



The effect of acupressure on post tonsillectomy nausea and vomiting in pediatrics: A randomized, single-blind, sham-controlled study

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ABSTRACT

Introduction and Aim: Tonsillectomy is one of the most commonly used pediatric surgeries. One of the frequent and unpleasant complications after this surgery is nausea and vomiting that affects many children. The present study was conducted to investigate the effect of acupressure at P6 point on the incidence of nausea and vomiting after tonsillectomy in children.

Methodology: This clinical trial was conducted on 144 children, aged 5-12 years undergoing tonsillectomy. The children were randomly assigned to one of the three groups; intervention, control and sham groups. The acupressure was applied on the P6 point in the intervention group and sham acupressure was done in the sham group. Only routine care was performed in the control group. Data were analyzed by SPSS version 22 software using descriptive and inferential statistics (Chi-square, Wilcoxon and Kruskal-Wallis). The intensity of nausea and vomiting was recorded.

Results: The level of changes in the PONV score of children was significantly higher in the acupressure group (4.23 ± 11.34) compared with the sham (1.23 ± 7.34) and control (1.14 ± 6.56) groups. There was no significant relationship between PONV score and demographic characteristics in children in the three groups. No complications were observed.

Conclusion: Acupressure is a safe and free of complications method, and it is significantly more effective than routine prophylactic techniques in treating post-tonsillectomy nausea and vomiting.

Keywords: Acupressure; Postoperative nausea and vomiting; Tonsillectomy; Complementary medicine

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INTRODUCTION

The tonsillectomy is one of the most commonly used pediatric ENT surgeries throughout the world.^{1,2} Some complications after this surgery include hemorrhage, pain, nausea and vomiting, inadequate

oral food intake and restlessness.³⁻⁸ Nausea and vomiting are of the most common post-tonsillectomy complications in children and one of unpleasant side effects following anesthesia and surgery.⁹⁻¹³ Postoperative nausea and vomiting (PONV) can lead to many complications in children, including hemorrhage, aspiration, pneumonia, body electrolyte

imbalance and physiological stress.^{14,15} The correct management of postoperative complications, such as nausea and vomiting, can result in a faster discharge of the child from the hospital, reduce the cost of treatment, and increase the satisfaction of the parent. Multiple pharmacological and non-pharmacological treatments are available to prevent the pediatric PONV. Pharmacological approaches can relatively prevent the PONV and have side effects such as headache, abdominal cramps, constipation, sedation, and extra pyramidal reactions.¹² The unwanted occurrence of PONV, the ineffective impacts of pharmacological treatments and the presence of their side effects call for attention to non-pharmacological methods for the prevention of nausea and vomiting.¹²⁻¹⁵ One of the non-pharmacological techniques used to prevent the PONV is acupressure and acupuncture.¹⁶⁻²³ The acupressure is one of the techniques of acupuncture and the fact its subsidiaries. In the acupressure instead of using a needle, the therapist uses the fingers to exert pressure on acupuncture points. This technique is more acceptable to children than acupuncture because it does not use a needle.²⁴⁻²⁶ One of the points used to prevent the PONV in acupressure is P6, which has been shown in some studies to reduce nausea and vomiting in children and adults.^{12,13,26} The P6 point is located inside the wrist and four fingers beneath this area(26). The effect and mechanism of acupressure on this point is not precisely known to attenuate nausea and vomiting. In some studies, acupressure or acupuncture on this point has significantly reduced nausea and vomiting, while it has not been effective in some studies.^{27,28} Considering the existence of this controversy in several studies and very few studies performed on children, this study aimed to investigate the effect of acupressure on the P6 point in alleviating post-tonsillectomy PONV in children.

The present study was conducted to investigate the effect of acupressure in P6 point on the incidence of nausea and vomiting after tonsillectomy in children aged 5-12 years.

METHODOLOGY

The present randomized clinical trial was performed on 144 children aged 5-12 years who were candidates for tonsillectomy referring to the Amir-al-Momenin Hospital in Rasht, Iran. Inclusion criteria were children aged 5 to 12 years, candidates for tonsillectomy and willingness of the parents. Exclusion criteria were the presence of coagulation disorders, skin lesions at acupressure points, and the presence of severe nausea and vomiting in the child and restlessness that made the child unable to cooperate in the study.

This study was registered in the Iranian Registry of Clinical Trials (Clinical Trials. IRCT ID: IRCT20171008036651N2) and was approved by the Ethics Committee of Guilan University of Medical Sciences (Ethical Code: IR.GUMS.REC.1397.054). The objectives of this study were explained to the children and parents. Parent's informed consent was obtained after getting permission from the Ethics Committee and the research committee of Guilan University of Medical Sciences. All the participants' parents also signed informed consent forms. Participation in the study was completely voluntary and optional. All the participants' parents were assured that the information obtained would be kept completely confidential.

The researcher had undergone training in acupuncture and acupressure and was certified for that.

All of the children were given standard general anesthesia with propofol, intubation and isoflurane in nitrous oxide-oxygen inhalation. The children were transferred from the operating room to the PACU, the researcher met them and randomly divided the children into one of the three groups; intervention, control and sham groups. Randomization was done using Random list software. In the intervention group, acupressure was performed for one minute at P6 area of the right and left hands (Figure 1). The intervention was repeated after one hour after the completion of tonsillectomy. Sham acupressure was done in the sham group. No intervention was performed in the control group and only routine care such as control of vital signs, medication, etc. was performed. The routine care was the same for all three groups.

The study instruments were a questionnaire for recording pediatric nausea and vomiting score and the Baxter Retching Faces (BARF) Scale. The BARF pictorial nausea scale is one of the visual tools for assessing the level of nausea and vomiting in children. Its validity and reliability have been confirmed in studies so that correlation coefficient of the tool has been reported with visual tool for assessing nausea and vomiting (95%CI=0.90-0.93, $p < 0.001$).^{13,29} This tool consists of six cartoon pictures with ten numbers, indicating the number zero as the absence of nausea and the number ten as severe nausea.²⁹ This tool owing to ease of use was applied to evaluate nausea and vomiting in children. In this study, nausea and vomiting were measured before and after intervention by main researcher. As a result, children were asked to specify their nausea intensity based on one of the smiles.

After collecting data, their normal distribution

Table 1: Demographic characteristics of the children undergoing tonsillectomy [n(%)]

Variable	Category	Control Group	Acupressure Group	Sham Acupressure Group	Total	Statistical evaluation
Gender	Female	20 (41.7)	22 (45.8)	20 (41.7)	62 (43.1)	p = 0.893
	Male	28 (58.3)	26 (54.2)	28 (58.3)	82 (56.9)	
Age (y)	> 7	25 (52.1)	27 (56.2)	19 (39.6)	71 (49.3)	p = 0.236
	< 7	23 (47.9)	21 (43.8)	29 (60.4)	73 (50.7)	
Operative reason	Chronic tonsillitis	13 (32.23)	11 (29.01)	20 (42.7)	40 (21.12)	p = 0.36
	Tonsillar hypertrophy	24 (53.1)	20 (52.1)	16 (38.6)	80 (64.23)	
	Obstructive sleep apnea	5 (21.16)	7 (13.11)	11 (29.6)	24 (15.11)	
Age Mean (y)		7.67	7.75	8.27	7.89	p = 0.35
Weight Mean (Kg)		28.25	30.36	29.06	29.22	p = 0.589

was first tested in SPSS software version 16 using Kolmogorov-Smirnov test at a significant level of less than 0.005. Data were analyzed by descriptive statistical methods (mean and standard deviation) and inferential statistics (Kruskal-Wallis and Wilcoxon).

RESULTS

The results of this study showed that 41.7% of subjects were girls and 58.3% were boys. Moreover, 52.1% were under 7 years of age and 43.8% were over 7 years of age. The mean weight of the children was 29.22 Kg and their mean age was 7.89 years. According to the cause of tonsillectomy, 21.12% had chronic tonsillitis, 64.23% had tonsil hypertrophy and 15.11% had obstructive sleep apnea (Table 1). There was no significant relationship between the demographic characteristics of children in the three groups (p > 0.05).

Table 2 exhibits the comparison of the mean scores of the nausea and vomiting intensity after tonsillectomy

Table 2: Comparative nausea and vomiting score after tonsillectomy before and after intervention in three groups [Data given as Mean ± SD]

Study groups	Before intervention	After intervention	p-Value
Intervention group	7.23 ± 12.22	6.44 ± 11.67	< 0.05
Sham group	7.2 ± 11.56	7.36 ± 11.67	> 0.05
Control group	6.56 ± 10.22	6.60 ± 10.34	> 0.05

Table 3: Comparative mean differences in nausea and vomiting scores in three groups [Data given as Mean ± SD]

Study groups	Mean difference	p-value
Intervention group	-0.79	< 0.05
Sham group	0.16	> 0.05
Control group	0.04	> 0.05

before and after intervention in the three groups as the

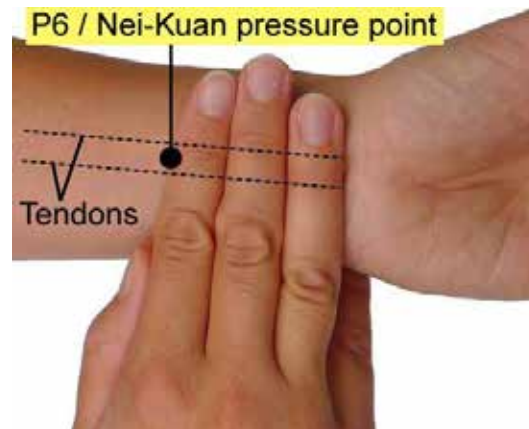


Figure 1: P6 (Neiguan) point location (26)

mean score was 7.23, 6.56, 7.20 before intervention, and 6.44 , 6.60 and 7.36 after intervention in the intervention, control and sham groups, respectively. There was a significant relationship between nausea and vomiting score before and after tonsillectomy in the intervention group (p < 0.05). However, there was no significant correlation between sham and control groups (p > 0.05).

Table 3 presents the changes in nausea and vomiting scores in the three groups (Table 3). After analyzing the data, it was found that there was a significant relationship between the mean change in

the score of nausea and vomiting in the intervention group ($p < 0.05$), but no significant relationship was seen between sham and control groups ($p > 0.05$). There was no difference in between other complications in the three groups.

DISCUSSION

The present study aimed to investigate the effect of acupressure on PONV in children aged 5-12 years. The results of this study indicated that the acupressure reduces the intensity of nausea and vomiting after tonsillectomy in children. The changes in the score of nausea and vomiting in the acupressure group were higher than that of the control and sham groups, which indicates a positive effect of acupressure. The results from a study by Liodden et al. showed that the acupuncture on the P6 point does not affect nausea and vomiting in children over 5 years of age under tonsillectomy with or without adenoidectomy. The results of which are contrary to the present study. Maybe acupuncture was not a good choice for management of acute pain management.¹³ Sadri et al. investigated the effect of acupressure on nausea and vomiting after adenotonsillectomy and found that the acupressure immediately after surgery leads to a reduction in the severity of nausea and vomiting, which is consistent with the results of our studies.³⁰ Linddon et al. evaluated the effect of intraoperative acupuncture and postoperative acupressure as additional treatments for postoperative vomiting in 1-11 year-old children under tonsillectomy with or without adenoidectomy, and found that the acupuncture and the acupressure are effective in attenuating pediatric PONV.¹²

In the present study, no significant relationship was observed between the demographic characteristics of the specimens in terms of age, sex, and cause of tonsillectomy in the three groups. Another study reported no difference between sex and vomiting intensity ($p = 0.431$ in the intervention group, $p = 0.166$ in the control group) or sex and nausea intensity ($p = 0.658$ in the intervention group and $p = 0.901$ in the control group), that are the same of our study.¹³ Hofmann et al. studied the effect of acupressure on the intensity of nausea and vomiting after outpatient surgeries and determined that the acupressure leads to a

reduction in the PONV intensity ($P < 0.005$), consistent with our study. This study also found no significant correlation between the demographic characteristics of the samples in the studied groups.¹⁷

In general, given the limited studies done so far on the effect of acupressure on the intensity of nausea and vomiting after tonsillectomy in children, the present study shows the positive effect of acupressure on the management of PONV intensity and suggests wider use of acupressure in the clinic. Several limitations of this study are the existence of cultural, family and mood differences, some uncooperative patients in entering the study, unwillingness of some patients in completing the interventions and evaluations among the research samples.

CONCLUSION

The acupressure is a low-cost and easy-to-use technique in the clinic and does not require special equipment. It is a useful complementary approach to pharmacological treatments for the prevention or reduction of PONV in children after tonsillectomy. Reduced intensity of nausea and vomiting can lead to increased child and parental satisfaction.

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Authors' contribution:

SP: Conduct of study, Data collection, Data analysis, interpretation of the data, writing the manuscript

YY: Study design, supervision of the project, revision of the draft

BNN & SM: Study design, Data analysis, interpretation of the data, writing the manuscript

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