Original Article

ROLE OF DEXAMETHASONE ON REDUCING POST TONSILLECTOMY MORBIDITIES

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SUMMARY

Pain, nausea, vomiting, oedema and poor oral intake are the most common morbidities after general anesthesia and surgery like tonsillectomy. This study was done to evaluate the effectiveness of intravenous dexamethasone (0.15mg/kg) at induction of anaesthesia on post tonsillectomy morbidities. In this prospective randomized double blind study, sixty children of age between 8-12 years, ASA I & II undergoing tonsillectomy under general anaesthesia were randomly assigned into two equal groups of 30 each. They received dexamethasone IV or saline (control) following induction of anaesthesia. Both anesthetic and surgical techniques were standardized. Post operative pain was assessed by visual analogue scale (VAS). Inj. Tramadol 1mg/kg in first 6 hrs and oral paracetamol 10mg/kg in next 24 hrs were administered as rescue analgesic. Incidence of nausea, vomiting, time and quantity of first oral intake were also noted. Patients receiving dexamethasone experienced significantly less pain, nausea and vomiting than control group throughout 24 hrs. Lesser patients required rescue analgesics (23.33% vs. 46.67%) in first 6 hrs. So, it is found that, single intravenous dose of dexamethasone (0.15mg/kg) provided significant analgesia, reduced nausea, vomiting and improved quality of oral intake in paediatric patients who underwent tonsillectomy.

INTRODUCTION

Following tonsillectomy in paediatric patient, pain, nausea, vomiting, oedema, poor oral intake are the most common morbidities which need medical attention. Association between pain and postoperative nausea, vomiting is also proved. [1] Postoperative pain in children is intense and short lasting, children with mild to moderate pain need analgesia only for 24 hrs.[2] Postoperative nausea, vomiting not only causes dehydration, electrolyte imbalance and delayed discharge, it can result in tension on suturelines, venous hypertension, increased bleeding under skin flap and pulmonary aspiration of vomitus.[3] There have been different reports of anti-inflammatory and antiemetic properties of corticosteroids used during different types of surgeries [4,5]. Tissue-injury induced acute inflammation is known to play a significant role in the genesis of surgical pain and dexamethasone is also known to have potent anti-inflammatory effect.[5] Aasbo etal [6] have demonstrated the effectiveness of steroid for hallux valgus and haemorhoidectomy surgery. Analgesic effect of corticosteroid has been observed by Baxendale etal [7] for extraction of third molar tooth. Dexamethasone has been used successfully as an enti-emetic for chemotherapy induced vomiting[7]. This study was undertaken to find out the effectiveness of a single intravenous dose of dexamethasone (0.15 mg/kg) on post tonsillectomy morbidities like pain, nausea, vomiting and oral intake.

MATERIALS AND METHODS

After taking informed consent and authority approval children aged between 8-12 years, ASA I & II undergoing tonsillectomy under general anaesthesia were recruited in this study. Patients with coagulopathy, diabetes, gastritis, peptic ulcer, cardiovascular, renal, hepatic diseases or on therapy with steroid, anti-emetics, anti-histamine or aspirin were excluded from the study. The patients were randomly assigned into two equal groups (dexamethasone and control groups) each with 30 members. The procedure of induction and maintenance of anaesthesia were the same for both groups. After preoxygenation with 100% oxygen for 3 mins, induction of anaesthesia was done with Inj. Fentanyl 1µg/kg and Thiopentone sodium 5mg/kg IV and tracheal intubation done after giving Inj Succinylcholine 1.5 mg/kg IV. General anaesthesia

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was maintained with 0.5-0.6 % halothane and 50% N_2O in oxygen and Inj. Atracurium besylate 0.5mg/kg. Before surgical incision one blinded anaesthesiologist administered either saline 2ml or dexamethasone 0.15mg/kg diluted in 2ml saline IV. Per- operatively D_5 0.225 NS fluid was infused at a rate of 5ml/kg/hr. Neuromuscular blockade was reversed with Inj. Neostigmine (0.05mg/kg) along with Inj. Atropine (0.02mg/kg) and tracheal extubation performed.

Another anaesthesiologist monitored the patient in post operative room for first 6 hrs and in the ward for 6 - 24 hrs. Pain was assessed by visual analogue scale (VAS – 0 to 100). Monitoring was done half hourly for the first 2 hrs, hourly for the next 4 hours and then at 8, 10, 12 & 24 hrs. If VAS > 40, rescue analgesic Inj. Tramadol 1mg/kg for first 6 hrs and orally paracetamol 10mg/kg for 6 – 24 hrs were administered.

Patients were divided into three pain groups for first 6 hrs and 6 – 24 hrs.

Moderate to severe pain	if,	VAS 40
Mild pain	if,	VAS < 40 > 20
No pain	if,	VAS < 20.

Nausea and vomiting if occurred, were recorded. Numbers of episodes of vomiting were also recorded. Inj. Ondansetron (0.1mg/kg) was used as rescue anti-emetic, if more than 2 episode of vomiting occurred in an hour.

Post tonsillectomy bleeding if occurred was noted. 4 hours after surgery patients were asked to take oral liquids. Quality of oral intake was graded as follows:

Excellent – when patient requested it, Good – patient accepts it when offered, Fair – patient accepts it on pressure, Poor – when patient refuses it.

If oral intake was delayed, time duration between the end of surgery and first acceptance of oral liquid noted.

Statistical Analysis

The data were compiled and analysed with the help of Chi-square test.Values were expressed as significant if $p< 0.05$ (confidence limit – 95%).

RESULTS

There was no significant difference between groups in ages, weight, height, ASA, type & duration of surgery. Regarding post operative pain, dexamethasone group had significantly lower VAS score than control group although 24 hrs. VAS of 27.4 ± 7.82 in control group versus 12.8±8.24 in dexamethasone group was noted ($p < 0.001$). In first 6 hrs incidence of moderate to severe pain was 73.33 % in control group versus 43.33 % in dexamethasone group ($p <0.05$). In 6 – 24 hrs 37 % of control group versus 90% of dexamethasone group were pain free ($p <0.001$). Through out 24 hrs analgesic requirement was less in dexamethasone group ($p <0.05$).

Rescue analgesics in control versus dexamethasone group was (46.67% vs. 23.33%) in first 6 hrs. and in 6 – 24 hrs. (20% vs. 3.33%).

Total no of vomiting episode were significantly higher in control (25) group compared to dexamethasone group (13), $p<0.01$. Six patients in control group versus two in dexamethasone group had two or more episodes of vomiting.

Table-I

Post Tonsillectomy Pain

Parameters	0-6 hours		6-24 hours	
Pain	Control	Dexamethasone	Control	Dexamethasone
Moderate/Severe	22(73.33)	13(43.33)*	10(33.33)	2(6.67)***
Mild	6(20)	11(36.66)*	9(30)	1(2.22)***
No Pain or pain free	2(6.67)	6(20)*	11(36.67)	27(90)***

* $p < 0.05$

*** $p < 0.001$

Table-II

Postoperative nausea, vomiting (PONV)

Parameters		Control	Dexamethasone	
Nausea	0-6 hrs	10 (33.33)	8 (26.67)	P>0.05
	6-24 hrs	4 (13.33)	0 (0)	P>0.05
Vomiting	0-6 hrs	8 (26.67)	6 (20)	P>0.05
	6-24 hrs	2 (6.67)	1 (3.33)	P>0.05
Pts. with multiple episodes of vomiting			6 (20)	2 (6.67)
Total number of episodes of vomiting			25	13

Oral intake was significantly delayed in control group (7.55 ± 1.91hrs) than dexamethasone group (5.77 ± 1.5 hrs) $p < 0.05$. In control group number of patients with excellent / good / fair and poor quality of intake was (2, 22, 5,1) and in dexamethasone group it was (8, 19, 3, 0) $p < 0.05$.

No patient had post tonsillectomy bleeding in dexamethasone group.

DISCUSSION

Tonsillectomy is a common operation performed in paediatric patients, but its post operative morbidities really need medical attention. Post tonsillectomy pain is caused by tissue injury induced acute inflammation, nerve irritation and spasm of exposed pharyngeal muscle. Oropharyngeal pain and irritation of gastric mucosa by swallowed blood are two main contributors of high incidence of PONV following tonsillectomy. Acute nociception at peripheral tissues leads to prostaglandin synthesis by induction of cyclo-oxygenase-2 and activation of phospholipase A2, resulting in a hyperalgesic state[8]. Corticosteroids are known to inhibit phospholipase and block both cyclo-oxygenase & lipo-oxygenase pathway, thus reducing prostaglandin synthesis[8] and thereby causing pain relief. In 1964, Smith injected a steroid penicillin- local anaesthetic mixture into the tonsiller fossa during surgery and observed a reduction in post operative pain and inflammation[9]. Corticosteroids have shown significant analgesia for extraction of third molar tooth, hallux valgus correction and haemorroidectomy [6,7]. The mechanism of dexamethasone induced anti emesis is not fully understood, but central inhibition of prostaglandin synthesis[10] and decrease in 5-HT turnover in the CNS[11] or changes in the permeability of blood CSF barrier to serum proteins may be involved[12]. Multiple studies have shown benefits with corticosteroid alone or as adjuvant for chemotherapy induced vomiting, gynaecological surgeries, thyroidectomy and opoid induced vomiting[13,14,15]. Local infiltration of steroids and oral 4 day course of steroids have shown promising results in tonsillectomy patients[16,17].

Our main aim was to evaluate the analgesic and anti-emetic effects of steroid on post-tonsillectomy paediatric patient.

Dexamethasone is highly potent and for its glucocorticoid activity has long half life (36-72 hours), so that the effect would remain even after the discharge of the patient. Single intravenous dose is devoid of side effects like gastritis, delayed healing in surgical patient, adrenal suppression etc[18]. Dexamethasone was given in intravenous route just before surgery to achieve peak effect in the early post operative period.

In our study the dose of dexamethasone selected was 0.15 mg/kg as doses ranging from 0.15 to 1mg/kg with maximum doses ranging from 8 to 25 mg have been used in the children. Splinter and Roberts[19] have used 0.15 mg/kg dexamethasone with good results. Doses used in adults are 8mg or 10mg, this also corresponds to 0.15mg/kg dose.

For evaluation of pain, we have used visual analogue scale, as we have selected children between 8 to 12 years of age. VAS score was lower in dexamethasone group throughout 24 hrs, this indicates prolonged analgesic effect of dexamethasone. Number of patients requiring rescue analgesic was less in dexamethasone group than control group.

In our study overall incidence of PONV was less (25%), compared to previous studies (40 – 70%). Splinter et al also showed reduction in PONV from 72% to 40% using 0.15 mg/kg dexamethasone.

We found better quality of oral intake in dexamethasone group, perhaps by decreasing pain and inflammation.Steward etal[20] found that children receiving dexamethasone were more likely to advance to a soft or solid diet in first tonsillectomy day.

CONCLUSION

In conclusion, we can say that a single intravenous dose of 0.15mg/kg dexamethasone, following induction of anaesthesia provided adequate and prolong analgesia, anti-emesis and earlier and better quality of oral intake without any complications in paediatric patients who underwent tonsillectomy.

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