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Analyzing the Side Effects By Systemic as Well as Local Administration of Dexamethasone in Tonsilectomy Patients- A Comparitive Prospective Study

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ABSTRACT

Background: Tonsillectomy is one of the most commonly performed surgeries, particularly in children, with careful patient selection; it is a safe and effective procedure, with minimal morbidity.

Pain, edema, nausea, vomiting and poor oral intake are the most common morbidities following tonsillectomy. The association between pain and post-operative nausea vomiting is also proved. 1

Dexamethasone has anti-inflammatory effect 2. There are quite a few studies with contradictory results about the effectiveness of steroids for reduction of post tonsillectomy morbidities3, 4, and 5,6,7,8.

Methods: this study was performed on a total of 100 patients diagnosed with chronic hypertrophy of tonsils and postoperative pain and oral intake were evaluated.

Group 1 – patients with administration of dexamethasone 0.15 mg/kg intravenously 5 minutes before intubation.

Group 2 – patients with infiltration of dexamethasone 0.5 mg/kg, maximum dose 12 mg in peritonsillar region 5 min prior to the onset of surgery but after induction of General anaesthesia.

Results: two variables were compared in Pre and Post tonsillectomized patient's Postoperative pain, and oral intake. Only 10 subjects (20%) had pain in the postoperative period among group 1 as compared to 39 (78%) subjects in group 2. This difference was found to be statistically significant.

35 subjects (70%) were able to intake orally in the postoperative period among IV dexamethasone group (1) as compared to only 14 (28%) subjects in Peritonsillar dexamethasone group (2). This difference was found to be statistically significant.

Conclusions: IV dexamethasone found to be effective method in reducing pain and improve oral intake in post tonsillectomy cases.

Keywords: Tonsillectomy, Dexamethasone, Oral intake, Pain

INTRODUCTION

Tonsillectomy is one of the most commonly performed surgeries in the world, particularly in children, with careful patient selection; it is a safe and effective procedure, with minimal morbidity. Though many techniques for performing tonsillectomy exist, the ultimate goal is excising the lymphoid tissue residing in the oropharynx, alleviating symptoms of airway obstruction, as well as minimizing the frequency of sore throat, [1, 2] Since then, the introduction of the guillotine tonsillectomy and later electro cautery and collation dissection have further refined the technique and allowed to minimize surgical complications such as intraoperative and postoperative pain and bleeding.[3]

Tonsillectomy, tonsillectomy and adenoidectomy are the most frequently undertaken surgeries in the field of otorhinolaryngology. These surgeries are considered to be safe procedures with low complication rates and are often performed in combination with each other. However, they can lead to severe postoperative hemorrhage, excessive pain, edema and poor oral intake has been reported, along with minor complications like vomiting and dehydration. [1, 2, 3]

Pain, oedema, nausea, vomiting and poor oral intake are the most common morbidities following tonsillectomy. The association between pain and postoperative nausea vomiting is also proved. [4]

Postoperative nausea and vomiting apart from causing dehydration and delayed discharge can result in tension on the suture lines, venous hypertension, hemorrhage and pulmonary aspiration. Dexamethasone has been used successfully as an antiemetic for chemotherapy induced vomiting[5]. Prior use also prevented vomiting due to epidural narcotics.[6]

Dexamethasone also has anti-inflammatory effect[7]. Analgesic effect of corticosteroids has been observed by Baxendale et al[8] for extraction of third molar tooth and by Aasboe et al[9] for hallux valgus and surgery of haemorrhoidectomy . There are quite a few studies with contradictory results about the effectiveness of steroids for reduction of post tonsillectomy morbidities.[10-15]

The aim of this study is to compare the impact of preoperative I.V. Dexamethasone versus Peritonsillar infiltration of dexamethasone intraoperative in tonsillectomized patients on postoperative significant analgesia (by objective pain scale, and cortisol level measurement**),** nausea, vomiting, edema and oral intake.

MATERIAL AND METHOD

The following prospective study was conducted at the Rao Tularam Memorial Hospital, Jaffarpur , New Delhi from September 2016 to October 2017. A total of 100 patients were included in the study. The cases were selected from the outpatient department and ward of otorhinolaryngology, after proper history and examination. The morning blood samples of the selected patients were sent in plain vial for cortisol levels before tonsillectomy and after Tonsillectomy and postoperative pain, edema, nausea, vomiting and oral intake were also evaluated.

Inclusion criteria was chronic upper airway obstruction in conjunction with Adenotonsillar hypertrophy, which manifests as snoring, obstructive sleep apnea, chronic infectious conditions such as chronic recurrent tonsillitis. Patients of 3 years and above age undergoing tonsillectomy for the above mentioned indications were considered for this prospective study.

Exclusion criteria was patients with coagulopathy, Diabetes, Gastritis, Peptic ulcer, Hypertension

and Cardiovascular or Renal disease or on therapy with Corticosteroids, Anti -emetics, Anti-histaminic, or Aspirin. Tonsillectomy due to cancer and non-consenting patients were also excluded from the study.

Cortisol level was measured preoperatively and postoperatively to correlate in both groups.

Preoperatively tonsil size was graded into four grades.[29]

0– In Tonsillar fossa.

a. I – +1 (< 25%)
b. II - +2 (>25 % - <50 %)
c. III– +3 (>50 % - < 75%)
d. IV -+4 (>75 %) <8>

- All patients were premedicated with I.M. inj. glycopyrrolate 0.004 mg/kg 30 minutes before induction.
- Inj. pentazocine 0.3 mg/kg and inj. midazolam 0.04 mg/kg IV following induction with inj. Thiopentone 5 mg/kg., Inj. suxamethonium 2 mg/kg.

- Anaesthesia maintained with 0.5–2% halothane and 66% N2O in oxygen and controlled ventilation using either inj. Vecuronium 0.08 mg/kg or inj. Atracurium 0.5 mg/kg.
    - After premedication with anaesthetic agents patients are divided in to two groups.
    - **Group 1**- patient was administered dexamethasone 0.15 mg/kg intravenously 05 minutes before intubation.
    - **Group 2** – patient was infiltrated dexamethasone 0.5 mg /kg, maximum dose 12 mg in peritonsillar region 05 min prior to the onset of surgery but after induction of general anaesthesia

Surgical method–

- Sharp dissection snare technique was used for tonsillectomy, bleeders were ligated using ties. Whenever indicated adenoids were

Volume 1, Issue 2; July-August 2018; Page No. 207-220

removed using curettes. Hemostasis was achieved using packs or sutures. No electrocautery was used.

- Three injections into both pillars were made on every patient, at superior pole, at inferior pole and between the poles, the needle was inserted superficially into tonsillar pillar and following aspiration the pillar was ballooned.
- After surgery, residual secretions and blood were removed with gentle suction. Intraoperative lactated Ringer's solution with dextrose will be infused at a rate of 5 ml/kg /hr. plus extra fluid 2 m/kg/hr. of starvation period was administered.
- Pain was assessed using- **Objective pain scale** (OPS) [23] (table – 4) in patients below eight Years.
- **Visual analogue scale** (VAS, 0-100) - Above 8 years of age.
- Recordings will be done every half hourly for the first two hours, hourly for next four hours and then at 10, 14 and 24 hours.
- If OPS³ 6 or VAS³ 40 occurred for analysis, patients of each group were divided into three pain groups for first six hours and 6-24 hours.
    a. Significant pain = OPS 6 or VAS 40[6]
    b. Mild pain = OPS 4-5 or VAS> 20 < 40
    c. Pain free = OPS 0-3 or VAS < 20
- Tramadol 1 mg/kg in first six hours or oral Paracetamol10 mg/kg in 6-24 hours were administered. Before administering rescue analgesic, a time period of 15 minutes would be allowed to see if patient responded to tender loving care and pain subside.
- Presence or absence of oedema as visual impression of elongation of uvula was noted at 6 and 24 hours. Temperature will be recorded at 6, 10, 14 and 24 hours.
- Nausea and vomiting were recorded.
- Numbers of episodes of vomiting were also noted, Inj. metoclopromide 0.15 mg/kg was administered, if more than two episodes of vomiting in an hour or nausea lasting for more than half hour occurred. If postoperative nausea and vomiting still persisted, inj. ondansetron 0.1 mg/kg was administered.
- Temperature > 37.60 C will be considered as fever.
- Haemorrhage, if occurred will be noted.
- AT 6 hours after the surgery patients were asked to take oral liquids, the quality of oral intake will be graded as follows:
    1. Excellent = patient requests it
    2. Good= Patient accepts it when offered.
    3. Fair = patient accepts it when coaxed.
    4. Poor = patient refuses.
- If the oral intake was delayed, the time duration between the end of surgery and first acceptance of oral liquid was recorded. Till that time 3 ml/kg/hr of lactated ringer's solution with dextrose was infused.

Evaluation of cortisol level

- Blood samples were drawn from the antecubital vein in the morning after 20-minute rest following a fasting period of 8 hours preoperatively.
- Analyses were performed by using Radio-immunoassay technique.
- Blood samples in the post-operative period were taken using same guidelines as above next morning.
- Levels of cortisol in blood were measured before and after giving i.v. dexamethasone preoperatively and intra operative infiltration of peritonsillar region.
- Relationship between Cortisol level on pain threshold and oedema were recorded and analysed. Patients were discharged after 24 hours,
- Patient or parents of younger patients were asked to note the time of first acceptance of solid food, fever bleeding or other side effects if occurred.
- This information was collected, when they returned on seventh day for follow up.

RESULTS

A total number of patients included in the study were 100, underwent tonsillectomy by dissection method and were evaluated preoperatively and postoperatively. Data entries were done in SPSS 20, paired t-test and unpaired t- test were applied to compare the variables.

Volume 1, Issue 2; July-August 2018; Page No. 207-220

All demographic characteristics were comparable for both groups. The youngest patient included in the study was 3 years of age and eldest patient was 45 years of age. The age demographics with level of significance are showed in the table 1 and graph 1.

The gender distribution with chi square test is shown in table 2 and graph 2.

There was similar distribution of male and female in both groups which was also shown statistically significant.

Six variables were compared Pre and Post tonsillectomized patients (table 4). Postoperative pain (table 3, graph 3), edema (table 4, graph 4), nausea, vomiting, oral intake and preoperative and postoperative cortisol level were recorded. The data entries were entered into SPSS software and paired t test was applied.

Following Tonsillectomy operation significant improvement was seen in Group-1 as compared to Group– 2. Only ten subjects (20%) had pain in the postoperative period among group 1 as compared to 39 (78%) subjects in group 2. This difference was found to be statistically significant. (Table 3, graph 3)

Only seven subjects (14%) had edema in the postoperative period among IV dexamethasone group 1 as compared to 21 (42%) subjects in Peritonsillar dexamethasone group 2. This difference was found to be statistically significant. (Table 4, graph 4)

Thirteen subjects (26%) had nausea in the postoperative period among IV dexamethasone group 1 as compared to 30 (60%) subjects in Peritonsillar dexamethasone group 2. This difference was found to be statistically significant. (Table 5, graph 5) Only ten subjects (20%) had vomiting in the postoperative period among IV dexamethasone group 1 as compared to 21 (42%) subjects in Peritonsillar dexamethasone group 2. This difference was found to be statistically significant. (Table 6, graph 6).

Thirty five subjects (70%) was able to intake orally in the postoperative period among IV dexamethasone group 1 as compared to only 14 (28%) subjects in Peritonsillar dexamethasone group 2. This difference was found to be statistically significant. (Table 7, graph 7)

- Group 1- The mean cortisol level in the preoperative period was 190.54 and the same decreased to 125.66 in the post-operative period, which accounts for decreased post-operative complications in group 1. This difference was found to be statistically significant (table 8, graph 8).
- Group 2- The mean cortisol level of 190.84 in preoperative period is increased to 545.12 in the postoperative period in the peritonsillar dexamethasone group, which may explain that there is not effect of peritonsillar infiltration in postoperative pain and edema while relating with cortisol level. (Table 9, graph 9).

In group -1, preoperative mean cortisol level was 190.54 nmol/L and in group– 2 , preoperative mean cortisol level was 190.84 nmol/L which was comparable and not statistically significant and postoperative cortisol level in group -1 was 125.66 nmol/L and postoperative level of cortisol in group -2 was 545.12 which was found to be statistically significant and p value was < 0.0001.

DISCUSSION

Tonsillectomy is one of the most commonly performed surgeries in North America, particularly in children, with over 5,00,000 surgeries taking place in the US alone.[1] With careful patient selection, it is a safe and effective procedure, with minimum morbidity. Though many techniques for performing tonsillectomy exist, the ultimate goal is excising the lymphoid tissue residing in the oropharynx, alleviating symptoms of airway obstruction, as well as minimizing the frequency of sore throat. Pain, nausea, vomiting, edema and poor oral intake are the most common morbidities following tonsillectomy.[24] The association between pain and postoperative nausea and vomiting is also proved.[4] Postoperative nausea and vomiting apart from causing dehydration and delayed discharge can result in tension on the suture lines, venous hypertension, hemorrhage. However many life threatening complications have become very rare with modern anaesthetic techniques still vomiting and retching being ones of very distressing postoperative complications in tonsillectomy and adenoidectomy. The study reflects on risk factors

Volume 1, Issue 2; July-August 2018; Page No. 207-220

and extent of immediate and late postoperative complications.

Dexamethasone is an exogenous steroid. We selected dexamethasone as it is highly potent and has long half-life (36-72 hours) for glucocorticoid activity, so that the effect would remain even after the discharge of the patient. Single dose of dexamethasone was used, as it is devoid of side effects like gastritis, adrenal suppression etc.[25] We selected the dose of dexamethasone as 0.15 mg/kg for following reasons. Doses ranging from 0.15 mg/kg to 1 mg/kg with maximum doses ranging from 8 to 25 mg have been used in the children.[26] On detail analyses of these studies, one would realize that, nearly half of the patients would receive less than the calculated per kg dose. Just for example in Vosdoganis's study[35] the dose used was 0.4 mg/kg (maximum dose 8 mg). Their weight range was 21.8±8.1 kg. This means that half of the patients received less than per kg dose.

In a large study involving 133 patients, Splinter and Roberts[14] have used 0.15 mg/kg dexamethasone with good results. Doses used in adults are 8 or 10 mg; this also corresponds to 0.15 mg/kg dose.

Wang et al[6] have done a dose ranging study (1.25 mg to 10 mg) in females undergoing thyroidectomy , they have found minimum effective dose to be 5mg. This also corresponds to 0.10 mg/kg dose. Since we had wide weight range, it was more appropriate to use per kg doses rather than fixed dose.

Research in the physiology of pain has delineated 2 distinct pain mechanism that result from the stimulus of surgical trauma.[28,29]

There is inflammatory pain, a local effect produced by the surgical trauma , and there is physiologic or functional pain, a central effect produced by stimulation of the central nervous system. Oropharyngeal pain and irritation of gastric mucosa by swallowed blood are two main contributors towards high incidence of postoperative nausea and vomiting following tonsillectomy.

Tissue injury induced acute inflammation, nerve irritation and spasm of exposed pharyngeal muscle is known to play a role in genesis of post tonsillectomy pain. It follows that the use of anti- inflammatory agents, such as acetaminophen ,would successfully treat pain and in fact , is standard practice in the treatment of postsurgical pain.

Likewise many surgeons use "preemptive analgesia" , the use of local anesthetics at the surgical site before a surgical procedure is commenced , because this blocks the hypersensitivity and hyperalgesia, which are important mechanism in the promotion central sensitization (physiologic pain)[28,29]

Corticosteroids have shown significant analgesia for extraction of third molar teeth, hallux valgus correction, and haemorrhoidectomy.[20] By inhibiting phospholipase enzyme, corticosteroids block both the cyclooxygenase and lipooxygenase pathway and thus prostaglandin production, there by leading to pain relief [29] The use of steroids, primarily dexamethasone, to decrease postsurgical pain after tonsillectomy is popular today. Systemic steroids have powerful anti-inflammatory effects and might be expected to improve recovery after surgical trauma. We used two different pain scores for evaluation of pain as we had selected all patients of 3 and above years of age including adults. There are no references proving equivalence of OPS 6 and VAS of 40. However in our opinion VAS of 40 signifies real pain as it is highly specific , whereas, OPS of 4 can be because of reasons other than pain also. OPS of 6 would better signify pain. Therefore, we had chosen OPS of ^{6} 6 or VAS of ^{6} 40 as significant pain. 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.

In our study, one of the complications was postoperative pain in post tonsillectomized patients. We found that in group 1 patients, pain was significantly reduced as compared to group 2 patients , with p value of < 0.000.

This observation is in concurrence with the study conducted by Dr. Anila D. Malde et al,[30] effect of dexamethasone on post-tonsillectomy morbidities, it was a prospective randomized double blind trial, in which 90 patients of age > 3 years undergoing tonsillectomy received either dexamethasone or

Volume 1, Issue 2; July-August 2018; Page No. 207-220

saline following induction of anaesthesia, they found that, in 6-24 hours, 91% of dexamethasone group versus 40% of control group were free of pain (P<0.001). Throughout 24 hours, analgesic requirement was in dexamethasone group (P<0.05).

The study done by Kaan MN.et al[31] on the effect of preoperative dexamethasone on early oral intake, vomiting and pain after tonsillectomy, was a double-blinded, placebo-controlled study 62 children, aged 4-12 years, who underwent tonsillectomy with or without adenoidectomy, they randomly assigned to receive single dose of 0.5 mg/kg i.v. dexamethasone preoperatively, it was found that the patients who received preoperative (i.v) dexamethasone had significantly less pain score during the first 6 h postoperatively (p<0.05).

Diakos EA. Et al[42] did meta-analysis of seven randomised controlled trials (580 patients) involving dexamethasone for reducing pain, vomiting and overall complications following tonsillectomy in adults. They found that dexamethasone in adults reduces the pain level experienced in the first post-tonsillectomy day [standard mean difference (SMD): -0.63, 95% CI: -1.13 to -0.12] with significant heterogeneity (I(2) = 84%, P < 0.00001).

In a study done by Hashmi M et al,[32] Post-tonsillectomy pain and vomiting : role of pre-operative steroids, it was a randomised controlled trial (100 patients), 50 in each group, One group was selected to receive dexamethasone 0.5 mg/kg (maximum of 8 mg); the second group was given equivalent volume of saline, pre-operatively they found that, Pain score was significantly lower and swallowing was less painful in patients after 4,8,12 and 24 hours in dexamethasone group. Pain score on the average was 0.8 - 1.2 factor less in dexamethasone group than in saline group in first 24 hours on a VAS score of 1 -10.

In a study done by Elhakim M et al,[33] Dexamethasone reduces postoperative vomiting and pain after pediatric tonsillectomy, a double-blinded study, 120 patients were randomly allocated to receive either dexamethasone 0.5 mg/kg (maximum dose 8 mg) i.v. or an equivalent volume of saline. Pain scores 30 min after extubation were lower (P < 0.05) in the dexamethasone group.

Thimmasettaiah, et al[34] did a randomized double-blind study, 100 patients who underwent tonsillectomy were enrolled and were randomly allocated into control or dexamethasone group (preoperative, intra operative and postoperative groups), Patients treated with dexamethasone particularly in the pre and intra operative groups (Group B, Group C) showed a general trend towards lower pain score than postoperative group (Group D). The scores were about 1.72±0.84 and 2.20±1.19 in Groups B and C respectively, and 2.64±0.99 in Group D. Overall pain score was found to be more in the control Group A about 4.84±1.21 at 6 h post operatively and showed similar trend for next 24 hours.

In a study done by Egeli E et al,[40] A prospective, randomized, double-blind, placebo-control clinical study was performed to determine the effects of peritonsillar infiltration of dexamethasone on preoperative and postoperative morbidity in patients undergoing tonsillectomy. No statistically significant differences were noted in postoperative complications, pain medication between the two groups of patients.

In a double blinded study done by Kamran M etal[31] on 62 patients were randomly allocated to infiltrate dexamethasone (0.5 mg/kg, maximum dose, 12 mg) or an equivalent volume of saline at the peritonsillar region. No statistically significant difference was found between the dexamethasone and placebo groups in pain score.

Our observation is not concurrent with the following study, Vosdogonis and Baines[35] described 41 children who received 0.4 mg/kg of intravenous dexamethasone or placebo, concentrating their observations on the first 24 h postoperatively. Time taken for first liquid and solid food intake, vomiting, and pain were assessed. There was no difference in postoperative pain assessment or analgesic requirement.

Few similar studies were done but the results were inconclusive in these studies were, Steward et al[36] did a meta-analysis of randomized double blind placebo controlled trials of a single dose of intravenous intraoperative steroid for paediatric patients who underwent tonsillectomy or adeno-tonsillectomy. Three studies[6,12,37] that evaluated pain scores as an endpoint did not publish enough data for

Volume 1, Issue 2; July-August 2018; Page No. 207-220

analysis leaving only two studies[11,36] to analyze that end point. Four studies[6, 12, 30, 34] evaluating analgesic use did not publish enough data for evaluation, leaving three studies[11, 36, 41] but each with different outcome measure for analgesic use. Goldman AC et al, [38] had similar results.

In our study OPS and VAS scores were lower (20% had pain) in preoperative IV dexamethasone group than peritonsillar infiltration of dexamethasone group (78% had pain), throughout the postoperative period. With increasing time after surgery, the VAS scores difference between the two groups increased. Majority of IV dexamethasone patients were pain free in 6-24 hours. This indicates prolonged analgesic effect of dexamethasone. Number of patients required rescue analgesic and the doses needed was less with IV dexamethasone.

In our study another complication was postoperative nausea and vomiting in post tonsillectomized patients. We found that in Group 1 patients, nausea and vomiting were significantly reduced as compared to Group 2 patients , with p value <0.05.

This observation is in concurrence with the following studies:

Heinz et al[41] did meta-analysis of 17 trials involving use of dexamethasone for prevention of Postoperative nausea and vomiting in surgical patients Vosdogonis and Baines[35] described 41 children who received 0.4 mg/kg of intravenous dexamethasone or placebo, concentrating their observations on the first 24 h postoperatively. Time taken for first liquid and solid food intake, vomiting, and pain were assessed. Postoperative vomiting was significantly decreased in the dexamethasone group (45 vs. 63%; *P* =0.02), as was the need for administration for rescue anti emetic and intravenous fluid supplementation.

Splinter and Roberts[14] observed 133 children who received 0.15 mg/kg of dexamethasone or placebo intravenously before outpatient tonsillectomy. Postoperative vomiting both in the hospital and at home for 24 h was recorded. The dexamethasone group had less vomiting in the immediate postoperative period as well as during the first 24 h at home (overall, 40 vs. 71%, respectively; *P* < 0.5).

April M et al[12], studied 80 children who received 1 mg/kg of dexamethasone or placebo prior to adenotonsillectomy and postoperative vomiting, fever, and complications during the first 24 h were measured. The dexamethasone group had significantly less trismus, fever, and vomiting in the first 6 h postoperatively, than the control group.

In a study done by Elhakim M etal[33] , Dexamethasone reduces postoperative vomiting and pain after pediatric tonsillectomy, a double-blinded study, 120 patients were randomly allocated to receive either dexamethasone 0.5 mg/kg (maximum dose 8 mg) i.v. or an equivalent volume of saline. Dexamethasone significantly decreased the incidence of early and late vomiting (P < 0.05, P < 0.001 respectively). Fewer patients in the dexamethasone group needed antiemetic rescue (P < 0.01).

Diakos EA. Et al[42] did meta-analysis of seven randomised controlled trials (580 patients) involving dexamethasone for reducing pain, vomiting and overall complications following tonsillectomy in adults. They found that dexamethasone in adults reduces the incidence of vomiting.

Fazel etal[39] did a double -blind, placebo – controlled clinical trial, 100 patients aged 5-15 years, ASA classes I and II were randomly selected to receive either 0.5 mg/kg IV dexamethasone (n=50), as study group or an equivalent volume of saline preoperatively , as control group. Data analysis showed that the overall incidence of early and late vomiting was significantly lesser in dexamethasone group than the control one.

Nagaraj Met al[34] did a randomized double-blind study, 100 patients who underwent tonsillectomy were enrolled and were randomly allocated into control or dexamethasone group (preoperative, intra operative and postoperative groups). They conclude that a single intravenous dose of 0.5 mg/kg dexamethasone at a maximum of 20 mg, given following induction of anesthesia or at the time of surgery, reduced nausea and vomiting. With 0.15 mg/kg i.v. dexamethasone, reduction in incidence of Postoperative nausea and vomiting from 72% to 40% was noted by Splinter et al.[14]

Volume 1, Issue 2; July-August 2018; Page No. 207-220

Our observation is not concurrent with the study performed by Pappas A et al[13] examined postoperative vomiting in 130 children who received 1 mg/kg of dexamethasone or placebo during outpatient tonsillectomy. Vomiting was recorded in the hospital and for the first 24 h at home. Duration of recovery-room stay was longer in the placebo group. The incidence of vomiting, need for rescue anti emetic treatment, and analgesic requirements were not different before hospital discharge, but during the 24-h period after that, fewer patients in the steroid group experienced vomiting (48 vs. 88%; $P < 0.5$).

In a study done by Dr. Anila D. Malde et al[30] ,effect of dexamethasone on post-tonsillectomy morbidities , it was a prospective randomised double blind trial, in which 90 patients of age > 3 years undergoing tonsillectomy received either dexamethasone or saline following induction of anaesthesia, they found that**,** Incidence of nausea, vomiting and requirement of anti-emetic were not significantly different for two groups. They concluded that when there is a high risk of Postoperative nausea and vomiting. A single prophylactic dose of dexamethasone is antiemetic compared with placebo, without evidence of any clinically relevant toxicity in otherwise healthy patients, late efficacy seems to be most pronounced. Though exact mechanism by which corticosteroids act as anti-emetic is not known, two studies have proved relationship between low levels of cortisol (endogenous or exogenously administered) and nausea, vomiting.[21,22]

In our study**,** overall incidence of Postoperative nausea and vomiting were present in 26% of patients and 20 % of patients respectively in group 1 and in group 2 ,60% of patients and 42% of patients respectively.

Dexamethasone may exert an antiemetic action via prostaglandin antagonism[38] or serotonin inhibition[39] in the gut and release of endorphins.

Recent study improved oral intake was also seen in post tonsillectomized patients. We found that in group 1 patients have significantly better oral intake as compared to group 2 patients ,with p value of <0.05. This observation is in concurrence with the meta-analysis performed by Steward et al[36] showed that children receiving dexamethasone were more likely to advance to a soft or solid diet on post-tonsillectomy day 1 (RR= 1.69; 95% CI, 1.02-2.79; p =0.04).

Vosdogonis and Baines[35] described 41 children who received 0.4 mg/kg of intravenous dexamethasone one or placebo, concentrating their observations on the first 24 h postoperatively. Time taken for first liquid and solid food intake, vomiting, and pain were assessed. Time taken to first liquid intake was similar between the groups, but first solid intake was earlier in the study group (6 vs. 10 h; P <0.1).

April M etal[274] studied 80 children who received 1 mg/kg of dexamethasone or placebo prior to adenotonsillectomy and measured postoperative oral intake, pain, vomiting, fever, and complications during the first 24 h. The dexamethasone group had significantly improved oral food (including early acceptance of solid food) than the control group .

Fazel et al[39] did a double -blind, placebo –controlled clinical trial, 100 patients aged 5-15 years, ASA classes I and II were randomly selected to receive either 0.5 mg/kg IV dexamethasone (n=50), as study group or an equivalent volume of saline preoperatively, as control group. Data analysis showed that dexamethasone shortened the time to first oral intake.

In study done by Kaan MN.et al[43], it was a double-blinded, placebo-controlled study 62 children , aged 4-12 years, who underwent tonsillectomy with or without adenoidectomy were randomly assigned to receive single dose of 0.5 mg/kg i.v. dexamethasone preoperatively, they found that the patients who received preoperative (i.v) dexamethasone group had shorter time for oral intake ($p<0.05$) and the discharge time was earlier ($p<0.05$).

Catlin and Grimes[10] studied the effect of single post induction dose of 8 mgm^{-2} on recovery from tonsillectomy in children. On day 3, 70% patients in group 1 had good appetite in contrast to 28 % patients in group 2

In a study done by Dr. Anila D. Malde et al[30], effect of dexamethasone on post-tonsillectomy morbidities, it was a prospective randomised double blind trial, in which 90 patients of age > 3

Volume 1, Issue 2; July-August 2018; Page No. 207-220

years undergoing tonsillectomy received either dexamethasone or saline following induction of anaesthesia, they found that, Oral intake was significantly delayed in control group (7.65 ± 1.92 hrs). Compared to that in dexamethasone group (5.87±1.5 hrs.) (P<0.05).

In a study done by Egeli E et al,[40] A prospective, randomized, double-blind, placebo-control clinical study was performed to determine the effects of peritonsillar infiltration of dexamethasone on preoperative and postoperative morbidity in patients undergoing tonsillectomy. No statistically significant differences were noted in postoperative complications , pain medication between the two groups of patients.

In our study, mean days of starting solid food were better in Group- 1(70% patients) as compared to Group -2 (28%) and 14% patients had postop edema in group 1 and 42 % had postoperative edema in group 2. This shows an anti-inflammatory effect of dexamethasone.

In our study another complication was postoperative edema in post - tonsillectomized patients. We found that in group 1 patients have significantly reduced postoperative edema as compared to group 2 patients ,with p value of <0.05. This observation is in concurrence with the study done by Dr. Anila D. Malde et al,[30] effect of dexamethasone on post-tonsillectomy morbidities , it was a prospective randomised double blind trial, in which 90 patients of age > 3 years undergoing tonsillectomy received either dexamethasone or saline following induction of anaesthesia, they found that Incidence of edema was significantly higher in control (86.67%) than dexamethasone group (46.67%) at 24 hours (P<0.001).

In our study we have compared the preoperative cortisol level with postoperative cortisol level and found that in group -1, preoperative mean cortisol level was 190.54 nmol/L and in group – 2 , preoperative mean cortisol level was 190.84 nmol/L which was comparable and not statistically significant but postoperative level of cortisol level in group -1 was 125.66 nmol/L and postoperative level of cortisol in group -2 was 545.12 which was found to be statistically significant and p value was <0.0001.

We have not found any available study, on cortisol level measurement preoperatively and postoperatively in tonsillectomized patient, after giving dexamethasone preoperatively in group 1 and intraoperative in group 2.

As cortisol is increased in stress[16] and trauma[17] induced pain , thus it was found that relatively the postoperative cortisol level in group 1 was found significantly less as compared to group 2 . It shows that dexamethasone when given intravenously has greater impact on postoperative cortisol level as compared to when dexamethasone infiltration is done.

CONCLUSION

This study was done in 100 patients with an aim to know the impact of i.v. dexamethasone preoperatively and peritonsillar infiltration of dexamethasone intraoperative in tonsillectomized patients, on postoperative analgesia (by objective pain scale and cortisol level measurement), nausea, vomiting, edema and oral intake.

We conclude that, a single I.V. dose of 0.15 mg/kg Dexamethasone, given following induction of anaesthesia, provided good and prolonged analgesia (also measured by cortisol level), reduced edema, nausea, vomiting and resulted in earlier and better quality of oral intake and without side effects as compared to peritonsillar infiltration of dexamethasone group.

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Volume 1, Issue 2; July-August 2018; Page No. 207-220

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Volume 1, Issue 2; July-August 2018; Page No. 207-220

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Volume 1, Issue 2; July-August 2018; Page No. 207-220

TABLES AND GRAPHS

Table- 1, Graph-1: Mean Age In Years

Groups	Mean age years	Std error	T stat	P value
Group–1	15.82	1.33	0.407	0.685(non-significant)
Group–2	15.06	1.32		

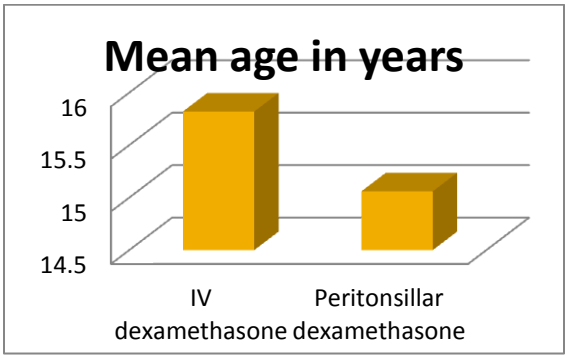


Table 2, Graph 2: Male To Female Ratio

Group	Number of male patients	Number of Female patients	Chi square	P value
Group–1	27	23	0.36	0.548
Group-2	24	26		

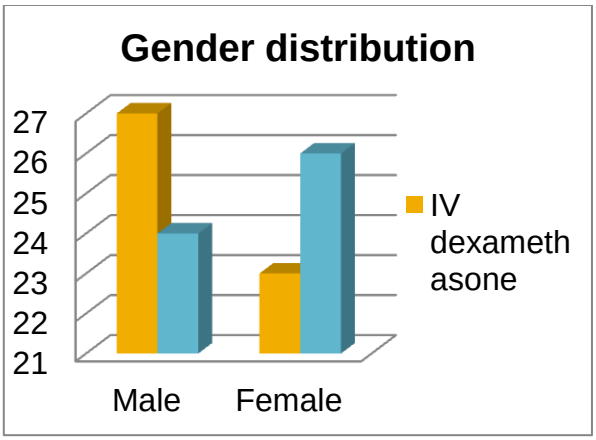


Table 3, Graph 3: Post-Operative Pain

Groups	Number of patients with Post-operative pain		Chi square	P value
	Present	Absent		
Group–1	10	40	33.65	0.0001
Group-2	39	11		

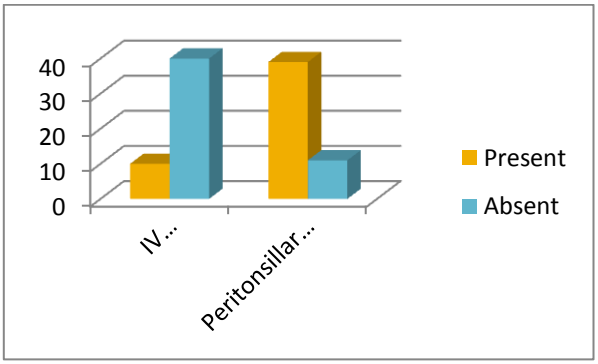


Table 4, Graph 4: Postoperative Edema

Groups	Number Of Patients with Post-Operative Edema		Chi Square	P Value
	Present	Absent		
Group - 1	7	43	9.72	0.002

Volume 1, Issue 2; July-August 2018; Page No. 207-220

Group – 2	21	29		

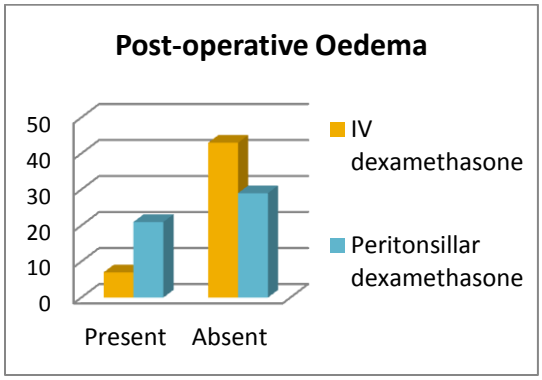


Table 5, Graph 5: Post-Operative Nausea

Groups	Number Of Patients With Post-Operative Nausea		Chi Square	P Value
	Present	Absent		
Group–1	13	37	11.79	0.0006
Group- 2	30	20		

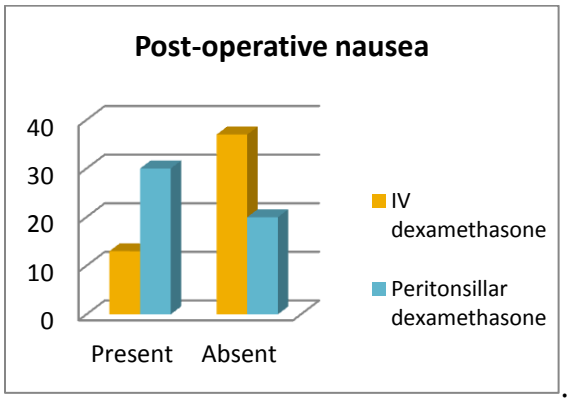


Table 6, Graph 6: Post-Operative Vomiting

Groups	Post-Operative Vomiting		Chi Square	P Value
	Present	Absent		
Group	10	40	5.66	0.017
– 1				
Group - 2	21	29		

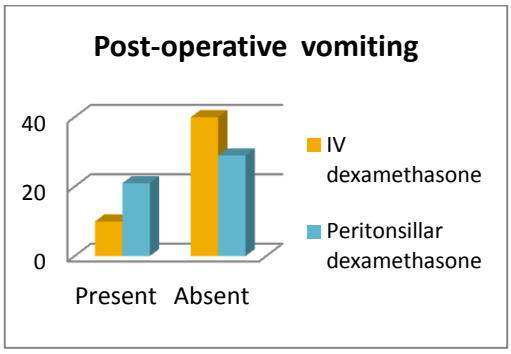
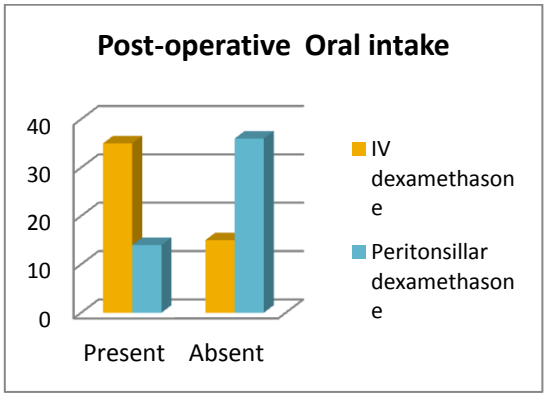


Table 7, Graph 7: Post-Operative Oral Intake

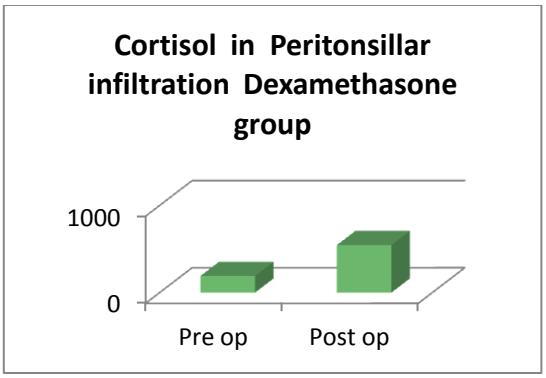
Groups	Patients with Improved Oral Intake		Chi Square	P Value
	Improved	Delayed		
Group - 1	35	15	17.65	0.0001
Group - 2	14	36		



Volume 1, Issue 2; July-August 2018; Page No. 207-220

Table 8, Graph 8: Cortisol Level Relationship in Group 1

	Pre- Op-Cortisol Level nmol/L	Post-Op-Cortisol Level nmol/L	Paired T Test	P Value
Mean	190.54	125.66	8.883	0.0001
Standard Error	4.16	6.64		



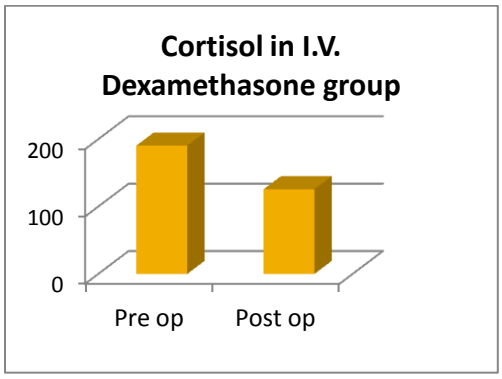


Table 9, Graph 9: Cortisol Level Relationship in Group 2

	Pre- op cortisol level nmol/L	Post- op cortisol level nmol/L	Paired t stat	P value
Mean	190.84	545.12	-24.409	0.0001
Std error	4.14	13.52		

Volume 1, Issue 2; July-August 2018; Page No. 207-220