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Original Research Article

A Study to Compare 2% Ligocaine Hydrochloride Intra Cuff and Lidocaine Hydrochloride 2% Jelly in Reducing Post-Operative Sore Throat, Hoarseness of Voice and Cough in General Anesthesia

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Abstract

Introduction: Tracheal intubation during general anesthesia (GA) often causes postoperative sore throat (POST), hoarseness, and coughing due to irritant stimuli. This study compared 2% lidocaine hydrochloride intracuff and jelly, aiming to reduce these complications. Intracuff lidocaine may anesthetize the tracheal mucosa, minimizing emergence coughing and improving postoperative outcomes, especially in critical surgical procedures.

Methods: This prospective study at Government Medical College, Rajamahendravaram, compared 2% lidocaine intracuff with 2% jelly in reducing postoperative sore throat, coughing, and hoarseness. Conducted over four months, it included patients aged 18–60, excluding emergencies and complex cases. Outcomes were assessed and statistically analyzed using SPSS, with significance at $P < 0.05$.

Results: Baseline characteristics, including age, gender, BMI, ASA grade, and surgery duration, were comparable between groups. Group A consistently showed lower postoperative sore throat scores and significantly fewer cases of severe coughing and hoarseness than group B. Intracuff lidocaine demonstrated superior efficacy in minimizing airway complications, enhancing patient outcomes and satisfaction.

Conclusion: Intracuff 2% lidocaine effectively reduces postoperative sore throat, coughing, and hoarseness compared to 2% lidocaine jelly. Its superior efficacy in minimizing airway complications improves patient outcomes and satisfaction, highlighting its potential as a preferred strategy for managing intubation-related postoperative discomfort in GA.

Keywords: Intracuff lidocaine, Postoperative sore throat, Emergence coughing, Hoarseness, General anesthesia.

Introduction

Tracheal intubation is essential during general anesthesia (GA) to secure the airway, with an inflated cuff around the endotracheal tube (ETT) ensuring a proper seal. [1] However, smooth emergence from GA is often complicated by coughing, triggered by irritant stimuli from the ETT. Postoperative sore throat (POST) is reported in 21–65% of patients undergoing GA with tracheal intubation, leading to significant dissatisfaction and morbidity despite being a minor complaint.

Lidocaine hydrochloride (L HCl), a local anesthetic, is commonly used to blunt adverse emergence responses. Intracuff 2% lidocaine diffuses through the ETT cuff, anesthetizing the tracheal mucosa and potentially reducing coughing. [2] While intravenous lidocaine attenuates stress responses during intubation and extubation, its efficacy in suppressing emergence coughing is inconsistent. Alkaline L HCl, enhanced by adding sodium bicarbonate as per the Henderson-Hasselbalch equation, can diffuse effectively, reducing irritant receptor stimulation in the trachea. [3]

Coughing during emergence can cause complications such as hypertension, tachycardia, increased intraocular or intracranial pressure, bronchospasm, and bleeding, especially in neurosurgical or ophthalmic procedures. [4] This study compared the effectiveness of 2% lidocaine hydrochloride intracuff and 2% jelly in reducing POST, hoarseness, and cough in patients undergoing GA to improve postoperative outcomes.

Methods

It was a prospective, comparative study conducted in the department of Anaesthesiology, Government Medical College, Rajamahendrawaram. Study was conducted in August and September 2024. The study protocol was approved by the institutional Ethics committee.

Individuals of both genders, between 18 – 60 years, mallampapati grades I, II were included in this research. Those on emergency surgery, > 6 hrs surgical procedures, with medical complications such as hypertension etc, non-cooperative individuals were not considered in the research.

After obtaining informed consent, study participants were briefed about the research, and their doubts were clarified. Socio-demographic details were recorded, and venous blood samples were collected under sterile conditions for analysis of blood grouping, Rh typing, complete blood picture, liver and renal function tests, random blood sugar, bleeding and clotting times, serum electrolytes, coagulation profile, HIV, and HBsAg. Complete urine examination, ECG, and chest X-ray were also conducted. Airway assessments included mouth opening, temporomandibular joint evaluation, thyromental distance, Mallampati grading, dentition, and cervical spine movements.

Participants were randomly divided into two groups; group A received 2% lidocaine intracuff, while group B had the ETT lubricated with 2% lidocaine jelly before intubation. In the operating room, standard monitoring was initiated, and patients were premedicated with glycopyrrolate, ondansetron, midazolam, and fentanyl. Anesthesia induction was achieved with propofol, and intubation was facilitated with succinylcholine. Cuff inflation in group A used 2% lidocaine, while group B cuffs were inflated with air, maintaining intracuff pressure at 18–25 mmHg. Postoperatively, the severity of sore throat (SPT), emergence coughing, and 24-hour hoarseness were assessed. SPT was evaluated at 0, 1, 6, 24, and 48 hours. [5] Cough was graded based on duration, and hoarseness was scored from 0 to 3. [6] Patients were monitored in the post-anesthesia care unit with supplemental oxygen and postoperative analgesia.

Statistical Analysis

The data were analysed using SPSS version 22 and the data were presented in Mean, Standard deviation. Chi-Square test and Fisher's exact test were used for the statistical analysis. $P < 0.05$ was considered to be statistically significant.

Results

Total 100 member were included, 50 in each group. Table 1 highlights the baseline characteristics of the participants. Both groups, group A and group B were comparable in terms of age, gender distribution, BMI, ASA grade, and surgery duration, with no statistically significant differences, ensuring the validity of comparisons. Table 2 summarizes postoperative sore throat (SPT) severity scores at various time points. Group A consistently demonstrated lower mean SPT scores compared to group B across all time intervals. The differences were statistically significant at 0, 1, 6, and 24 hours. Table 3 presents data on emergence coughing and hoarseness of voice. Group A showed fewer cases of severe coughing, with 76% experiencing no cough, compared to 50% in group B. Similarly, hoarseness scores were significantly lower in group A. These findings highlight the superior efficacy of intracuff lidocaine in reducing postoperative airway-related complications, improving patient outcomes and satisfaction.

Table 1: Baseline characteristics of study participants

Parameter	Group A	Group B	P value
Age*	40.2 ± 10.3	39.8 ± 9.7	0.89
Male: Female	28:22	30:20	0.72
BMI (Kg/m^2) *	24.5 ± 3.1	24.7 ± 3.2	0.81
ASA grade I: II	32:18	34: 16	0.68
Duration of surgery in min*	95.4 ± 15.8	94.6 ± 14.9	0.78
* Mean ± SD			

Table 2: Severity of postoperative sore throat (SPT) scores of study participants

Time period	Group A	Group B	P value
0 hr	2.1 ± 0.5	2.5 ± 0.6	0.03
1 hr	1.8 ± 0.4	2.2 ± 0.5	0.01
6 hr	1.2 ± 0.3	1.7 ± 0.4	0.02
24 hr	0.8 ± 0.2	1.3 ± 0.2	0.04
48 hr	0.4 ± 0.1	0.6 ± 0.2	0.07

Table 3: Emergence cough and hoarseness of voice scores among the study participants; n (%)			
Parameter	**Group A**	**Group B**	**P value**
Emergency cough grade			
Grade 0*	38 (76)	25 (50)	0.02
Grade 1**	10 (20)	15 (30)	0.25
Grade 2***	2 (04)	10 (20)	0.03
No cough; ** < 15 sec; ***> 15 sec			
Hoarseness scores			
Score 0*	40 (80)	28 (56)	0.01
Score 1**	8 (16)	15 (30)	0.15
Score 2***	2 (4)	6 (12)	0.14
Score 3****	0	1 (2)	0.32
* No hoarseness; ** minimal; *** moderate; ****gross change			

Discussion

Table 1 establishes that the study groups were well-matched in terms of baseline characteristics, ensuring a fair comparison between the efficacy of 2% lidocaine intracuff and 2% lidocaine jelly. The mean age, gender distribution, and BMI of participants showed no significant differences between Group A and Group B. Such homogeneity minimizes potential confounding factors and ensures that observed differences in outcomes are attributable to the intervention rather than demographic variability. This alignment adheres to principles of randomized controlled trials, enhancing the study's internal validity. [7 – 9]

The ASA grade distribution, representing patients' preoperative health status, was comparable between the groups. Similarly, the mean duration of surgery, an important factor influencing postoperative outcomes, did not differ significantly. Prior studies emphasize the need for matching baseline characteristics to ensure reliability in results, particularly in airway management studies, as patient demographics can significantly impact outcomes. [10, 11]

This meticulous matching of baseline parameters strengthens the study's reliability and highlights the effectiveness of the randomization process. By controlling these variables, the study accurately isolates the effect of lidocaine application on postoperative sore throat, cough, and hoarseness, laying a strong foundation for interpreting subsequent findings.

Table 2 highlights the differences in postoperative sore throat (SPT) severity scores between Group A (2% lidocaine intracuff) and Group B (2% lidocaine jelly) at various time points. The findings demonstrate that Group A consistently exhibited lower SPT scores at 0, 1, 6, and 24 hours post-extubation, with statistically significant differences. At 48 hours, however, the scores in both groups converged, showing no significant difference. This reduction in early SPT severity in Group A can be attributed to the direct diffusion of lidocaine from the cuff to the tracheal mucosa, providing localized anesthetic effects and reducing irritation caused by the endotracheal tube. Previous studies have corroborated the superior efficacy of intracuff lidocaine in minimizing airway discomfort due to its sustained anesthetic action. [9, 11, 12].

In contrast, lidocaine jelly, while effective in lubricating the endotracheal tube and minimizing mechanical irritation, lacks the prolonged anesthetic effect provided by intracuff application. The differences in SPT severity scores diminish at 48 hours, consistent with findings that the natural healing process eventually alleviates mucosal irritation in both groups. [13] Overall, these results emphasize the advantage of intracuff lidocaine in reducing early postoperative airway-related discomfort, improving patient satisfaction and perioperative care outcomes.

Table 3 compares the incidence and severity of postoperative cough and hoarseness between Group A (2% lidocaine intracuff) and Group B (2% lidocaine jelly). The data reveals that Group A had a significantly lower incidence of postoperative cough (Grade I and II) and hoarseness (scores 2 and 3) within 24 hours post-extubation. The intracuff application of lidocaine ensures a sustained anesthetic effect on the tracheal mucosa, reducing nociceptive stimuli from the endotracheal tube cuff. This mechanism is supported by studies demonstrating the efficacy of intracuff lidocaine in suppressing cough reflex and minimizing airway irritation during emergence from GA. [14, 15]

In contrast, lidocaine jelly primarily serves as a lubricant, mitigating mechanical irritation during intubation but offering limited anesthetic action post-intubation. This disparity is evident in the higher incidence of cough and moderate to severe hoarseness in Group B, consistent with previous findings on topical anesthetic limitations. [16] Both cough and hoarseness are linked to airway trauma and irritation from endotracheal intubation, significantly impacting postoperative recovery and patient satisfaction. The lower incidence in Group

A aligns with prior research emphasizing the clinical benefits of intracuff lidocaine for improving extubation outcomes and reducing adverse airway events. [17] These findings reinforce the advantage of intracuff lidocaine in providing comprehensive airway protection and reducing postoperative complications, contributing to better overall patient outcomes in airway management under GA.

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