Post-Tonsillectomy Pain and Vomiting: Role of Per-Operative Steroids

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ABSTRACT

Background: Vomiting and severity of throat pain in adults undergoing tonsillectomy by dissection method under standard general anesthesia.

Objectives: To evaluate the effects of single pre-operative dose of dexamethasone with the frequency of post-operative tonsilectomy pain and vomiting.

Material & Methods: This was a randomized control trial conducted in ENT Department, Saidu Teaching Hospital Swat, from January 2017 to October2017.Adults of either gender aged between 14-24 years, undergoing tonsillectomy were divided into two groups of 45 each. One group was selected to receive dexamethasone 0.1mg/kg (maximum of 8 mg); the second group was given equivalent volume of saline, per-operatively. The frequency of vomiting was assessed 6 hours post-operatively. Mean score of postoperative throat pain were compared in both groups. Severity of throat pain was monitored by Visual Analogue Scale (VAS) score 0-10 after 3,6,10 and 24 hours of extubation.

Results: Dexamethasone group showed significantly less postoperative vomiting (17.8%, n = 8) as compared to placebo (73.3%, n = 33) group ($p < 0.05$). Pain score was also significantly lower and swallowing was less painful in patients after 3,6,10 and 24 hours in dexamethasone group. Pain score on the average was 0.8, 1.2 factors less in dexamethasone group than in saline group in first 24 hours on a VAS score of 1 -10.

Conclusion: Pre-operative intravenous dexamethasone reduced postoperative vomiting and pain significantly in adults undergoing tonsillectomy by dissection method.

Key words: *Tonsillectomy. Pain.adults .dissection. Dexamethasone.*

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INTRODUCTION

According to American Association of Otolaryngology, tonsillectomy is the second most commonly performed pediatricsurgery.[1]Despite improvement in anesthetic and surgical technique, postoperative pain continues to be a significant clinical concern.[1] The incidence of postoperative nausea and vomiting (PONV) ranges between 40 73%.[2]

After surgery, patients usually have considerable odynophagia, change of diet, and decreased activities.

The recovery period of children usually lasts 4 days to a week, while adults may remain symptomatic up to 2 weeks. The odynophagia can be severe enough to limit oral intake that on occasion patients may become dehydrated requiring admission for intravenous fluids.[3]

Although nausea and vomiting is considered a minor postoperative complication, yet it may assume significance in short stay and day care surgery like tonsillectomy.[4] PONV can be very distressing, resulting in bleeding, dehydration, electrolytes and acid base imbalance.[4] Persistent retching and vomiting can impair the results of various surgical procedures and increase the risk of pulmonary aspiration of vomitus. It also prolongs stay in the post-anesthesia care unit (PACU), delays discharge and increase hospital admission rate.[4]

The frequency of postoperative nausea and vomiting can be reduced by refined anesthetic technique and by avoiding the factors predisposing to it. Although routine antiemetic prophylaxis in elective operations is not indicated but it may be justified in patients who are at greater risk of PONV.

Dexamethasone has recently been used as prophylaxis for postoperative nausea and vomiting in children undergoing tonsillectomy.[5-7] Dexamethasone has combined antiemetic and anti-inflammatory effects, which decreases postoperative tissue injury, edema and pain after electrocautery tonsillectomy.[8-9]

The aim of this study was to assess the effect of per- operative single dose of dexamethasone on postoperative vomiting and severity of pain in young adults undergoing tonsillectomy using a standardized anesthetic technique.

MATERIALAND METHODS:

It was a randomized, double blinded, placebo controlled study. Patients between 14 and 24 years of age of either gender undergoing an elective tonsillectomy who consented to participate in the study, were included. Informed consent was taken on a

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specially designed proforma explaining the purpose of the study. Approval from hospital ethical committee was obtained before start of the study. The data of all the participants was kept confidential. All the tonsillectomies were bilateral, and surgical indications were chronic tonsillitis, recurrent attacks of acute tonsillitis and symptomatic tonsillar hypertrophy.

The exclusion criteria were patients undergoing emergency surgery, a history of tonsillar abscess within the previous month, and non-immune patients who had been in contact with chickenpox infected case in the last 3 weeks and patients having unilateral enlarged tonsil and having suspicion of malignancy.

Patients were divided into two groups having 45 patients in each group. Patients were randomized to receive either dexamethasone 4mg/kg (maximum 8 mg) or equivalent volume of saline. One group received dexamethasone was labelled as “D”, while control group given saline was labelled as “S”. Study agent or equivalent volume of saline was given immediately after I/V access was established by the anesthesiologist who was not involved in monitoring of patients postoperatively.

Patients were kept nil by mouth 6 hours before operation. To ensure that all the patients received the same medications before and during the surgery, a standardized anesthetic protocol was used.

All the tonsillectomies were performed by a single surgeon by Dissection method.

Vomiting was defined as vomiting occurring within first 6 hours of extubation and was recorded in numbers. Vomiting repeated within 1-2 minutes period was recorded as a single episode of vomiting.

Pain was assessed postoperatively by using a 10 points “Faces” visual analogue scale (1 = no pain and 10 = severe pain). All patients were shown the VAS pre-operatively and its use was explained. VAS was recorded at 3, 6, 10 and 24 hours after extubation. Nursing staff was trained in recording VAS. Postoperatively all patients were given oral paracetamol and co-amoxiclav in three divided doses. Injection ketorolac was kept for patients who were repeatedly complaining of pain and having pain score more than 8. Additional requirement of analgesics was also recorded.

Mean and standard deviation were calculated for age and postoperative pain score after 3, 6, 10 and 24 hours on Visual Analogue Score 1-10 in two groups and analyzed by applying independent sample t-test. Presence of vomiting was assessed in two groups and statistical significance was analyzed by chi-square test. P-value of less than 0.05 was considered significant.

RESULTS

Demographic characteristics of the 90 patientswere not significantly different in two groups (Table I). The average age of patients was 19 ± 3.082 years in placebo (S) and 18.64 ± 2.95 years in dexamethasone (D) group.

Administration of dexamethasone showed significant reduction in the postoperative early vomiting in Dexamethasone group (D) 17.8% (n = 8) as compared to 73.3% (n = 33) in Placebo group(S). Statistical significance was less than 0.05 (Table III) and as shown in (figure 1)

Figure 1: Frequency of vomiting in dexamethasone and saline group

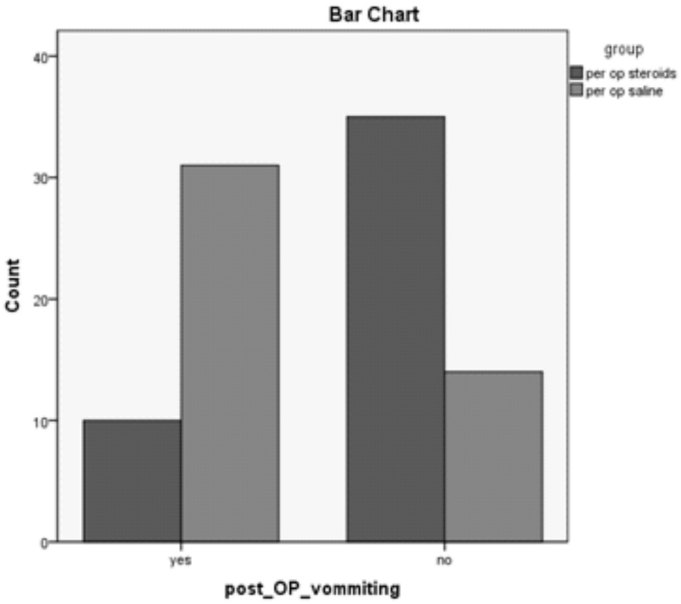


Figure 2: VAS of pain in Dexamethasone and saline group at 3hours post op

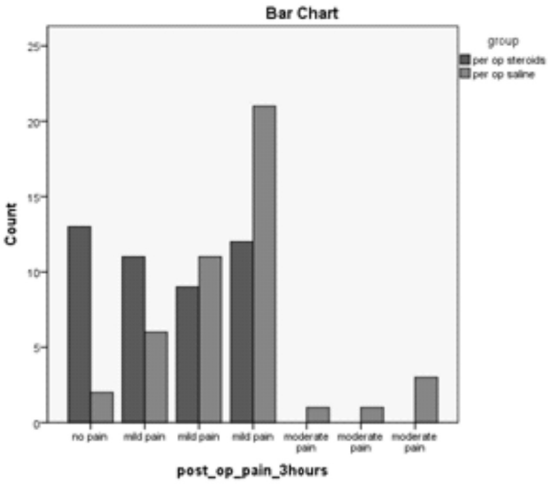


Figure 3: VAS of pain in Dexamethasone and saline group at 6 hours post op

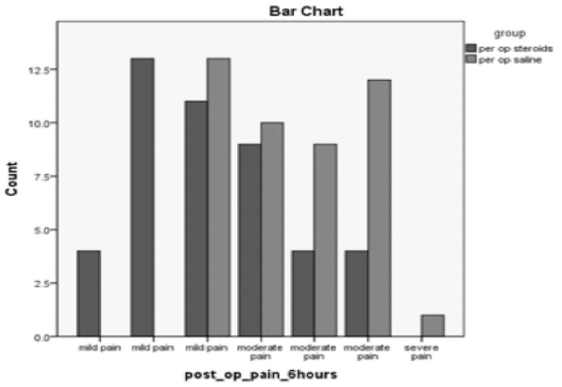


Figure 4: VAS of pain in Dexamethasone and saline group at-10hours-postop

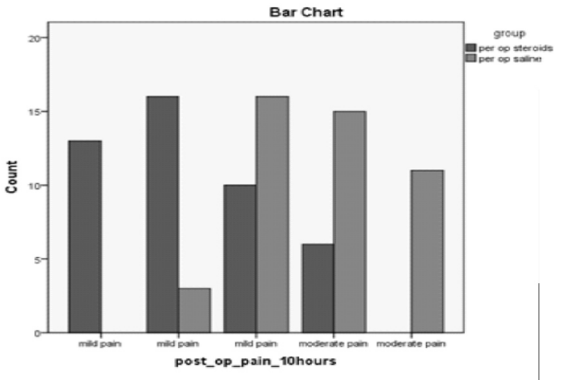
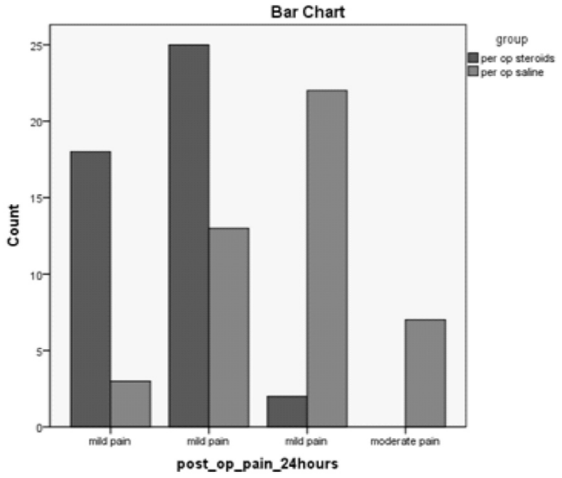


Figure 5: VAS of pain in Dexamethasone and saline group at-24hours-post-op



Visual analogue scale score was also much lower in "D" group than in "S" group at all the time postoperatively. VAS on the average was 1.44, 3.17, 2.20 and 1.64 at 3, 6, 10 and 24 hours respectively in D group while S group had an average VAS of 2.62, 4.51, 3.76, and 2.73 at the same time. P-value also showed a significant difference ($p < 0.05$) as shown in (Table II, figure 2, figure 3, figure 4 and figure 5)

Table I: Demographic characteristics of placebo "S" and dexamethasone "D" groups.

Characteristics	"S"	"D"	p-value
	Placebo group (n=45) Mean	Dexamethasone group (n=45) Mean	
vomiting	33 (73.3%)	08(17.8%)	0.000

Table II: Comparison of postoperative pain on visual analogue score and time of oral start in Placebo "S"and dexamethasone "D"

Characteristics	"S" Placebo group (n = 45)	"D" Dexamethasone group (n = 45)
Gender (M/F)	17(37.7%)/28(62.3%)	21(46.6%)/24(53.4%)
Age (years) mean± SD	19 ± 3.082	18.64 ± 2.95

Table III: Frequency of vomiting in placebo "S" and dexamethasone "D" Group.

Characteristics	"S" Placebo group S (n=45) Mean±SD	"D" Dexamethasone group D (n=45) Mean±SD	p-value
VAS at 3 hours	2.62 ± 1.33	1.44 ± 1.17	0.000
VAS at 6 hours	4.51 ± 1.23	3.17 ± 1.41	0.000
VAS at 10 hours	3.76 ± 0.90	2.20 ± 1.01	0.000
VAS at 24 hours	2.73 ± 0.80	1.64 ± 0.57	0.000

DISCUSSION

The postoperative course of tonsillectomy encompasses significant morbidity and potential complications. After surgery, patients usually have considerable odynophagia, change of diet, and decreased activity.

The recovery period after tonsillectomy in children is usually 4 days to a week, while adults may have symptoms up to 2 weeks.[3] The odynophagia can be severe enough to limit oral intake and patients on occasion may become dehydrated requiring admission for intravenous fluid administration.

High incidence of postoperative nausea and vomiting (PONV) along with trismus and delayed oral starts always posed a challenge for otolaryngologist and anesthesiologist after tonsillectomy.[10] Heavy dose of antibiotics along with steroids and analgesics have been used, but with controversial results.[11] This study was aimed at the per-operative use of single dose of dexamethasone in cases of tonsillectomy and its effect on PONV and pain severity postoperatively.
It showed a decrease in the frequency of postoperative vomiting as well as reduction in postoperative pain score during the first 24 hours after tonsillectomy in young adults who received dexamethasone 4 mg/kg I/V after induction of anesthesia compared with those who received placebo.

Evaluation of pain is difficult because of its qualities like subjectivity and wide degree of its inter-patient variability. There is also variability in Pain threshold and sensitivity of individual to pain in our society. In this study the evaluation of pain was made objective by adding quality of life questionnaire along with “Faces” type of VAS scale. Quality of life questionnaire was having questions for patients about drinking, eating in the last one hour, talking, drooling, activity and mood of the patient postoperatively. These parameters were assessed for the support of proper assessment of VAS. Quality of life questionnaire was not used for the interpretation of results.

Research into the physiology of pain has delineated two distinct pain mechanisms that result from the stimulus of surgical trauma. There is inflammatory pain and local effect produced by surgical trauma. The other is a physiological or functional pain as control effect produced by stimulation of central nervous system.[12]Anti-inflammatory agents would successfully treat pain and in fact is a standard practice in the treatment of postsurgical pain. Likewise many surgeons use pre-emptive analgesia (the use of local anesthesia at a surgical site before a surgical procedure is commenced) because this blocks the development of hypersensitivity and hyperalgesia, which are important mechanisms in the promotion of central sensitization.[12]

Systemic steroids have powerful anti-inflammatory effects and are expected to improve postsurgical trauma. Several well-controlled studies have shown that dexamethasone can decrease postsurgical pain, nausea and vomiting postoperatively.[1,4,7,13]

The mechanism by which, dexamethasone exerts an analgesic effect is not fully understood. Glucocorticoids have strong anti-inflammatory action and have demonstrated reduced pain and swelling after oral surgery.[14]

Systemic glucocorticoids administration has been found to suppress tissue levels of bradykinin and the release of neuropeptides from nerve endings, both of which can enhance nociception in inflamed tissue. The established reduction in prostaglandin production mediated by glucocorticoids might further contribute to analgesia by inhibiting the synthesis of the cyclo-oxygenase isoform 2 (COX-2) in peripheral tissues and in the CNS.[1] They also inhibit other mediators of inflammatory hyperalgesia, like tumour necrosis factor-α (TNF-α), interleukin-1β (IL-β), and IL-6.[1]

However, not all clinical studies show such profound effects. Failure of dexamethasone to decrease pain was reported by some authors.[12, 15]Decrease in nausea and vomiting has not been a universal finding.[16]

Thus, despite the fact that the exact mechanism is not fully understood, many authors support the role of postoperative pain reduction by corticosteroids.[8,9] In addition quicker return to normal diet is also reported.[9]

The recent guidelines regarding tonsillectomy strongly recommend the use of a single, intra-operative dose of intravenous dexamethasone to children undergoing tonsillectomy.[17]

Dexamethasone administration would not only lead to a decreased incidence of postoperative nausea and vomiting, an important morbidity associated with pediatric tonsillectomy, but would also decrease throat pain and time to resumption of oral intake.[18] The mechanism of the efficacy of dexamethasone is unknown, but believed to be related to its anti-inflammatory properties.

The majority of studies from developing world has shown results which are comparable to our results, as shown by Steward et al 2006[1] (mean VAS difference at 24 hours=-0.97) as compared to(mean VAS difference of -1.09 at 24 hours) in our study. Similar results are shown by NasreenLaig,Adnan khan 2005[5] (mean VAS at 4,8,12,24 hours in dexamethasone group to be 4.7, 4.2, 3.8 and 3.4 respectively) as compared to(mean VAS at 3,6,10 and 24 hours in dexamethasone group to be 1.44, 3.17, 2.20 and 1.64) in our study.

Similarly for post op vomiting our study is comparable to locally generated study of Nasreen Laig, Adnan khan 2005[5] (showing mean post op vomiting of 16% in saline and 4% in Dexamethasone group) as compared to (mean post op vomiting of 73% in saline and 8% in Dexamethasone group) in our study.

CONCLUSION

This study has shown that a single dose of dexamethasone (0.1 mg/kg), given intravenously, at induction of anesthesia for tonsillectomy significantly decreased the postoperative pain. Postoperative vomiting was also reduced significantly for the day of operation. Apart from markedly reduced postoperative morbidity there are economic benefits because of reduced need for analgesia and anti-emetics, prevention of infection and early return to normal diet. Single pre-operative dose administration of dexamethasone carries no significant adverse effects.

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