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# Effect of Intravenous Hydrocortisone on Preventing Postoperative Sore Throat Followed by Laryngeal Mask Airway Use in patients Undergoing Urogenital Surgeries

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ABSTRACT

**Introduction**: Postoperative sore throat is a common complication which can lead to discomfort after operation and delay in patients' returning to normal daily activities. The present study was carried out to evaluate the influence of intravenous hydrocortisone on preventing postoperative sore throat followed by laryngeal mask airway use. **Methods**: Sixty patients who were scheduled to undergo urogenital surgery were divided into two groups. Five minutes before anesthesia induction, 100 mg of intravenous hydrocortisone or placebo with the same volume were given to the patients randomly. At the end of the operation and after LMAs were removed, patients were asked about having sore throat at hours 2, 4 and 24 after operation. **Results**: There were three and six cases of sore throat after operation in hydrocortisone and in placebo groups respectively which showed no significant statistical difference (P=0.472). No cases of moderate or severe pain were reported in any of the patients in both groups and no statistically significant difference was observed regarding pain severity in recovery, hours 2, 4 or 24 after operation. **Conclusion**: Based on the statistical data obtained from this research, administrating intravenous hydrocortisone five minutes before anesthesia induction has no effect on postoperative sore throat severity and degree in urogenital surgeries.

## Introduction

Patient safety and acquiring skilled practice has always been of great importance for the physician of all eras.[1-27] Post-operative complications can be derived from the anesthesia techniques used for the surgery, for instance, the back pain caused following spinal anesthesia or the surgical process solely.[28] Postoperative sore throat is a common complication in anesthesia which can cause discomfort after operation and delay in patients' returning to normal daily activities. In the recent years, many studies have been carried out to determine the incidence of postoperative sore throat and to find a solution to prevent it.[29-33] Sore throat incidence has been reported to be 14.4% to 50% after intubation and 5.8% to 34% after using LMAs. Airway management method is the most effective factor in the incidence of postoperative sore throat.[34] The relation between the types of the devices used for airway management in general anesthesia and a degree of laryngopharyngeal complications is well-understood. While using LMA, its filled cuff can produce enough pressure to reduce circulation in laryngeal mucosa and also cause laryngeal trauma leading to sore throat.[35] Corticosteroids are of immense anti-inflammatory effects regardless of the source of the inflammation i.e. infection, chemical or physical damage or immune deficiency[36]; hence it was hypothesized that anti-inflammatory characteristics of hydrocortisone may prevent postoperative sore throat or decrease its severity. Therefore, in the present study we decided to determine the effect of the administration of intravenous hydrocortisone on the degree and severity of postoperative sore throat in patients undergoing general anesthesia using LMAs for urogenital surgeries. The objective of this research was to answer the question if preventive medication using hydrocortisone could prevent postoperative sore throat caused by LMAs cuff.

## Materials and methods

In a double-blinded randomized clinical study conducted at Imam Reza Hospital of Tabriz University of Medical Sciences from September 2009 to March 2010, sixty adult patients having ASA Class I-II who were scheduled to undergo urogenital surgery were selected. Patients

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having the following conditions were excluded from our study: Upper respiratory tract abnormalities or infection, sore throat, abdominal surgery, first unsuccessful LMA insertion, patients with full stomach, emergency conditions, pregnancy and smoking. Patients in both genders and in the age range of 20 to 60 were divided into two groups randomly. The patients in hydrocortisone group were given 100 mg (2 mL) of intravenous hydrocortisone five minutes before anesthesia induction. The patients in placebo group were given normal saline with the same volume, five minutes before anesthesia induction. All patients were given Midazolam IV 0.03 mg/kg as premedication 20 minutes before surgery. Routine monitoring including pulse oximetry, pulse rate, non-invasive blood pressure, EKG, and ETCO2 were performed for all patients equally. Anesthesia induction was performed using fentanyl 1-2 µg/kg and propofol 2.5-3.5 mg/kg. Appropriate LMA size was selected according to the instructions of the manufacturer based on body weight. LMA cuff was lubricated using saline after being deflated. LMA was inserted after loss of consciousness and later filled with appropriate volumes of room air according to the instructions of the manufacturer. For example: LMA#4 with 30 cc of room air for adults with normal sized bodies.[37] LMA insertion success was confirmed by chest expansion and capnography; halothane (1-2%) and a blend of $N_2O$ 50% and oxygen and fentanyl 50 µg every 30 minutes were used for anesthesia maintenance. Hemodynamic status of the patients was continuously monitored (Sazegan Gostar, VISTA model) using systolic and diastolic blood pressure, pulse rate, pulse rate, respiratory rate and arterial blood oxygen saturation in both groups before and after induction, at the end of the operation and in recovery. At the end of the operation and after LMA was removed, patients were asked about sore throat in recovery and hours 2, 4 and 24 after surgery. Pain degree was measured using a four score rating scale by an anesthesiologist who was unaware of the type of the solution content administered before operation. The four score rating scale was as following: 0= lack of sore throat in response to the question, 1= pain only in response to the question without any behavioral sign (mild), 2= pain response to the question accompanied with behavioral sign or complaining about the pain without being asked (moderate), 3= intense verbal response or frowning (severe).[38]

### *Statistical methods*

To compare the mean of the normal quantity variables t-test and to compare the abnormal variables Mann-Whitney test were used. Qualitative variables were compared in both groups using Fisher's exact test. Repeated measure tests were used to determine normal data and Friedman test to determine abnormal data regarding study of the changes in blood pressure, pulse rate, respiratory rate and arterial blood oxygen saturation at four stages before and after induction, at the end of the surgery and in the recovery. *P* value less than 0.05 was considered significant in all tests. Analyses were performed using SPSS 15.

## Results

In this study, there was no significant difference between the patients of both groups regarding gender, weight, age and physical status (ASA), operation and anesthesia duration, cuff volume and LMA size (Table 1).

**Table 1**. Demographic characteristics

| Demographic characteristics | Hydrocortisone group (n=30) | Placebo group (n=30) | P-Value |
|---|---|---|---|
| Age (years) | 35.66±2.30* | 34.33±1.49* | 0.66 |
| Sex (Male/ Female) | 29/1 | 29/1 | |
| Weight (kg) | 74.30±2.25* | 74.56±1.91* | 0.92 |
| ASA I | 27 | 27 | |
| ASA II | 3 | 3 | |
| Operation duration(min) | 32.02 | 29.48 | 0.48 |
| Anesthesia duration(min) | 31.53 | 21.47 | 0.64 |
| LMA Size | 31 | 30 | 0.64 |
| Cuff volume(cc) | 31 | 30 | 0.64 |
| * Mean ±SD | | | |

Hemodynamic status (blood pressure, pulse rate, respiratory rate and arterial blood oxygen saturation) was not constant at all stages before and after anesthesia induction, at the end of surgery and recovery in both groups (inside groups) and significant differences were observed inside each group; however, these changes were not significantly (Table 2).

Table 2. The variables related to the hemodynamic status (before and after anesthesia induction, at the end of the surgery and recovery) in both groups

| Variables | Hydrocortisone group (n=30) | Placebo group(n=30) | P |
|---|---|---|---|
| SBP (before induction) | 130.53±2.73* | 131.43±2.27* | 0.8 |
| DBP (before induction) | 79.43±2.35* | 80.66±1.96* | 0.68 |
| PR (before induction) | 79.06±1.86* | 80.43±1.78* | 0.5 |
| RR (before induction) | 29.55 | 31.45 | 0.66 |
| SaO2 (before induction) | 30.4 | 30.6 | 0.94 |
| SBP (after induction) | 115.46±3.29* | 117.13±2.77* | 0.7 |
| DBP (after induction) | 72.53±2.59* | 74.50±2.58* | 0.59 |
| PR (after induction) | 80.22±1.7* | 81.12±1.90* | 0.62 |
| RR (after induction) | 32 | 29 | 0.48 |
| SaO2 (after induction) | 30.58 | 30.42 | 0.96 |
| SBP (end of surgery) | 115.40±2.08* | 116.63±1.85* | 0.65 |
| DBP (end of surgery) | 73.03±2.03* | 73.76±2.24* | 0.82 |
| PR (end of surgery) | 76.16±2.29* | 75.50±1.81* | 0.82 |
| RR (end of surgery) | 31.75 | 29.25 | 0.53 |
| SaO2 (end of surgery) | 30.52 | 30.48 | 0.99 |
| SBP (recovery) | 123.80±3.10* | 125.03±2.52* | 0.75 |
| DBP (recovery) | 79.56±2.65* | 80.53±2.12* | 0.7 |
| PR (recovery) | 78.00±2.90* | 77.06±2.30* | 0.8 |
| RR (recovery) | 31.08 | 29.92 | 0.74 |
| SaO2 (recovery) | 28.88 | 32.12 | |
| * Mean ± SD | | | |

In this study, sore throat complaint was observed in three cases (10%) of hydrocortisone group and six cases (20%) of placebo group; the difference between two groups was not statistically significant (*P*=0.472). These values are in accordance with the existing data from numerous studies. Regarding pain degree, no case of moderate or severe pain was reported in both groups during the study, all the existing complaints were of mild sore throat which could have been due to the short time of surgery and anesthesia in the present study.

Overall, there was no statistically significant difference between two groups regarding pain degree at the stages of recovery and hours 2, 4 and 24 after surgery (Table 3).

**Table 3**. Sore throat, pain degree in recovery 2, 4 and 24 hours after operation

| | | Hydrocortisone group (n=30) | Placebo group(n=30) | P |
|---|---|---|---|---|
| Sore throat | | 3(10%) | 6(20%) | 0.472 |
| | *Time of operation* | | | |
| Pain degree | In recovery | 3.3% | 13.3% | 0.35 |
| | 2 hours later | 10% | 13.3% | 1 |
| | 4 hours later | 6.7% | 6.7% | 1 |
| | 24 hours later | 3.3% | 10% | 0.61 |

## Discussion

Sore throat is considered a common complication after operation which can be caused due to numerous factors.[39] Announced reports are suggestive of the fact that sore throat incidence varies in different studies due to the methods of airway management.[40,41] The relation between devices used for airway management in general anesthesia and incidence and severity of laryngopharyngeal complications are well-understood and studied. Filled LMA cuff can impair mucosal blood circulation by its pressure leading to direct laryngeal trauma and sore throat which have also been reported in case of tracheal tubes.[41] On the other hand, in another study, it has been concluded that the differences between the cuff pressures in LMA have no effect on laryngopharyngeal complications severity (dysphagia, hoarseness and sore throat).[42] In recent years, numerous studies have been carried out to determine postoperative sore throat incident seeking a solution to prevent it.40 Post operative sore throat incidence has been reported to be 14.4% -50% after tracheal intubation and 5.8% -34% after LMA insertion.[43-45] Similar to tracheal intubation, the incidence reported for sore throat after LMA insertion is varied which may be due to existing differences in expertise and insertion techniques, administration of lubricants and cuff pressure.[45] In a study carried out on outpatient cases in which LMAs and tracheal tubes were used, post operative sore throat incidences were compared. This study revealed that post operative sore throat incidence decreased significantly from 45% to 34% using LMA.[44] Mchardy et al. conducted a study which revealed that method of asking questions from the patients is a key factor in post operative sore throat incidence. 2 patients from 129 patients had a complaint of sore throat after indirect questioning whereas after direct questioning 28 patients from 113 patients complained about sore throat. This difference could be suggestive of the fact that patients usually pay attention to the signs directly related to their main problem i.e. surgery, not to the signs like sore throat which do not appear instantly after anesthesia or surgery.[39] The obtained data from our study regarding sore throat incidence are in accordance with the existing articles. The existing difference may be due to the differences in expertise and techniques between anesthesiologists and or the definitions of sore throat in each anesthesiologist and patient's mind. Therefore, airway management technique is important and essential and appropriate LMA and tracheal tube sizes should be selected for each patient. The efficacy of lubricants containing local anesthetics and their being helpful or harmful regarding sore throat after operation have not been thoroughly studied.[39] Keller et al., in a study carried out on 120 patients undergoing general anesthesia using LMA, concluded that lubricating LMA with topical Lidocaine 2% did not reduce post operative sore throat incidence compared to lubricating with normal saline.[46] To the best of our knowledge, no study has been conducted to approve the usage of topical anesthetic gel in lubricating tracheal tube decreasing post operative sore throat incidence.[39] Surprisingly, in a study, using Lidocaine spray before intubation increased postoperative sore throat incidence[37]; in addition, in another study, lubricating tracheal tube using hydrocortisone gel 1% also increased postoperative sore throat incidence from 50% to 90%.[48] Park et al., in a study carried out on 166 patients, showed that administering dexamethasone (0.2mg/kg IV) prior to operation reduced postoperative sore throat incidence in the patients undergone general anesthesia using double-lumen endobronchial tube.[49]

## Conclusion

Based on the results obtained from the present study, it could be concluded that intravenous administration of hydrocortisone five minutes prior to anesthesia induction has no effect on degree or severity of post operative sore throat after using LMA in urogenital surgeries. Therefore, it is suggested that in future studies, considering larger statistical sample volumes and longer surgeries, effect of hydrocortisone, solely or in association with other medications, on post operative sore throat incidence is studied.

**Competing interests**: The authors had no competing interests to declare in relation to this article.

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