ORIGINAL ARTICLE

LARYNGEAL COMPLICATIONS OF ENDOTRACHEAL TUBE AND LARYNGEAL MASK AIRWAY IN ELECTIVE SURGICAL PATIENTS REQUIRING GENERAL ANESTHESIA

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ABSTRACT

Objective: To investigate the use of Laryngeal mask airway and its comparison with endotracheal tube for postoperative laryngeal complications.

Material and Methods: A toal of 114 adult American Society of Anaesthesiologist (ASA) I and II patients who were candidate for elective surgical operation participated in this study. Patients randomized into two groups Laryngeal mask airway was used in one group and Endotracheal tube in the other one. Postoperative laryngeal complications including sore throat and coughing were assessed in all patients during the first six hours.

Results: A total of 114 patients were divided in two equal groups, managed by laryngeal mask airway and endotracheal tube. Sex distribution among the groups was insignificant with p-value=0. 107. The age distribution among the group was also insignificant with p-value 0. 605. Sore throat was significant in both the procedure with p-value=0. 007 and coughing was also significant in both the procedure with p-value=0. 012.

Conclusion: Laryngeal Mask Airway is better than endotracheal tube in terms of laryngeal complications of sore throat and cough.

Key Words: Endotracheal Tube, laryngeal mask, airway, anesthesia.

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INTRODUCTION

Laryngoscopy and endotracheal intubation is a common method of securing a definitive airway for administering anaesthesia. Laryngeal mask airway the first supraglottic device has established role in modern anaesthesia practice. It avoids laryngoscopy and endotracheal intubation and has become popular as a backup device to ventilate patients in emergency and difficult airways. Expert airway management is the most essential skill in anesthetic practice and inability to secure the airway can lead to major anesthesia related morbidities and mortalities[1]. Endotracheal intubation is the gold standard for securing the airway. As endotracheal intubation requires laryngoscopy and manipulation of vocal cords therefore it is associated with some undesirable complications e.g., trauma to lips, teeth, tongue, epiglottis, larynx and trachea, hemodynamic instability, sore throat and coughing postoperatively[2].

In an effort to decrease the complication of endotracheal intubation, supraglottic devices were invented in 1983 and laryngeal mask airway was the first of its kind. The laryngeal mask airway classic consists of an inflatable silicone mask with a connecting tube. The mask is reduced in size so that it could be positioned directly over the laryngeal opening. It is inserted blindly into the pharynx with the aid of index finger. It forms a low pressure seal around the laryngeal inlet[3].

Many studies were conducted on usage of laryngeal mask airway for protecting the patient's airway during surgery and showed that it has many advantages including easier insertion no need for laryngoscope fewer hemodynamic complications and less harmful complication for the larynx and vocal cords[4]. Laryngeal mask airway is useful in pre-hospital setting, where emergency medical technician typically have less experience with intubation and lower success rates[5]. Nowadays endotracheal tube is being replaced by laryngeal mask

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airway due to the advantages of easier insertion, no requirement of laryngoscope for insertion and causes less harmful complications for larynx and vocal cords[6]. We compared the effects of laryngeal mask airway and endotracheal tube on postoperative sore throat and coughing hypothesizing that incidence of sore throat would be lower with laryngeal mask airway insertion as compared to endotracheal tube.

MATERIAL & METHODS

This randomized controlled trial study was carried out in the anesthesia department of Khyber Teaching Hospital, Peshawar from August 2014 to February 2015. A total of 114 patients belonging to American Society of Anesthesiologists (ASA) class I and II between age groups 15-50 years, with no gender discrimination were included. Those patients falling into ASA class III and IV or had a difficult airway with mallampatti (MP) class 3 and 4 or patients with respiratory tract infection and emergency cases were excluded from the study. These 114 patients were randomly divided into two groups. Group A consisted of patient having Laryngeal mask airway and group B patients with Endotracheal tube.

After a thorough pre-operative evaluation of patients to assess their fitness for anesthesia the procedure was explained to them and written informed consent taken A standard preoperative essential protocol was followed for each patient and data was collected on separate proformas. On the day of surgery patients were kept nil orally for at least 6 hours prior to surgery and given tablet Bromazepam 3mg, one night before surgery to relieve anxiety.

After arrival to the operation theater baseline values of blood pressure, pulse and oxygen saturation were taken before induction. After pre oxygenation patients were induced with tramadol 1mg/kg thiopentone 5mg/kg and atracurium 0.5mg/kg. Patient lungs were ventilated with 100% oxygen and 2% isoflurane for 3 minutes prior to insertion of Laryngeal mask airway or Endotracheal tube.

In group A patients Laryngeal mask airway of size 3 for adult females and size 4 for adult males was selected and lubricated with xylocaine 2% gel and inserted. In group B patients a polyvinyl chloride endotracheal tube size 7 was selected for females and size 7.5 – 8 for males which was inserted following laryngoscopy. A tidal volume of 10ml/kg and respiratory rate 12/min was set for all patients. Anesthesia maintained with O_2 100% isoflurane 1.2-2% and atracurium. At the end of procedure laryngeal mask airway or endotracheal tube was removed after adequate reversal of neuromuscular block with neostigmine 0.05mg/kg and atropine 0.02mg/kg Monitoring of B.P, pulse and oxygen saturation were continued during the procedure and in the recovery room.

All patients were assessed for postoperative laryngeal complications. Sore throat and coughing in the immediate postoperative 6 hours period were the parameters looked for as the laryngeal complications. Cough was defined as a reflex action to clear the airway of mucus and irritants such as dust or smoke. Those patients who had three or more episodes of cough within 6 hours will be labeled as cough positive. Sore throat was defined as painful irritation in throat and exaggerated on swallowing or talking. Those patients with complaint of throat pain at rest or during talking and swallowing within 6 hours were labeled as sore throat positive. The data was collected on a proforma.

RESULTS

The data was analyzed using SPSS software statistical package version 10. Frequency and percentages were calculated for categorical variables like gender and complications i.e sore throat and cough. Mean and ± SD were calculated for continuous variables like age. Chi-square test was used to compare laryngeal complications into both groups. P- value < 0.05 were considered significant. The results were presented in form of tables. Genderwise distribution showed that over all male to female ratio was 2.12:1. Sex distribution among the group was insignificant with p-value = 0.107 (Table 1) the age distribution among the group was also insignificant with p-value 0.605 (Table 1).

In Laryngeal mask airway group sore throat was observed in 21(36.8%) patients while in Endotracheal tube group 35(61.4%) patient complained of sore throat. This shows that sore throat was significant in both the groups with p-value =0.007 (Table 2). Similarly 22

Table 1: Gender and age wise comparison of both the groups

Gender		Procedure	
		Group A	Group B
		Laryngeal Mask Airway	Endotracheal Tube
		Frequency %	Frequency %
Male		35 (61.4%)	43 (75.4%)
Female		22 (38.6%)	14 (24.6%)
Total		57 (100.0%)	57 (100.0%)
Age (in years)	<= 20.00	7 (12.3%)	5(8.8%)
	21.00 - 30.00	18 (31.6%)	13 (22.8%)
	31.00 - 40.00	21 (36.8%)	25 (43.9%)
	41.00+	11 (19.3%)	14 (24.6%)
Total		57 (100.0%)	57 (100.0%)

Table 2: Sore throat wise comparison in both the groups

Sore Throat		Procedure	
		Group A	Group B
		Laryngeal Mask Airway	Endotracheal Tube
Yes		21	35
		36.8%	61.4%
No		36	22
		63.2%	38.6%
Total		57	57
		100.0%	100.0%
Coughing	Yes	22 (38.6%)	35 (61.4%)
	No	35 (61.4%)	22 (38.6%)
Total		57 (100.0%)	57 (100.0%)

(38.6%) patient in Laryngeal mask airway group had coughing and while 35 (61.4%) patients complained of coughing in the Endotracheal tube. This shows that coughing was significant in both the groups with p-value = 0.012 (Table 2). Genderwise distribution of sore throat and coughing showed that 50% of females had sore throat in Laryngeal mask airway group while 32.5% males had sore throat in the Laryngeal mask airway group. In the Endotracheal tube group 50% females and 67% males had sore throat. Coughing occurred in 52.9% females and 32.5% males in Laryngeal mask airway group while 47.1% females and 67.5% males had coughing in Endotracheal group.

DISCUSSION

Postoperative sore throat and coughing after general anaesthesia are common but minor complications after endotracheal intubation and laryngeal mask airway. These can cause discomfort and dissatisfaction among patients and prolong hospital stay[7]. Internationally the incidence of sore throat and coughing ranges between 14.4% to 50% after tracheal intubation and 5.8% to 34% after Laryngeal mask airway insertion. This variation depends on many factors e.g., the device used for airway management method of questioning from the patient whether direct or indirect and anesthetist experience[8,9].

In our study sore throat incidence was 36.8% in the patients of Laryngeal mask airway group and 61.4% in the Endotracheal tube group patients. Venugopal and Jacob compared pharyngolaryngeal morbidity of laryngeal mask airway versus endotracheal tube and found that sore throat occurred in 35.8% of laryngeal mask airway group patients and 61.1% in endotracheal tube group patients which are in accordance with our findings[10]. Peirovifer et al studied postoperative complications of laryngeal mask airway and endotracheal tube during low flow anaesthesia with controlled ventilation. They observed that 40% of patients in endotracheal tube group and 5% of patients in laryngeal mask airway group had sore throat coughing occurred in 20% and 2% of patients in endotracheal tube and laryngeal mask airway group respectively[11]. The increased rate of complication in our study can be attributed to high flow ventilation which causes dryness and turbid flow.

Previous studies have shown that women are at a greater risk of postoperative sore throat compared to men after an endotracheal tube[12-14]. In contrast our study did not find any gender differences in postoperative sore throat after an endotracheal tube. One reason could be the use of small sized endotracheal tube in our study decreasing postoperative sore throat as observed in other studies.

However we did find the women have more postoperative sore throat (50%) after an laryngeal mask airway then men (32.5%) which confirm the finding of Nott et al[15], but not Grady et al[16] who found that men and women had a similar incidence of postoperative throat (20%). The low incidence of post operative sore throat in men in our study compared to other studies raises the questions as to why men and women respond differently to a standard laryngeal mask airway. One explanation could be that despite the manufactures recommendations many anesthetists inserted the laryngeal mask airway with a partially inflated cuff. Having said this, earlier studies have not confirmed that insertion technique is associated with postoperative sore throat[17,18].

Aliya and Shemaila observed that 28% of patients suffered from sore throat with endotracheal tube against 3.5% with laryngeal mask airway in postoperative elective gynaecological patients[19]. The use of nitrous oxide which we did not use may have been responsible for reducing postoperative sore throat frequency as it provides analgesia, decreases anesthetic requirement and increases depth of anesthesia causing less irritation to the airway.

In the study conducted by Akhter[20] no patients coughed or had sore throat postoperatively in laryngeal mask airway gp. While 87% patients coughed and 33% patients had sore throat after extubation this result may be attributed to the use of propofol infusion by them which increased tolerance to laryngeal mask airway.

Ahsan and Fouzia also found significantly higher number of patients who suffered from coughing 24% after extubation in contrast to 4% of patients in laryngeal mask airway gp[21]. Dadmehr et al also mentioned decreased adverse pharyngolaryngeal events with laryngeal mask airway in contrast to endotracheal tube[22]. A meta-analysis by brimacombe evaluated 52 prospective randomized trials and determined the benefits of laryngeal mask airway over endotracheal tube. He concluded the laryngeal mask airway has an increased speed and ease of placement by both experienced providers inexperienced personnel moreover postoperative sore throat & coughing were less with laryngeal mask airway than endotracheal tube[23].

CONCLUSION

The laryngeal mask airway is better than endotracheal tube in terms of laryngeal complications of sore throat and cough.

RECOMMENDATIONS

In elective surgical patients requiring general anesthesia, laryngeal mask airway is recommended for use in such patients in future in our setup.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Naz U: Planning of study manuscript writing.
Aurangzeb: Data analysis.
Ilyas M: Data management.
Khan A: Statistics.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.