

Incidence of Post-Operative Hoarseness and Sore Throat between Endotracheal Cuff Is Inflated with Alkalinised Lignocaine Versus Air in Laproscopic Procedures: A Comparative Study

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Abstract

Introduction: Airway management with cuffed endotracheal tubes for General Anaesthesia is an integral part of anaesthesiologist's responsibilities towards patient care. Amongst the sequel inherent to the usage of cuffed endotracheal tubes are local irritation and inflammation of the airway caused by prolonged inflation of the cuff which results in post extubation morbidities like sore throat, hoarseness of voice and cough. **Objectives:** To compare the incidence of post-operative, sore throat has any relation with age, sex and post-operative nausea and vomiting. **Methods:** A prospective one-year cross sectional study was conducted in department of Anaesthesiology, Baby Memorial Hospital, Calicut during the period of November 2014 to October 2015. Patients undergoing laproscopic surgeries in surgical, gynaecological and urology under general Anaesthesia at Baby Memorial Hospital were the study population. Patients were divided into two groups. Post-Operative sore throat and hoarseness were calculated on 0,6-hour, 12 hour and 24 hours. SPSS (IBM 22.0) was used for analysis. Chi square test and t test were used as test of significance. **Results:** The mean age of 32.1 was calculated with a standard deviation of 6.801. Similarly, in the control group mean age of 32.3 was calculated with a standard deviation of 6.990. Among 100 patients taken for the study in the test group, 57 were females (57 %) and 43 were males (43 %). Intervention with alkalinised lignocaine in endotracheal tube cuff is much effective in reducing the incidence of sore throat than air in the cuff. ($p < 0.001$). Out of 100 patients in the test group AL, 82 patients had no Post-Operative Nausea and Vomiting, 18 had Post-operative nausea and Vomiting. In the control group A out of 100 patients, 34 had nausea and vomiting post operatively whereas 66 had no such complaints. In Group A, 35 patients had Visual analogue scale of 1, 57 had 2, 8 had 3. In Group AL out of 100, 50 had Visual analogue scale of 1 and rest 50 had Visual analogue scale of 2. **Conclusion:** The intervention of using alkalinised lignocaine in endotracheal cuff instead of air in the endotracheal cuff in laproscopic surgeries produces significant reduction in sore throat and hoarseness, when observed over a period of 24 hours.

Keywords: Endotracheal tube cuff, hoarseness, post-operative sore throat, laparoscopic, vomiting, visual analog scale (VAS).

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Introduction

Definite airway means passing cuffed endotracheal tube through glottis and is a part and parcel of anaesthesiologist responsibilities towards patient care. Amongst the sequel inherent to the usage of cuffed endotracheal tubes are local irritation and inflammation of the airway. This is attributed to the prolonged inflation of the cuff, which results in post extubation morbidities like sore throat, hoarseness of voice and cough. This undesirable out comes in the post-operative period influence patient satisfaction and patient activities after discharge from hospital [1,2]. Postoperative sore throat occurs in up to 90% of intubated patients and is the most common and distressing complaint after tracheal intubation. Cuff related tracheal damage is influenced by both lateral wall pressure and the duration of intubations. To avoid ischemic damage the endotracheal tube cuff pressure should be maintained below the mean mucosal capillary perfusion pressure. The use of nitrous oxide during general anaesthesia leads to its diffusion into endotracheal tube cuffs.

This results in the lack of frequent control of intracuff pressure during the perioperative period and is the most important factors that contribute to the high incidence of excessive intracuff pressure during the intraoperative period [3,4]. Compared to patients who had undergone laprotomy, patient who had undergone laparoscopic surgery showed significantly higher sore throat scores. Reducing post-operative discomforts involves quality of care and is always anaesthetist preference in the perioperative period. Here we have analysed the positive outcomes from various studies and tried to formulate a better relief which is cost effective for prevention of post-operative hoarseness and sore throat and hence the study.

Materials and Methods

A prospective one-year cross sectional study was conducted in department of anaesthesiology, Baby Memorial Hospital, Calicut during the period of November 2014 to October 2015. Patients undergoing laproscopic surgeries in surgical, gynaecological and urology under general Anaesthesia at Baby Memorial Hospital were the study population.

Sample size

Based on hospital statistics 80 % of laproscopic surgeries during past 1 years, a total of 200 patients are enrolled in the study. 200 patients divided in to two groups using the formula

$$N = \frac{(Z\alpha + Z\beta)^2 PQ}{d^2}$$

where N is the sample size for each group

$Z\alpha = z$ value for an error of 5 % = 1.96 (constant)

$Z\beta = z$ value for b error of 20% = 0.84, P the average outcome

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$$P = \frac{p_1 + p_2}{2}$$

$$p = 50 \quad q = 100 - p$$

and d = clinically meaningful difference between the group. P was obtained from a study conducted by Lais Helena in 2007 comparing the incidence of emergence coughing and sore throat during the postoperative period published in Sao Paulo medical journal in which the incidence of post-operative sore throat after tracheal intubation was 50% [5]

Selection of patients

Based on the different techniques used for inflating endotracheal cuffs, selection of patients was done into two groups.

Group AL- Patients with endotracheal cuff filled with alkalised lignocaine.

Group A- Patients with endotracheal cuff filled with air.

Inclusion criteria

1. Patients aged between 18 to 65 years in either sex.
2. Patients undergoing laparoscopic general, urological and gynecological surgeries under general Anaesthesia.
3. American society of anaesthesiologist grade I&II patients.
4. General anesthesia lasting for more than 60 minutes and less than 180 Minutes.

Exclusion criteria

1. Patients with difficult air way: Mallampatti classification III/ IV.
2. Patients with acute respiratory tract infection.
3. Patients with history of laryngeal and tracheal surgery.
4. Patients with asthma.
5. Patient refusing to give informed consent.
6. Documented hypersensitivity to lignocaine.

Method of Measurement of Outcome of Interest

Post-operative sore throat

Immediately after extubation patients were assessed for sore throat and hoarseness and later at 6, 12, 24 hours post extubation.

Assessment of sore throat was done by following scores.

0. No complaints of sore throat
1. Complaints of sore throat on asking
2. Complaints of sore throat frequently

Post-operative Hoarseness

Assessment of hoarseness was done by asking the candidate to say his/name and is assessed by following scores.

0. No hoarseness.
1. Hoarseness of voice present after 1 minute of extubation.
2. Hoarseness of voice present after 6 hours of extubation.
3. Hoarseness of voice present after 12 hours of extubation

Methodology

Study subjects fulfilling selection criteria were selected for study and a written informed consent was obtained from the selected patients. Demographic data was recorded, and history was taken. Clinical examination was done for all patients and findings were recorded on predesigned and pretested proforma for study. Strict nil per oral for 8 hours was confirmed for all study subjects. Patients were premedicated with intravenous midazolam (1 mg) half hour before Anaesthesia induction. All groups received a standardized balanced anesthesia management, including sevoflurane and nitrous oxide with oxygen in the ratio 66:33 and was maintained on IPPV. 7.0 mm internal diameter for women and 8 mm internal diameter for men. Patients were induced with propofol (2 mg/kg IV), fentanyl 1.5 µg/kg, Atracurium (0.5 mg/kg IV) and intubated with high-volume/low pressure endotracheal tubes by a qualified anaesthetist. In the control group, the cuff was initially slowly inflated with air. For liquid filled lignocaine cuff groups, a mixture of 2 ml lidocaine 2%, mixed with sodium bicarbonate (NaHCO₃) 7.5 % 0.1ml was injected into the cuff and then supplemental volume of air was filled to obtain minimal occlusive volume. Standard monitoring was done. After surgical procedure, the neuromuscular block (NMB) was reversed with neostigmine and glycopyrolate. Incidence of sore throat, hoarseness was analyzed by a qualified anaesthetist by the given score. The duration of anaesthesia, visual analogue scale (VAS) and the incidence of postoperative nausea and vomiting (PONV) were also recorded. Visual analogue pain scale is a response scale for subjective assessment that cannot be directly measured. This was measured by a scale from 0 -10, by assessing the pain response on asking the patient, zero representing no pain, while ten the maximum ever pain possible.

Statistical analysis

The categorical data is expressed as percentages and continuous data is expressed as Mean ± Standard Deviation (SD). The comparison among the group is done by appropriate statistical test using chi square test, unpaired 't' test and Mann-whitney U test. A 'p' value of <0.05 was considered as significant.

Results

Table 1: Age wise distribution of groups

Age in years	Group A (n=100)	Group AL (n=100)	Total
21-30	38	39	79
31-40	55	57	112
41-50	5	4	9
51-60	0	0	0
61-70	0	0	0
Total	100	100	200
Mean(SD)	32.10(± 6.801)	32.30(± 6.990)	

t test = -.205, df= 198, p =.838

as per table 1 among the test group the mean age of 32.1 was calculated with a standard deviation of 6.801. Similarly, in the control group mean age of 32.3 was calculated with a standard deviation of 6.990. The results does not show significant association with two variables.

Table 2: Sex wise Distribution of Groups

Sex	Group A (n=100) Number	Group AL (n=100) Number	Total
Male	43	48	91
Female	57	52	109
Total	100	100	200

Chi square (χ^2) = .504, df= 1, p =.478

As per table 2 Among 100 patients taken for the study in the test group, 57 were females (57 %) and 43 were males (43 %). Similarly among 100 patients taken for the study in the test group, 58 were females (58 %) and 42 were males (42 %). Chi square test was performed to find the association between sex (qualitative variable) and intervention (qualitative variable). The results does not show any association with two variables.

Table 3: Incidence of Post Operative Sore throat at different hours both groups

Groups	0 hour		6 hour		12 hour		24 hour	
	A	AL	A	AL	A	AL	A	AL
Mean	1.97	1.32	1.90	0.302	1.19	0.394	0.66	0.11
SD	0.171	0.548	0.97	0.50	0.88	0.473	0.476	0.314
p-value	0.001		0.001		0.001		0.001	

As per table 3 Since the outcome is measured in intervals at 0 hours 6 hours ,12 hour and it is a continuous variable we have applied mannwhitneytest.The result shoes a p value <.05 .So the given study signifies that intervention with alkalised lignocaine in endotracheal tube cuff is much effective in reducing the incidence of sore throat than air in the cuff.

Table 4: Incidence of Post-Operative Hoarseness

Groups	1 minute		6 hour		12 hour	
	A	AL	A	AL	A	AL
Mean	0.98	0.54	1.46	0.43	0.63	0.06
SD	0.141	0.501	0.892	0.820	1.228	0.922
p-value	0.001		0.001		0.001	

As per table 4 Since the outcome is measured in intervals at 1 minute, 6 hours ,12 hour and it is a continuous variable we have applied Mann Whitney U test. The result shoes a p value <.05 .So the given study signifies that intervention with alkalised lignocaine in endotracheal tube cuff is much effective in reducing the incidence of hoarseness than air in the cuff.

1. Table 5: Effect of the intervention on Post-Operative Nausea and Vomiting

Post Operative Nausea and Vomiting	Group A	Group AL
Yes	34	18
No	66	82

Chi square (χ^2)=6.653 ,df=1,p=0.01

According to table 5 out of 100 patients in the test group AL, 82 patients had no Post-Operative Nausea and Vomiting,18 had Post-operative nausea and Vomiting. In the control group A out of 100 patients, 34 had nausea and vomiting post operatively whereas 66 had no such complaints. Chi square test was performed to find association between incidence of Post-operative nausea and vomiting in the two groups and it showed a significant association between two variables.

Table 6: Association between type of intervention and Visual Analogue Scale

Visual Analogue Scale	Group A	Group AL
1	35	50
2	57	50
3	8	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0

Chi square (χ^2)=11.105 ,df=2,p=0.004

As per table 6 In Group A ,35 patients had Visual analogue scale of 1,57 had 2,8 had 3.In Group AL out of 100, 50 had Visual analogue scale of 1 and rest 50 had Visual analogue scale of 2.Chi square test was done to find out the association between VAS and type of intervention. It was found to be statistically significant. (p=0.004).

Discussion

Laparoscopic surgeries are emerging as safe in both procedure wise and in reduction on post-operative stay and pain relief, apart from cosmetologically concern. But the incidence of post-operative sore throat and hoarseness are much higher. Both post-operative hoarseness and sore throat are described as worse experience than surgical pain by many patients. Many studies have been performed exploring the measures to minimize post intubation morbidities like use of high volume low pressure cuffed endotracheal tubes, use of smaller size endotracheal tubes, taper shaped cuff ,inhalation of steroids, topical application of lubricant jellies, intravenous lignocaine, endotracheal tube filled with lignocaine as a drug delivery system[1,5,6,7,8]. When lidocaine is injected into the ET cuff it spreads through the semi permeable membrane wall and induces anaesthetic action in the trachea. This increases airway tolerance to tracheal and tracheotomy tubing. After tracheal extubation, the hemodynamic alterations are minimized, thus reducing the incidence of coughing[i,ii]. There are many proposed mechanisms as are laryngeal oedema and ischemia. The incidence of post-operative morbidities were found to be more in females, in old age, in thyroid surgeries and following transcervical anterior approaches to the spine[9,10,11]. The mean age group in group A was32.1;in group AL was 32.9 years with range being 22 to 42 years. The results do

not show significant association with two variables. This result was not in accordance with the study conducted by Maria Jaensson which had mentioned an increase in sorethroat and hoarseness of voice above the age of 60[12].Visual analogue scale was recorded to find the patient morbidity in terms of pain. It was found to be statistically significant. (p=0.004). Post-operative soreness and hoarseness was measured according to a scale. The result shows a 'p' value <.05 %,. So the given study signifies that intervention with alkalised lignocaine in endotracheal tube cuff is much effective in reducing the incidence of sore throat and hoarseness than air in the cuff . The incidence of post operative sore throat and hoarsens was significant in the group A compared to group AL suggested by a 'p' value of <.05.This is in accordance to J P Estebe study[3] The results does not show significant association with two variables. This not in accordance with the study conducted with Alia[13].

Conclusion

The intervention of using alkalised lignocaine in endotracheal cuff instead of air in the endotracheal cuff in laproscopic surgeries produces significant reduction in sore throat and hoarseness, when observed over a period of 24 hours. The present study has not been able to validate the association between the age, sex with the incidence of sore throat and hoarseness.This could be due to the

reduced sample size and might be significant if a large population was included.

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