# Efficacy of Single Dose Preoperative Intravenous Dexamethasone for Postoperative Pain Relief in Tonsillectomy Patients

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Abstract: <u>Introduction</u>: Tonsillectomy continues to be one of the most common surgical procedures performed worldwide. Despite advances in anaesthetic and surgical techniques, post tonsillectomy pain remains a significant clinical problem for the patient, family and physician. We undertook the study to find out the effectiveness of a single IV dose of dexamethasone (0.15 mg/kg) on post tonsillectomy pain. <u>Methods</u>: This study was conducted with 100 patients who underwent tonsillectomy. Patients were divided into two groups of 50, where one group received preoperative dexamethasone injection and the other group were not given injection Dexamethasone.Postoperative pains of both groups were assessed using visual analogue scale (VAS) and objective pain scale (OPS).Tramadol 1 mg/kgin first six hours and oral paracetamol 10 mg/kg in next 6-24 hours were administered if OPS score of 6 or VAS score of 40 occurred. <u>Results</u>: There is significant difference in pain relief in both the groups infirst 6 hours and next 6- 24 hours postoperative hours. <u>Conclusions</u>: A single dose of preoperative intravenous dexamethasone significantly decreased the postoperative pain in tonsillectomy patients.

Keywords: Tonsillitis, Tonsillectomy, Pain relief, Dexamethasone

## 1. Introduction

Tonsillectomy continues to be one of the most common surgical procedures performed worldwide. Despite advances in anaesthetic and surgical techniques, post tonsillectomy pain remains a significant clinical problem for the patient, family and physician.<sup>1</sup>Post tonsillectomy pain is probably the result of muscle spasm caused by inflammation and irritation of the pharyngeal musculature.<sup>2, 3</sup>

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.<sup>4,5</sup>

Steroids can have beneficial effects on post-tonsillectomy morbidity due to their anti-inflammatory and antiemetic properties. The most measured steroid for this purpose is dexamethasone, which is inexpensive and largely devoid of side effects. Steroids are believed to act to reduce tissue damage and postoperative pain by suppressing fibrin deposition, capillary dilation, edema formation and leucocyte migration. Steroids are believed to increase thirst and appetite, result in a more rapid return to regular diet and adequate fluid intake.<sup>6,7,8</sup>

There are quite a few studies with contradictory results about the effectiveness of steroids for reduction of post-tonsillectomy morbidities.<sup>9,10,11,12,13,14</sup>

Partly these are because of lack of standardization in anaesthetic and surgical technique. Most of these studies have measured anti-emetic effect, but have failed to assess analgesic effect of the steroids. In fact, because of the missing data and varied outcome measures, pain could not be meaningfully analysed by Steward et al13 in a metaanalysis for steroid use in tonsillectomies. We undertook the study to find out the effectiveness of a single IV dose of dexamethasone (0.15 mg/kg) on post tonsillectomy pain.

## 2. Materials and Methods

This was a Prospective study conducted in Department of ENT and HNS SKIMS Medical College and Hospital, Srinagar tertiary care hospital between January2018 to March2019.100 patients were enrolled in this study and were randomly divided into two equal groups of 50 patients each. The patients were explained about the study and the procedure involved and written and informed consent was taken. Ethical clearance for the study was obtained from the hospital ethical committee. Relevant clinical and demographic data were obtained from the concerned patient. They also underwent detailed ENT examination.

Patients with coagulopathy, diabetes, gastritis, peptic ulcer, hypertension and cardiovascular or renal disease or on therapy with corticosteroids, anti-emetics, anti-histaminic, or aspirin were excluded. Preoperatively tonsil size was graded into four grades:

- I Tonsil within tonsillar fold
- II Just outside the tonsillar fold
- III Well outside the tonsillar fold
- IV Reaching uvula or past uvula

Patients in group A (n=50) were administered intravenous dexamethasone (0.15 mg/kg) after the induction of anaesthesia. Group B patients (n=50) were not administered injection dexamethasone.

Postoperatively, the pain was assessed in both the groups at 6 and 6-24 hours using objective pain scale (OPS) in children less than 8 years and visual analogue scale (VPS) in those above 8 years.

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#### International Journal of Science and Research (IJSR) ISSN: 2319-7064 ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Pain was assessed using objective pain scale (OPS)(Table 1) in patients below eight years and visual analogue scale (VAS, 0-100) above eight years of age. Recordings were done every half hourly for the first two hours, hourly for next four hours and then at 10,14 and 24 hours. If OPS score of 6 or VAS score of 40 occurred, tramadol 1 mg/kg in first six hours or oral paracetamol10mg/kg in next 6-24 hours was administered. Before administering rescue analgesic, a time period of 15 minutes was allowed to see if patient responded to tender loving care and pain subsided.



Figure 1: Visual analogue scale

Fable	1:	Objective	nain	scal	e

Observation	Criteria	Points
Blood pressure	+/-10% of preoperative	0
	>20% of preoperative	1
	>30% of preoperative	2
Crying	Not crying	0
	Crying but responding to tender loving care	1
	Crying and does not respond to tender loving care	2
Movement	None	0
	Restless	1
	Thrashing	2
Agitation	Patient asleep or calm	0
	Mild	1
	Hysterical	2
Verbalises pain	Asleep or no verbalization of pain	0
	Cantnot localise pain	1
	Localizes pain	2



Each group comprised of 50 patients. The values obtained from OPS and VPS were tabulated and compared. Except for the age, all demographic characteristics including type of surgery and tonsil size were comparable for both groups (Table 2). Age was slightly higher in the cases group. Assessment of pain was done using OPS in patients below eight years of age and using VAS in patients above eight years of age. Chi  $X^2$  analysis was done to see the association of pain relief with I/V Dexamethasone.

Table 2						
Demographic Data						
Parameter	Control	Dexamethasone				
Age	6.86 <u>+</u> 3.3	9.58 <u>+</u> 4.02				
Weight (kg)	30.75 <u>+</u> 12.45	23.86 <u>+</u> 9.3				
M/F (no of pts)	20/30	22/28				
Surgery type (No of pts $T/T + A$	22/28	23/27				
Tonsil size (No pts) I /II / III / IV	4/15/16/15	3/16/17/14				
Method for analysis of pian (No						
of pts)	20/30	22/28				
OPS/ VAS						

Age and weight are presented as mean $\pm$ standard deviation T – tonsillectomy; T+ A – tonsillectomy and adenoidectomy OPS – Objective pain scale

VAS - Visual analogue Scale

Dexamethasone group had significantly lower VAS scores, throughout 24 hours (fig.2). At 24 hours, VAS of  $27.5\pm7.92$  in control group versus  $12.5\pm8.44$  in dexamethasone group was noted (p<0.001).OPS scores were significantly higher in control group (fig. 3). At 24 hours, OPS were  $1.45\pm0.82$  in control group versus $0.59\pm0.79$  in dexamethasone group (P<0.001). In first six hours, incidence of significant pain was 76% in control group vs48% in dexamethasone group. In 6-24 hours, 90% of dexamethasone group versus 36% of control group were free of pain. Throughout 24 hours, rescue analgesic requirement was less in dexamethasone group(table 3). The p value was 0.025 for the first 6 hours and p value was 0.001 for the next 6-24 hours which shows significant association between the effect of single dose of I/V Dexamethasone and pain relief.



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Table 5							
Post tonsillectomy pain							
Parameter	Firs	t six hours	6 – 24 Hours				
	Control	Dexamethasone	Control	Dexamethasone			
Pain							
Significant	38 (76%)	24(48%)	18(36%)	3(6%)			
Mild	9 (18%)	18(36%)	14(28%)	2(4%)			
Pain free	3(6%)	8(16%)	18(36%)	45(90%)			
Rescue analgesic	24(48%)	10(20%)	9(18%)	2(4%)			

**T** 11 3

Data indicated as number of patients (% of patients)  $X^2 = 31$ df-2

p value < 0.025 in first 6 h p value< 0.001 in 6-24 h

# 4. Discussion

Dexamethasone is one of the most potent glucocorticoids available that can effectively suppress a basic inflammatory response to tissue injury.<sup>15,16</sup>Dexamethasone has been identified as astrong anti-inflammatory glucocorticoid, which also has antinociceptive influences by inhibiting glial activation, sympathetic sprouting, production of leukotrienes, tumor necrosis factor-a and other mediators of inflammatory hyperalgesia and central sensitization.<sup>17,18</sup>

By inhibiting phospholipase enzyme, corticosteroids block both the cyclooxygenase and lipooxygenasepathway and thus prostaglandin production, thereby leading to pain relief.

Local infiltration of steroids and oral 4-day courseof steroids have shown promising results in tonsillectomy patients.<sup>19,20,21</sup> However, the literature regarding the use of IV corticosteroids for tonsillectomy is conflicting.<sup>9,10,11,12,13,14</sup> Most of the studies have either lacked the control group or are not standardized for the anaesthetic as well assurgical technique. There are controversies about the type and dose of the corticosteroid, whether to use single or multiple doses and whether to use alone or as adjuvant to other drugs.

Buland et al and Hashmi et al, in their studies concludedthat single dose intravenous injection of dexamethasone relieved post-tonsillectomy pain significantly.<sup>2,3,4</sup>

Hermans et al in their study concluded that the incidenceof significant pain did not differ between dexamethasone groups and the placebo group, however, on postoperative day 2, the incidence of significant pain was significantly lower in the groups using dexamethasone. They used visual analogue scale for pain evaluation.<sup>22</sup>

These studies were done on 60 and 100 patients respectively. In our study we have taken 100 patients and we found that single I/V dexamethasone (0.15 mg/kg) dose significantly reduced postoperative pain in tonsillectomy.

In our study, 100 patients were included who underwent tonsillectomy. 50 patients received preoperative intravenous dexamethasone and other 50 patients were not given dexamethasone. Patients who received dexamethasone had significant reduction in postoperative pain. In our study OPS and VAS scores were lower in dexamethasone group, throughout the postoperative period. With increasing time after surgery, the VAS scores difference between the two groups increased. Majority of dexamethasone treated patients were pain free in 6-24 hours. This indicates prolonged analgesic effect of dexamethasone. Number of patients requiring rescue analgesic and the doses needed was less with dexamethasone.

We had chosen OPS of 6 or VAS of 40 as significant pain for giving rescue analgesia. In addition to avoid the influence of factors other than pain on higher OPS, before administering rescue analgesic, a time period of 15 minutes was allowed to see if patient responded to tender loving care or pain subsided.

# 5. Conclusion

This study shows that, a single dose of preoperative intravenous dexamethasone significantly decreased the postoperative pain in tonsillectomy patients. There is significant difference in pain score at 6th and 6-24 hours between both the groups. Single preoperative dose administration of dexamethasone carries no significant adverse effects and hence can be safely given.

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