

COMPARATIVE STUDY OF OROGASTRIC SUCTION AND DEXAMETHASONE TO REDUCE VOMITING AFTER PEDIATRIC TONSILLECTOMY

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ABSTRACT

Objective: To compare the effect of gastric emptying with an orogastric tube and the effect of a single dose of dexamethasone on the incidence of postoperative vomiting in children undergoing tonsillectomy.

Methods: Two hundred and ten patients of both genders, aged 1.5-14 years, who were scheduled to undergo tonsillectomy with or without adenoidectomy were studied prospectively. Patients were randomized into three groups. Group I included patients who underwent gastric aspiration with an orogastric tube prior to extubation following surgery (n = 70). Group II included patients who received dexamethasone 0.5 mg/kg intravenously (maximum dose 8 mg) after the induction of anesthesia and before surgery (n = 70). Group III included patients who neither received dexamethasone nor underwent gastric aspiration (n = 70). Data on the number of episodes of vomiting, total volume of emesis, administration of rescue prophylactic antiemetics were recorded.

Results: The incidence of early postoperative vomiting (before discharge from recovery room) was not significantly different between the three groups. The incidence of vomiting during stay on the ward (late vomiting) was more frequent in group I and III. The mean number of episodes of vomiting in the three groups was 2.4, 2.2 and 2.3 respectively. The mean volume of emesis for the patients who experienced postoperative vomiting was similar in the three groups (183 ml, 176 ml and 180 ml respectively). Prophylactic antiemetic rescues were required in 13% of group I, 4% in group II and 10% in group III. The time to the first oral intake and duration of intravenous hydration was significantly shorter in the dexamethasone group than in the other two groups.

Conclusion: Prophylactic intra operative single dose of dexamethasone decreases the incidence of postoperative vomiting, and accelerates the return to normal diet in children undergoing tonsillectomy. Aspiration of gastric contents with an orogastric tube does not decrease postoperative vomiting, mean number of vomiting episodes and the volume of emesis. Routine use of orogastric tube placement for gastric aspiration following pediatric tonsillectomy is not advisable.

Key words: Gastric aspiration, Dexamethasone, Tonsillectomy.

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Introduction

Tonsillectomy is one of the most frequently

performed ambulatory surgical procedures in children and is associated with an incidence of

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postoperative vomiting ranging between 40%-73%.⁽¹⁻³⁾ The incidence of postoperative emesis is more frequent in pediatric patients than in adults.⁽⁴⁾

Within the pediatric population, postoperative emesis increases with age to reach a peak incidence in the preadolescent 11-14 year age group.⁽⁵⁾ Also, postoperative vomiting depends on many factors including the age, anesthetic care, postoperative management, concurrent drugs and the type of surgery. The incidence of vomiting after strabismus, tonsillectomy or orchidopexy is greater than it is after extremity or orthopedic surgery. Some of these factors, such as age and surgical procedure, cannot be altered.⁽⁶⁾

Anesthesiologists and otolaryngologists are seeking methods that will minimize this problem, especially in day care surgical programs. Thus, prophylactic antiemetic therapy is indicated in this high-risk group of children.

In response to this "Big 'Little' Problem",⁽⁷⁾ multiple studies have investigated the effects of newer anesthetic agents and antiemetic prophylaxis on postoperative vomiting.⁽⁸⁻¹³⁾ In general, the results of these studies have been mixed. Marginal improvements, unfavorable adverse effect profiles, and high costs have limited the universal adoption of any single protocol.

The use of gastric aspiration in reducing postoperative vomiting has been advocated in the older medical literature and several review articles.⁽¹⁴⁻¹⁶⁾ However, recent studies have failed to demonstrate any benefit of gastric aspiration in reducing postoperative vomiting in gynecologic or general surgical patients.⁽¹⁷⁻¹⁸⁾

Dexamethasone was first reported to be an effective antiemetic drug in patients receiving cancer chemotherapy.⁽¹⁹⁾ Recently, dexamethasone has been found to have a prophylactic effect on postoperative vomiting in adults undergoing laparoscopic and gynecological surgery⁽²⁰⁻²²⁾ and in children undergoing tonsillectomy and strabismus surgery.^(8,9,23,24) Dexamethasone lacks side effects when used as a single injection and has a low cost and a prolonged biological half-life of 36 to 48 hours.⁽²⁵⁾ Also, it has combined antiemetic and anti-inflammatory effects that may decrease postoperative edema and subsequently may improve oral intake after tonsillectomy. However, many reports have questioned the efficacy of dexamethasone as an antiemetic as well as its beneficial effect on the quality of oral intake after

tonsillectomy.^(10,11) This controversy may be attributed to the wide range of dosage of dexamethasone as well as the wide variety of anesthetic techniques used.

The purpose of this study was to compare the effect of gastric emptying with an orogastric tube and the effect of a single dose of dexamethasone on the incidence of postoperative vomiting in children undergoing tonsillectomy.

Methods

Two hundred and ten patients of both genders, aged 1.5-14 years scheduled to undergo tonsillectomy with or without adenoidectomy at Prince Hashem Bin Al-Hussein hospital and Princess Haya Al-Hussein Hospital during the period between July 2005 and June 2006 were studied prospectively.

The indications for tonsillectomy were chronic tonsillitis, recurrent episodes of acute tonsillitis and/or hyperplastic obstructive tonsils causing sleep apnea syndrome.

Children who received antiemetics or steroids within 24 hours before surgery were excluded from the study. Also, children in whom steroid administration was contraindicated and children with any remarkable history of gastrointestinal disorders were excluded.

Patients were randomized into three groups:

Group I included patients who underwent gastric aspiration with an orogastric tube prior to extubation following surgery (n=70).

Group II included patients who received dexamethasone 0.5 mg/kg IV (maximum dose, 8 mg) after the induction of anesthesia and before surgery (n=70).

Group III included patients who neither received dexamethasone nor underwent gastric aspiration (n=70).

Patients fasted from midnight and were not given any premedications. The anesthetic protocol was standardized throughout the study and all the operations were performed by two surgeons in the above mentioned hospitals employing the standard dissection technique. The bleeding was controlled by bipolar diathermy or ligation. In group I, an orogastric tube was placed postoperatively under direct visualization and the gastric contents were aspirated prior to emergence from anesthesia. A mouth gag was in place at the time of suctioning.

Table I. Demographic and surgical data

| Characteristics | Group I (n = 70) | Group II (n = 70) | Group III (n = 70) |
|------------------------------|---------------------|----------------------|-----------------------|
| Age (yr) | 5.3±2.1 | 5.2±2.2 | 5.1±2.2 |
| Weight (kg) | 19.7±5.8 | 20.3±5.5 | 20.0±5.3 |
| Sex (male/female) | 38/32 | 41/29 | 39/31 |
| Type of surgery | | | |
| - Tonsillectomy | 22 | 20 | 19 |
| - Adenotonsillectomy | 48 | 50 | 51 |
| Duration of surgery (min) | 14.8±3.1 | 14.6±4.4 | 15.1±3.4 |
| Duration of anesthesia (min) | 38.1±7.3 | 39.2 ± 5.1 | 38.2 ± 6.1 |
| Blood loss (ml) | 12±4 | 13±2 | 13±4 |

Values are expressed as number (n), or mean (± SD).

Table II. Recovery characteristics during the first twenty-four hours

| Recovery Characteristics | Group I (n = 70) | Group II (n = 70) | Group III (n = 70) |
|---|---------------------|----------------------|-----------------------|
| Early vomiting (before discharge from recovery room) | 10 (14%) | 8 (11%) | 11 (16%) |
| Late vomiting (following discharge from recovery room and up to 24 hours) | 14 (20%) | 4 (6%) | 15 (21%) |
| The mean number of episodes of vomiting | 2.4 | 2.2 | 2.3 |
| The mean volume of emesis (ml) | 183 | 176 | 180 |
| Prophylactic antiemetic rescues | 9 (13%) | 3 (4%) | 7 (10%) |
| Time to first oral intake (hours) | 5.4 ± 1.7 | 3.2± 1.8 | 5.1± 2.1 |
| Duration of IV hydration (hours) | 13.4± 2.1 | 9.2± 2.7 | 12.8± 2.4 |

The 70 patients in group II received dexamethasone 0.5 mg/kg IV after the induction of anesthesia and before surgery. In group III, the patients underwent tonsillectomy without receiving dexamethasone or gastric aspiration.

All children were transferred to the recovery room where standard monitoring was established, and they were observed for two hours. The incidence of vomiting was recorded by the nurse in the recovery room who was unaware of the groups of patients or the purpose of the study. Vomiting was defined as the forceful expulsion of gastric contents from the mouth. Retching and nausea were not considered vomiting for the purpose of this study.

After transfer to the ward, a soft diet was offered to all children during their hospital stay. Also, a maintenance intravenous infusion was kept until their oral intake was judged adequate (oral ingestion of 100ml of fluids and 100ml of soft food within four hours). Patients who vomited more than twice in the hospital were treated with metochlorpropamide 0.15mg/kg intravenously. Rectal paracetamol 30 mg/kg was administered to all children every six hours. Patients were observed for 24 hours after their surgery.

Data on the number of episodes of vomiting, total volume of emesis, administration of rescue prophylactic antiemetics were recorded.

Results

A total of 210 patients were entered in the study. They were randomized into three groups with 70 patients in each group. Demographic characteristics of the patients, anesthetic duration, and duration of surgery, type of surgery and the amount of intraoperative blood loss were not different between the three groups (Table I).

The incidence of early postoperative vomiting (before discharge from recovery room) was not significantly different between the three groups; ten patients (14%) in the group I compared with eight patients (11%) in group II and eleven patients (16%) in group III.

The incidence of vomiting during stay on the ward (late vomiting) was more frequent in group I and III. Only four (6%) patients in the dexamethasone group vomited once during the late postoperative period (on the ward) compared with 14 patients (20%) in group I and 15 patients (21%) in group III (Table II).

The mean number of episodes of vomiting in the three groups was 2.4, 2.2 and 2.3 respectively. The mean volume of emesis for the patients who experienced postoperative vomiting was similar in the three groups (183 ml, 176 ml and 180 ml respectively). Prophylactic antiemetic rescues were required in 13% of group I, 4% in group II and 10% in group III.

The time to the first oral intake and duration of intravenous hydration was significantly shorter in the dexamethasone group than in the other two groups.

Discussion

Postoperative vomiting represents the most common complication of pediatric tonsillectomy and adenoidectomy. Despite advances in anesthetic and surgical technique, incidences as high as 75% have been reported.^(7,26,27) Persistent vomiting is costly both in terms of financial effect and potential medical sequelae.^(28,29) The cause of postoperative vomiting in the pediatric population is thought to be multifactorial with patient characteristics, anesthetic medications, surgical manipulation, and postoperative care all hypothesized to be contributing factors.^(5,14,27-29)

The use of a gastric tube to decompress the stomach is generally believed by anaesthetists to be an effective way of decreasing postoperative nausea and vomiting. This belief has made its way into review articles⁽³⁰⁻³²⁾ and textbooks⁽³³⁾ although in the only study that has addressed the issue in a controlled manner, Hovorka *et al.*⁽¹⁸⁾ studied 201 patients who underwent hysterectomy and showed no statistically significant difference in the incidence of vomiting between patients who underwent postoperative gastric aspiration and patients who did not (79% vs. 70% respectively). Trepanier and Isabel⁽¹⁷⁾ actually demonstrated a higher incidence of vomiting in patients who underwent postoperative gastric aspiration with an orogastric tube (17% vs. 6.8%) in a study of 256 ambulatory general surgical patients. Older studies show conflicting results, some showing a beneficial effect,⁽¹⁵⁾ while others reported either no effect⁽¹⁶⁾ or even a deleterious one.⁽³⁴⁾

The efficacy of gastric aspiration in reducing post tonsillectomy vomiting is available indirectly from several studies. Ferrari and Donlon⁽³⁾ and Furst and Rodarte⁽²⁾ in their investigations of the role of prophylactic antiemetics in reducing post

tonsillectomy vomiting, required all patients, including the control groups, to undergo gastric aspiration. The incidence of vomiting in these control groups was high (62% and 70%, respectively). In comparison, three similar studies evaluating prophylactic antiemetics were designed so that no patients underwent gastric aspiration. The control groups of these studies also had high incidences of post tonsillectomy vomiting (54%-73%).^(1,8,9) Although experimental and surgical variables preclude the direct statistical comparison of these studies, they seem to indicate that gastric aspiration may not significantly affect the incidence of post tonsillectomy vomiting. Our results show that aspiration of stomach contents in patients in group I did not decrease the incidence of postoperative vomiting, the number of episodes of vomiting, or total volume of emesis.

Many reports have questioned the efficacy of dexamethasone as an antiemetic as well as its beneficial effect on the quality of oral intake after tonsillectomy.^(10,11) Dexamethasone exerts an antiemetic action via prostaglandin antagonism, release of endorphins, and tryptophan depletion.⁽³⁵⁾ However, it is not clear whether in this procedure dexamethasone exerts its effect by a central or peripheral mechanism. These therapeutic effects have led to the widespread use of dexamethasone in children undergoing tonsillectomy.

Several published studies failed to demonstrate any beneficial effect of dexamethasone on the incidence of postoperative vomiting or the degree of pain after tonsillectomy in children.^(10,11) These studies included a limited number of children and were not standardized for both the anesthetic technique and other perioperative factors.

April *et al.*⁽²⁴⁾ found that treatment with IV dexamethasone (1mg/kg up to 16mg) in children before electrocautery tonsillectomy and adenoidectomy decreases morbidity and increases early postoperative oral intake. Pappas *et al.*⁽²³⁾ observed a decrease in the overall incidence of postoperative vomiting, especially during the 24 hours after discharge, as well as an improvement in the postoperative quality of oral intake in children undergoing tonsillectomy who received dexamethasone 1mg/kg after the induction of anesthesia as compared with those in a control group. No difference was observed between the two groups in the incidence of early vomiting.

In Splinter and Roberts' study,⁽⁹⁾ dexamethasone

decreased vomiting in children after tonsillectomy both during early post anesthesia recovery and delayed (24 hour) recovery.

In the present study, the incidence of vomiting during stay on the ward (late vomiting) was less frequent in the dexamethasone group while the incidence of early vomiting (in recovery room) was not significantly different between the three groups. Also the time to the first oral intake and duration of intravenous hydration was significantly shorter in the dexamethasone group than in the other two groups and the need for prophylactic antiemetic rescues were less in dexamethasone group. On the other hand, we found that the mean number of vomiting episodes and the volume of emesis for the patients who experienced postoperative vomiting were similar in the three groups.

Conclusion

Prophylactic intra operative single dose of dexamethasone decreases the incidence of postoperative vomiting, and accelerate the return to normal diet in children undergoing tonsillectomy.

Aspiration of gastric contents with an orogastric tube does not decrease postoperative vomiting, mean number of vomiting episodes and the volume of emesis. Routine use of orogastric tube placement for gastric aspiration following pediatric tonsillectomy is not advisable.

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