necessitating medical treatment following traumatic nasal surgery (table4).

Table 4. Hypotension requiring treatment between the ketamine and dexmedetomidine groups

Group	Hypotension requiring treatment, n (%)	p-value
Ketamine	0 (0%)	
Dexmedetomidine	1 (3.12%)	0.884

Bradycardia requiring treatment was monitored in both groups after traumatic nasal surgery. In the ketamine group, no cases of bradycardia were observed (0%), while in the dexmedetomidine group, 3 patients (9.37%) required intervention for bradycardia. The difference between the groups was not statistically significant (p=0.957), suggesting that although the incidence was slightly higher with dexmedetomidine, both drugs have a comparable safety profile regarding this complication (5).

Table 5. Bradycardia requiring treatment between the ketamine and dexmedetomidine groups

Group	Bradycardia requiring treatment, n (%)	p-value
Ketamine	0 (0%)	
Dexmedetomidine	3 (9.37%)	0.957

Discussion

In this randomized clinical trial, we compared the incidence of key postoperative complications namely, nausea, vomiting, shivering, hypotension requiring intervention, and bradycardia requiring treatment between ketamine and dexmedetomidine administered as anesthetic adjuncts in patients undergoing traumatic nasal surgery. The findings of this study indicate that both agents confer comparable risks for the monitored adverse events, with no statistically significant differences observed across all measured outcomes. This comprehensive analysis contributes important evidence to the ongoing debate regarding the optimal choice of adjuvant anesthesia for traumatic nasal procedures, an area characterized by the need for improved perioperative safety and patient satisfaction (20).

Nausea and vomiting remain among the most concerning adverse effects associated with anesthetic administration, given their substantial impact on patient comfort, postoperative recovery, and, in some cases, the risk of surgical complications such as wound dehiscence or aspiration. In this study, the incidence of postoperative nausea was slightly higher in the ketamine group (21.87%) compared to the dexmedetomidine group (15.62%), while the rate of vomiting was also higher in the ketamine arm (12.50% vs. 6.25%, respectively). Despite these numerical differences, statistical analysis demonstrated that the differences did not reach significance (p=0.552 for nausea, p=0.663 for vomiting).

These results mirror findings from previous research, where both agents have demonstrated antiemetic properties to varying degrees, but often without clear superiority of one over the other in the context of nasal or other facial surgeries (21).

Ketamine, a dissociative anesthetic with N-Methyl-D-aspartate receptor antagonism, has traditionally been associated with an increased risk of postoperative nausea and vomiting (PONV) due to its sympathomimetic effects and psychomimetic emergence reactions. However, it is also recognized for dose-dependent analgesic and anti-inflammatory properties, which may indirectly mitigate the risk of PONV through improved pain control and reduced opioid requirements. Dexmedetomidine, an alpha-2 adrenoceptor agonist, has meanwhile garnered increasing interest for its ability to reduce the incidence of PONV through central sympatholytic effects, reduction in catecholamine release, and direct antiemetic properties. Several meta-analyses and randomized controlled trials have indicated that dexmedetomidine is effective in reducing the incidence of PONV, especially when used as part of multimodal anesthesia for ENT and maxillofacial procedures. Our findings, therefore, are consistent with the broader literature in that both agents, when used as adjuncts to standard anesthesia protocols, offer reasonable protection against PONV, though neither agent demonstrated clear superiority in this patient population (22).

Shivering, another common postoperative complication, was observed in a minority of patients in both groups, with incidences of 9.37% in the ketamine group and 15.62% in the dexmedetomidine group (p=0.705). The prevention of perioperative shivering is clinically important, considering its potential to increase metabolic demand, exacerbate postoperative discomfort, and complicate hemodynamic stability particularly in trauma patients who are more susceptible to hypovolemia and altered thermoregulation. While ketamine has been previously shown to reduce the incidence of postoperative shivering by virtue of its modulation of central neurotransmitter activity, dexmedetomidine is well established as an anti-shivering agent due to its action in the locus cerulean, reducing the shivering threshold and attenuating hypothalamic thermoregulatory responses. The results of this trial are notable for the absence of statistically significant differences in shivering rates, underscoring the comparable efficacy of both agents for shivering prophylaxis in traumatic nasal surgery a finding that underscores the clinical flexibility of both drugs in the perioperative setting (23).

The hemodynamic profiles of ketamine and dexmedetomidine were also closely monitored, given the potential for both hypotension and bradycardia to complicate anesthesia in the context of facial trauma where blood loss and pre-existing cardiovascular instability are not uncommon. In the present study, hypotension requiring treatment was rare, with no episodes recorded in the ketamine group and only a single case (3.12%) noted in the dexmedetomidine group (p=0.884). The low incidence in both arms highlights the relative hemodynamic stability provided by these agents when titrated appropriately in a controlled surgical setting. Ketamine is generally known for its cardiovascular stimulatory effects, including increased heart rate and blood pressure due to central sympathetic stimulation, making it a particularly appealing option for patients with a higher risk of hypotension. Dexmedetomidine, in contrast, is associated with a dose-dependent decrease in sympathetic tone, which can result in bradycardia and hypotensioneffects that are of greatest concern in elderly patients or those with compromised autonomic regulation (24).

Notably, bradycardia requiring treatment was observed exclusively in the dexmedetomidine arm, with an incidence of 9.37%, while no cases occurred in patients who received ketamine (p=0.957). This outcome aligns with the well-documented risk profile of dexmedetomidine, which, by promoting enhanced vagal tone and reducing norepinephrine outflow, can predispose to significant bradyarrhythmias, particularly at higher doses or with rapid administration. Though the difference between groups was not statistically significant, the clinical relevance of this finding should not be underestimated, especially in selected populations with existing conduction disturbances, youth, or volume depletion. Here, the absence of bradycardia in ketamine recipients further supports its preferential use in patients where bradyarrhythmia may pose a particular risk, while the overall low incidence in dexmedetomidine recipients remains consistent with judicious dosing and vigilant intraoperative monitoring (25).

Taken together, these findings suggest that ketamine and dexmedetomidine, when utilized within the context of well-structured anesthesia protocols for traumatic nasal surgery, offer similar levels of safety and efficacy regarding several critical perioperative complications. The comparable rates of nausea, vomiting, shivering, and hemodynamic disturbances support flexibility in anesthetic planning, allowing clinicians to tailor their approach based on individual patient risk profiles, procedural circumstances, and resource availability. This is especially pertinent in settings where either the prevention of sympathetic surges (favoring dexmedetomidine) or avoidance of hypotension and bradycardia (favoring ketamine) is a clinical priority (26).

The implications of these results extend beyond the acute postoperative setting. The low incidence of serious complications in both groups is likely to translate into improved patient satisfaction,

decreased length of hospital stay, and lower resource utilization all critical metrics in an era increasingly defined by value-based healthcare and cost containment. Moreover, minimizing postoperative nausea, vomiting, and other discomforts is associated with earlier return to oral intake, reduced perioperative opioid requirements, and faster functional recovery, all of which are important outcomes from both patient-centered and economic perspectives (27).

From a pharmacological standpoint, the present findings reaffirm the versatility of both agents. Ketamine, while long feared for its psychotomimetic emergence reactions, continues to reemerge as a valuable adjuvant in multimodal anesthesia, not only due to its hemodynamic effects but also owing to its opioid-sparing and possible anti-inflammatory actions. Dexmedetomidine's unique profile, featuring sedative, analgesic, and sympatholytic properties, positions it as an increasingly popular adjunct for a wide variety of surgical procedures, especially where calm emergence and stable postoperative hemodynamics are desired. Ultimately, the decision to employ either agent should be individualized, weighing the specific risks and benefits in the context of patient comorbidities, surgical requirements, and institutional expertise (28).

Despite these strengths, this study is subject to several limitations. The sample size, while adequate for the detection of moderate to large differences in primary outcomes, may be insufficient for the identification of rarer complications or subtler shifts in complication rates. Additionally, the relatively homogeneous population employed for this investigation primarily adult, otherwise healthy patients may limit generalizability to pediatric, geriatric, or medically complex populations, in whom the balance of anesthetic risks and benefits may differ. Furthermore, the open-label design of the surgical intervention and possible differences in intraoperative fluid administration, additional medications, or surgeon technique may introduce confounding variables that cannot be fully controlled, despite the randomized and double-blind allocation to anesthetic groups (29).

Future research should focus on evaluating these pharmacological agents in more diverse patient populations, including those at elevated risk for PONV, hemodynamic instability, or in whom the avoidance of specific side effects (such as emergence delirium for ketamine or bradyarrhythmia for dexmedetomidine) is of particular clinical concern. Comparative trials incorporating newer agents, multimodal antiemetic protocols, or enhanced recovery pathways may also further clarify the relative positioning of ketamine and dexmedetomidine in perioperative care. Additionally, exploration of dose optimization, timing of administration, and combination strategies may unlock further reductions in complication rates while preserving the desirable analgesic and sedative effects inherent to both drugs (30).

In conclusion, the present study demonstrates that both ketamine and dexmedetomidine are effective and comparably safe choices for anesthetic management in traumatic nasal surgery, as evidenced by similar rates of postoperative nausea, vomiting, shivering, hypotension, and bradycardia. Individualization of anesthetic plan remains paramount, as both agents show favorable profiles, and selection can be based on the unique clinical context, provider experience, and patient-specific risk factors. These results add to the growing body of literature supporting the prudent and evidence-based use of both ketamine and dexmedetomidine as adjuncts to anesthesia in facial trauma, and reinforce the importance of ongoing research to optimize perioperative outcomes and enhance the quality of surgical care (31).

Conclusion

This study demonstrates that ketamine and dexmedetomidine provide comparable safety profiles for patients undergoing traumatic nasal surgery, with no significant difference in the incidence of nausea, vomiting, shivering, hypotension, or bradycardia requiring intervention. These findings support the use of either agent as an anesthetic adjunct, allowing for individualized selection based on patient characteristics and clinical judgment without heightened concern for specific postoperative complications.

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Authors' Contributions

All authors contributed to data analysis, drafting, and revising of the paper and agreed to be responsible for all the aspects of this work.

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