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COMPARATIVE EFFECTS OF PREOPERATIVE DEXAMETHASONE AND KETAMINE NEBULIZATION ON MINIMIZING NASOGASTRIC TUBE-RELATED COMPLICATIONS FOLLOWING LAPAROSCOPIC SURGERY

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Abstract

Background: Inserting a nasogastric (NG) tube is a common medical procedure, yet the resulting oropharyngeal discomfort is often underestimated. Typically, only standard lubricant jelly is used, with no additional analgesia, leading to suboptimal pain relief. This study compares the preoperative effectiveness of nebulized dexamethasone and ketamine in minimizing postoperative throat discomfort following NG tube insertion in patients undergoing laparoscopic surgery.

Duration and place of study: This study was conducted in Hatta Hospital Dubai UAE from 01.06.2022 to 01.01.2024

Methodology: 150 patients with ASA physical status I–II, ages 18–65, who were scheduled for laparoscopic abdominal procedures under general anesthesia were enrolled in this prospective, study. Group A received 8 mg of nebulized dexamethasone, Group B received 50 mg of nebulized ketamine, and Group C received 5 ml of nebulized saline. Participants were randomly assigned to one of three groups. The NG tube was inserted after anesthesia induction. Patients were assessed for postoperative sore throat at recovery (0 hours), and then at 2, 8, 12, and 24 hours postoperatively. Data were analyzed using SPSS software version 26, with median, range, and qualitative data percentages and counts presented. A significance threshold of $P < 0.05$ was applied.

Results: Both dexamethasone and ketamine nebulization significantly reduced the incidence of postoperative sore throat (POST) compared to saline. Dexamethasone demonstrated a greater

reduction in POST than ketamine, with statistically significant differences at 0 hours ($P < 0.001$), 2 hours ($P < 0.001$), 8 hours ($P < 0.001$), 12 hours ($P < 0.001$), and 24 hours ($P < 0.001$).
Conclusion: According to this study, preoperative nebulized dexamethasone reduces postoperative sore throat related to NG tube insertion more effectively than nebulized ketamine.

Keywords: Nebulized dexamethasone, ketamine, nasogastric tube, postoperative sore throat

Introduction

Nasogastric (NG) tube insertion is a routine procedure frequently performed in patients undergoing various surgeries, including laparoscopic interventions, to decompress the stomach and prevent complications associated with gastric contents in the airway during anesthesia [1, 2]. However, NG tube insertion is often accompanied by notable discomfort, including oropharyngeal irritation and sore throat, which can negatively impact patient recovery and satisfaction [3, 4]. Traditional methods for alleviating this discomfort, such as lubricant jelly, may be inadequate in managing pain, leading to suboptimal relief and increased postoperative complications [5, 6].

To address this, preemptive administration of anesthetic agents like ketamine and dexamethasone has gained attention for their analgesic and anti-inflammatory properties. Ketamine, a well-known NMDA receptor antagonist, provides effective analgesia and has been shown to reduce postoperative sore throat in a variety of settings by mitigating inflammatory responses [7, 8]. Studies have highlighted the benefit of ketamine nebulization as a non-invasive approach to alleviating postoperative throat discomfort, enhancing patient comfort without significant side effects [9, 10].

Similarly, dexamethasone, a corticosteroid with potent anti-inflammatory effects, has been investigated for its efficacy in reducing postoperative sore throat and airway inflammation associated with NG tube placement [11, 12]. Dexamethasone nebulization has been shown to reduce mucosal edema and inflammation, thereby lowering the incidence of sore throat and other discomforts postoperatively [13, 14]. Furthermore, recent research suggests that dexamethasone may provide more sustained relief from sore throat compared to ketamine when administered preoperatively, though studies are ongoing to substantiate these findings across diverse patient populations [15, 16].

In laparoscopic surgery, where minimal invasiveness is a priority, optimizing perioperative care through non-invasive premedication such as nebulization could improve patient outcomes significantly [17, 18]. Considering the potential benefits and ease of administration, this study aims to compare the effectiveness of nebulized ketamine and dexamethasone in preventing postoperative sore throat following NG tube insertion in laparoscopic surgeries. Given the increasing attention on patient comfort and reduced postoperative complications, understanding the comparative efficacy of these agents is essential for enhancing perioperative care in patients undergoing laparoscopic procedures [19, 20].

Methodology

In order to determine whether nebulized dexamethasone and ketamine can effectively prevent postoperative sore throat after nasogastric (NG) tube placement in patients undergoing laparoscopic abdominal surgery, this study was a prospective study . 150 patients in all, ranging in age from 18 to 65, were enrolled. Every participant was scheduled for laparoscopic abdominal surgery under general anesthesia and assigned a physical status of I or II according to the American Society of Anesthesiologists (ASA).

Using a computer-generated randomization sequence, patients were randomized to one of three trial groups (n = 50 each group). Group B was given 50 mg of nebulized ketamine, Group C was given 5 ml of nebulized saline as a placebo, and Group A was given 8 mg of nebulized dexamethasone. The nebulization

After induction of general anesthesia, an NG tube was inserted in each patient. Standard anesthetic protocols were followed, including the use of lubricants as necessary to minimize discomfort during NG tube placement. Postoperative assessments were conducted at multiple time points to evaluate the

incidence and severity of sore throat: at recovery (0 hours) and subsequently at 2, 8, 12, and 24 hours postoperatively.

Data on the incidence of sore throat at each time point were recorded by trained staff blinded to group allocation. Statistical analysis was performed using SPSS software, version 26. Descriptive statistics were used to present median values, ranges, percentages, and frequencies for qualitative data. Differences among groups were analyzed with an appropriate statistical test, and a significance level of $P < 0.05$ was established for all analyses to determine statistical relevance.

Table 1: Study Groups and Nebulization Protocols

Group	Intervention	Dosage	Volume Administered (ml)
Group A	Nebulized Dexamethasone	8 mg	5 ml
Group B	Nebulized Ketamine	50 mg	5 ml
Group C	Nebulized Saline (Placebo)	-	5 ml

Results

150 patients in all were recruited and split equally among three groups: Group A (50 patients receiving dexamethasone), Group B (50 patients receiving ketamine), and Group C (50 patients receiving saline). Five time points were used to measure the incidence of postoperative sore throat (POST): recovery (0 hours), 2, 8, 12, and 24 hours after surgery.

At every time point evaluated, the incidence of POST was significantly lower with dexamethasone and ketamine nebulization than with saline. At every evaluation, dexamethasone achieved statistically significant decreases in POST incidence, demonstrating its superior efficacy over ketamine. Group A (dexamethasone) saw a considerably lower incidence of POST at 0 hours than Group B (ketamine) and Group C (saline) ($P < 0.001$). Group A continued to exhibit a significantly reduced incidence of POST than Groups B and C at two hours ($P < 0.001$). At 8 hours, Group A reported fewer instances than Group B and Group C, and the difference in POST incidence was still statistically significant ($P < 0.001$).

When compared to the other groups, Group A's POST decrease was still significant at 12 hours ($P < 0.001$). At 24 hours, Group A's incidence of POST was considerably lower than that of Groups B and C ($P < 0.001$).

When compared to both ketamine and saline, the data show that preoperative nebulization with dexamethasone dramatically lowers the frequency and duration of POST. Compared to saline, ketamine similarly reduced the incidence of POST; however, at each postoperative time point, its effects were not as strong as those of dexamethasone.

Data were analyzed using SPSS software version 26. Descriptive statistics, including median and range, were calculated for each time point, and the statistical significance was assessed with a P-value threshold of <0.05. The differences between the groups were consistently significant, underscoring the superior effectiveness of dexamethasone nebulization in managing POST.

Table 2: Summary of Statistical Analysis

Comparison	Significance Level (P-Value)
Dexamethasone vs. Ketamine	<0.001
Dexamethasone vs. Saline	<0.001
Ketamine vs. Saline	NS (not significant)

Discussion

The present study demonstrates that preoperative nebulization with dexamethasone significantly reduces the incidence of postoperative sore throat (POST) compared to nebulized ketamine and saline in patients undergoing laparoscopic abdominal surgeries. The findings align with previous research highlighting the efficacy of dexamethasone in managing postoperative complications related to airway interventions.

A study by El-Boghdadly et al. also found that the use of dexamethasone prior to surgery effectively reduced the incidence of POST following endotracheal intubation. Their research indicated a significant reduction in sore throat at multiple time points, similar to the present study's findings, particularly noting the effectiveness of corticosteroids in attenuating postoperative inflammation and pain [21].

In contrast, a randomized controlled trial by Wong et al. evaluated the impact of nebulized ketamine for sore throat prevention and found that while it reduced POST incidence, the effect was less significant compared to dexamethasone. This is consistent with our results, where dexamethasone outperformed ketamine in all assessed time points . The mechanism behind this may involve the anti-inflammatory properties of dexamethasone, which likely provide superior pain relief and inflammation reduction compared to the analgesic effects of ketamine [22].

Furthermore, a study conducted by Kashi et al. (2020) confirmed the effectiveness of dexamethasone in reducing POST following various surgical procedures, including laparoscopic surgeries. Their results supported the use of dexamethasone as a routine preoperative measure to minimize postoperative complications [23].

Conversely, a meta-analysis by Khan et al. synthesized data from multiple trials and concluded that while both dexamethasone and ketamine were effective in reducing POST, dexamethasone consistently showed greater efficacy across studies. This is in line with our findings, where dexamethasone significantly reduced POST incidence compared to both ketamine and saline [24].

Finally, a more recent investigation by Tan et al. examined the effects of various nebulized agents on postoperative sore throat and echoed the results found in the present study. They emphasized that corticosteroids like dexamethasone should be considered a standard component of preoperative care for patients at risk of sore throat due to airway manipulations [25].

Conclusion

This study concludes that preoperative nebulization with dexamethasone significantly reduces the incidence of postoperative sore throat compared to nebulized ketamine and saline in patients undergoing laparoscopic abdominal surgeries. The findings suggest that incorporating nebulized dexamethasone into preoperative protocols can enhance patient comfort and satisfaction. Future research should focus on optimal dosing strategies and the long-term effects of dexamethasone in perioperative care.

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