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Research Article

The Incidence and Associated Risk Factors of Post-Operative Sore Throat after General Anesthesia with Endotracheal Intubation at Hawassa University Ethiopia: A Crossectional Study

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ABSTRACT

Background: Postoperative sore throat is a common complaint by patients after general anesthesia with endotracheal intubation, which contributes to postoperative morbidity and patient dissatisfaction following general anesthesia. A problem of postoperative pharyngeal discomfort is so prevalent that it is almost expected by patients and anesthesiologist or anesthetist like as an unavoidable part of routine anesthesia. Complaints range from a minor throat irritation to severe pain, inability to swallow and temporary voice changes.

Objective: This study aims to determine the incidence and associated risk factors of postoperative sore throat following general anesthesia with endotracheal intubation.

Method and materials: Cross sectional study design was used to conduct this study among 95 patients who underwent general anesthesia with endotracheal intubation from November 1st to December 1st, 2013 E.C at Hawassa university comprehensive specialized hospital, Hawassa, Southern Ethiopia. Data was collected by fourth year anesthesia students using structured questionnaire prepared on variables being measured and analyzed using SPSS version 20.

Results: Out of 95 study subjects who had general anesthesia with endotracheal intubation, 29 of study participants (30.5%) complained various forms of post-operative sore throat. In this study, we found that size of Endotracheal intubation and size of laryngoscope blade showed statistically significant association with the post-operative sore throat with the size of ETT (p-value=0.01, AOR=3.291, 95% CI=1.658, 6.531) Size of laryngoscope blade (p-value=0.03, AOR=0.15, 95% CI=0.14, 0.18).

Conclusion: The result of this study showed that the larger the size of ETT and laryngoscope blade, the higher the incidence of postoperative sore throat. Even though endotracheal intubation is mandatory for good airway protection during surgical procedures, we recommend using the smaller ETT size (6 mm, 6.5 mm ID) and smaller laryngoscope blade (size 2, size 3).

Keywords: Post-operative Sore throat, Endotracheal tube, Anesthesia

INTRODUCTION

Postoperative sore throat is a condition in which the mucous membrane in the throat is inflamed particularly when general anesthesia with endotracheal intubation is used. This is because the conduct of this technique of anesthesia often involves interference with the normal airway mucosal barrier mechanisms by way of instrumentation, or interference with the normal mucosal or ciliary activities due to inhalation of unhumidified anesthetic gases. The interference in many cases may lead to trauma, foreign body contaminations, mucosal dryness and airway irritation, which manifests in various ways in the postoperative period [1]. The exact mechanism of POST is not clear but it appears to be an inflammatory process since the

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tracheal mucosa has been found to release inflammatory mediators after intubation. However the exact anatomical locations of sore throat still remain uncertain in patients. Some of associated POST factors include type and size of airway device, technique of insertion, use of lubricant, cuff pressure, length of procedure, and seniority of anesthetist [2].

Sore throat is a common uncomfortable distressing sequel of tracheal intubation which contributes to post-operative morbidity and patient dissatisfaction following general anesthesia. These represent a significant negative aspect of surgical care [3]. There is no enough research available for healthcare providers that assess the incidence and its associated risk factors of POST in Ethiopia. Therefore, this study is aimed at clearly assessing the most common factors associated with POST and its incidence in Ethiopia. Awareness of the variables associated with an increased incidence of POST will allow health care providers to minimize combinations of risk factors, reduce the incidence and severity of POST, and improve a patient's anesthesia experience [4].

MATERIALS AND METHODOLOGY

Study area and period

The study was conducted in HUCSH from November 1st to December 1st, 2013 E.C, which is one of the oldest public hospitals located in Hawassa. It is the capital city of Sidama region located 275 km away from Addis Ababa. It is one of the Universities in Ethiopia where health and many other professionals of different disciplines have been trained. The hospital has given surgical, medical, gynecological, obstetrical, pediatrics, dental, ophthalmological, psychiatry and dermatology services. It also has 10 operation rooms (2 in Ophthalmology, 2 in obstetrics and 6 in major OR) which are all functional. It has also one ICU and one NICU. Currently the hospital has been serving as the only referral hospital in southern parts of country [5].

Study design

Cross sectional study design was used.

Population

Source population: All adult patients who has undergone general anesthesia with intubation.

Study population: Selected patients who has undergone general anesthesia with endotracheal intubation in the study period.

Sampling size and sampling technique

Sampling size determination: To determine sample size, single population proportion formula was used by considering the following assumptions of 95% confidence level, 10% margin of error and a prevalence of POST (45%).

$$n = (z\hat{}2p(1-p))/d\hat{}2, n = ([(1.96)]\hat{}2 \times (0.45)(1-0.5))/((0.01)2) = 95$$

Where

- n = Initial sample size.
- Z α/2 = Confidence level at 95% = 1.96, using level of significance of α = 0.05.
- P = prevalence POST.
- d = margin of error to be tolerated = 10%.
- Z = value of a standard normal distribution score = 1.96.
- ^ = Margin Size.

Sampling technique: Probability sampling methods; convenience sampling technique was used to conduct this study.

Data collection: Data was collected using structured questionnaire prepared in English and then translated to Amharic. The response was encircled or written in space provided. Record review was done from intraoperative anesthesia chart to ascertain intraoperative anesthesia management. Data was collected by group members who were familiar with the topic. Follow up was taken for every patient post operatively for at least 24 hours by data collectors.

Data analysis plan

After data collection, data was summarized and coded. Data was entered into SPSS version 20.0 for data cleaning up and analyzing. Proportion was calculated for all categorical variables, bivariate analysis was done for each independent variable with dependent variable and binary logistic regression was done to measure association between dependent and each independent variable while controlling other variables. P value and 95% C.I was used to judge significant of association. P-value <0.05 would be used as cut off point.

Operational definition

POST (Post-Operative Sore Throat): Post-operative sore throat is a condition in which the mucous membrane in the throat is inflamed after procedure done by general anesthesia with endotracheal tube.

Endo Tracheal Tube (ETT): Is a specialized device used for airway maintenance.

Endotracheal intubation: A technique used for airway maintenance by which a tube is inserted to trachea through mouth or nose.

Laryngoscopy: Is a technique of using a device called laryngoscope to view laryngeal structures to facilitate endotracheal intubation.

RESULTS

Socio-demographic characteristics of the study subjects

A total of 95 patients were included into the study. The study showed majority of the subjects were aged between 18 and 65. Out of the patients who develop postoperative sore throat 26 patients (89.6%) were found between 18 and 65 years and 3 patients (10.4%) aged above 65 years. The mean age of the patient was 35.57, and the standard deviation is 16.063 and the minimum and maximum age is 18 and 75 years. In this study

there was no significant association between age and occurrence of POST [6]. A study conducted in Watford general Hospital, United Kingdom, also showed no significant difference in the incidence of sore throat between age groups studied. In this study male patients reported more sore throat than female patients (69% *vs.* 31%, 20/29 *vs.* 9/29). Again sex had no significant association in occurrence of post-operative sore throat.

Prevalence and risk factors for post-operative sore throat

Post-operative sore throat was complained by 29 patients (30.5%). In this study size of endotracheal tube and size of laryngoscope blade was significantly associated with POST. Size of Endotracheal tube had strong association with post-operative sore throat (p-value=0.01, AOR=3.291, 95% CI=1.658, 6.531).

The variable with a p-value of <0.05 from binary logistic regression that had no association with post-operative sore throat were age, sex, type of surgery, ASA status, mallampati grading tube used, experience of anesthetist, number of attempts at laryngoscopy and intubation, and duration of anesthesia and surgery (Tables 1-7) and (Figure 1).

		Frequency	Percent
Age	18-65	84	88.4
	>65	11	11.6
Sex	Male	59	62.1
	Female	36	37.9

Table 1: Socio-demographic characteristics.

Type of surgery	Frequency	Percentage
Gynecologic	7	7.36
Endocrine(thyroid)	14	14.7
General (Breast, intestinal, Colon, Appendectomy)	33	34.7
Thoracic	2	2.1
Urologic	8	8.42
Neurologic	16	16.8
Orthopedic	15	15.7

Table 2: Type of surgery.

		Frequency	Percentage
ASA	ASA 1	61	64.21
	ASA 2	29	30.52
	ASA 3	5	5.26
	ASA 4	0	
Mallampati	Malampati 1	63	66.31
	Malampati 2	29	30.52
	Malampati 3	2	2.1
	Malampati 4	1	1.05
Size of ETT	6 mm	32	33.68
	6.5 mm	35	36.84
	7 mm	19	20
	7.5 mm	9	9.47
Size of laryngoscope blade used	2	0	
	3	46	48.42
	4	49	51.57

Note: ASA-American Society of Anesthesiologists, ETT-Endo-Tracheal Tube.

Table 3: ASA Status, Mallampati grade size of ETT used and size of laryngoscope blade used.

	Year	Frequency	Percentage
Anesthetist who intubate the patient	Year III	0	
	Year IV	59	62.1
	B.Sc.	26	27.36
	M.Sc.	10	10.52
Number of attempts at laryngoscopy	1	85	89.47
	2	7	7.36
	3	2	2.1
	4	1	1.05
Number of at intubation	1	88	92.63
	2	4	4.21
	3	3	3.15
	4	0	
Duration of surgery	<3 hour	87	91.57
	3-6 hour >6 hour	7	7.36
		1	1.05
Duration of anesthesia	< 3 hour	87	91.57
	3-6 hour	7	7.36

	>6 hour	1	1.05

Table 4: Anesthetist who intubate the patient, number of attempts at laryngoscopy and intubation, and duration of anesthesia and surgery.

	Frequency	Percent
Yes	7	7.4
No	88	92.6
Total	95	100

Table 5: Frequency of nasogastric tube used.

		Frequency	Percent	Valid Percent	Cumulative Percent
Sore throat	Yes	29	30.5	30.5	30.5
	No	66	69.5	69.5	100
	Total	95	100	100	

Table 6: Frequency of POST.

		Continuous Throat pain		Total
		1	2	
Size of ETT used	6 mm	1	23	24
	6.5 mm	4	30	34
	7 mm	11	12	23
	7.5 mm	13	1	14
Total		29	66	95

Table 7: Size of ETT used sore throat cross tabulation.

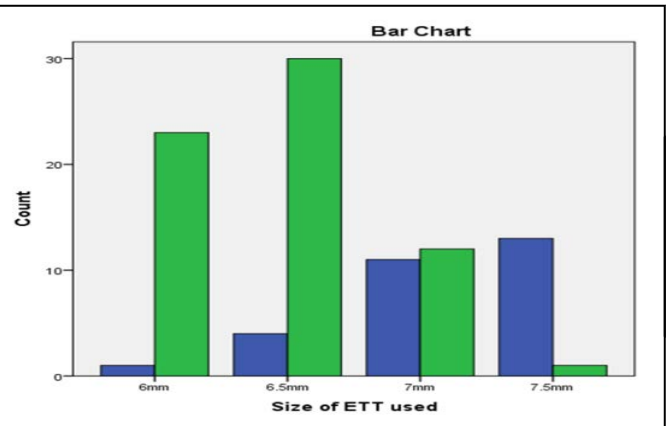

Figure 1: Size of ETT used sore throat cross tabulation.

DISCUSSION

Post-operative sore throat has been a well-recognized complication after general anesthesia with endotracheal intubation with prevalence of (30.5%) which is high compared with studies conducted by P.P. Higgins, F. chung and G. Mezei (12.1%). The difference might be due to mucosal ischemia following large sized tube tight fighting pressure on airway mucosa. Size of ETT used had significant association with post-operative sore throat ETT (p-value = 0.01, AOR = 3.291, 95% CI =1.658, 6.531). Institutional based cross sectional study conducted in Black lion hospital, Addis Ababa, Ethiopia, from February 1st to 30th 2016, had comparable result showing significant association between size of ETT and occurrence of POST with ETT size No. 7.5 vs. 6 (39.5% vs. 3.5%, P=0.05) [7]. Size of laryngoscope blade used had significant association with postoperative sore throat with Size of laryngoscope blade (p-value =0.03, AOR = 0.15, 95% CI = 0.14, 0.18).

In this study there was no significant association between age and occurrence of POST. A study conducted in Watford general Hospital, United Kingdom, also showed no significant difference in the incidence of sore throat between age groups studied. Type of surgery, presence of Ng tube, number of attempts at laryngoscopy and intubation all have no significant association with compliant of sore throat in this study [8]. A study by Christensen AM had no stastically significance on type of surgery, presence of Ng tube and number of attempts at laryngoscopy.

There was no significant association between duration of anesthesia, surgery, and occurrence of POST in this study. But in a study conducted in Isra and Memon university hospital and in Black Lion hospital, Addis Ababa, Ethiopia operation and anesthesia duration more than one hour had showed significant association in occurrence of post-operative sore throat.

CONCLUSION

Sore throat was found to be more common with certain patient, anesthetic and surgical related factors. The prevalence of post-operative sore throat was (30.5%) in this study. Size of ETT and size of Laryngoscope blade were the independent risk factors for post-operative sore throat in Hawassa University. This is most likely due to trauma induced by large laryngoscope blade and tight fitting ETTs release inflammatory mediators and forming edema around throat. So we recommend using smaller sized ETT (6-6.5 mm) and small sized laryngoscope blade (2 & 3) to minimize pressure-induced trauma on airway mucosa. Even though this study didn't show statically significant association between experience of anesthetist, number of attempts at laryngoscopy and intubation, and POST, we advise students should practice on doll before real patient and should not be allowed for repeated attempt of laryngoscopy and intubation in case of difficult airway management.

Little appreciation was given to the postoperative complication in the study area. Awareness creation should be made about the problem for all health professionals who will be involved in patient management after operation in HUCMHS referral

hospital. We suggest the introduction of post-operative sore throat management protocol in the hospital system.

Further study need to be conducted with large sample size to determine age of patient, type of surgery, ASA status, mallampati grade, use of Ng tube and airway used, experience of anesthetist, number of attempt at laryngoscopy and intubation, and duration of anesthesia and surgery might have an effect on occurrence of post-operative sore throat in population.

AUTHOR CONTRIBUTION

BS, developed proposal, study design, collected data, analysis and, DA, and NG prepared manuscript, revised proposal, analysis, result writing and final approval.

AVAILABILITY OF DATA AND MATERIAL

The data were collected by data collectors and submitted to the authors who are willing to share the data upon request from peer researchers.

CONFLICT OF INTEREST

None

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