

# The Efficacy of Injection of 0.25 mg/kg Dexamethasone after Induction of Anesthesia on Reducing Tonsillectomy Morbidities

Saad M. Al Muhayawi, MD, FRCS(C)

Department of Otolaryngology-Head and Neck Surgery, Faculty of Medicine  
King Abdulaziz University, Jeddah, Saudi Arabia

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## Correspondence

Dr. Saad M. Al Muhayawi  
P.O. Box 80215, Jeddah 21589, Saudi Arabia  
e.M: dr.muahayawi@gmail.com

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## Abstract

Tonsillectomy is one of the most commonly performed surgical procedures in otolaryngology practice. Nausea, vomiting, pain, decreased oral intake and dehydration are frequently associated with tonsillectomy. This study demonstrates the effect of prophylactic administration of dexamethasone as a single dose on post-tonsillectomy morbidities. This was a comparative cross-sectional study of pediatric patients (3-15 years) attending the otolaryngology outpatient clinics at King Abdulaziz University Hospital between October 2010 – December 2012. A sample of 100 patients, divided into two groups of 50 patients was included for analysis. The first group received intravenous dexamethasone (0.25 mg/kg) as a single dose with induction of anesthesia. In the second, control, group, no pre-operative dexamethasone was administered. The outcome was assessed by a questionnaire distributed to both groups to evaluate post-operative nausea, vomiting, pain and early oral feeding. Pain score was assessed using a visual analogue scale (ranging from 0 to 10). Our results showed a statistically significant reduction in morbidity associated with tonsillectomy, supporting the administration of single dose intravenous dexamethasone during tonsillectomy.

## Keywords

Tonsillectomy; Post-operative; Morbidity; Dexamethasone

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## Introduction

Tonsillectomy is one of the most commonly performed ear, nose, and throat surgeries worldwide. It is associated with several morbidities, including pain, nausea, vomiting, oropharyngeal edema and poor oral intake. Despite advances in anesthetic care and surgical techniques, post tonsillectomy pain, malaise, nausea, vomiting and

decreased oral intake remain a significant concern for patients and their family members<sup>[1]</sup>. According to one meta-analysis, a single dose of dexamethasone administered during tonsillectomy was associated with a statistically significant reduction in post-tonsillectomy morbidity<sup>[2,3]</sup>. Others authors have also shown that prophylactic dexamethasone reduced post-tonsillectomy nausea and vomiting, suggesting that it is an effective 5-HT<sub>3</sub> antagonist<sup>[4]</sup>. It also decreases

post-tonsillectomy pain and increases in oral intake and earlier tolerance to soft and regular foods<sup>[5]</sup>.

The objective of this study is to determine the role of dexamethasone (steroid) in decreasing morbidity associated with tonsillectomy.

### Subjects and Methods

This study was a comparative cross-sectional study conducted at the outpatient clinics of the Ear, Nose and Throat (ENT) Department at King Abdulaziz University Hospital between October 2010 – December 2012 on patients who required tonsillectomy. Patients were informed about the study, including the medication administered, as well as the benefits and risks involved. Informed consent was taken with operative consent. The demographic data of the patients are shown in Table 1.

One hundred patients with a diagnosis of chronic tonsillitis were included in the study, age 3 – 15 years, both genders. The exclusion criteria were patients with

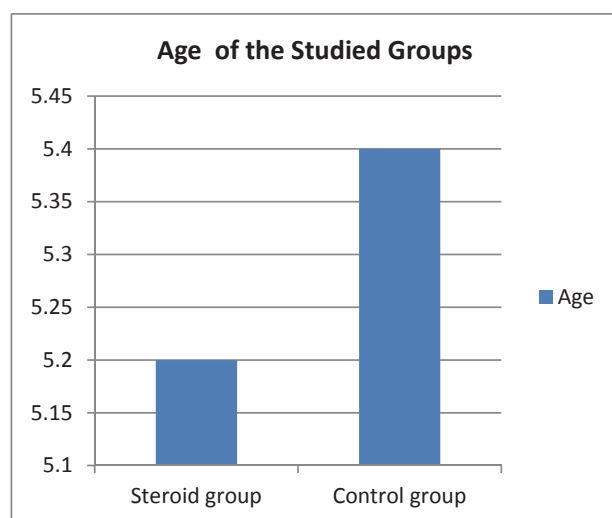
hypertension, *diabetes mellitus*, psychotic illness and bleeding disorders.

All patients were examined, and their medical history was documented prior to surgery; baseline investigations, such as a complete blood count were performed for all included patients. Tonsillectomy was performed by the same surgeon who applied the same technique. Patients were divided into two groups:

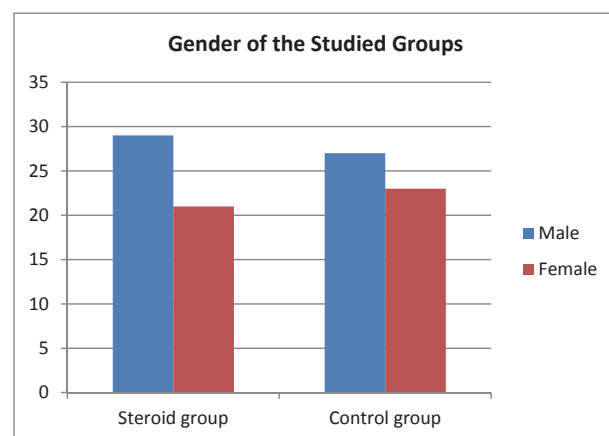
- The first group: received 0.25 mg/kg intravenous dexamethasone after induction of anesthesia. Up to maximum 12 mg.
- The second group: did not receive pre-operative dexamethasone.
- All patients were assessed in the three parameters which included the following:
  1. Pain score
  2. Difference in oral intake
  3. Nausea and vomiting

**Table 1.** Age and gender of the studied groups.

Variable	Steroid N = 50	Control N = 50	Test of Significance of P Value
<b>Age</b>			
Mean ± SD	5.2 ± 2.71	5.4 ± 1.92	0.55
Range	(3-15)	(4-15)	
<b>Gender</b>			
Male	29	27	0.68
Female	21	23	



**Figure 1.** Age of both control and steroid group.



**Figure 2.** The gender of steroid and control group.

The main outcome measures included: the pain score using the visual analogue scale with 0 corresponding to no pain and 10 to severe pain (Table 2). The difference in starting post-operative feeding in the two groups is shown in Table 3, while the incidence of post-operative nausea and vomiting in both groups is shown in Table 4.

Sample size calculation was done at alpha error 0.05 and confidence level 0.95. Beta error was 0.20 and the power of the study was 0.80. The sample was decided at 50 patients in each group.

### Statistical Analysis

The data were collected and analyzed using the IBM SPSS Statistics for Windows, Version 22 (IBM Corp., Armonk, NY USA).

Quantitative data were presented as mean and standard deviation. "Student's" *t* test was utilized as a test of significance to compare the two groups.

Qualitative data were presented as frequencies and percentages. A chi-square ( $\chi^2$ ) test was used as a test of comparison between each of the two groups. Significance was considered at p value less than 0.05.

### Results

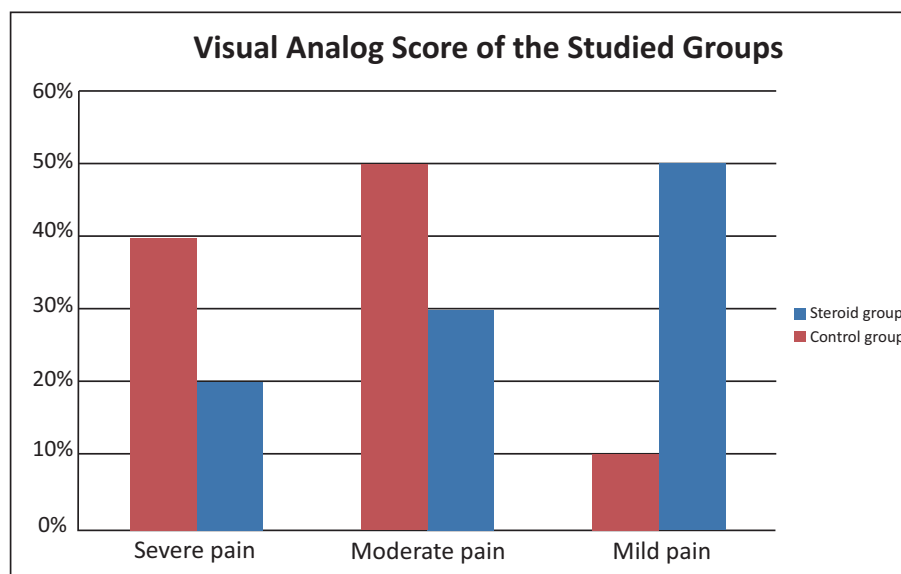
The mean age of the patients was 5.2 years and 5.4 years for the steroid and control groups, respectively. When categorized by gender, the frequency of patients in both groups was as follows: 29 males in the steroid group versus 27 in the control group and 21 females in the steroid group versus 23 in the control group (Table 1, Figs. 1 and 2)

There was significant difference in the level of pain in the steroid group compared with the control group ( $P < 0.001$ ): 50% of patients in the steroid group complained of no or only mild pain compared with 10% in the control group. In the steroid group 15 (30%) and 10 (20%) of the patients suffered from moderate and severe pain, respectively; compared with the control

**Table 2.** Visual analogue score of the studied groups.

Variable Visual Analogue Score	Steroid N = 50 N (%)	Control N = 50 N (%)	Test of Significance P-value
Mild or No Pain	25 (50.00%)	5 (10.00%)	0.001*
Moderate Pain	15 (30.00%)	25 (50.00%)	
Severe Pain	10 (20.00%)	20 (40.00%)	

\*Significant at alpha <0.05

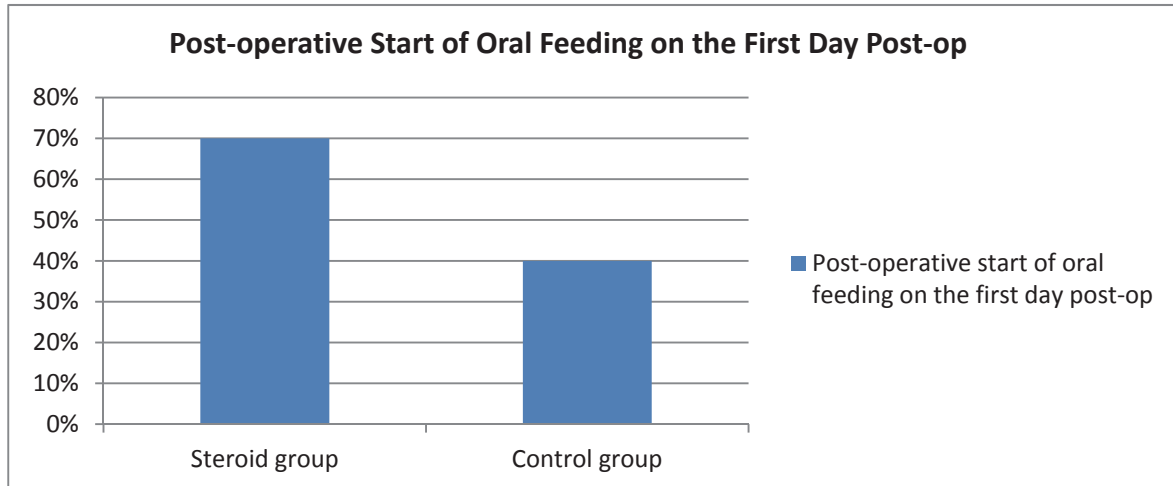


**Figure 3.** Comparison of the degree of pain in steroid and control group.

**Table 3.** Post-operative start of feeding of the studied groups.

Variable	Steroid N = 50 N (%)	Control N = 50 N (%)	Test of Significance
Early start of feeding	35 (70.00%)	20 (40.00%)	P = 0.002 *

\* Significant at alpha <0.05

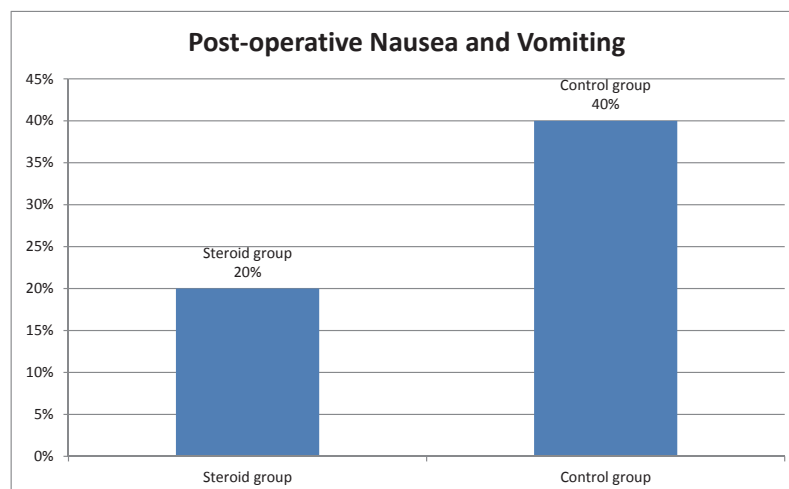


**Figure 4.** The difference in post-operative start of oral feeding between the steroid and control group.

**Table 4.** Post-operative nausea and vomiting of the studied groups.

Variable	Steroid N = 50 N (%)	Control N = 50 N (%)	Test of Significance
Nausea and Vomiting	10 (20.00%)	20 (40.00%)	P = 0.015 *

\* Significant at alpha <0.05



**Figure 5.** The difference in post-operative nausea and vomiting between the steroid and control group.

group where 25 (50%) of the patients complained of moderate pain and 20 (40%) reported severe pain (Table 2, Fig. 3).

Table 3 shows post-operative outcomes related to feeding. There was significant difference between the two groups ( $P = 0.002$ ), with 35 (70%) patients from the steroid group starting early feeding compared to only 20 (40%) in the control group as in Figure 4.

Table 4 shows a significant difference in the improvement of post-operative outcomes (nausea and vomiting morbidities) between the steroid and control group. Only 10 (20%) patients in the steroid group had nausea and vomiting compared with 20 (40%) in the control group ( $P=0.015$ ), as in Figure 5.

### Discussion

Post-tonsillectomy morbidities including pain, decreased oral intake, fever, dehydration, nausea and vomiting continue to be significant. In spite of advances in surgical and anesthetic technique as well as the use of pharmacological agents to control pain and nausea, patients and their family are still concerned about post-operative symptoms. Our study showed a decrease in the incidence of post-operative pain scores and improvement in the quality of early oral intake after administration of single-dose intravenous dexamethasone (0.25 mg/kg/body weight), administered after anesthesia induction. Several recent publications supported the use of steroids for reducing tonsillectomy symptoms<sup>[6-8]</sup>. Steroids are thought to reduce tissue damage as well as post-operative pain and edema by suppressing the deposition of fibrin, dilating capillaries causing leukocyte migration, increasing the capillary permeability and reduce post-operative edema formation.

Steroids also have an anti-emetic effect and have been used in patients undergoing chemotherapy<sup>[9]</sup>. Steroids may exert an anti-emetic action by antagonizing prostaglandins, inhibiting isotonin in the gut and releasing endorphins. In a study conducted on a small sample of patients, Carr *et al.*<sup>[10]</sup> found that single-dose intravenous dexamethasone administered during tonsillectomy reduced pain post-surgery over 10 days. Malde *et al.*<sup>[11]</sup> studied the effectiveness of single-dose intravenous dexamethasone (0.15 mg/kg) in patients above 3 years of age and showed that dexamethasone

provided significant analgesia, reduced post-operative edema and improved the quality of oral intake.

Samarkandi *et al.*<sup>[12]</sup> showed that in pediatric patients, the administration of dexamethasone reduced post-tonsillectomy vomiting and pain. In a case-control of 30 adult tonsillectomies, Al-Shehri<sup>[13]</sup> showed that frequency of pain, nausea and vomiting was lower in the pre-operative dexamethasone group. Furthermore, patients in the pre-operative dexamethasone group had better healing and less slough and granulation than controls; no adverse effects were reported.

In another study conducted by Splinter and Roberts<sup>[14]</sup> it was shown that dexamethasone reduced post-tonsillectomy vomiting.

Steward *et al.*<sup>[15]</sup>, performed a meta-analysis, which included eight double-blinded, randomized, placebo controlled studies, and recommended single intravenous dose of dexamethasone keeping its efficacy, safety and its cost effectiveness. Their findings are consistent with the results of our study.

### Conclusion

Overall, a single intravenous dose of dexamethasone (0.25 mg/kg) administered before tonsillectomy in an otherwise healthy child was safe and resulted in a statistically significant reduction in post-operative pain, nausea, and vomiting and improved oral intake in the first 24 hours following tonsillectomy. Owing to the absence of side effects in our sample, we highly recommend administration of a single intravenous dose of dexamethasone in the pre-operative protocol for tonsillectomy.

### Conflict of Interest

The author has no conflict of interest.

### Disclosure

The author did not receive any type of commercial support either in forms of compensation or financial for this study. The author has no financial interest in any of the products or devices, or drugs mentioned in this article.

### Ethical Approval

Obtained.

### Reference

- [1] Randall DA, Hoffer ME. Complications of tonsillectomy and adenoidectomy. *Otolaryngol Head Neck Surg* 1998; 118(1): 61-68.
- [2] Afman CE, Welge JA, Steward DL. Steroids for post-tonsillectomy pain reduction: meta-analysis of randomized controlled trials. *Otolaryngol Head Neck Surg* 2006; 134(2): 181-186.
- [3] Goldman AC, Govindaraj A, Rosenfeld RM. A metaanalysis of dexamethasone use with tonsillectomy. *Arch Otolaryngol Head Neck Surgery* 2000; 123(6): 682-686.
- [4] Gan TJ, Meyer TA, Apfel CC, Chung F, Davis PJ, Habib AS, Hooper VD, Kovac AL, Kranke P, Myles P, Philip BK, Samsa G, Sessler DI, Temo J, Tramèr MR, Vander Kolk C, Watcha M; Society for Ambulatory Anesthesia. Society for Ambulatory Anesthesia guidelines for the management of postoperative nausea and vomiting. *Anesth Analg* 2007; 105: 1615-1628.
- [5] Baugh RF, Archer SM, Mitchell RB, Rosenfeld RM, Amin R, Burns JJ, Darrow DH, Giordano T, Litman RS, Li KK, Mannix ME, Schwartz RH, Setzen G, Wald ER, Wall E, Sandberg G, Patel MM; American Academy of Otolaryngology-Head and Neck Surgery Foundation. Clinical practice guideline: tonsillectomy in children. *Otolaryngol Head Neck Surg* 2011; 144(1Suppl): S1-30.
- [6] Elhakim M, Ali NM, Rashed I, Riad MK, Refat M. [Dexamethasone reduces postoperative vomiting and pain after pediatric tonsillectomy.] *Can J Anesth* 2003; 50(4): 392-397.
- [7] Kaan MN, Odabasi O, Gezer E, Daldal A. The effect of preoperative dexamethasone on early oral intake, vomiting and pain after tonsillectomy. *Int J Pediatr Otorhinolaryngol* 2006; 70(1): 73-79.
- [8] Liechti M, Feurer R, Gross D, Schmitz A, Stutz K, Gerber A, Weiss M. Prevention of postoperative nausea and vomiting in children following adenotonsillectomy, using tropisetron with or without low-dose dexamethasone. *J Anesth* 2007; 21(3): 311-316.
- [9] Cassileth PZ, Lusk EJ, Torri S, DiNubile N, Gerson SL. Antiemetic efficacy of dexamethasone therapy in patients receiving cancer chemotherapy. *Arch Intern Med* 1983; 143(7): 1347-1349.
- [10] Carr MM, Williams JG, Carmichael L, Nasser JG. Effect of steroids on post-tonsillectomy pain in adults. *Arch Otolaryngol Head Neck Surg*. 1999; 125(12): 1361-1364.
- [11] Malde AD, Sonawane VS, Jagtap SR. Effect of dexamethasone on post-tonsillectomy morbidities. *Indian J Anesth* 2005; 49(3): 202-207.
- [12] Samarkandi AH, Shaikh MA, Ahmad RA, Alammar AY. Use of dexamethasone to reduce post-operative vomiting and pain: a double-blind randomized controlled trial. *Clin Otolaryngol* 2006; 31(1): 36-40.
- [13] Al-Shehri AM. Steroid therapy for post-tonsillectomy symptoms in adults: a randomized, placebo-controlled study. *Ann Saudi Med* 2004; 24(5): 365-367.
- [14] Splinter WM, Roberts DJ. Dexamethasone decreases vomiting by children after tonsillectomy. *Anesth Analg* 1996; 83(5): 913-916.
- [15] Steward DL, Welge JA, Myer CM. Do steroids reduce morbidity of tonsillectomy? Meta-analysis of randomized trials. *Laryngoscope* 2001; 111(10): 1712-1718.

## تأثير مدى فعالية إعطاء جرعة ٠.٢٥ ر.مليجرام/كيلوجرام ديكساميثاسون المصاحبة للتخدير في تخفيف مضاعفات عملية إستئصال اللوزتين

سعد محمد صلاح المحياوي

قسم الانف والاذن والحنجرة، كلية الطب، جامعة الملك عبد العزيز  
جدة- المملكة العربية السعودية

**المستخلص.** الهدف من هذه الدراسة هو معرفة مدى تأثير فعالية إعطاء جرعة (٠.٢٥ ر.مليجرام/كيلوجرام) من عقار ديكساميثاسون خلال التخدير لتخفيف المضاعفات المصاحبة لعملية إستئصال اللوزتين. تم عمل دراسة مقارنة بين ١٠٠ مريض يتابعون بعيادة الانف والاذن والحنجرة ويحتاجون لاستئصال اللوزتين في الفئة العمرية بين (٣ سنوات – ١٥ سنة). تم تقسيم المرضى الى مجموعتين. المجموعة الأولى أعطيت جرعة ٠.٢٥ ر.مليجرام/كيلوجرام ديكساميثاسون عند اعطاء التخدير. والمجموعة الثانية لم تعط هذه الجرعة. تم تقييم المضاعفات المصاحبة لعملية إستئصال اللوزتين إلى: الألم بعد العملية، سرعة الاقبال على الطعام، التقىأ، وقد أثبتت نتائج هذه الدراسة فعالية إعطاء جرعة ٠.٢٥ ر.مليجرام/كيلوجرام ديكساميثاسون خلال العملية في تخفيف المضاعفات المصاحبة لاستئصال اللوزتين.