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EFFICACY OF PERITONSILLAR INFILLTRATION OF KETAMINE, TRAMADOL, AND LIDOCAINE FOR PREVENTION OF NAUSEA AND VOMITING AFTER TONSILLECTOMY

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ABSTRACT

Backgrounds: Tonsillectomy is one of the most common surgeries in children. Controlling post operative nausea and vomiting (PONV) is still controversial. In this study, the efficacy of peritonsillar injection of lidocaine, tramadol, ketamine, and placebo is compared on post tonsillectomy nausea and vomiting.

Methods: In a randomized double-blind clinical trial, 120 patients referring for tonsillectomy to Imam Khomeini hospital in Ahvaz, Iran were recruited into four groups: ketamine, tramadol, lidocaine, and normal saline. One milliliter of medications was injected in each tonsil. Surgery was performed by a surgeon with sharp dissection technique without electrocautery. nausea and vomiting were recorded 1, 4, 8, 16, and 24 hour(s) after the operation.

Results: Baseline characteristics such as age, sex, weight, height, and surgery and anesthesia time did not differ significantly among four groups. nausea and vomiting scores decreased over

time in all groups. No significant difference was observed among ketamine, tramadol, lidocaine, and placebo regarding nausea and vomiting quality, surgery time, hospitallization, and beginning liquid diet.

Conclusion: Local injection of ketamine, tramadol, and lidocaine were not significantly different from placebo for prevention of PONV in the first 24 hours after tonsillectomy.

Key words: Tonsillectomy, PONV, lidocaine, tramadol, ketamine

INTRODUCTION

Tonsillectomy is one of the most common surgeries in children that is followed by severe and significant postsurgical pain, which not only affects the patients' health negatively, but may also cause swallowing dysfunction, bleeding, and dehydration. Despite the emphasis on controlling pain after tonsillectomy, nearly 50% of children undergoing this procedure experience severe pain after the surgery (1,2). Laryngospasm, odynophagia, airway obstruction, nausea, and vomiting are considered as the symptoms of the pain after tonsillectomy (3).

Nausea and vomiting are the common postoperative complication. These are annoying complications that increase the anxiety and suffering of patients. Typically postoperative nausea and vomiting occurs generally after the anesthesia while it is more limited to the first 24 hours after surgery. In many patients, postoperative nausea and vomiting are considered more incapable than the surgery. The symptoms are not only undesirable, but also they causes stretching the place of sutures, wound dehiscence, bleeding, electrolyte imbalances, and dehydration in many cases while it leads to pulmonary aspiration of gastric contents rarely. The complications also delay the patient discharge and lead to reuse the intravenous fluids, medications and get more doctors and nursing staff involved so that all of the events increase the financial burden (4)

Tramadol is a μ_1, noradrenergic, and serotonergic agonist. In addition to the systemic effect, the local analgesic effect of tramadol on peripheral nerves has been shown in laboratory and clinical studies (5).

Ketamine is an NMDA antagonist receptor and blocks pain messages to the limbic system by blocking glutamate receptors of brain's thalamus. It can be administered through intravenous, intramuscular, rectal, epidural, and intranasal pathways. Different studies have shown effects of sub-analgesic doses of ketamine on postoperative pain and opioid consumption (6).

Lidocaine is a topical amide-like analgesic. It is locally injected in multiple procedures. A vasoconstrictor like adrenaline is usually added to reduce its absorption by local blood flow and reduce bleeding (7).

In this study, we compare peritonsillar injection of lidocaine, tramadol, ketamine, and placebo on post tonsillectomy nausea and vomiting.

MATERIALS AND METHODS:

The current study is a randomized three blinded clinical trial(IRCT code: IRCT2014121520320n1). After permission from the Ethics committee of the Ahvaz University of Medical Sciences, Iran (Ethics code: Ajums.REC.1393.346), 120 patients referring for tonsillectomy to Imam Khomeini hospital, Ahvaz in 2014 who were between 4 and 15 years were enrolled.

Written consent to participate in the research was obtained from all parents. Patients with chronic tonsillitis were recruited. Exclusion criteria included patients with underlying diseases or known physiologic problem, patients with a history of drug sensitivity to anesthetic drugs or studied drugs, patients whose surgery took more than one hour (5). General anesthesia was equally induced with 3 μg/kg fentanyl, 5 mg/kg STP, 0.5 mg/kg atracurium, 0.02 mg/kg atropine, and 0.03 mg/kg midazolam and then tracheal intubation was performed. Patients were randomly divided into four groups: the first group received 0.5 mg/kg ketamine (Rotexmedica, TriTTAU, Germany), the second group 2 mg/kg tramadol (Daroupakhsh, Iran), the third group 20 mg/ml lidocaine hydrochloride (Daroupakhsh, Iran)and epinephrine 0.00125%,and the fourth groupreceived 2 ml normal saline. 2 cc of drugs were prepared and 1 cc was injected in anterior pillar of each tonsil before tonsillectomy. All Surgeries were performed by one surgeon with sharp dissection technique without electrocautery. In the end of the procedure, anesthesia was reversed with muscle relaxants: 0.05 mg/kg neostigmine and 0.02 mg/kg atropine. Postoperative nausea was recorded 1, 4, 8, 16 and 24 hours after the surgery. The surgeon, researcher (assistant of ear, nose and throat surgeon), and the patients were not aware of the type of applied drug. The extubation time was zero. The times of beginning the liquid diet and length of hospitalization were recorded.

Evaluating of nausea was recorded based on the patient feeling including without nausea, mild nausea, moderate nausea, and severe nausea. If the patient was feeling nausea at least 5 minutes, then it was considered as one nausea episode.

Vomiting is also defined as the severe motility of gastrointestinal tract which extracts its contents (8).The severity of vomiting including without vomiting, once (mild Vomiting), two or three times (moderate vomiting) and more than three times (sever vomiting) were recorded. If there was at least one minute interval between vomiting, then each was considered as once (4).

Descriptive statistics was used to estimate mean, standard deviation, and plotting graphs. To analyze and compare the effects of drugs on normal distribution of data, variance analysis or its non-parametric equivalent was used. The chi-square test was also used to analyze qualitative variables.

RESULTS:

The demographic information of patients, duration of surgery and anesthesia are presented in table 1. No significant difference was observed among four groups regarding demographic data (age, sex, weight, and height), and duration of surgery and anesthesia.

Table 1: Demographic and surgical characteristics of patients

variables	Lidocaine	Ketamine	Tramadol	Placebo	Pvalue
Age (mean±SD,year)	8.53±3.2	9.23±2.4	8.5±2.9	7.4±1.9	0.07
Gender(Male)	26.7%	36.7%	26.7%	46.7%	0.3
Weight(Kg)	34.37±16.8	31.3±11.3	33.16±14.8	27.7±7.4	0.23
Height(Cm)	129±20.7	129±13.3	128.8±20.25	125±11.3	0.79
Surgery time	24.1±12.6	28.3±11.9	24.13±12.6	30.2±11.7	0.14
Anesthesia time	46.6±10.36	44.3±11.1	46.7±10.4	45.2±13.7	0.82

No significant difference was found among groups regarding length of hospitalization and time of liquid diet start (Table 2)

Table 2: The length of hospitalization, and time of liquid diet start(mean ± SD)

variables	Lidocaine	Ketamine	Tramadol	Placebo	Pvalue
Hospitalization(hour)	17.2±6.04	18±6.1	21.2±10.7	18.8±6.04	0.19
PO time(hour)	5.7±0.46	5.7±0.62	5.7±0.47	6.07±0.74	0.05

No significant difference was observed between the groups in terms of nausea and vomiting (Tables 3 and 4).

Table 3: Postoperative nausea severity in four groups

nausia		Lidocaine	Ketamine	Tramadol	Placebo	p-value
1 hour	nothing	80%(24)	85.2%(23)	90%(27)	80%(24)	0.03
	mild	13.3%(4)	14.8%(4)	0	10%(3)	
	moderate	6.7%(2)	0	10%(3)	10%(3)	
4 hour	nothing	93.3% (28)	83.3%(25)	90%(27)	90%(27)	0.026
	mild	6.7%(2)	16.7%(5)	0	10%(3)	
	moderate	0	0	10%(3)	0	
8 hour	nothing	93.3%(28)	80%(24)	93.3%(28)	100%(30)	0.04
	mild	6.7%(2)	20%(6)	6.7%(2)	0	
16 hour	nothing	100%(30)	100%(30)	100%(30)	100%(30)	
24 hour	nothing	100%(30)	100%(30)	100%(30)	100%(30)	

Table 4: The rate of PONV in four groups:

vomiting	Lidocaine	Ketamine	Tramadol	Placebo

nothing	**86.7%(26)**	**73.3%(22)**	**86.7%(26)**	**73.3%(22)**
mild(1 time)	**13.3%(4)**	**20.0%(6)**	**13.3%(4)**	**26.7%(8)**
moderate(2-3times)	**0**	**6.7%(2)**	**0**	**0**
Sever(>3)	**0**	**0**	**0**	**0**

Pvalue 0.19

DISCUSSION

In this study, the effect of local injection of ketamine, tramadol, and lidocaine was compared on PONV after tonsillectomy. 120 patients referring for tonsillectomy to Imam Khomeini hospital, Ahvaz, in 2014 between 4 and 15 years old were enrolled. Four groups of 30 participants randomly received ketamine, tramadol, lidocaine, and normal saline.

nausea and vomiting scores decreased in all groups over time.

The meta-analysis of Yao Tang and his colleaguesin 2014 with the title of " Ketamine peritonsillar infiltration during tonsillectomy in pediatric patients." demonstrated that infiltration peritonsillar ketamine reduced the nausea and vomiting but its postoperative analgesic time was short (1hour after sugrey). Generally it reduces analgesic requirements and incidence of PONV while there was no difference in the first time of analgesic demands (3).

In the study by Bushra Abdul Hadi and Saleh M. Sbeitan in 2015 entitled " Clinical pharmacy intervention post tonsillectomy: a randomized control trial." 60 cases of 7-12 years old patients undergoing tonsillectomy were divided into two groups: the first group received peritonsillar infiltration of tramadol and ketamine, and the second group received peritonsillar infiltration of tramadol and ketamine. The second group had less pain. The amount of analgesics required, surgery time, and PONV were similar in both groups (9).

Ayatollahi V and colleagues showed in a study in 2012entitled "Comparison of peritonsillar injection of ketamine and tramadol on pain after tonsillectomy" that tramadol had significantly less pain, longer time to first analgesic request, less time to start the liquid diet, better hemodynamic parameters such as blood pressure and heart rate than the other two groups.Ketamine had significantly more negative behavior and delusion than the other two groups (6).

In Akbay BK et al's study,pain was significantly lower in tramadol group, but otherparameters (nausea, vomiting, fever, constipation, abdominal pain, sore throat, painful swallowing, ear pain, trismus, and halitosis) were not significantly different (10).

In another study by Akkaya T et al entitled "Comparison of peritonsillar and intravenous

injection of tramadol for pain relief in children after adenotonsillectomy" that peritonsillar administration of tramadol was more effective for pain relief (11).
In our study, no significant difference was observed between ketamine, tramadol, lidocaine, and placebo regarding nausea and vomiting score, surgery time, hospitalization, and time of liquid diet start.

The limitation of this study was the nausea and vomiting measurement scale, in which people's response and understanding is very diverse and also that the studied population was children whose responses to these questions were unreliable.

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