"A Comparative Study: Intra-cuff Ketamine vs. Alkalinized Lidocaine for Preventing Post-Operative Sore Throa

Nadeem Naqvi[1], Arif Iftikhar Malihi[2], Ali Asgher Saifuddin[3], Umer Rafique[4]

ABSTRACT

BACKGROUND: Postoperative sore throat (POST) occurs in 21-65% of patients, with prior use of ketamine as a rinse for reducing POST showing limitations. This study aimed to compare the efficacy of intra-cuff ketamine versus alkalinized lidocaine in mitigating POST.

OBJECTIVE: To assess the relative effectiveness of intra-cuff Ketamine versus Alkalinized Lidocaine in preventing Post-Operative Sore Throat at a tertiary care Hospital in Karachi.

METHODS: This single-center, consecutive non-probability cross-sectional study was conducted from April 15th, 2018, to July 15th, 2018. After obtaining informed written consent, the severity of postoperative sore throat pain, cough, hoarseness, laryngeal spasm, and changes in heart rate and blood pressure were evaluated and compared among patients undergoing general anesthesia with endotracheal intubation. Data were recorded using a designated form.

STUDY DESIGN: Cross-sectional study

RESULTS: Sixty participants undergoing general anesthesia with endotracheal intubation were enrolled based on inclusion criteria. They were allocated into two groups: Group K (intra-cuff ketamine) and Group LA (alkalinized lidocaine). The ketamine group exhibited lower incidences of sore throat pain, cough, hoarseness, laryngeal spasm, and changes in heart rate and blood pressure compared to the lidocaine group.

CONCLUSION: Intra-cuff alkalinized lidocaine significantly reduced the severity of POST, cough, hoarseness, and laryngeal spasm, especially during the early postoperative phase, in comparison to intra-cuff ketamine.

KEY WORDS: ketamine, Alkalinized lidocaine, post-operative sore throat

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Introduction

Post-operative sore throat (POST) occurs in 21-65% of patients receiving general anesthesia (GA) with tracheal intubation.1,2 Though considered as a minor complication, but it may cause significant post-operative morbidity and patient dissatisfaction.3 Various non-pharmacological and pharmacological trials have been used for attenuating POST with no proven single modality.

The pharmacological methods used to reduce POST include use of beclomethasone gel, gargling with azulene sulphonate, ketamine and licorice, intra-cuff ketamine & alkalinized lidocane.4-6 Ketamine is an N-methyl-D-aspartate (NMDA) receptor antagonist and has been used as a gargle for reducing the incidence and severity of POST due to its anti-nociceptive and anti-inflammatory effects.6,7

Previous studies with *in vitro* and *in vivo* approaches that used large doses (200 to 500 mg) of lidocaine hydrochloride (L-HCl) instead of saline have shown that L-HCl could slowly diffuse through the cuff, and this could be dangerous if the cuff ruptured.8,9 The purpose of our study was to evaluate the effectiveness of endotracheal intracuff lidocaine vs alkalinized lidocaine in reducing the post operative sore throat (POST).

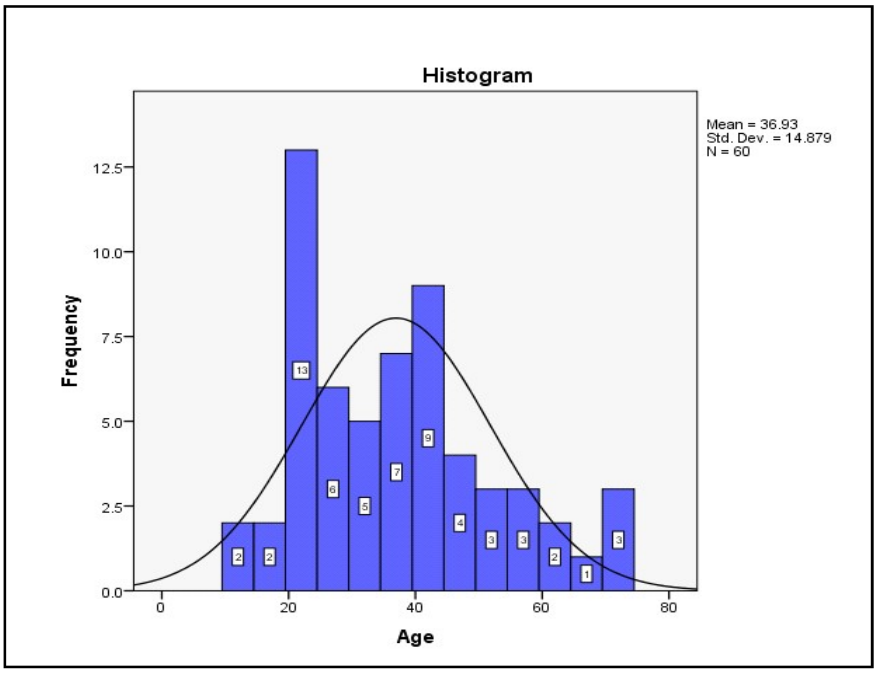
Post-operative sore throat (POST) happens in 21-65% of patients accepting general anesthesia (GA) with tracheal intubation.1,2 However considered as a minor complexity, yet it might cause huge post-operative dismalness and persistent dissatisfaction.3 Different non-pharmacological and pharmacological preliminaries have been utilized for weakening POST with no demonstrated single methodology.

The pharmacological strategies used to diminish POST incorporate utilization of beclomethasone gel, swishing with azulene sulphonate, ketamine and licorice, intra-cuff ketamine and alkalinized lidocaine 4-6. Ketamine is a N-methyl-D-aspartate (NMDA) receptor foe and has been utilized as a wash for lessening the occurrence and seriousness of POST because of its enemy of nociceptive and calming effects 6,7.

Past investigations with in vitro and in vivo approaches that utilized substantial dosages (200 to 500 mg) of lidocaine hydrochloride (L-HCl) rather than saline have demonstrated that L-HCl could gradually diffuse through the sleeve, and this could be perilous if the cuff ruptured.8,9 The motivation behind our examination was to assess the viability of endotracheal intracuff lidocaine versus alkalinized lidocaine in diminishing the post agent sore throat (POST).

Material &Methods

This single center, Non probability consecutive, cross sectional study was conducted from 15th April 2018 to May 15th July 2018. The study was conducted by the Department of anesthesiology, Liaquat National Hospital and Medical College, Karachi, after the approval of the study from the Institutional Ethical Board. Once an eligible patient has been identified in the preoperative round meeting the inclusion and exclusion criteria, the study details were carefully discussed with the potential subject and informed consent attained. If the patient was illiterate, then the informed consent form was read to the patient and if consent was given, it was signed and dated by an impartial witness who is independent of the Principal Investigator.



Graph 1

A Performa was filled by the investigator as a data collecting tool for preoperative and postoperative assessment.

Group were allocated randomly as Group K & Group LA. Once the patient identified then General anesthesia was given using induction dose of propofol 2-3mg/kg , nalbuphine 0.1mg/kg and atracurium 0.5mg/kg and patient will be intubated with 7.0 mm size ETT for females and 8.0mm size ETT for male patients. All intubations were performed by an anesthesiologist with minimum of two year experience. ETT cuff was inflated by using Ketamine 2.5% in Normal Saline in group K and 2% lidocaine with 8.4% Sodium bicarbonate in LA group till the air leak has diminished. After surgery patient was assessed on extubation for any emergence phenomena and then were assessed for 1st, 6th, 12th and 24th hour post surgery for outcome. The assessment was done by the oncall anesthesiology resident who was blinded of the study group. Any patient who develops Post- operative sore throat was given dexamethasone 8 mg IV stat and advised warm normal saline gargles.

Principal investigator recorded all clinical history demography on a perfoma that was already designed, informed on paper consent was taken before enrollment. Exclusion criteria was firmly followed to avoid confounding variables

Statistical analysis

For analyzing the data SPSS version 22 was used. For calculation of quantitative variables like age, frequency and percentage. Mean and standard deviation was computed and for qualitative variables i.e. gender and paraprotienemia. Satisfactory data was taken in correspondance to gender and age. Chi-square test was applied for post satisfication; p-value d"0.05 was taken as significant.

Results

Total 70 participants who were going under General anesthesia with endotracheal intubation as per inclusion criteria were included in our study. Patients were randomly

Age 2 +groups	Group K	Group LA	Overall	P-value
12-40 years	23(32.85%)	21(30%)	44(62.85%)	
41-70 years	12(17.14%)	14(20%)	26(37.14%)	
Total	35(50%)	35(50%)	70(100%)	0.530
Mean±SD	36.51±14.133	36.29±14.600	36.40±14.264	
Gender	Group K	Group LA	Total	P-value
Male	20(28.6%)	21(30%)	31(44.28%)	
Female	15(21.4%)	14(20%)	29(41.42%)	0.000
Total	35(50%)	35(50%)	70(100%)	
Co-morbids	Group K	Group LA	Total	P-value
Diabetes mellitus (DM)	2(2.9%)	1(1.4%)	3(4.28%)	
Hypertension	4(5.7%)	2(2.9%)	6(8.57%)	
Breast carcinoma	1(1.4%)	0(0%)	1(1.4%)	
Hepatitis C	1(1.4%)	0(0%)	1(1.4%)	0.000
Hypertension/Asthma	1(1.4%)	1(1.4%)	2(2.8%)	
Hypertension/Parkinson's disease	1(1.4%)	0(0%)	1(1.4%)	
DM/ Hypertension	0(0%)	2(2.9%)	2(2.8%)	
No known co-morbids	25(35.71%)	27(38.57%)	52(74.28%)	
Total	35(50%)	35(50%)	70(100%)	

Table-I; Age, gender & co-morbids distribution with respect to groups

Severity of sore throat pain	Group K		Group LA		Total	P-value
	Mild pain	No Pain	Mild pain	No Pain		
15 minutes	7(10%)	23(40%)	7(10%)	23(40%)	70(100%)	0.000
1 hour	8(11.42%)	27(38.57%)	2(2.9%)	33(47.1%)	70(100%)	0.000
3 hours	2(2.9%)	33(47.1%)	2(2.9%)	33(47.1%)	70(100%C)	0.000
24 hours	0(%)	35(50%)	0	35(50%)	70(100%)	0.000
Cough	Group K		Group LA		Total	P-value
	Yes	No	Yes	No		
15 minutes	4(5.71%)	31(44.28%)	9(12.85%)	26(37.14%)	70(100%)	0.000
1 hour	3(4.28%)	32(45.71%)	5(7.14%)	30(42.85%)	70(100%)	0.000
3 hours	0(0%)	35(50%)	0(%)	35(50%)	70(100%)	0.000
24 hours	1(1.4%)	34(48.6%)	0(%)	35(50%)	70(100%)	0.000
Hoarseness	Group K		Group LA		Total	P-value
	Yes	No	Yes	No		
15 minutes	1(1.4%)	34(48.6%)	1(1.4%)	34(48.6%)	70(100%)	0.000
1 hour	1(1.4%)	34(48.6%)	1(1.4%)	34(48.6%)	70(100%)	0.000
3 hours	0(%)	35(50%)	0(%)	35(50%)	70(100%)	0.000
24 hours	0(%)	35(50%)	0(%)	35(50%)	70(100%)	0.000
Laryngeal spasm	Group K		Group LA		Total	P-value
	Yes	No	Yes	No		
15 minutes	1(1.4%)	34(48.6%)	3(4.28%)	32(45.47%)	70(100%)	0.000
1 hour	0(%)	35(50%)	0(%)	35(50%)	70(100%)	0.000
3 hours	0(%)	35(50%)	0(%)	35(50%)	70(100%)	0.000
24 hours	0(%)	35(50%)	0(%)	35(50%)	70(100%)	0.000

Table-II: Severity of pain at 15 minutes, 1 hour, 3 hours & 24 hours, Cough at 15 minutes, 1 hour, 3 hours & 24 hours distribution with respect to groups

Heart rate	Group K		Group LA		Total	P-value
	57-85	86-135	57-85	86-135		
Pre-operative heart rate	16(22.85%)	19(27.14%)	13(18.57%)	22(31.42%)	70(100%)	0.077
Mean & standard deviation	88.20±18.526		86.97±11.116			
Post operative at 15 minutes	11(15.71%)	24(34.28%)	5(7.14%)	30(42.85%)	70(100%)	0.512
Mean & standard deviation	89.86±12.790		96.83±11.281			
At 1 hours	16(22.85%)	19(27.14%)	7(10%)	28(40%)	70(100%)	0.396
Mean & standard deviation	86.63±13.251		91.34±8.267			
At 3 hours	20(28.57%)	15(21.42%)	15(21.42%)	20(28.57%)	70(100%)	0.521
Mean & standard deviation	84.60±13.276		88.74±8.903			
At 24 hours	25(35.71%)	10(14.28%)	14(20%)	21(30%)	70(100%)	0.500
Mean & standard deviation	81.74±12.149		87.44±8.217			
Blood pressure	Group K		Group LA		Total	P-value
	100/50-140/90	141/91-170/118	100/50-140/90	141/91-170/118		
Pre-operative blood pressure	27(38.57%)	8(11.42%)	29(41.42%)	6(8.57%)	70(100%)	0.000
Post operative blood pressure at 15 minutes	30(42.85%)	5(7.14%)	23(32.85%)	12 (17.14%)	70(100%)	0.000
At 1 hours	29(41.42%)	6(8.57%)	29(41.42%)	6(8.57%)	70(100%)	0.000
At 3 hours	33(47.14%)	2(2.8%)	32(45.71%)	3(4.28%)	70(100%)	0.000
At 24 hours	32(45.71%)	3(4.28%)	32(45.71%)	3 (4.28%)	70(100%)	0.000

Table-III

Pre-operative heart rate, heart rate at 15 minutes, 1 hour, 3 hours & 24 hours, Pre-operative blood pressure, blood pressure at 15 minutes, 1 hour, 3 hours & 24 hours distribution with respect to groups

divided into two groups, group K patients were given intra-cuff ketamine and group LA patients were given alkalinized lidocaine and assessed by severity of post operative sore throat, cough, Hoarseness, laryngeal spasm, heart rate & blood pressure.

Group 'K' included 35 subjects of which 20(28.6%) were male while 15(25%) were female, with mean age of 36.51±14.133 years, group 'LA' also included 35 patients of which 21(30%) were male while 14(20%) were female, with mean age 36.29±14.600 years (as shown in table:1). The overall mean age came out to be 36.40±14.264 years (as shown in table-1).

In our study the co-morbids in group K were Diabetes mellitus (DM) in 2(2.9%), hypertension in 4(5.7%), Breast carcinoma in 1(1.4%), Hepatitis C in 1(1.4%), Hypertension/Asthma in 1(1.4%), Hypertension/Parkinson's disease in 1(1.4%), No known co-morbids in 25(35.71%), while in group LA Diabetes mellitus (DM) in 1(1.4%), hypertension in 2(2.9%), Breast carcinoma in 0(0%), Hepatitis C in 0 (0%), Hypertension/Asthma in 1(1.4%), DM/Hypertension 2 (2.9%), No known co-morbids in 27(38.57%), as shown in Table-1.

Severity of sore throat pain in group K at 15 minutes was mild in 7(10%) & no pain in 23(40%), at 1 hour was mild in 8(11.42%) & no pain in 27(38.57%), at 3 hours was mild in 2(2.9%) & no pain in 33(47.1%) & 24 hours was mild in 0(%) & no pain in 35(50%), while in group LA Severity of sore throat pain at 15 minutes was mild in 7(10%) & no pain in 23(40%), at 1 hour was mild in 2(2.9%) & no pain in 33(47.1%), at 3 hours was mild in 2(2.9%) & no pain in 33(47.1%) & 24 hours was mild in 0(0%) & no pain in 35(50%), as shown in Table-2

Cough in group K at 15 minutes post operatively was noted in 4(5.71%), at 1 hour in 3(4.28%), at 3 hours in 0(0%) & at 24 hours in 1(1.4%), while in group LA at 15 minutes post operatively was noted in 9(12.85%), at 1 hour in 5(7.14%), at 3 hours in 0(0%) & at 24 hours was noted in none patient 0(0%), as shown in table-2

Hoarseness was only noted in group K at 15 minutes in 1(1.4%), at 1 hour in 1(1.4%), not noted at 3 hours & at 24 hours, while in group LA also noted at 15 minutes in 1(1.4%), at 1 hour in 1(1.4%), not noted at 3 hours & at 24 hours, as shown in table-2

Laryngeal spasm was only noted at 15 minutes in Group K in 1(1.7%), while in group LA in 3(4.28%), it was not noted at 1 hour, at 3 hours & at 24 hours, as shown in Table-2

The mean heart rate in group K, per operatively was 88.20±18.526 b/min, post operatively at 15mins was 89.86±12.790, at 1 hours 86.63±13.251, at 3 hours 84.60±13.276 & at 24 hours was 81.74±12.149, while in group LA heart pre operatively was 86.97±11.116, at 15 mins was 96.83±11.281, at 1 hour 91.34±8.267, at 3 hours 88.74±8.903 & at 24 hours was 87.44±8.217, as shown in Table-3

Blood pressure in both groups pre operatively, at 15 minutes, 1 hour, 3 hours & at 24 hours is given in Table-3

Discussion

Many of the general anesthetic procedures in the modern anesthetic practice are carried out with endotracheal intubation. Post-operative sore throat is a well recognized minor complication after general anesthesia10 rated by patients as the 8th most undesirable outcome in the post-operative period.11Prophylactic management for decreasing its frequency and severity is still recommended to improve the quality of post anesthesia care though the symptoms resolve spontaneously without any treatment.12 POST is a parsimonious description representing a broad constellation of signs and symptoms of laryngitis, tracheaitis, hoarseness, cough or dysphagia11 with incidence varying from 14.4% to 100% after endotracheal intubation.10 Research indicates that POST can be attenuated using a multi model approach consisting of pharmacological and non-pharmacological interventions. Identification of the factors associated with an increased risk of POST will allow anesthesia providers to avoid combination of controllable factors, decrease the incidence of POST and improve patients' anesthetic outcome. Many pharmacological interventions like steroids and non-steroidal anti-inflammatory drugs, lignocaine, have been used to attenuate POST by various authors. But all such maneuvers had their own limitations. Ketamine is in the middle of the affinity range of the uncompetitive NMDA antagonists which has been found by various authors to attenuate POST.12 An increasing amount of experimental data shows that NMDA receptors are found not only in central nervous system but also in the peripheral nerves. Peripherally administered NMDA receptor antagonists are involved with anti-nociception and anti-inflammatory cascade13 by reducing NFK beta activity and

TNF alpha production14, expression of inducible nitric oxide synthase15 serum C-reactive protein IL-6 and IL-1016

In the present examination, the rate of POST at 3 and 24 hours was diminished significantly, and the constriction of seriousness of POST happened in the both groups however more generally in ketamine group at 15 minutes and 1 hour. The instrument of impact was potentially the topical impact of intra-cuff ketamine that lessened the nearby inflammation.17 Writing bolsters the topical impact of ketamine by means of its NMDA-hostile activity and mitigating impact dependent on creature demonstrate data.18 Ketamine is a NMDA receptor foe with the essential site of activity in the focal sensory system, and parts of the limbic framework while its utilization by means of nasal course, rinse, and rectal course proposes its fringe effect.19 Trial creature thinks about have demonstrated a defensive impact on airway inflammatory damage with ketamine.20

The utilization of a little measurements of alkalized L-HCl uniquely enhanced ETT resistance amid a more delayed timeframe. The utilization of alkalinized neighborhood soporifics in the ETT cuff offers the upsides of negligible pressure reaction to smooth extubation and hack free development. No cuff break was recorded in our examination which is like Estebe et al21 think about and different previous studies 22-25. This outcome affirmed that presentation of lidocaine isn't injurious for the cuff. Previous research 22-25 have demonstrated that L-HCl set inside the cuff of an ETT can gradually diffuse through its hydrophobic structure.

In our study severity of sore thro at pain in group K at 15 minutes was mild in 9(15%) & no pain in 31(51.7%), at 1 hour was mild in 8(13.3%) & no pain in 32(53.3%), at 3 hours was mild in2(3.3%) & no pain in 38(63.3%) & 24 hours was mild in 0(%) & no pain in 40(66.7%), while in group LA Severity of sore throat pain at 15 minutes was mild in 3(5%) & no pain in 17(28.3%), at 1 hour was mild in 2(3.3%) & no pain in 18(30%),at 3 hours was mild in 2(3.3%) & no pain in 18(30%) & 24 hours was mild in0(0%) & no pain in 20(33.3%), as compare to one previous study in which overall post operative sore throat was less in Ketamine group with 17(34%) patients when compared to Alkalinized lidocaine group with 28(56%) patients complaining of it with P = 0.043.26

Study limitation

The main limitation was the small sample size. There were also different Anesthesiologists involved. Only 200 patients were enrolled in this study due to incomplete data, missing case notes or exclusion criteria.

Conclusion

Intra-cuff alkalinized lidocaine significantly attenuated the severity of POST, cough, hoarseness & laryngeal spasm especially in the early post-operative period, as compare to intra-cuff ketamine.

Pakistan DRUG MANUAL

ARTICLE INFORMATION

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Authors Contribution:
Dr. Saad Abdul Razzaq contributed to the conception and design of the study acquisition of data, Dr Mariam Imran help in drafting the manuscript and interpretation of data.., Dr. Zahid Mehmood, Dr. Zawwar Reza, Dr. Ghansham, Dr Hazrat Bilal Burki contributed to the acquisition, analysis and interpretation of data along. All authors approved the final version of the manuscript.

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