Milad Borji[1,2] / Somaye Pouy[3] / Yasaman Yaghobi[3] / Bahram Naderi Nabi[4]

Effectiveness of acupressure on anxiety of children undergoing anesthesia

[1] Nursing and Midwifery School, Students Research Committee, Kermanshah University of Medical Sciences, Kermanshah, Iran
[2] Department of Nursing, Faculty of Nursing and Midwifery, Kermanshah University of Medical Science, Kermanshah, Iran
[3] School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran
[4] Anesthesiology Department, Guilan University of Medical Sciences, Rasht, Iran, E-mail: Naderi_bahram@yahoo.com

Abstract:
Background and objectives: Tonsillectomy is one of the most commonly used pediatric surgeries with high stress levels for children and their parents. The present study was designed and implemented regarding the fact that limited studies have ever been carried out about the effects of complementary therapies such as acupressure on the preoperative anxiety levels in children throughout the world.
Materials and methods: Present study was a randomized clinical trial that was done in three groups with 144 children aged 5–12 years undergoing tonsillectomy. In present study, the children were allocated in three groups: intervention, control and sham. In the intervention group, the acupressure was applied on the Yintang point and in the sham group, was applied at a sham acupoint. No intervention was performed in the control group. Before and after intervention, the pediatric anxiety levels were measured using instruments. The results were analyzed using descriptive and inferential statistics such as the Kruskal-Wallis and Wilcoxon tests, chi-square ($\chi 2$) and analysis of variance (ANOVA) test. The significance level was considered $p < 0.05$.
Results: The total anxiety score in children was (70.39 ± 20.93) in the control group, (67.83 ± 16.78) in the intervention group and (71.40 ± 21.82) in the sham group, not significant difference ($p > 0.05$). The different in the overall anxiety score among children before intervention compare to after intervention was as following: Control group (–3 ± 17.46), intervention group (8.42 ± 32.98) and sham group (–4.32 ± 24.47).
Conclusion: Like other surgical procedures, the tonsillectomy has serious stress for children. Our study demonstrates that the acupressure has a significant effect on the level of preoperative anxiety in children undergoing surgery. Therefore, nurses can use this technique to reduce the pediatric anxiety.

Keywords: acupressure, anxiety, children, tonsillectomy
DOI: 10.1515/ijamh-2018-0177
Received: August 6, 2018; **Accepted:** September 30, 2018

Introduction

Surgery is one of the common therapies in health setting and can be as an unpleasant event that any people experiencein their life [1]. The surgery can be programed or unprogrammed, minor or major, invasive or non-invasive and can be applied in different body organs [2]. Each surgery has been regarded as an anxious experience because of the threat to bodily integrity and sometimes the threat to personal survival [3]. Surgery is thought to be the most feared treatment in children and these fears and anxieties are major barriers in achieving therapeutic outcomes [4].

In fact, each surgery is considered as a hard experience that any children could suffer from [5]. Illness, hospitalization and probable surgery are among the main causes of anxiety in children and can be the first critical issue facing a child [6]. One of the most commonly used surgeries that result in high levels of stress in children is the tonsillectomy [7], [8], [9]. Anxiety is a natural physiologic process that allows individuals to adapt and deal with a variety of adverse conditions [10]. In general, some degree of anxiety has been expressed already [11]. Anxiety resulting from surgery, is seen in all patients, but is more prevalent in children and requires special attention [12]. Children, especially during the primary years after birth, are more sensitive to anxiety, due to a long period of stress not only changes the recovery process of child and the family interaction, but also children have more limited mechanisms for solving stressful problems [6].

Cognitive disorders in patients is important [13]. Excessive anxiety after operation can instigate the peripheral nervous systems and lead to tachycardia, high blood pressure and arrhythmias, also a weakened immune system and delayed recovery [14]. So we should reduce and manage the anxiety in children in order to reach to

Bahram Naderi Nabi is the corresponding author.

an ideal operation consequences [15]. For many patients, especially children, the fear and anxiety experienced before a diagnostic-interventional action or before anesthesia and surgery can have a more negative impact than the intervention itself [16]. Different methods have been introduced to attenuate the anxiety caused by child separation and relaxation for anesthetic induction, which are generally divided into pharmacological and non-pharmacological methods [17]. The pharmacological methods require cost and have many complications. Acupressure and acupuncture are of the non-pharmacological methods in the reduction of pediatric preoperative anxiety. Acupressure is a purposeful massage of acupuncture points. This study was designed and implemented due to limited studies being done on the effect of acupressure on the level of preoperative anxiety in children.

Materials and methods

Design

This was a clinical trial study that surveyed the effect of acupressure on the level of preoperative anxiety in three groups of children including a control, an intervention and a sham group. The acupressure was performed once before surgery in the intervention group and on a sham acupressure point in the sham group. Only routine care was performed in the control group and no intervention was applied. In all three groups, for measuring anxiety we used the modified Yale Preoperative Anxiety Scale (mYPAS). This study has approval of the Iranian Registry of Clinical Trials (Clinical Trials. IRCT Code: IRCT2017100836651N1) and received the approval of Guilan University of Medical Sciences Ethics Committee (Ethical Code: IR.GUMS.REC.1396.229). Participation in this study was voluntary for the subjects and all parents signed the informed consent.

Participants and setting

The study population consisted of 5–12-year-old children undergoing tonsillectomy referred to the Medical and Educational Center of Amiralmomenin Hospital in Rasht, Iran. The sample size was 48 for each group and totally 144 for the whole population. Inclusion criteria were children aged 5–12 years undergoing tonsillectomy who were hospitalized in the Department of Surgery at the Medical and Educational Center of Amiralmomenin in Rasht. Exclusion criteria were the existence of mental disorders, skin lesions near the acupressure site, coagulopathy and severe preoperative stress losing the child's ability to participate in this study. The children who met the study inclusion criteria were selected randomly in one of the three groups: control, intervention and sham. The randomization method was selected based on the random number table. The children and their parents were blind about how they were allocated to each of the three groups. Sampling lasted from November 2016 to April 2017.

Intervention

Children were randomly allocated in three groups of intervention, control and sham before entering the operating room. In the intervention group, the children were transferred to the specific room that was designed for this study. At first, the anxiety level of children was measured and recorded. Then the acupressure was applied on the extra-1 point (Figure 1) [18]. The applied pressure was a deep massage, with a rotational clockwise method and with thumb and index fingers of the researcher. The amount of pressure was 3–4 kg. After 15 min of intervention, the anxiety level of children was measured. In the sham group, the pressure was applied to a sham acupoint, which has no therapeutic effect (Figure 2) [19]. In the control group, the children went to the room, but no intervention was taken. The design of study and acupoint selection was done according to the previous studies.

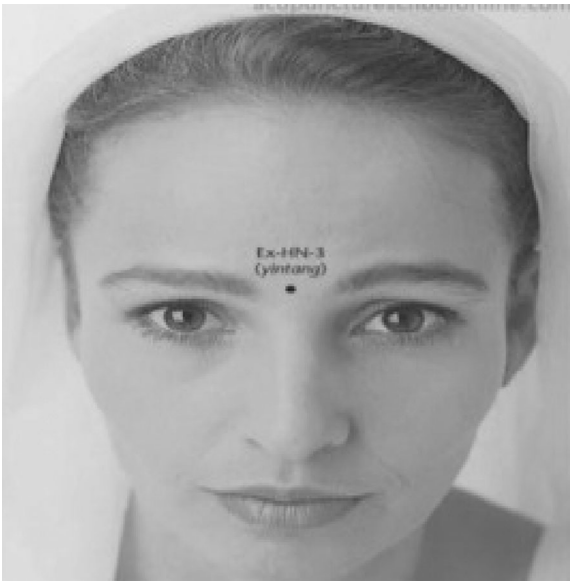

Figure 1: Extra-1 acupoint [19].

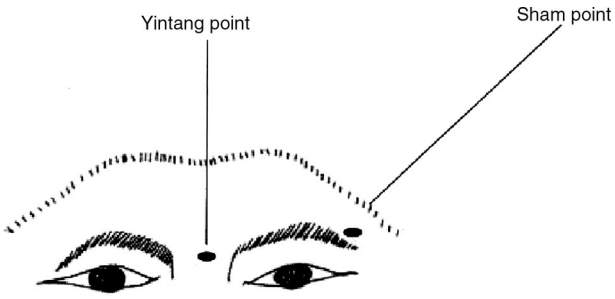

Figure 2: Extra-1 and sham acupoint [18].

Instruments

The data collection tools in this study consisted of a demographic information questionnaire and mYPAS. This scale included five domains (Arousal, Vocalization,Activity, Use of Parents and Emotional Expressivity) that each of domains had multiple scores. This tool has validated reliability and validity and has been used in numerous international studies[20], [21], [22].

Statistical analysis

The data after collecting were assessed and analyzed by inferential statistics of Kruskal-Wallis and Wilcoxon tests and analysis of variance (ANOVA) and The chi-squared ($\chi 2$) and descriptive statistics (mean, median, standard deviation) in order to determine the statistical relationship among the frequency distribution of the gender and also the age groups of the children admitted for tonsillectomy in the three groups of intervention, control and sham groups. The one-way ANOVA test was used to determine the statistical relationship between age and weight of the children who underwent tonsillectomy in three groups of the intervention, control and sham groups. The Kruskal-Wallis test was utilized to determine and compare the changes in anxiety score before and after the intervention. The significance of the statistical tests was regarded to be $p < 0.05$.

Results

The demographic children's profiles was shown in Table 1. The results indicated that a difference among the anxiety marks before and after intervention in intervention and sham groups ($p < 0.05$), but not between control and the sham groups ($p > 0.05$). As shown in Table 2, theredoes notfound any special difference in mean changes

of the anxiety score before and after intervention between sham and control groups, but there was a remarkable difference in mean anxiety score changes in the acupressure group (Table 2).

Table 1: The demographic characteristics of the children undergoing tonsillectomy.

Variable	Category	Control		Intervention		Sham acupressure		Total		Statistical evaluation
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	
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 (year)	8 > age	25	52.1	27	56.2	19	39.6	71	49.3	p = 0.236
	8 < age	23	47.9	21	43.8	29	60.4	73	50.7	
Age mean (year)			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

Table 2: Total anxiety score and its differences in three groups.

Anxiety	Study group M ± SD			p-Value
	Intervention	Sham	Control	
Total anxiety score before intervention	67.83 ± 16.88	71.40 ± 21.82	70.39 ± 20.93	p > 0.05
Total anxiety score after intervention	59.43 ± 14.56	71.35 ± 20.33	71.01 ± 21.12	p < 0.05[a]
Anxiety score differences	8.42 ± 32.98	–4.32 ± 24.47	–3 ± 17.46	p < 0.05 [a]

Discussion

Pain affects the health of patients. Like other surgical procedures, the tonsillectomy leads to high levels of stress in the children and the use of pharmacological treatments for preoperative anxiety control can result in many complications in the children. The anxiety before surgery and anesthesia can cause severe psychological stresses and negative psychological effects associated with nightmares, restless sleep, separation anxiety, problems in normal development and nutrition [23], [24], [25]. In addition, failure in preoperative anxiety relief can lead to an increase in the need to take intraoperative analgesics and anesthetics as well as postoperative analgesics and prolong the duration of hospitalization [18], [26]. Therefore, it is necessary to adopt interventions to reduce pediatric anxiety. To the best of our knowledge, this is the first study evaluating the effect of acupressure on anxiety levels before tonsillectomy in children aged 5–12 years. Our study showed a difference between level of anxiety changes before and after the intervention in the acupressure group (p = 0.002), while no significant changes were observed in control (p = 0.546) and sham (p = 0.332) groups. As a result, the acupressure on extra1 point had a positive effect on reducing the anxiety level in children. Wang et al. investigated the effect of acupressure on anxiety levels before endoscopic procedures requiring anesthesia in children and reported that the changes in anxiety scores were higher than in intervention compared to the control group, the acupressure also had a remarkable impression for anxiety reduction, consistent with the present study [27]. Rachoti et al. studied the effect of acupressure on the anxiety of hospitalized children undergoing invasive procedures and showed that the children receiving acupressure reported the mean changes in the anxiety score more than the control group [28]. Agarwal et al. found that the acupressure resulted in a reduction in preoperative anxiety [7]. According to a study by Hmwe et al., they showed that acupressure therapy administered 3 times a week for 4 three sessions during four weeks could manage and generally control psychological distress such as anxiety and depression in pediatrics [29]. Another study by Priyanka et al., in order to test the effect of acupressure on children's dental anxiety, indicated that acupressure can be a viable alternative to reduce anxiety in children undergoing scaling and restorative procedures [18]. Also a meta-analysis that was done by Hyojeong et al. showed that acupuncture therapy reduces preoperative anxiety and has a significant effect in comparison with sham or nontreatment conditions in children and adults [30].

Our findings revealed that acupressure can be as an effective non-pharmacological technique for alleviating preoperative anxiety in children and nurses can employ this method without the need for specific facilities. Due

to limited studies in this area and in the pediatric population, it is recommended to perform further research to demonstrate the acupressure efficacy on preoperative anxiety.

References

[1] Mirbagher Ajorpaz N, Sadat Shahshani M, Dianati M. Effect of music on preoperative anxiety and some physiological indexes of general surgery. J Kermanshah Univ Med Sci. 2011;15(2):90–5.
[2] Basampour SH, Nasrabadi AN, Mehran A, Poresmaeil Z, Valiee S. Effect of acupressure on patients' anxiety and vital sign before abdominal surgeries. J Fac Nurs Midwifery Tehran Univ Med Sci. 2008;14(2):23–34.
[3] Uddin I, Kurkuman AR, Jamil T, Iftikhar R. Pre-operative anxiety in patients admitted for elective surgery in King Saud hospital, Unaizah, Al-Qassim Kingdom of Saudi Arabia. Pak J Med Sci. 2008;18(4):306–10.
[4] Quiles MJ, Ortigosa JM, Méndez FX, Pedrache S. The child surgery worries questionnaire adolescent form. Psychol Spain. 2000;4(1):82–7.
[5] Phippen M, Wells MP. Patient care during operative and invasive procedures. 7th ed. Philadelphia, PA: Saunders; 2000. p. 70–9.
[6] Whaley I, Wong D. Nursing care of infant and children. 7th ed. Philadelphia, PA: Mosby; 2003. p. 1032–8.
[7] Agarwal A, Ranjan R, Dhiraaj S, Lakra A, Kumar M, Singh U. Acupressure for prevention of pre-operative anxiety: a prospective, randomised, placebo controlled study. Anaesthesia. 2005;60(10):978–81.
[8] Cho HK, Park IJ, Jeong YM, Lee YJ, Hwang SH. Can perioperative acupuncture reduce the pain and vomiting experienced after tonsillectomy? A meta-analysis. Laryngoscope. 2016;126(3):608–15.
[9] Gilbey P, Bretler S, Avraham Y, Sharabi-Nov A, Ibrgimov S, Luder A. Acupuncture for posttonsillectomy pain in children: a randomized, controlled study. Pediatr Anesth. 2015;25(6):603–9.
[10] Fraley BW. Preoperative anxiety and education in the adolescent population. Beckley, WV: Mountain State University; 2007.
[11] Caumo W, Ferreira MB. Preoperative anxiety: psychobiology and effects in postoperative recovery. Pain clinic. 2003;15(2):87–101.
[12] Preoperative anxiety in pediatrics [Internet]. 2012. Available from: http://ornaa.org/newsletter/articles/2011.dir/11JAN-SCORNA-_Preoperative_Anxiety_in_Pediatrics.pdf.
[13] Hatefi M, Behzadi S, Dastjerdi MM, Ghahnavieh AA, Rahmani A, Mahdizadeh F, et al. Correlation of homocysteine with cerebral hemodynamic abnormality, endothelial dysfunction markers, and cognition impairment in patients with traumatic brain injury. World Neurosurg. 2017;97:70–9.
[14] Ghardashi F. Factors affecting preoperative anxiety. J Semnan Univ Med Sci. 2007;8(3):123–30.
[15] McMann ME, Kain ZN. The management of preoperative anxiety in children: an update. Anesth Analg. 2001;93(1):98–105.
[16] Krauss B, Green SM. Procedural sedation and analgesia in children. Lancet. 2006;367(9512):760–80.
[17] Anderson K, Weisman S. Non pharmacologic methods of analgesia and sedation. Clin Pediatr Emerg Med. 2007;8:24–8.
[18] Avisa P, Kamatham R, Vanjari K, Nuvvula S. Effectiveness of acupressure on dental anxiety in children. Pediatr Dent. 2018;40(3):177–83.
[19] Pour PS, Ameri GF, Kazemi M, Jahani Y. Comparison of effects of local anesthesia and two-point acupressure on the severity of venipuncture pain among hospitalized 6–12-year-old children. J Acupunct Meridian Stud. 2017;10(3):187–92.
[20] de Mello EG, Gonçalves VB, Novo NF, Novo NF, Moro ET. Relationship between preschool children and the caregiver's preoperative anxiety. A cross study assessing modified Yale preoperative anxiety Scale (m-YPAS). Rev Fac Ciênc Méd Sorocaba. 2015;17(3):131–4.
[21] Jenkins BN, Fortier MA, Kaplan SH, Mayes LC, Kain ZN. Development of a short version of the modified Yale Preoperative Anxiety Scale. Surv Anesthesiol. 2015;59(3):142–3.
[22] Jung K, Im MH, Hwang JM, Oh AY, Park MS, Jeong WJ. Reliability and validity of Korean version of modified: Yale preoperative anxiety scale. Ann Surg Treat Res. 2016;90(1):43–8.
[23] Fortier MA, Del Rosario AM, Martin SR, Kain ZN. Perioperative anxiety in children. Pediatr Anesth. 2010;20(4):318–22.
[24] Gulur P, Fortier MA, Mayes LC, Kain ZN. Perioperative behavioral stress in children. In: A practice of anesthesia for infants and children. 6th ed. Philadelphia, PA, USA: Elsevier; 2019. p. 25–34.e3.
[25] Liu PP, Sun Y, Wu C, Xu WH, Zhang RD, Zheng JJ. The effectiveness of transport in a children's ride-on car for reducing preoperative anxiety in preschool children: a randomised controlled prospective trial. Br J Anaesth. 2018;121(2):438–44.
[26] Charana A, Tripsianis G, Matziou V, Vaos G, Iatrou C, Chloropoulou P. Preoperative anxiety in greek children and their parents when presenting for routine surgery. Anesthesiol Res Pract. 2018;2018:6.
[27] Wang SM, Escalera S, Lin EC, Maranets I, Kain ZN. Extra-1 acupressure for children undergoing anesthesia. Anesth Analg. 2008;107(3):811–6.
[28] Rachoti V, Ambika K, Sheela W. Effectiveness of acupressure on anxiety of hospitalized children undergoing invasive procedures. Int J Ment Health Nurs. 2015;1(1):139–42.
[29] Hmwe NT, Subramanian P, Tan LP, Chong WK. The effects of acupressure on depression, anxiety and stress in patients with hemodialysis: a randomized controlled trial. Int J Nurs Stud. 2015;52(2):509–18.
[30] Bae H, Bae H, Min B-I, Cho S. Efficacy of acupuncture in reducing preoperative anxiety: a meta-analysis. Evid Based Complement Alternat Med. 2014;2014:12.