International Journal of Otorhinolaryngology and Head and Neck Surgery
Rameshkumar E et al. Int J Otorhinolaryngol Head Neck Surg. 2017 Apr;3(2):371-375
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

Original Research Article

DOI: http://dx.doi.org/10.18203/issn.2454-5929.ijohns20171195

Postoperative sore throat in patients undergone head and neck surgeries under endotracheal intubation and laryngeal mask anaesthesia

Edakkattil Rameshkumar*, Prathibha Ajayakumar

Department of Otorhinolaryngology, Jubilee Mission Medical College and Research Institute, Thrissur, Kerala, India

Received: 29 January 2017
Revised: 04 March 2017
Accepted: 06 March 2017

***Correspondence:**
Dr. Edakkattil Rameshkumar,
E-mail: drerk@rediffmail.com

ABSTRACT

Background: Postoperative sore throat (POST) is a frequent complaint among the subjects undergoing head and neck surgeries. Orotracheal intubation with the endotracheal tube (ETT) and laryngeal mask (LM) was used for anaesthesia. This study was aimed to analyze the effect of variation in cuff pressure and size of ETT and LM mask anaesthesia on post-surgical pain.
Methods: Patients (ages of 10-79) who underwent head and neck surgeries by ETT intubation and LM anaesthesia were included in the study. The pain was measured as pain score during different cuff pressure and size of tube or mask and data was statistically analyzed.
Results: Total 100 subjects of each group and both genders were included in the prospective study. No statistically significant difference could be observed among the number of cases in both groups. Among the patients, females were dominant ($p = 0.405$). The intensity of pain was gradually decreased during the 2nd and 3rd post surgical days in both groups. The frequency of patients with pain in the LMA group was less than that of ETT group on the 1st day. No correlation between the pain score and cuff pressure or size of ETT and LMA could be evidenced.
Conclusions: The postoperative sore throat can be effectively reduced by LMA. The pain score and frequency of patients with pain in the LMA group was less than that of ETT group. No correlation of pain score with different cuff pressure and size of tube or mask could be evidenced.

Keywords: Pain score; Postoperative sore throat, Endotracheal tube, Laryngeal mask, Pharynx, Larynx

INTRODUCTION

Postoperative sore throat (POST) is a frequent complaint in subjects undergoing the surgical procedure under general anaesthesia. Different techniques have been adapted to avoid POST. William Macewen in 1880 first demonstrated the orotracheal intubation with the endotracheal tube (ETT) for anaesthesia and a century later in 1981, Dr. Archie Brain developed laryngeal mask anaesthesia (LMA).[1] The use of LMA is found to be increased because of the ease of insertion. Further, it is also used in anticipated or actual difficult airways and even in failed intubations. Some measures to decrease the POST like nebulising subjects with ketamine and magnesium prior to intubation had been tried with various results.[2,3]

Previous studies indicate that ETT intubation is associated with higher incidence of POST than that with LMA.[4,5] The incidence of POST varies from 12% to 63% in various studies, Females were found to have a higher incidence of POST.[6-8] The wide variation could be the results of differences in the size of ETT, LMA, methods of insertion, cuff pressure and duration of surgeries etc.

Previous studies did not mention about physical findings in the throat and most of their evaluation was completed in the first 24 hours. Hence this study was aimed to analyze the incidence of POST in subjects undergoing the surgical procedure with ETT and LMA. Furthermore, any visible findings in the pharynx and larynx, as well as the duration of pain persisting after the procedure were evaluated so that an appropriate remedial measure can be sought.

METHODS

Study design

This prospective study was carried out from May 2016 to January 2017 in the department of Otorhinolaryngology, Jubilee Mission Medical College and Research Institute, Thrissur, Kerala, India. The study protocol was approved by the Institutional Research Ethics Committee and complied with the declaration of Helsinki. A written informed consent was taken from each subject prior to the commencement of the study.

Subjects

Patients, between the ages of 10 and 79, undergoing head and neck surgeries by general anaesthesia given by ETT and LMA in the Department of Otorhinolaryngology, were included in the study. Surgical procedures done in the oral cavity, oropharynx or those with throat packed excluded from the study. Subject below the age 10 or above 80 years were also excluded from the study. Proseal and classical types were used commonly in the LMA group. Different cuff pressures and various sizes of the tube were used in ETT while various sizes of mask and cuff pressures were used in LMA. Pain score was graded by constructing a 10 point scale and asking the patient to touch the scale. The parameters were statistically analyzed.

Statistical analysis

The statistical analysis was performed using SPSS (version 16.0, IBM, CA, USA). Pearson Chi-Square was used to compare the correlation of size or pressure applied with pain in each group. P less than 0.05 were considered as significant.

RESULTS

Total 100 subjects from each group were enrolled in the study. Proseal (96%) and classical (4%) were used commonly in the LMA group. No statistically significant difference could be observed among the number of cases in both groups. Among the patients females were dominant (Figure 1). The commonly used size was 7.0 (66%) and 7.5 (19%) in ETT group, while the sizes were proceal 3 (65%) and 4 (26%) in LMA group. Cuff pressure of 30 mmHg (55%) was commonly applied in both groups. The second common pressure was 40 mmHg which was 15% in ETT and 22% in LMA. Thirty-seven patients in ETT and twenty six patients in LMA were reported with pain (Figure 2). However, no statistically significant change could be observed among them. The pain was gradually decreased during the post-surgical days in both groups (Table 1). However, on 1st day, the pain frequency in the LMA group was less than that of ETT group. ETT group of patients showed pain score of 7 on day two and three, while none of the patients in LMA group showed pain score of 7 on these days. While an increase in size, the number of patients in both ETT and LMA groups showed no correlation with the frequency of pain (Table 2 and 4). However, with increase in cuff pressure, an increase in the number of patients with pain in both groups was observed (Table 3 and 5). An increase in patients with pain in LMA group while using large size of the mask was found whereas, in the ETT group, the size of the tube did not correlate with the incidence of POST. However, no statistically significance correlation was found. In the LMA group, only 1 patient with POST had inter arytenoid congestion, while in the ETT group 1 patient had congested anterior pillars, 3 had inter arytenoid congestion and 2 had congested arytenoids.

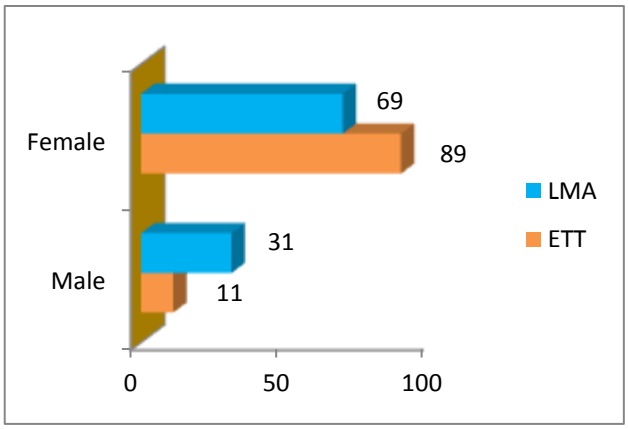

Figure 1: Distribution of gender.

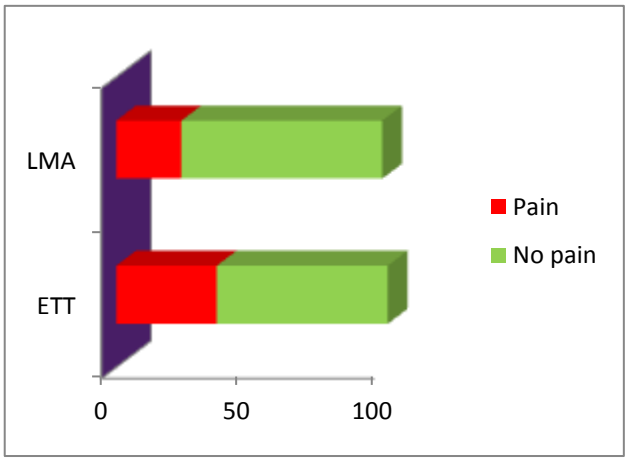

Figure 2: Distribution of pain.

Table 1: Frequency of pain during the post-surgical days.

Group	Pain Score	Pain Day 1		Pain Day 2		Pain Day 3	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
ETT	0	64	64	64	64	65	65
	1	5	5	5	5	4	4
	2	16	16	11	11	10	10
	3	4	4	6	6	5	5
	4	4	4	7	7	6	6
	5	1	1	4	4	3	3
	6	6	6	3	3	1	1
	7	0	0	3	3	3	3
	Total	100	100	100	100	100	100
LMA	0	80	80	77	77	77	77
	1	5	5	0	0	1	1
	2	7	7	10	10	9	9
	3	5	5	5	5	4	4
	4	2	2	5	5	6	6
	5	1	1	0	0	0	0
	6	0	0	3	3	3	3
	Total	100	100	100	100	100	100

Table 2: Frequency of pain with variation in tube size in endotracheal tube (ETT) anaesthesia.

Pain/et size	7.0	7.5	8.0	8.5	9.0	Grand total
Y	3	24	7	3		37
N	2	42	12	6	1	63
Grand total	5	66	19	9	1	100

P = 0.775 (Pearson Chi-square test) not significant

Table 3: Frequency of pain with variation in cuff pressure in endotracheal tube (ETT) anaesthesia.

Pain/ et cuff pressure	20	25	30	35	40	45	50	Grand total
N	3	4	49	7	11			74
Y		1	6	1	11	1	6	26
Grand total	3	5	55	8	22	1	6	100

P = 0.195 (Pearson Chi-square test) not significant

Table 4: Frequency of pain with variation of size of mask in laryngeal mask anaesthesia (LMA).

Pain/LMA size	Classic-3.0	Proseal-2.5	Proseal-3.0	Proseal-3.5	Proseal-4.0	Proseal-5.0	Total
Y	3		16		5	2	26
N	1	1	45	4	21	2	74
Grand total	4	1	61	4	26	4	100

P = 0.416 (Pearson Chi-square test) not significant correlation

Table 5: Frequency of pain with variation in cuff pressure mask in laryngeal mask anaesthesia (LMA).

Pain/ LMA cuff pressure	20	25	30	35	40	45	50	Grand total
N	3	4	49	7	11			74
Y		1	6	1	11	1	6	26
Grand total	3	5	55	8	22	1	6	100

P = 0.32 (Pearson Chi-square test) not significantly correlated

DISCUSSION

The results of this study revealed that LMA was better than ETT in reducing the POST. This was evident by analyzing the frequency of pain in both groups. In the LMA group, the pain was less than that of ETT group on the 2nd day. An increase in cuff pressure above 40 mm of Hg produced an increase in the number of patients with pain in both groups.

The use of LMA is increasing in recent days due to its ease of insertion, speed of insertion, need of less expertise and its improved hemodynamic stability at induction of anaesthesia and reversal. Many studies indicate that the frequency of POST and cough is less with LMA, as compared to ETT. The incidence of bronchospasm and laryngospasm was also seen to be less with LMA than with ETT. Some studies report a higher incidence of gastric insufflations and anesthetic gas leak due to low seal pressure with LMA.[9] Apart from the POST and cough, there are postoperative nausea and vomiting, hemodynamic changes were affecting the heart rate and BP associated with general anaesthesia which is also less with LMA.[10] The cause for POST and cough is not clear.[11] However, certain factors thought to cause the POST are size of the tube, gender – females more than males, cuff pressure and design, use of nitrous oxide, insertion techniques and its urgency, patient positioning, duration of surgery, obesity and pharyngeal suction, etc. The possible associated injuries include edema of the post cricoid region and tracheal rings, epithelial loss, mucosal injuries and hematoma.[12] Incidence of laryngospasm, cough at extubation, dysphagia, dysphonia, sore throat and hoarseness was found to be higher in ET than in supraglottic devices.[13] Attempts have been made to prevent POST by application of benzydamine hydrochloride to the cuff and pharyngeal mucosa, inhalation of fluticasone propionate, etc, but have not been found to be definite.[14]

Our present study showed a higher incidence of POST with ETT (37%), as compared to LMA (26%), but this difference was not statistically significant. The pain was also found to be significantly higher on postoperative days 2 and 3, and the difference in both the groups and was found to be significant. The maximum intensity of pain was on the third day in both the groups.

CONCLUSIONS

The result of this study concluded that LMA was better than ETT in reducing the POST. No significant correlation of pain was found with increasing the cuff pressure or size of the device in both methods.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the valuable help of Dr. Ajith TA, Professor of Biochemistry, Department of Biochemistry, Amala Institute of Medical Sciences during the preparation of the manuscript and Mr. Tom Thomas, Biostatistician, Jubilee Mission Medical College and Research Institute, Thrissur, Kerala, India for the statistical analysis.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Higgins PP, Chung F, Mezei G. Postoperative sore throat after ambulatory surgery. Br J Anaesth. 2002;88:528-4.
2. Gupta SK, Tharwani S, Singh DK, Yadav G. Nebulized magnesium for prevention of postoperative sore throat. Br J Anaesth. 2012;108:168-9.
3. Andrea LB, Baker KS, Terri J. Factors Affecting the Incidence of Sore Throat Following General Anesthesia with Endotracheal Tube Versus Laryngeal Mask Airway. School of nurse anesthesia, Texas Christian University, Word Count. 2011;14:888.
4. Elyassi H, Mousavinasab M, Rambod M, Hashemian MR, Dabbagh A. The effects of anaesthesia method on throat pain after elective rhinoplasty. Int J Prev Med. 2011;2:275-95.
5. Hu B, Bao R, Wang X, Liu S, Tao T, Xie Q, et al. The size of endotracheal tube and sore throat after surgery: A systematic review and meta –analysis. PLoS One. 2013;8:744-67.
6. McHardy FE, Chung F. Postoperative sore throat: cause, prevention and treatment. Anaesthesia. 1999;54:444–53.
7. Jaensson M, Guptha A, Nilsson UG. Risk Factors for Development of Postoperative Sore Throat and Hoarseness After Endotracheal Intubation in Women: a secondary analysis. AANA J. 2012;l80:67-73.
8. Edomwonyi NP, Ekwere IT, Omo E, Rupasinghe A. Postoperative throat complications after tracheal intubation. Annu Afr Med. 2006;5:28-32.
9. Peirovifar AA, Eydi M, Mirinezhad MM. Mahmoodpoor AA, Mohammadi A,Golzari SEJ. Comparison of postoperative complications between LMA and ET during low flow anaesthesia with controlled ventilation. Pak J Med Sci. 2013;29:601-5.
10. Dadmehr H, Negargar S, Mahmoodpoor A, Ghaderi B, Anvari H, Rahmani A. Comparison of the effects of endotracheal tube and laryngeal mask airway on immediate postoperative complications in elective operations. Shiraz E-Med J. 2010;11:191–7.
11. Scuderi, Phillip E MD. Postoperative sore throat: More answers than questions. Anesth Analg. 2010;111:831–2.
12. Zuccherelli L. Postoperative upper airway problems. Southern Afr J Anesth Analg. 2003;9:12-6.

13. Park SK, Ko G, Choi GJ, Ahn EJ, Kang H. Comparison between supraglottic airway devices and endotracheal tubes in patients undergoing laparoscopic surgery – a systemic review and meta-analysis. Med. 2016;95:e4598.
14. Phillip E S. Postoperative sore throat: More answers than questions. Anesth Analg. 2010;111:831-2.

Cite this article as: Rameshkumar E, Ajayakumar P. Postoperative sore throat in patients undergone head and neck surgeries under endotracheal intubation and laryngeal mask anaesthesia. Int J Otorhinolaryngol Head Neck Surg 2017;3:371-5.