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Original Research Article

A Comparison Study Evaluating the Incidence of Post-Operative Hoarseness and Sore Throat when the Endotracheal Cuff is Inflated with Alkalinized Lignocaine during Laproscopic Procedures

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Abstract

Introduction: Cuffed endotracheal tubes are used to maintain the airway during general anaesthesia, which is a crucial aspect of the anaesthesiologist's role in patient care. A consequence of using cuffed endotracheal tubes is localised airway irritation and inflammation brought on by prolonged cuff inflation, which can lead to post-extubation morbidities like a sore throat, hoarse 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: In the months of August 2021 and July 2022, the anaesthesia department at Rama Medical College and Hospital carried out a prospective one-year cross-sectional study. The study population consisted of people having laparoscopic procedures in the areas of urology, gynaecology, and surgery while under general anaesthetic at Hospital. There were two groups of patients. Calculations were made for the postoperative painful throat and hoarseness at 0, 6, and 24 hours. Analysis was performed using IBM 22.0 SPSS.

Results: A standard deviation of 6.801 was used to obtain the mean age of 32.1. Similar calculations were made for the control group, which had a mean age of 32.3 and a standard deviation of 6.990. Among the 100 patients enrolled in the study's test group, 57 (or 57% of the total) were women and 43 (or 43% of the total). When compared to air in the cuff, alkalinized lignocaine is substantially more effective at reducing the occurrence of sore throat ($p<0.001$). 82 patients in the test group AL's 100 patients did not experience post-operative nausea and vomiting, while 18 of them did. Out of 100 patients in the control group A, 34 suffered post-operative nausea and vomiting while 66 did not.

Conclusion: When examined over the course of 24 hours, the intervention of employing alkalinized lignocaine in the endotracheal cuff instead of air in the endotracheal cuff during laparoscopic procedures significantly reduces sore throat and hoarseness.

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

Introduction

Creating a definitive airway involves inserting a cuffed endotracheal tube through the glottis and is integral to the duties of an anesthesiologist in providing patient care. Localized discomfort and airway inflammation are among the side effects that come with using cuffed endotracheal tubes. This is due to the cuff's extended inflation, which causes post-extubation morbidities such coughing, hoarseness, and sore throats. This unfavourable postoperative outcome has an impact on patient satisfaction and activity following hospital release [1,2].

The most prevalent and upsetting complaint following tracheal intubation is postoperative sore throat, which affects up to 90% of patients who have been intubated. The length of intubations as well as lateral wall pressure has an impact on tracheal injury caused by the cuff. The endotracheal tube cuff pressure should be kept below the mean mucosal capillary perfusion pressure to prevent ischemic damage. Nitrous oxide diffuses through endotracheal tube cuffs when used during general anaesthesia.

One of the main causes of the high frequency of excessive intracuff pressure during the intraoperative period is the lack of regular regulation of intracuff pressure during the perioperative phase, which has the following effect: [3,4] Patients who underwent laparoscopic surgery had significantly greater sore throat scores than those who had undergone laprotomy. It comprises providing high-quality treatment and is always preferred by anaesthetists during the perioperative period to lessen postoperative discomforts.

Materials and Methods

The Rama Medical College and Hospital's department of anesthesiology conducted a prospective cross-sectional study from August 2021 to July 2022. The study population consisted of patients having laproscopic procedures in urology, gynaecology, and surgery while under general anaesthesia at the hospital.

Sample size

Based on data from hospitals 200 patients, or 80% of those who underwent laparoscopic procedures in the previous year, are included in the study. 200 patients were split into two groups using the equation N= (Z+ Z)2 PQ/ d2.

N is the number of samples taken from each group.

Z=Z value equals 1.96 with a 5% inaccuracy (constant)

Z = z value for a 20% b mistake is equal to 0.84, P the typical results

P= p1+p2

2

p =50 q =100-p

Where d is the clinically significant difference in the group. P was acquired from a study done by Lais Helena in 2007 and published in a medical publication in Sao Paulo. In that study, the incidence of post-operative sore throat following tracheal intubation was compared to the incidence of emerging coughing [5].

Selection of patients

Method of Measurement of Outcome of Interest

The patients were divided into two groups according on the various endotachealcuff inflation procedures.

Patients in Group AL have endotracheal cuffs stuffed with alkalinized lignocaine.

Patients in Group A have air-filled endotracheal cuffs.

Inclusion standards

1. People of either sex between the ages of 18 and 65.
2. Patients having general anaesthesia for laparoscopic general, urological, and gynaecological operations

3. Patients grade I&II by the American Society of Anesthesiologists.
4. A general anaesthetic that lasts more than 60 but not more than 180 minutes

Exclusion standards

1. Mallampatti classifications III/IV for patients with difficult airways.
2. People who have a severe respiratory infection.
3. Patients who have had tracheal and laryngeal surgery in the past.
4. Asthmatic patients.
5. Refusal to provide informed consent by the patient.
6. Reported hypersensitivity

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 participants who met the criteria for selection were chosen, and patients chosen for the study provided written informed consent. History was taken, and demographic information was collected. Each patient underwent a clinical examination, and the results were documented on a proforma that had been previously created and tested. For all trial participants, strict nil per oral for 8 hours was confirmed. Half an hour prior to the onset of anaesthesia, patients received intravenous midazolam (1 mg) as premedication. The anaesthetic management for all groups was uniform and included sevoflurane and nitrous oxide with oxygen in the ratio 66:33 while being maintained on IPPV. 8 mm for men and 7.0 mm for women, respectively, is the interior diameter.

A qualified anaesthetist inducted the patients with propofol (2 mg/kg IV), fentanyl 1.5 g/kg, atracurium (0.5 mg/kg IV), and intubated them with high-volume/low pressure endotracheal tubes. The cuff was originally gradually inflated with air in the control group. For liquid-filled lignocaine cuff groups, sodium bicarbonate (NaHCO3) 7.5% 0.1 ml and 2 ml lidocaine were put into the cuff to create a minimal occlusive volume before additional air was added. Regular monitoring was carried out. Neostigmine and glycopyrolate were used to break the neuromuscular block (NMB) after surgery. An experienced anaesthetist scored the incidence of sore throat and hoarseness. The amount of time under anaesthesia, the VAS, and the frequency of postoperative nausea and vomiting (PONV) were all noted. A response scale for subjective evaluation that cannot be quantified directly is the visual analogue pain scale. This was determined by asking the patient to rate their level of pain on a scale from 0 to 10. The pain scale goes from zero to 10, with ten being the most painful number.

Statistical Analysis

Continuous data is expressed as Mean Standard Deviation, whereas categorical data is expressed as percentages (SD). Chi square test, unpaired 't' test, and Mann-whitney U test are used as relevant statistical tests to compare the groups. A "p" value of 0.05 or lower was deemed 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 = -0.205, df = 198, p = 0.838

According to Table 1, the test group's mean age of 32.1 and standard deviation of 6.801 were calculated. Similar calculations were made for the control group, which had a mean age of 32.3 and a standard deviation of 6.990. The findings do not indicate a meaningful relationship between the two factors.

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 $(\chi)^2 = 0.504$, df = 1, p = 0.478

Based on table 2 Among the 100 patients enrolled in the study's test group, 57 (or 57% of the total) were women and 43 (or 43% of the total). In the test group, out of 100 patients enrolled for the study, 58 (58%) were female and 42 (42%), respectively. The chi square test was used to determine the relationship between the intervention and the qualitative variable of sex (qualitative variable). The findings do not indicate any correlation between the two factors.

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

	0 hour		6 hour		12 hour		24 hour	
Groups	**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	

Based on table 3 Since the outcome is a continuous variable and is measured at intervals of 0 hours, 6 hours, and 12 hours, we used the Mann-Whitney test. The outcome yields a p value of.05. The results of the study indicate that alkalinized lignocaine in the endotracheal tube cuff is substantially more effective than air in the cuff at reducing the occurrence of sore throat.

Table 4: Incidence of Post-Operative Hoarseness

	1 minute		6 hour		12 hour	
Groups	**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	

Based on table 4 We used the Mann Whitney U test because the outcome is a continuous variable that is measured at 1-minute, 6-hour, and 12-hour intervals. The outcome yields a p value of.05. The results of the study indicate that alkalinized lignocaine in the endotracheal tube cuff is substantially more effective than air in the cuff at reducing the occurrence of hoarseness.

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 $(\chi)^2$=6.653, df=1, p=0.01

Table 5 shows that of the 100 patients in the test group AL, 18 patients experienced post-operative nausea and vomiting, leaving 82 individuals free of these symptoms. Out of 100 patients in the control group A, 34 suffered post-operative nausea and vomiting while 66 did not. The chi square test was used to compare the incidence of post-operative nausea and vomiting between the two groups, and it revealed a statistically significant relationship between the 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 $(\chi)^2$=11.105, df=2, p=0.004

Based on table 6 35 individuals in Group A had a Visual Analogue Scale of 1, 57 had 2, 8, and 3 had it. Out of 100 participants in Group AL, 50 had a visual analogue scale score of 1, while the remaining 50 had a score of 2. To determine the relationship between VAS and the type of intervention, the chi square test was used. Statistics were used to determine its significance. (p=0.004).

Discussion

Aside from cosmetic concerns, laparoscopic operations are proving to be safe in terms of the surgery itself as well as the reduction of recovery time and pain management. However, the likelihood of hoarseness and a painful throat following surgery is substantially higher. Many individuals say that having a painful throat or hoarse voice after surgery is worse than the actual surgery itself.

Numerous studies have been conducted investigating ways to reduce post-intubation morbidities, including the use of high volume, low pressure cuffed endotracheal tubes, smaller endotracheal tubes, taper-shaped cuffs, steroids inhaled, lubricant jelly applied topically, intravenous lignocaine, and endotracheal tubes filled with the drug [1,5-8]. Lidocaine travels through the semi-permeable membrane wall when it is administered into the ET cuff and causes anaesthesia in the trachea. This makes

tracheal and tracheotomy tubing more tolerable to the airways.

Coughing is less common after tracheal extubation because hemodynamic changes are decreased. Laryngeal oedema and ischemia are two of numerous hypothesised explanations. Females, older patients, thyroid procedures, and patients who underwent transcervical anterior approaches to the spine were reported to have higher incidences of post-operative morbidities [9-11].

In group A, the mean age was 32.1; in group AL, it was 32.9, with a range of 22 to 42 years. The results show that there is no significant link between the two variables. This result did not match the findings of a study by Maria Jaensson, which indicated that voice hoarseness and sore throats increased with age. For the purpose of determining the patient's pain morbidity, a visual analogue scale was recorded. Statistics were used to determine its significance. (p=0.004). A scale was used to quantify the degree of discomfort and hoarseness following surgery. The outcome displays a "p" value of.05%.

The results of the study indicate that alkalinized lignocaine in the endotracheal tube cuff is substantially more effective than air in the cuff in lowering the incidence of sore throat and hoarseness. 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 <0.05.This is in accordance to J P Estebe study [3]. The results do not show significant association with two variables. This not in accordance with the study conducted with Alia [13].

Conclusion

When examined over the course of 24 hours, the intervention of employing alkalinized lignocaine in the endotracheal cuff instead of air in the endotracheal cuff during laproscopic procedures significantly reduces sore throat and hoarseness. The current investigation was unable to confirm a link between age, sex, and the frequency of sore throats and hoarseness. Given the smaller sample size, this might be substantial if a sizable population was taken into account.

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