

Comparison of Pain Scores between Intravenous versus Rectal Acetaminophen in Children Undergoing Tonsillectomy

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ABSTRACT

Background: Post-operative tonsillectomy pain is widely observed especially among children which leads to longer hospitalization, slower recovery, eating disorder and continuation of IV fluids ingestion.

Objective: To compare mean pain scores between intravenous versus rectal acetaminophen in children undergoing tonsillectomy.

Study Design: Randomized controlled trial

Place and Duration of Study: Department of Anesthesiology, Surgical Intensive Care & Pain Management, Civil Hospital Karachi, Dow University of Health Sciences, Karachi from 15th July 2015 to 14th January 2016.

Methodology: Seventy eight patients with American Society of Anesthesiologist Physical Status (ASA) I and II having age 4-10 years of either gender presented with chronic tonsillitis and duration of disease of more than or equal to one year and underwent elective surgeries (tonsillectomy) were enrolled. Patients were randomly allocated by computer generated random number in two groups; group A received intravenous acetaminophen and group B received rectal acetaminophen. In group A, intravenous acetaminophen 10mg/kg was given and in group B, rectal acetaminophen 15mg/kg was given. Postoperative pain was assessed after 4 hour in ward based on CHIPPS criteria.

Results: Mean age was 6.69 ± 2.12 years in intravenous group whereas 5.94 ± 1.97 years in rectal group (P=0.114). Mean duration of disease in intravenous group was 1.82 ± 0.72 years whereas in rectal group, it was 2.07 ± 0.62 (P=0.097). Mean pain score in intravenous group was 2.65 ± 0.05 and 1.97 ± 0.01 in rectal group (P=0.001).

Conclusion: Significant difference was observed in mean pain scores between intravenous versus rectal acetaminophen in children undergoing tonsillectomy

Keywords: Tonsillectomy, Intravenous versus rectal acetaminophen, Pain scores

INTRODUCTION

Tonsillectomy is the most frequent surgical procedure especially among children for obstructive sleep apnea, peritonsillar abscess, removal of tumor and tonsillitis.^{1,2} Pain is widely observed in this surgical procedure which lead to longer hospitalization, slower recovery, eating disorder and continuation of IV fluids ingestion.³⁻⁵

Non-steroidal anti-inflammatory drugs (NSAIDs) are mainly administered as analgesia after tonsillectomy. Usage of NSAIDs is still considered to be controversial and adverse effects are also associated including platelet function deterioration which increased risk of bleeding.^{6,7} Efficacy of various analgesics such as morphine, lidocaine and ketamine were compared.^{8,9} Route of administration of acetaminophen and its related effectiveness is compared. Less post-operative pain is observed after rectal administration as compared to intra-venous intake.^{10,11}

In another study, level of pain was compared and assessed through CHIPPS criteria after rectal acetaminophen and IV paracetamol administration. Significant difference in mean pain score has been observed after four hours' post-operative tonsillectomy between two groups.¹⁰

As there is no published data available on this in our country so we will conduct this study to compare mean pain score based on CHIPPS criteria by using intravenous acetaminophen and rectal acetaminophen in tonsillectomy. So the present study was generated local data and the better of two modalities were used in future in such cases. Furthermore it was enhance the quality of life, help in early mobilization and early discharge from hospital and it also help in our health budget.

MATERIALS AND METHODS

This randomized controlled trial was conducted at Department of Anesthesiology, Surgical Intensive Care & Pain Management, Civil Hospital Karachi, Dow University of Health Sciences Karachi from 15th July 2015 to 14th January 2016 and 78 patients were enrolled. American Society of Anesthesiologist physical status (ASA) I and II, age 4-10 years, either gender, chronic tonsillitis, duration of disease of more than or equal to one year and elective surgery (tonsillectomy) were included. Chronic pain (VAS score >3) of

more than 6 months duration evaluated on history, constant use of acetaminophen for more than 6 months evaluated on history, allergic to studied drugs and comorbid conditions like: active renal, liver, respiratory or cardiovascular diseases like arrhythmia, cardiomyopathy, congenital heart defects, neurological like cerebral palsy, epilepsy or neuromuscular disorders like muscular dystrophies, spinal muscular atrophies, hereditary neuropathies were excluded. Patients were randomly allocated by computer generated random number in two groups; group A received intravenous acetaminophen and group B received rectal acetaminophen. In the operating room standard monitoring was established with ECG, non-invasive blood pressure (NIBP), pulse oximetry, capnography and baseline measurements were recorded. All children were received 0.01mg/kg atropine, 2mcg/kg fentanyl, and 0.1mg/kg dexamethasone as antiemetic. Anaesthesia was induced by 3-5mg/kg sodium thiopental, and 0.5mg/kg atracurium, after endotracheal intubation anaesthesia was maintained by 0.5-0.6% isoflurane, 50% oxygen and 50% N₂O, by an anaesthetist having more than 2 years experienced.

In Group A intravenous acetaminophen 10mg/kg was given, and in Group B rectal acetaminophen 15mg/kg was given. Postoperative pain was assessed after 4 hour in ward based on CHIPPS criteria. This information along with base line characteristics like age, gender, weight, height and duration of disease was noted. Data was entry and analyzed through 20-SPSS. Both the groups were compared in terms of mean pain scores, applying un-paired t test.

RESULTS

There were 26 (66.67%) males and 13 (33.33%) female in intravenous group while in rectal group, 20 (51.28%) males and 19 (48.72) females. Majority of the patients 24 (61.54%) with ASA status II were in intravenous group whereas in ASA status I, 29 (74.35%) of patients were presented in rectal group (Table 1).

According to age, 14 (35.89%) patients having age ≤6 years and 25 (64.11%) patients having age >6 years in intravenous group whereas in rectal group, 23 (58.97%) patients having age ≤6 years and 16 (41.03%) having >6 years. The mean ages were 6.69

± 2.12 years in intravenous group and 5.94 ± 1.97 in rectal group [$P=0.114$] (Table 2).

Thirteen (33.33%) patients having weight ≤ 30 kg and 26 (66.67%) patients having weight >30 kg presented in intravenous group whereas in rectal group, 23 (58.97%) patients having weight ≤ 30 kg and 16 (41.03%) patients having weight >30 kg. Mean weight in intravenous group was 30.87 ± 5.33 kg whereas 27.79 ± 5.01 in rectal group ($P=0.010$) [Table 3].

Majority of the patients with ≤ 110 cm height were presented in intravenous group whereas in patients with >110 cm height were presented in rectal group. Mean height of the patients was 111.30 ± 22.17 cm in intravenous group whereas in rectal group, 111.97 ± 21.94 cm ($P=0.894$) [Table 4].

There were 32 (82.05%) patients having duration of disease was ≤ 2 years and 7 (17.95%) having duration of disease was >2 years in intravenous group whereas rectal group, 30 (76.92%) patients having duration of disease was ≤ 2 years and 9 (23.08%) patients having >2 years duration of disease. Mean duration of disease in intravenous group was 1.82 ± 0.72 years whereas in rectal group 2.07 ± 0.62 years ($P=0.097$) [Table 5].

Table 1: Demographic information of the patients in both groups (n=78)

Variable	Intravenous Group (n=39)		Rectal Group (n=39)	
	No.	%	No.	%
Gender				
Male	26	66.67	20	51.28
Female	13	33.33	19	48.72
ASA status				
I	15	38.46	29	74.35
II	24	61.54	10	25.65

Table 2: Comparison of age within group (n=78)

Age (years)	Intravenous Group (n=39)		Rectal Group (n=39)	
	No.	%	No.	%
≤ 6	14	35.89	23	58.97
> 6	25	64.11	16	41.03
Mean \pm SD	6.69 \pm 2.12		5.94 \pm .97	
P value	0.114			

Table 3: Comparison of weight within group (n=78)

Weight (kg)	Intravenous Group (n=39)		Rectal Group (n=39)	
	No.	%	No.	%
≤ 30	13	33.33	23	58.97
> 30	26	66.67	16	41.03
Mean \pm SD	30.87 \pm 5.33		27.79 \pm 5.01	
P value	0.010			

Table 4: Comparison of height within group (n=78)

Height (cm)	Intravenous Group (n=39)		Rectal Group (n=39)	
	No.	%	No.	%
≤ 110	24	61.53	23	58.97
> 110	15	38.47	16	41.03
Mean \pm SD	111.30 \pm 22.17		111.97 \pm 21.94	
P value	0.894			

Table 5: Comparison of duration of disease within group (n=78)

Duration of disease (years)	Intravenous Group (n=39)		Rectal Group (n=39)	
	No.	%	No.	%
≤ 2	32	82.05	30	76.92
> 2	7	17.95	9	23.08
Mean \pm SD	1.82 \pm 0.72		2.07 \pm 0.62	
P value	0.097			

Table 6: Comparison of pain score within group (n=78)

Pain score	Intravenous Group	Rectal Group	P value
	2.65 \pm 0.05	1.97 \pm 0.01	

Mean pain score in patient with intravenous group was 2.65 ± 0.05 whereas mean pain score in rectal group was 1.97 ± 0.01 (p-value 0.001) (Table 6).

DISCUSSION

Tonsillectomy is one of the prevalent surgical procedures among children and pain is frequently associated with this procedure. The compliance of caregiver of delivering on the day 1 has been reported to be in majority of the children. In the present study, mean pain scores in intravenous group was 2.65 ± 0.05 whereas 1.97 ± 0.01 in rectal group ($P=0.001$).¹²⁻¹⁴ Various studies have proved that, regardless of the fact children were in intense pain, no medication or single dose were mostly given to children even post-operative day 1 and 3.^{15,16}

Different types of topical agents including mouth washes, oral rinses and sprays have been extensively employed to reduce post-operative pain. Result of meta-analysis of 6 study trials has proved that, results were either bias or inadequate to conclude any results. Widely used drug, acetaminophen alone prove beneficial effects and greatly reduce the severity of the pain after tonsillectomy as compared to the acetaminophen with codeine. Another study on adults also reported the similar results and pain was significantly relieved.¹⁷⁻¹⁹ Codeine render the acetaminophen effect due to the genetic variation in cytochrome P450 system which is the targeted and main site for drug metabolism and converts codeine into its active metabolites.^{20,21} Few side effects are also associated with the use of codeine but on the other hand, acetaminophen alone is not sufficient for analgesic effects.²² It is also observed that, acetaminophen with codeine is better tolerated orally than to the rectal administration.²³

Controversial results are achieved after the use of NSAIDs including platelet function deterioration leading to prolonged bleeding time than usual.^{24,25} Review analysis highlights that, no significant difference in post-operative bleeding was observed after NSAIDs, other analgesic or placebo administration.²⁶ Even high risk of hemorrhage is associated with the use of ketorolac after tonsillectomy.^{27,28}

Medication at fixed schedule is proven to be an effective strategy to reduce the pain level in contrast to dosage administration as required.^{29,30} Similarly, post-operative discomfort is more frequently observed in morning despite of fixed schedule medication. This could possibly be happened due to home environment distraction, overnight dehydration, muscle spasms, sleep disturbance and poor quality sleep.³¹⁻³³

Despite of the variety of analgesics, post-operative pain management is still needs to be rigorously considered. Dosage administration according to the children's weight at fixed schedule might prove beneficial in controlling or relieving tonsillectomy pain.

CONCLUSION

Significant difference was observed in mean pain scores between intravenous versus rectal acetaminophen in children undergoing tonsillectomy.

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