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Relation between Intraoperative Dexamethasone and Post-Tonsillectomy Morbidity

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Abstract

Objective: To determine the effects of dexamethasone on reduction of post-operative morbidity in patients undergoing tonsillectomy.

Design: Cross-sectional study.

Setting: Al-Sabah, Zain Ear, Nose, and Throat Hospital, Kuwait.

Patients: Ninety-four (50 male and 44 female), aged between 5 and 18, who underwent tonsillectomy.

Intervention: All patients received a single dose of intravenous dexamethasone intraoperatively.

Main Outcome Measures: Post-operative pain, nausea and vomiting, and airway obstruction with respiratory compromise.

Results: Statistically significant decline in post-operative pain, nausea and vomiting, and airway obstruction with respiratory compromise.

Conclusion: A single intra-operative dose of dexamethasone 1mg/kg is an efficacious and safe method for reducing post-tonsillectomy morbidity.

Keywords: dexamethasone; post-opretaive morbidity; tonsillectomy; pediatrics

Introduction

More than 280,000 tonsillectomies are performed annually in patients younger than 18 years of age in the United States, which is almost equal to 13% of all operations performed by otolaryngologists in the USA every year. Regardless of improvements in anesthetic techniques, post tonsillectomy morbidity is still an important clinical matter [1].

Common morbidities occurring in post tonsillectomy patients include pain, nausea and vomiting, and airway obstruction leading to respiratory compromise; this can intern lead to tension on the sutures, hemorrhage, aspiration pneumonia, as well as increased risk of mortality [2].

Dexamethasone has been approved to treat inflammatory conditions [3,4] including allergic reactions, inflammatory bowel disease, nervous system conditions, such as acute exacerbation of multiple sclerosis, brain swelling (cerebral edema) associated with a brain tumors and head injury, autoimmune connective tissue disorders, and arthritis. It has also been used as an antiemetic and as an analgesic in patients undergoing chemotherapy [5]. Due to its anti-inflammatory, analgesic and antiemetic effects, Dexamethasone may decrease post-tonsillectomy morbidities.

Numerous randomized studies on steroids in post-tonsillectomy morbidity have established incongruous results, as some show clinical benefit while others no benefit at all. [6,7]

The aim of this study was to investigate the relation between intraoperative dexamethasone (1mg/kg) administration and post-tonsillectomy morbidity.

Subjects and Methods

Informed consent was acquired from each patient or patient's legal guardian (with approval from the Institutional Review Board).

Ninety-four patients (50 male and 44 female) between the ages of 5 and 18 years who underwent tonsillectomy were included in this study, all of which received a single dose of intravenous dexamethasone (1mg/kg) intraoperatively.

Those with known medical disorders or with contraindications to steroid therapy were not included in the study. On the other hand, the patients considered in the study satisfied the routine pre-operative criteria for tonsillectomy (history, physical exam, laboratory work up). The anesthetic protocol and surgical technique were also standardized for all patients. Cold dissection tonsillectomy was the surgical procedure performed on all the patients.

The post-operative regimen for analgesia and anti-emesis used was: Paracetamol 1gm orally routinely administered every 6 hours, and Ibuprofen (Profinal) 5mg/kg was administeredper-oral when the patient complained of pain. Metclopromide (5ml) was also administered when necessary.

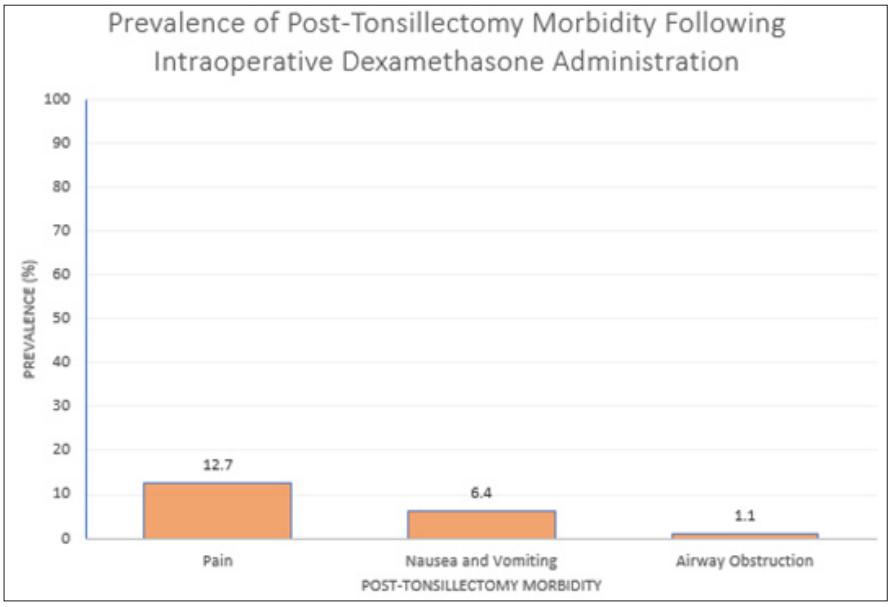
Post-operatively, all patients were monitored for pain (depending on frequency of need for analgesia), number of episodes of vomiting 6 hours post-operative, and for any signs of airway compromise (determined by clinical evaluation and oxygen saturation on monitor) in the hospital for 24 hours or longer depending on the morbidity.

If no complications or morbidities were observed in the patients after 24 hours and the patients were tolerating good oral intake, they were discharged. Furthermore, each patient had regular follow-up visits with the consultant and data was collected regarding any morbidities.

Results

Ninety-four patients between 5 and 18 years of age were included in this study (mean age 11.5 ± 3), each receiving intravenous dexamethasone intraoperatively. There were no adverse effects of the drug recorded in this study, and the male to female ratio was 1:0.88.

On the day of the operation only 12 patients out of the 94 (12.7%) required an extra analgesic due to pain. In addition, only 6 out of all the patients in the study (6.4%) experienced more than 2 episodes of vomiting 6 hours postoperative, and only one case exhibited airway compromise (1.1%).



All the patients were fit for discharge after 24 hours postoperative and non-required readmission, which confirms no complications.

Thus, dexamethasone has a significant effect on reduction of post-operative morbidity in patients undergoing tonsillectomy as opposed to the old-fashioned no dexamethasone use intraoperatively, as many cross-sectional studies showed higher prevalence of tonsillectomy post-operative morbidity when no dexamethasone was administered [8].

Discussion

Pain after tonsillectomy is mainly due to the inflammation and nerve irritation after tissue injury, and there has also been a causal relationship between the exposure of pharyngeal muscle post-tonsillectomy and the onset of pain. The main culprit in the onset of pain is the release of prostaglandin through the activation of both the cyclo-oxygenase and lipo-oxygenase pathways involved in inflammation and edema [9]. Corticosteroids like dexamethasone work by blocking these pathways and hence relieving pain.

Corticosteroids have been extremely effective in reducing edema and inflammation [10] leading to airway compromise in cases seen in otolaryngology including epiglottitis, laryngeal trauma, allergic laryngeal edema, and laryngotracheal bronchitis [11].

Swallowing blood post-tonsillectomy as well as pain in the oral cavity and pharynx are the main reasons for post-operative nausea and vomiting seen in these patients. Steroid action against prostaglandins, in addition to it causing release of endorphins and tryptophan depletion, make steroids useful anti-emetics and thus improving the patients post-surgical course [12]. This has been proven by various studies and meta-analysis that showed benefits with corticosteroids alone or as adjuvant therapy in chemotherapy induced vomiting, opioid therapy, and thyroidectomy. [13]

Sanjay Kumar Verma *et al.*[14] did a double-blind randomized controlled trial of the effect of steroids on post-tonsillectomy pain in adults and concluded that there was a slight reduction in pain after use of 20 mg intravenous dexamethasone given intraoperatively while performing electrocautery tonsillectomy.

Chad *et.al.*[15] did a systematic review of currently available randomized controlled trials using a single-dose, intravenous corticosteroid during pediatric tonsillectomy. Visual analog pain scale (VAS) data was extracted with reviewers blinded to results. Meta-analysis was performed, and the results support the administration of steroids for post-tonsillectomy pain reduction.

Mathew M. Hanasono *et.al.*[16] did a prospective, randomized, double blind study on the efficacy of dexamethasone administration on reduction of post-tonsillectomy pain, oral intake, and emesis on post-operative day 1 and the results showed a significant decrease in all the main outcome measures.

Our main aim was todetermine the relation between intraoperative administration of dexamethasone and post-operative morbidity in patients undergoing tonsillectomy. (post-operative pain, nausea and vomiting, and airway obstruction with respiratory compromise).

Due to its long half-life of almost 48 hours [17], dexamethasone was selected. A single dose of dexamethasone (1m/kg) was administered immediately after anesthesia induction, and the surgical and anesthetic techniques were standardized amongst all subjects in the study. The patients were discharged 24 hours after the operation and were followed up in the outpatient department.

The vast majority of patients studied responded to dexamethasone with positive outcome as most did not require extra analgesia, antiemetics, or showed any signs of airway compromise.

Conclusion

Our study concluded that intra-operative dexam ethasone administration showed a decrease in post-tonsillectomy morbidity in pediatric as well as adult populations. Although increasing the sample size and adding controls to the study can reinforce the statistical power of this study, we can establish that dexamethasone is a safe and efficient tool in reducing post-tonsillectomy morbidity when administered intra-operatively.

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