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SCIENTIFIC ARTICLE

Reducing sore throat following laryngeal mask airway insertion: comparing lidocaine gel, saline, and washing mouth with the control group

Mehryar Taghavi Gilani^a, Iman Miri Soleimani^a, Majid Razavi^{a,*}, Maryam Salehi^b

^a Cardiac Anesthesia Research Center, Imam-Reza Hospital, School of Medicine, Mashhad University of Medical Science, Mashhad, Iran

^b Social Medicine Department, School of Medicine, Mashhad University of Medical Science, Mashhad, Iran

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Washing mouth;
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Abstract

Background: Laryngeal mask airway is still accompanied by complications such as sore throat. In this study, effects of three methods of reducing postoperative sore throat were compared with the control group.

Methods: 240 patients with ASA I, II candidates for cataract surgery were randomly divided into four same groups. No supplementary method was used in the control group. In the second, third and fourth groups, lidocaine gel, washing cuff before insertion, and washing mouth before removing laryngeal mask airway were applied, respectively. Anesthesia induction was done with fentanyl, atracurium, and propofol and maintained with propofol infusion. The incidence of sore throat was evaluated during the recovery, 3–4 h later and after 24 h using verbal analog scale. The data were analyzed by *t*-test, analysis of variance and chi-square using SPSS V11.5.

Results: Age, gender, duration of surgery and cuff pressure were the same in all the four groups. Incidence of sore throat at recovery room was highest in the control group (43.3%) and lowest in the washing mouth group (25%). However, no significant statistical difference was observed between these four groups (recovery, $p=0.30$; discharge, $p=0.31$; examination, $p=0.52$). In this study, increased duration of operation had a significant relationship with the incidence of sore throat ($p=0.041$).

Conclusion: Sore throat is a common postoperative problem, but no special method has been found completely efficient yet. In this study, cuff washing, lidocaine gel, and mouth washing before removing laryngeal mask airway were not helpful for sore throat.

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* Corresponding author.

E-mail: razavim@mums.ac.ir (M. Razavi).

PALAVRAS-CHAVE

Dor de garganta;
Máscara laríngea;
Lidocaína;
Lavagem da boca;
Salina

Redução da dor de garganta após a inserção de máscara laríngea: comparação de gel de lidocaína, salina e lavagem da boca com o grupo controle

Resumo

Justificativa: A máscara laríngea ainda é relacionada a complicações como a dor de garganta. Neste estudo, os efeitos de três métodos para reduzir a dor de garganta, no período pós-operatório, foram comparados com o grupo controle.

Métodos: Duzentos e quarenta candidatos, com estado físico ASA I-II, foram aleatoriamente divididos em quatro grupos iguais para a cirurgia de catarata com estado físico ASA I-II, candidatos para a cirurgia de catarata foram aleatoriamente divididos em quatro grupos iguais. Nenhum método complementar foi usado no grupo controle. No segundo, terceiro e quarto grupos, os métodos utilizados foram: Aplicação de gel de lidocaína, lavagem do manguito antes da inserção e lavagem da boca antes de remover a máscara laríngea, respectivamente. A anestesia foi induzida com fentanil, atracúrio e propofol e mantida com propofol. A incidência de dor de garganta foi avaliada durante a recuperação, 3-4 h depois e após 24 h usando uma escala verbal analógica. Teste-t, análise de variância e teste do qui-quadrado foram usados para a análise dos dados por meio do programa estatístico SPSS V11.5.

Resultados: Idade, gênero, tempo de cirurgia e pressão do manguito foram semelhantes em todos os quatro grupos. Na sala de recuperação, a incidência de dor de garganta foi maior no grupo controle (43,3%) e mais baixa no grupo lavagem da boca (25%). No entanto, não houve diferença estatisticamente significativa entre os quatro grupos (recuperação, $p=0,30$; alta, $p=0,31$; exame, $p=0,52$). Neste estudo, o tempo mais longo de cirurgia apresentou relação significativa com a incidência de dor de garganta ($p=0,041$).

Conclusão: Dor de garganta é um problema pós-operatório comum, mas nenhum método em especial foi considerado totalmente eficiente. Neste estudo, a lavagem do manguito, a aplicação de gel de lidocaína e a lavagem de boca antes de remover a máscara laríngea não foram úteis para evitar a dor de garganta.

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Introduction

Although anesthesiologists frequently use laryngeal mask airway because of its easy insertion and fewer complications, it is still associated with complications such as sore throat, which sometimes reduce patients' satisfaction and limit post-discharge activities. Occasionally, sore throat presents as dysphonia, dysphagia, and mucosal dryness. Sore throat is more common after tracheal intubation; however, some studies have reported equal incidence rates of sore throat following laryngeal mask and tracheal intubation.¹ This complication has even been reported in patients ventilated by mask.² Incidence of sore throat in laryngeal mask airways has been reported from 5.8% to 34%.³⁻⁵

Physical damage has been mentioned as the main reason of sore throat and various methods have been proposed for reducing sore throat following the use of laryngeal mask airways. Assuming that physical trauma during insertion of laryngeal mask airways causes pressure on salivary glands leading to decreased saliva production and sore throat, we washed patients' mouths with 20 mL saline before laryngeal mask airway removal and compared the results with other methods such as applying lidocaine and saline before insertion and the control group.

Methods

After the approval of the Deputy for Research of Mashhad University of Medical Sciences, this study was conducted in

Ophthalmology Hospital on 240 patients with ASA I-II who had undergone cataract surgery. This study was prospective, randomized, and double-blind. Exclusion criteria included age under 15, addiction, obesity, severe asthma or chronic obstructive pulmonary disease, failure of laryngeal mask airway insertion, sensitivity to lidocaine, sore throat and common cold symptoms.

After venous catheterization and injection of 5 mL/kg of saline, 1 μ g/kg fentanyl, 0.2 mg/kg atracurium, and 2 mg/kg propofol were used for induction of anesthesia. After 2 min, laryngeal mask airways were inserted. Patients were randomly divided into four groups, each with 60 patients, using randomized block method. In the control group, laryngeal mask airway was inserted without lubricants. In the lidocaine group, lidocaine gel was used, and in the saline group, laryngeal mask airway was washed with saline before insertion. In the fourth group, patients' mouths were washed with 20 mL of saline before laryngeal mask airway removal. Laryngeal mask airways were inserted by the same person using 90-degree rotation method and semi-full cuff. In this method, laryngeal mask airway is entered from the right side of the mouth and, after passing the tongue, it is rotated. Then, the cuff was filled with air, based on the size (20 cm³ for no. 3 and 30 cm³ for no. 4) and cuff pressure was measured. Anesthesia was maintained with 100–150 μ g/kg/min propofol and 50% O₂ and N₂O. At the end of the surgery, after return of breath, neostigmine and atropine were injected and laryngeal mask airway was removed.

Table 1 Demographic information, cuff pressure, and surgery duration. Mean \pm SD.

Variables	Control	Lidocaine	Saline	Mouth washing	<i>p</i> level
Age (year)	61.7 \pm 10.9	61.2 \pm 9.3	62 \pm 7.1	60.8 \pm 8.4	0.93
Gender (male/female)	36/24	31/29	32/28	33/27	0.78
Surgery duration (min)	54.7 \pm 23	52.2 \pm 17.7	54.5 \pm 21.5	48.7 \pm 15.3	0.49
Cuff pressure (cm H ₂ O)	196 \pm 18.1	192.2 \pm 22.3	200.1 \pm 23.3	195.6 \pm 20.4	0.62

Table 2 Incidence of sore throat during recovery (VAS = verbal analog scale), *N* (%).

Variables	Control	Lidocaine	Saline	Mouth washing
Without pain	34 (56.7)	39 (65)	39 (65)	45 (75)
VAS \leq 4	17 (28.3)	13 (21.7)	14 (23.3)	8 (13.3)
4 < VAS \leq 7	9 (15)	8 (13.3)	7 (11.7)	7 (11.7)

Table 3 Incidence of sore throat before discharge (VAS = verbal analog scale), *N* (%).

Variables	Control	Lidocaine	Saline	Mouth washing
Without pain	36 (60)	40 (66.7)	41 (68.4)	46 (76.7)
VAS \leq 4	16 (26.7)	13 (21.7)	11 (18.3)	8 (13.3)
4 < VAS \leq 7	8 (13.3)	7 (11.6)	8 (13.3)	6 (10)

During recovery, before discharge (around 3–4 h) and next examination (24 h later), incidence and severity of sore throat were evaluated in patients by verbal analog scale (VAS). Then, they were divided to four categories (no pain, score \leq 4, 4 < score \leq 7 and score > 7). When score was higher than 7, intramuscular opioid was injected and the patient was discharged later. If score was less than 7, we recommended oral analgesic (such as acetaminophen 500 mg) and mouth washing with saline if needed after discharge. The person who evaluated sore throat in recovery and before discharge from the hospital was not aware of patients' group assignment in the study. Because of the outpatient nature of the surgery and use of oral analgesics after discharge, sore throat evaluation was difficult after discharge from hospital.

The gathered data were analyzed using SPSS V11.5. Parametric data with normal variation were analyzed with analysis of variance and *t*-test. Non-parametric results were compared by Mann–Whitney and Kruskal–Wallis tests and nominal data with chi-square test. *p* < 0.05 were considered significant.

Results

Demographic information such as age, gender and the other information like surgery duration and cuff pressure after filling are shown in Table 1. There was no statistically significant difference between these parameters in the four groups.

Sore throat was most common in the control group (43.3%) and least common in the mouth washing group (25%). Incidence of sore throat in the lidocaine and saline groups

was the same (35%). No statistically significant difference was observed between four groups for sore throat (during recovery *p* = 0.30; during discharge *p* = 0.31). Incidence of sore throat during recovery and before discharge was not different significantly. Since pain score was not more than 7, no patients took opioid analgesic. Incidence of sore throat during recovery and before discharge is shown in Tables 2 and 3. Only 2 patients in control and saline group had pain after 24 h with score less than 4 (*p* = 0.52).

There was no correlation between age, gender, and cuff pressure with sore throat. There was a significant relationship between mean surgical time and sore throat (no pain 48.1 \pm 17.1 min vs. with pain 58.7 \pm 21.2 min) (*p* = 0.041).

Discussion

Sore throat is one of the most common postoperative complaints, which follows tracheal intubation, use of laryngeal mask airway, oral airway insertion, and even mask ventilation. Incidence of sore throat caused by laryngeal mask airway has been reported to be related to insertion method and techniques, users' experience, laryngeal mask airway size, and cuff pressure. In the present work, incidence of sore throat ranged from 25% in the mouth washing group to 43.3% in the control group; however, no significant difference was observed between the groups.

No special medication or procedure has been completely useful for pain control. For reducing of physical trauma, various insertion methods such as classic method, rotation method, and jaw thrust method have been utilized.^{6–8} Measuring and adjusting cuff pressure have produced

contradictory results.^{12–14} In addition, various compounds and methods have been used for reducing sore throat, including lidocaine gel,⁹ benzydamine hydrochloride,¹⁰ washing laryngeal mask airway, local and systematic steroids,¹¹ etc.

Multiple techniques are used for insertion of laryngeal mask airways. The classic method is done by putting a finger in the patient's mouth in order to facilitate laryngeal mask airway passage. However, some specialists use other methods like 180-degree rotation of laryngeal mask airway to avoid passing finger through the patient's mouth.⁸ In this study, 90-degree rotation method was used; however, no comparison was made between this method and classic method for laryngeal mask airway insertion. In classic method, the cuff should be evacuated, but in some studies, full and semi-full cuffs have been compared with this method.¹ There was less blood in the method with full cuff than in classic technique (0% vs. 15.3%) and sore throat was remarkably less prevalent (4.1% vs. 21.4%). We used a semi-full cuff, i.e. the cuff was filled and then it was drained to barometric pressure.

Study of the relationship between cuff pressure and incidence of sore throat has produced contradictory results in different reports. In one study, high and low pressures of cuff were compared and no significant difference was observed in the incidence of sore throat (40% and 50%, respectively).¹² The investigation by Brimacombe et al. showed that high cuff pressure increased dysphagia and sore throat.¹³ In another study, however, maintenance of cuff pressure at less than 60 cm H₂O reduced sore throat rate by 5.8%.¹⁴ In our study, the cuff was filled with standard volume and cuff pressure was measured and no significant difference was observed for cuff pressure between the groups ($p=0.62$). No relationship was found between cuff pressure and sore throat; it is notable however that the cuff pressure was high.

Using lubricants has been widely studied in inserting laryngeal mask airways. In a study by Keller et al., lidocaine gel was compared to saline and it was demonstrated that lidocaine increased complications by 2%.¹⁴ Benzydamine hydrochloride spray has also reduced postoperative sore throat (from 34% to 4%).¹⁰ Pattern of ventilation of patients (spontaneous or mechanical) and induction drugs have been considered to have a role in incidence of sore throat.^{15–17} Muscle relaxants have shown no impact on incidence and intensity of throat problems.¹⁸ In our investigation, there was no significant difference between lidocaine, saline, mouth washing, and control groups.

Conclusion

In this study, four methods of using cuff without lubricants, using lidocaine gel, using saline, and mouth washing before removing laryngeal mask airways were compared for their impact on the incidence of sore throat following laryngeal mask airway insertion. The incidence of sore throat was most common in the control group (43/3%) and least in the mouth washing group (25%), but no statistically significant difference was obtained. High incidence of sore throat in this work might be due to inadequate experience of the user (anesthesia resident with 1.5 years of experience), high cuff

pressure, or the 90-degree rotation method. The limitations of this study can be early discharge of patients, uncontrolled consumption of tranquilizers and lack of longer investigation.

Authorship contribution

Mehryar Taghavi Gilani contributed towards the conception and design and for the data acquisition. Iman Miri Soleimani contributed towards the research and data collection. Majid Razavi contributed towards the revision and the final approval. Maryam Salehi contributed towards the methodology and the data analysis.

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Conflicts of interest

The authors declare no conflicts of interest.

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