

Comparison of the Effects of Low Dose Methylprednisolone and Metoclopramide on Nausea and Vomiting and Respiratory Complications after Adenotonsillectomy

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ABSTRACT

Objective: The aim of this study is to compare the effects of low dose methylprednisolone and metoclopramide on nausea, vomiting and respiratory complications after adenotonsillectomy.

Study Design: Retrospective study

Place and Duration: The study was conducted in Divisional Headquarter Teaching Hospital, Mirpur AJK for duration of six months from December 2020 to May 2021.

Methods: Total 150 patients of both genders underwent adenotonsillectomy presented in this study. Patients were aged between 3-15 years. Detailed demographics of enrolled cases age, sex and weight were recorded after taking informed written consent. Patients were equally divided into two groups. Group I had 75 patients and received 1 mg/kg IV methylprednisolone and group II received 0.15 mg/kg metoclopramide among 75 patients. Post-operative effects on PONV were assessed and compared among both groups in terms of oral intake time, vomiting episodes, respiratory complications and side effects. Mean pain score was calculated by VAS. Complete data was analyzed by SPSS 23.0 version.

Results: There were 40 (53.3%) females and 35 (46.7%) males in group I with mean age 9.43 ± 1.44 years while in group II 42 (56%) were females and 33 (44%) were male patients with mean age 8.04 ± 3.36 years. Mean weight of the patients in group I was 23.08 ± 4.61 kg and in group II mean body weight was 22.11 ± 6.84 kg. Mean operative time in group I was 27.41 ± 8.53 min and in group II mean time was 28.17 ± 6.34 min. Post-operative frequency of vomiting and nausea was lower in group I 14 (18.7%) and 16 (21.3%) as compared to group II 21 (28%) and 24 (34%). Low pain score was found in group I 1.71 ± 6.11 as compared to group II 3.02 ± 4.09 . Time to oral intake was higher in group II 2.98 ± 3.48 hours as compared to group I 1.09 ± 7.51 hours. Rate of respiratory complications and side effects were significantly higher in group II.

Conclusion: We concluded in this study that the use of methylprednisolone was effective among patients those underwent for adenotonsillectomy in terms of post-operative frequency of PONV, pain, respiratory complications and side effects. Except this low dose of methylprednisolone were effective in earlier tolerance of oral intake.

Keywords: Adenotonsillectomy, Metoclopramide, Methylprednisolone, Oral Intake

INTRODUCTION

Tonsillectomy is a common surgical technique in otolaryngology for infections that are occlusive or recurring [1]. Following this procedure, patients usually report pain during swallowing [2, 3]. An additional risk factor for postoperative dehydration is a painful throat, which can have the opposite effect of increasing oral intake and decreasing it. Some late postoperative problems such as epithelium loss and necrosis in soft tissue, bleeding in dehydrated patients, acute pain and a delayed recovery may also be caused by sore throats. Studies on the use of local anesthetic (LA) injections before tonsillectomy have demonstrated that they are effective in reducing postoperative discomfort [5]. LA drugs are used preoperatively for two reasons: to avoid central nervous system sensitization after tissue damage and to reduce peripheral nociceptive stimulation after tissue damage [6]. Los Angeles aspirin is commonly used as a preparation for

surgery because of its potent vasoconstrictor effect. When combined with adrenaline (which also has a strong vasoconstrictor effect), this combination helps to keep the Los Angeles aspirin in place at the surgical site and maintain the Los Angeles aspirin's effect better [7]. On the other hand, several randomized controlled studies demonstrate that LA does not work during tonsillectomy [9]. If you combine a LA with even a tiny quantity of adrenaline, you run the risk of cardiac arrhythmia, uncontrolled hypertension (which can cause severe headaches, blurred vision and ringing in the ears), anxiety, confusion, and even heart attacks, you should avoid this. [10].

A greater frequency of respiratory problems, ranging from 1.4% to 5%, is associated with pediatric tonsillectomies and adenoidectomies. Pharyngeal edema and the risk of airway compromise can both be reduced with perioperative steroids. [11]

Patients receiving chemotherapy for the first time were given glucocorticoids as antiemetics. In adult laparoscopic and gynecological surgery, as well as tonsillectomy and strabismus surgery in children, these devices have been utilized extensively. As for how steroids work, no one knows for sure. However, one theory is that they inhibit 5-HT3's transformation in the brain by triggering prostaglandin antagonism and endorphin production. [12]

Postoperative edema and pain were found to be reduced following tonsillectomy and increased oral intake due to glucocorticoids' antiemetic and anti-inflammatory characteristics, according to numerous studies. However, there is little evidence to support the safety of prophylactic dexamethasone use.

When it comes to treating acute respiratory disorders, methylprednisolone outperforms dexamethasone. [13,14] Inflammation of the airways can be controlled rapidly and effectively, as well as spasm relief, resulting in shortness of breath and wheezing. When it comes to treating acute respiratory symptoms, methylprednisolone has been found to be more effective than dexamethasone. The use of methylprednisolone for PONV prevention following adenotonsillectomy in children has not been compared to other antiemetics, however. [15]

The purpose of this study is to compare the effects of low dose methylprednisolone and metoclopramide on nausea, vomiting and respiratory complications after adenotonsillectomy.

MATERIAL AND METHODS

This retrospective study was conducted at Divisional Headquarter Teaching Hospital, Mirpur AJK for duration of six months from December 2020 to May 2021. The study consisted of 150 child patients. Patients' detailed demographics were recorded after taking informed written consent from the authorities. Patients had allergy to drugs and those had history of PONV were excluded from this study.

Patients were aged between 3-15 years. For premedication, midazolam 0.05 mg/kg IV was given, and standard monitoring (heart rate, noninvasive blood pressure, and pulse oxygen saturation) was used after the first entry into the operating room." Fentanyl 1 mg/kg and Propofol 2 mg/kg IV were used to produce anesthesia. Endotracheal intubation was conducted with the administration of Rocuronium 0.6 mg/kg IV. 60 percent N2O and 40 percent O2 were used to keep the patient asleep, with Sevoflurane at 2-4 percent. The maintenance dose of 1/3 isodex (3.33 percent dextrose + 0.3 percent sodium chloride solution) was injected into all children before surgery and during anesthesia.

Before being extubated, all children's stomach contents were emptied via an orogastric catheter after the surgery was completed. Before extubation, injectable neostigmine (0.05 mg/kg) and intravenous atropine (0.02 mg/kg) were given to reverse the neuromuscular block. Patients were equally divided into two groups. Group I had 75 patients and received 1 mg/kg IV methylprednisolone and group II received 0.15 mg/kg metoclopramide among 75 patients. Post-operative effects on PONV were

assessed and compared among both groups in terms of oral intake time, vomiting episodes, respiratory complications and side effects. Mean pain score was calculated by VAS. Complete data was analyzed by SPSS 23.0 version.

RESULTS

There were 40 (53.3%) females and 35 (46.7%) males in group I with mean age 9.43±1.44 years while in group II 42 (56%) were females and 33 (44%) were male patients with mean age 8.04±3.36 years. Mean weight of the patients in group I was 23.08±4.61 kg and in group II mean body weight was 22.11±6.84 kg. Mean operative time in group I was 27.41±8.53 min and in group II mean time was 28.17±6.34 min. (Table 1)

Table 1: Baseline detailed demographics of enrolled cases

Variables	Group I (n=75)	Group II (n=75)
Gender		
Male	35 (46.7%)	33 (44%)
Female	40 (53.3%)	42 (56%)
Mean age (yrs)	9.43±1.44	8.04±3.36
Mean body weight (kg)	23.08±4.61	22.11±6.84
Mean operative time (min)	27.41±8.53	28.17±6.34

Post-operative frequency of vomiting and nausea was lower in group I 14 (18.7%) and 16 (21.3%) as compared to group II 21 (28%) and 24 (34%) (Table 2)

Table 2: Postoperative frequency of NV

Variables	Group I (n=75)	Group II (n=75)
Vomiting		
Early	8 (10.7%)	11 (14.7%)
Late after 4hrs	6 (8%)	10 (13.3%)
Nausea		
Early	9 (12%)	13 (17.3%)
Late after 4hrs	7 (9.3%)	11 (14.7%)

Low pain score was found in group I 1.71±6.11 as compared to group II 3.02±4.09. Time to oral intake was higher in group II 2.98±3.48 hours as compared to group I 1.09±7.51 hours. (Table 3)

Table 3: Post-operative comparison of pain and time to oral intake

Variables	Group I	Group II
Mean Pain score (VAS)	1.71±6.11	3.02±4.09
Oral Intake (hrs)	1.09±7.51	2.98±3.48

Rate of respiratory complications and side effects were significantly higher in group II. (Table 4)

Table 4: Comparison of respiratory complications and side effects

Variables	Group I	Group II
Respiratory Complications		
Severe hypoxemia (oxygen saturation < 70%)	32	11
Oxygen desaturation (saturation 71%-90%)	29	10
Upper-airway obstruction	17	12
Bradycardia	4	5
Supplemental oxygen	34	16
Side Effects		
Drowsiness	19	13
Fatigue	12	7
Facial flushing	1	0
Headache	7	3
Fever	1	0

DISCUSSION

Nowadays, the development of superior surgical procedures, as well as the introduction of new anesthetic medicines and advanced anesthesia systems, have lowered the frequency of numerous peri-operative problems. However, the prevalence of PONV has still not been totally controlled. [16] About 30 percent of all patients receiving surgery have PONV. Metoclopramide is one of the earliest medications commonly used as an antiemetic. Its antiemetic effectiveness has been the topic of many recent investigations. [17] It hastens the gastrointestinal transit time, which results in a lower incidence of PONV. [18]

In this study, we retrospectively examined the benefits of low dose (1 mg/kg) methylprednisolone in contrast to metoclopramide at our hospital for the prevention of PONV and respiratory problems in children after adenotonsillectomy. Total 150 patients of both genders were presented with ages 3-15 years. Patients categorized into 2-groups. Group I had 75 patients and received 1 mg/kg IV methylprednisolone and group II received 0.15 mg/kg metoclopramide among 75 patients. There were 40 (53.3%) females and 35 (46.7%) males in group I with mean age 9.43 ± 1.44 years while in group II 42 (56%) were females and 33 (44%) were male patients with mean age 8.04 ± 3.36 years. These findings were comparable to the previous studies in which majority were females. [19] Mean weight of the patients in group I was 23.08 ± 4.61 kg and in group II mean body weight was 22.11 ± 6.84 kg. Mean operative time in group I was 27.41 ± 8.53 min and in group II mean time was 28.17 ± 6.34 min. [20]

In current study post-operative frequency of vomiting and nausea was lower in group I 14 (18.7%) and 16 (21.3%) as compared to group II 21 (28%) and 24 (34%). Using methylprednisolone and dexamethasone as prophylaxis in late-term PONV, Weren M. found that it was more effective than a placebo, and that steroids were better at preventing late PONV than those used in early PONV prevention. [21] Methylprednisolone was found to be the most effective (89%) antiemetic in avoiding nausea and vomiting, followed by domperidone and metoclopramide in a trial of cancer chemotherapy patients by Ise et al (17 percent). [22] In our study low pain score was found in group I 1.71 ± 6.11 as compared to group II 3.02 ± 4.09 . Time to oral intake was higher in group II 2.98 ± 3.48 hours as compared to group I 1.09 ± 7.51 hours. This was comparable to the previous study. [23]

Rate of respiratory complications and side effects were significantly higher in group II. As a result of airway blockage, metoclopramide has been linked to acute dystonic responses and respiratory failure. [24] Metoclopramide has a low risk of side effects such as dyskinesia and extrapyramidal symptoms. In other words, the higher the dosage, the greater the risk. Methylprednisolone has been found to provide 24-hour analgesia after a single dose. [25] Preoperative low-dose methylprednisolone reduces analgesic requirements, improves postoperative swallowing and time to oral intake, and reduces pain scores and analgesic requirements. Methylprednisolone's anti-inflammatory and pain-relieving properties can be linked to the outcomes.

Metoclopramide's most prevalent adverse effects are extrapyramidal symptoms, particularly acute dystonic responses. [23-25]

CONCLUSION

We concluded in this study that the use of methylprednisolone was effective among patients those underwent for adenotonsillectomy in terms of post-operative frequency of PONV, pain, respiratory complications and side effects. Except this low dose of methylprednisolone were effective in earlier tolerance of oral intake.

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