Effectiveness of a Preoperative Single Dose Intravenous Dexamethasone in Reducing the Prevalence of Postoperative Sore Throat after Endotracheal Intubation

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Objective: To evaluate the effectiveness of two-different doses of prophylactic dexamethasone intravenous administration in reducing the prevalence of postoperative sore throat following general endotracheal anesthesia.

Material and Method: All patients (105 cases) of different procedures of elective surgery scheduled to have general anesthesia performed with endotracheal intubations were included. The subjects randomized into three pre-operative intravenous substance/drug administrations, group I (35 cases) with normal saline 2 ml, group II (35 cases) with dexamethasone 4 mg, and group III (35 cases) with dexamethasone 8 mg, respectively. The prevalence of sore throat and its severity was assessed, using visual analogue scale (VAS), scores of 0 to 10; 0 = no pain, and 10 = most severe pain.

Results: Among three groups, the duration of surgery, and intubation-induced trauma had no statistical significance. The prevalence of sore throat at 1-hour/24-hour postoperative was 48.6/48.6%, 54.3/28.6%, and 54.3/42.9% in group I, II, and III respectively, and without statistical significance.

Conclusion: The intravenous dexamethasone had no significant effectiveness against postoperatively sore throat after endotracheal intubation.

Keywords: Dexamethasone, Endotracheal intubation, Postoperative sore throat

Postoperative sore throat, with the incidence of 40 to 90%(1-5), is a common complaint and distressing sequence following general anesthesia. There are many contributing factors such as female gender, history of smoking or lung diseases, postoperative nausea(1), intubation-induced trauma, large tracheal tube size, cuff design, and duration of surgery(1,3,5). The underlying mechanisms of sore throat are thought to be irritation and inflammation from endotracheal tube insertion and cuff inflation.

Preventive measures to diminish these effects such as use of a smaller endotracheal tube to reduce contact area with mucosa(6,7), low intra-cuff pressure(8), cuff filled with saline or xylocaine to prevent cuff expansion during anesthesia(6,9), inhalation of steroid(10), and steroid-coated endotracheal tube have been reported(6,11-13).

Dexamethasone is a potent corticosteroid with anti-inflammatory, analgesic, and anti-emetic actions. It has minimal side effects after a single-dose administration. Dexamethasone is shown to be an effective treatment for moderate to severe pharyngitis. Although there were studies showing the effectiveness of prophylactic high dose intravenous dexamethasone in preventing postoperative sore throat(14,15), there has yet been any study on its different dose effect.

The objective of the present study was to evaluate the effect of normal saline, dexamethasone 4 mg, and dexamethasone 8 mg given preoperatively, on the prevalence of postoperative sore throat caused after general anesthesia with endotracheal intubation.

Material and Method

The present study was performed after the approval of the Ethical Committee, Faculty of Medicine,
Prince of Songkla University. Between September 11, 2009 and February 25, 2010, the patients who underwent elective surgery, received general anesthesia with endotracheal intubation, aged between 15 to 65 years, and ASA class I to II were enrolled into the present study. Exclusion criteria were the difficult intubation of more than two attempts, head and neck surgery, known history of sensitivity or allergy to steroids, preoperative complaint of sore throat or respiratory tract infection, obesity (BMI more than 28 kg/m²), diabetes mellitus, pregnancy, during corticosteroids or calcium channel blockers administration, duration of surgery more than 4 hours, required intubation and mechanical ventilator in postoperative period. The subjects were randomized in three groups, group 1 (35 cases) with normal saline 2 ml, group II (35 cases) with dexamethasone 4 mg, and group III (35 cases) with dexamethasone 8 mg, respectively. After pre-oxygenation, anesthesia was induced with intravenous thiopental or propofol and morphine, vecuronium was then given for intubation. A single use PVC tracheal tube (Hi-Lo™ Mallinckrodt) with low-pressure-high-volume cuff, of size 7.5 mm internal diameter for female and 8.0 mm internal diameter for male was used. No lubricant was used. No intraoperative administration of ondansetron or metoclopramine was given. A blinded member of the research team assessed the patients at 1- and 24-hour postoperatively. The patients were asked about the occurrence of sore throat and its intensity was assessed using visual analogue scale scores (VAS), scores of 0 to 10; 0 = no pain, and 10 = most severe pain, as well as the cough, hoarseness, and adverse events of nausea/vomiting.

The data of delay suspicion and isolation were compared with non-delay suspicion and isolation with Student’s t-test for continuous variables and with Chi-square test (\(x^2\)) or Fisher’s exact test for numeric variables. Significance was determined with \(p\)-value less than 0.05.

The demographic data was analyzed using the Fisher’s exact test (categorical data) and the Student’s t-test (parametric data). Continuous data was analyzed by un-paired Student’s t-test for normal distribution data and by Mann-Whitney U test for non-normal distribution data. The results are expressed as mean ± standard deviation (SD) for normal distribution data and median (range) for non-normal distribution data. The \(p\)-value less than 0.05 is considered to be statistically significant. The statistical analysis was examined with Statistical Package for the Social Sciences (SPSS).

**Results**

The 105 patients were analyzed. The mean age was 41.57 ± 11.23 years. The majority of patients were female (83.81%) with mean BMI of 23.94 ± 17.00, and the ASA class II were up to 61.9% with low proportion of smoking history (11.4%).

In Table 1, the contributing factors with scientific ground such as duration of surgery had no statistical significance. However, the intubation-induced trauma with bloodstained endotracheal tube was higher in group three than group one and two. The prevalence of sore throat at 1-hour/24-hour postoperative was 48.6%/48.6%, 54.3%/28.6%, and 54.3%/42.9% in group I, II, and III, respectively, and without statistical significance. Accordingly, the severity of sore throat, cough, and nausea and vomiting were also insignificant.

**Discussion**

The result of the present study did not show the promising effect of preoperative intravenous dexamethasone in reducing the prevalence of postoperative sore throat compared with normal saline, and the efficacy was similar to the previous two studies\(^{(14,15)}\). The contradicting result may be explained from the mechanism of injury and pathophysiological viewpoints.

<table>
<thead>
<tr>
<th>Group I (n = 35)</th>
<th>Group II (n = 35)</th>
<th>Group III (n = 35)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal saline</td>
<td>4 mg dexamethasone</td>
<td>8 mg dexamethasone</td>
<td></td>
</tr>
<tr>
<td>Duration of surgery (minutes ± SD)</td>
<td>105.91 ± 45.69</td>
<td>125.63 ± 51.58</td>
<td>115.74 ± 48.70</td>
</tr>
<tr>
<td>Intubation-induced trauma [number (%)]</td>
<td>1/35 (2.9%)</td>
<td>1/35 (2.9%)</td>
<td>6/35 (17.1%)</td>
</tr>
<tr>
<td>Postoperative 1-hour sore throat [number (%)]</td>
<td>17/35 (48.6%)</td>
<td>19/35 (54.3%)</td>
<td>19/35 (54.3%)</td>
</tr>
<tr>
<td>Postoperative 24-hour sore throat [number (%)]</td>
<td>17/35 (48.6%)</td>
<td>10/35 (28.6%)</td>
<td>15/35 (42.9%)</td>
</tr>
</tbody>
</table>

Table 1. Comparison of contributing factors and prevalence of sore throat among three different groups
Many confounding factors can affect the postoperative sore throat such as the different types of surgical procedure, and anesthetic protocol, as well as the contributing factors, and the preventive measures. Therefore, the insignificant prevalence of postoperative sore throat was attributed that the prophylactic effectiveness of dexamethasone in reducing the postoperative sore throat was not verified.

In conclusion, the intravenous dexamethasone had no significant effectiveness against post-operatively sore throat after endotracheal intubation.

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**Potential conflicts of interest**

None.

**References**

ประสิทธิภาพของยา dexamethasone ทางหลอดเลือดดำครั้งเดียวก่อนผ่าตัดในการลดอุบัติการณ์ภาวะเจ็บคอหลังการผ่าตัดภายหลังใส่ท่อช่วยหายใจ

ศักดิชัย เรืองสิน, อินท์ชานก วณสุวรรณกุล, งามจิตต์ กัทธิไทย, วิศรา อะซิ่ม

วัตถุประสงค์: ประเมินประสิทธิภาพของการให้ยา dexamethasone แบบป้องกันสองขนาดที่แตกต่างกันในการลดอุบัติการณ์ภาวะเจ็บคอหลังการผ่าตัดภายหลังใส่ท่อช่วยหายใจ

วัสดุและวิธีการ: ผู้ป่วยทั้งหมด (105 ราย) ได้รับการผ่าตัดแบบไม่ฉุกเฉินด้วยวิธีการปฏิบัติต่างกัน ดังได้รับการแบ่งกลุ่มโดยสุ่มโดย randomization 3 กลุ่ม ได้รับยาทางหลอดเลือดดำก่อนผ่าตัดแตกต่างกัน กลุ่ม 1 ได้รับน้ำเกลือ 2 มิลลิลิตร กลุ่ม 2 ได้รับยา dexamethasone ขนาด 4 มิลลิกรัม และกลุ่ม 3 ได้รับยา dexamethasone 8 มิลลิกรัมตามลำดับ ประเมินอุบัติการณ์ภาวะเจ็บคอด้วย visual analogue scale (VAS) คะแนน 0 ถึง 10 คะแนน 0 หมายถึงไม่เจ็บ และคะแนน 10 หมายถึง เจ็บรุนแรงมากที่สุด

ผลการศึกษา: ระหว่าง 3 กลุ่ม ระยะเวลาผ่าตัดและการบาดเจ็บจากการใส่ท่อช่วยหายใจไม่แตกต่างอย่างมีนัยสำคัญต่ออุบัติการณ์ภาวะเจ็บคอ แต่ 1 ชั่วโมง/24 ชั่วโมงหลังผ่าตัด เท่ากันราวๆ 48.6/48.6, 54.3/28.6 และ 54.3/42.9 ในกลุ่ม 1, 2 และ 3 ตามลำดับ และไม่มีความแตกต่างอย่างมีนัยสำคัญ

สรุป: ยา dexamethasone ทางหลอดเลือดดำไม่มีประสิทธิภาพแตกต่างอย่างมีนัยสำคัญต่อภาวะเจ็บคอหลังผ่าตัดตามหลักการใส่ท่อช่วยหายใจ