

The Effect of Acupressure on Nausea and Vomiting after Cesarean Section Under Spinal Anesthesia

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Abstract- Postoperative nausea and vomiting (PONV) is one of the most common postoperative complications. Aside from pharmacological interventions, other complementary healing modalities have been introduced to assist patients in decreasing PONV and improving postoperative outcomes. This study examined acupressure as a safe complement to the more traditional approach of using drugs to prevent and/or relieve nausea and vomiting in the Cesarean section (C/S) under spinal anesthesia. In a prospective randomized clinical trial, 152 patients who were candidate for elective C/S under spinal anesthesia were evaluated in two groups (acupressure vs control groups). Subjects in the acupressure group received constant pressure by a specific wrist elastic band (without puncture of the skin) on the Nei-Guan acupuncture point, 30 min prior to spinal anesthesia. The incidence of PONV was assessed during the surgery, at recovery room and at 1st, 2nd and 3rd two hours after the surgery. Significant differences in the incidence of the post-operative nausea and vomiting were found between the acupressure and control groups, with a reduction in the incidence rate of nausea from 35.5% to 13.2%. The amount of vomitus and the degree of discomfort were, respectively, less and lower in the study group. In view of the total absence of side-effects in acupressure, its application is worthy. Our study confirmed the effectiveness of acupressure in preventing post-operative nausea and vomiting, when applied 30 minutes prior to surgery.

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Introduction

Post-operative nausea with or without vomiting (PONV) is a common complication during or after surgical procedures (1). In patients undergoing a major abdominal or gynecologic surgery, the rate of PONV is demonstrated to be 50% (2). For a surgery like Cesarean section (C/S) this rate reported to be 50-80% (3,4). high risk patients are suggested to receive prophylactic anti-emetic agents (anticholinergic agents, serotonin receptor antagonists, etc) (5,6), but these drugs may be accompanied by some undesirable side effects.

An alternative for these modern anti-vomiting medications is the traditional eastern medicine, acupuncture. Acupuncture has been used for thousands of years for treating nausea and vomiting in the eastern world (7). Stimulating a specific acupuncture point (Nei-Guan on the volar side of forearm 2 cm proximal to the wrist crease, between the tendons of palmaris longus and

flexor carpi radialis) is demonstrated to have a role in the control of post-operative nausea and vomiting. Acupressure is a type of acupuncture, and it's the application of pressure (such as non-penetrating needles) to acupuncture points.

A systematic review concluded that acupuncture is more effective than anti-emetic drugs in treating PONV (8). Some authors have criticized the results because of publication bias in Asian countries which skewed the cumulative results in favor of acupuncture. Another systematic review in 2008 evaluated ten randomized controlled trials and demonstrated that only three of them have found statistically significant effect for acupuncture in preventing nausea and vomiting in the first 24 h after surgery (9). Considering the controversy around this topic, in this study, we aimed to investigate the effect of pre-surgery use of acupressure on the occurrence and the intensity of nausea and vomiting during and after the C/S under spinal anesthesia.

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Materials and Methods

This double-blind randomized clinical trial was conducted in Imam Khomeini General Hospital of Urmia in 2010, with the approval of Scientific and Ethical Review Boards of Urmia University of Medical Sciences, Urmia, Iran. One hundred fifty two ASA class I or II pregnant women who were candidate for elective C/S under spinal anesthesia were enrolled. All the patients signed an informed consent for their participation in the study. All those with a past history of PONV or motion sickness, any nausea or vomiting in 24 h prior to C/S, patients who required i.v. opioids because of complicated or inappropriate spinal anesthesia, patients who have undergone emergent C/S because of probable high-risk vaginal delivery (e.g. multiple pregnancy, placenta previa, placental abruption, etc), obese patients (to prevent swelling and discomfort after deploying elastic bands on wrist), patients with previous experience of acupuncture or acupressure were excluded. Subjects were randomly allocated into one of two groups (76 subjects for each one). A single size elasticated band was used for all the subjects even in the control group. In the intervention group, this band had a button on its internal surface, right on the Pericardium 6 (Nei-Guan) point. This point is located on the volar side of forearm 2 cm proximal to the wrist crease, between the tendons of palmaris longus and flexor carpi radialis. The elastic band in the control group lacked the button. Pulse oximetry was used to avoid elastic band-related decrease in the circulation of the dependant hand. The pressure of elastic band was adjusted not to impair patient's radial or ulnar pulses, nor to impair venous return from distal. The elastic band was placed thirty minutes prior to spinal anesthesia.

One liter of Ringer solution was administered intravenously to increase the intravascular volume. Standard monitors including electrocardiogram, non-invasive blood pressure and pulse oximetry were placed. The materials related to the general anesthesia were provided to induce general anesthesia if the patient experienced any complication of spinal anesthesia. Subarachnoid puncture in the L3-L4 or L4-L5 interspace was performed with the patients in the sitting position, using a 25 gauge Quincke bevel (Exel trademark) spinal needle. Patients received 2.5 ml (12.5 milligram) of 0.5% bupivacaine into the subarachnoid space with an average injection speed of 0.2 ml/sec. Then the patients were repositioned into supine position. The level of anesthesia was evaluated to be on T4 level. Also in order to prevent inferior vena cava syndrome (supine

hypotension syndrome) the beds were rotated 10° to the left. Patients were received 5 l/min of oxygen by face mask. None-invasive blood pressure measurement was performed every 2 minutes until the patient left the operating room. A decrease in systolic blood pressure (>25% decrease or BP<90 mmHg) was treated with 5 mg intravenous ephedrine. A decline in pulse rates (<60 beats per min) were treated with 0.5 mg intravenous atropine. After the C/S was implemented, the patient was brought to the recovery room, and left there after regaining the sensory level of T10 (umbilical level) with a stable situation. Nausea and vomiting during the surgery or in the recovery room was treated with very slow injection of 10 mg i.v. metoclopramide. The data regarding the occurrence of nausea or vomiting within the theatre or recovery rooms were written in the checklists by the anesthesiology technician. PONV was observed at the ward by the nurses within the first, second, and third 2 h following the C/S. The patients' charts were assessed at the end of 24 h for anti-emetic and analgesic requirements, and the data was written in the study checklists. The study was double blind, and neither the patients, nor the study team were aware of the patients groups.

The intensity of nausea and the efficacy of anti-emesis initiatives were evaluated using visual analogue scale (VAS) (10). Patients were asked to rate their nausea on a 100-mm VAS (0=without nausea, 100=very severe nausea).

All the collected data were entered in the SPSS statistical software for windows (version 16). Measures of central tendency and dispersion were provided for each variable, if appropriate. Independent t-test was used to investigate the age difference among two groups. Pearson's Chi-square test was performed to evaluate the relationship among the factors. Also Fisher's exact test was used to compare the occurrence of vomiting among two groups during, and after the surgery.

Results

In this double-blind randomized clinical trial, 152 women candidate for C/S with spinal anesthesia were randomly allocated into two groups with 76 subjects in each of them. The mean age was 29.02±4.98 years in the acupressure group, and 29.74±6.58 years old in the control group, and there was no statistical difference between the ages of two groups ($P=0.55$).

The findings of this study (including the occurrence and intensity of nausea and vomiting during the C/S section, in the recovery room, at first, second, and third

2 h after the surgery) were summarized in the Table 1.

Nausea was more frequent in the acupressure group compared to the controls, during the C/S ($P=0.001$), in the recovery room ($P=0.002$), 1st two h ($P=0.001$), 2nd two h ($P=0.001$), and 3rd 2 h ($P=0.04$) after the surgery.

The nausea was more severe in the acupressure group compared to the controls, during the surgery ($P=0.001$), in the recovery room ($P=0.008$), 1st two h ($P=0.001$), 2nd two h ($P=0.001$), and 3rd two h ($P=0.04$) after the surgery.

Among 76 subjects in the acupressure group, only 5 cases (6.6%) experienced vomiting during the study period (during and after the surgery) and received i.v. metoclopramide, but 17 subjects (22.4%) in the control group had vomiting during the study period ($P=0.006$).

As demonstrated in Table 1, the main difference in

the occurrence of vomiting between two groups, was observed during the surgery (0/76 in the acupressure group compared to 11/76 in the controls; $P=0.002$). The occurrence of vomiting was not statistically different among two groups during the 6 h after the C/S.

Discussion

Some blood-borne toxins and drugs stimulate an area in the medulla which is called chemoreceptor trigger zone (CTZ); This zone communicates with the vomiting center, to initiate vomiting (2). It should be noted that if the CTZ was stimulated, its deactivation would be difficult (11). Therefore the best timing for the application of acupressure is essential (12).

Table 1. The nausea and vomiting during operation, in the recovery room, at 1st, 2nd, and 3rd 2 h after the surgery among acupressure (case) and control groups.

Group		Without NV	Mild Nausea	Moderate Nausea	Severe NV	P	Nausea	P	Vomiting	Plasil	P
During C/S	Case	66	4	6	0	0.001	10 (13.2%)	0.001	0	0	0.002
	Control	49	11	5	11		27 (27%)		11	11	
Rec. room	Case	74	1	0	1	0.008	2 (2.6%)	0.002	1	1	NS
	Control	62	5	8	1		14 (18.4%)		1	1	
1 st 2hours	Case	70	2	0	4	0.001	6 (7.9%)	0.001	4	4	NS
	Control	51	19	3	3		25 (32.9%)		3	3	
2 nd 2hours	Case	73	3	0	0	0.001	3 (3.9%)	0.001	0	0	NS
	Control	55	17	2	2		21 (27.6%)		2	2	
3 rd 2hours	Case	76	0	0	0	0.04	0 (0.0%)	0.04	0	0	NS
	Control	72	4	0	0		4 (5.3%)		0	0	

NV: Nausea & Vomiting; C/S: Cesarean Section; Rec room: Recovery Room; P: P-value; Plasil: Metoclopramide administration; NS: non-significant;

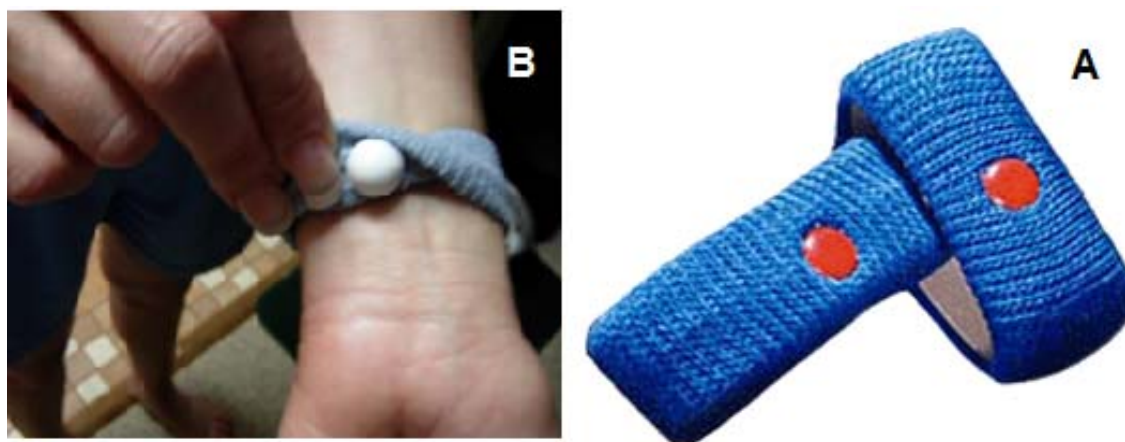


Figure 1. The elastic acupressure band (A), and the place of application on the forearm.

Our study confirmed the effectiveness of acupressure in preventing post-operative nausea and vomiting, when applied 30 minutes prior to surgery. Most of previous studies supported our findings. These studies revealed that the acupressure is an efficient method to decrease the occurrence and the intensity of nausea and vomiting, during and after the surgery (9,13-23).

Stein *et al.* claimed that both acupressure and metoclopramide reduce the nausea in patients undergoing the elective C/S with spinal anesthesia, but acupressure is not as effective as metoclopramide in reducing intra-operative vomiting (24). Also in the study of Montazeri *et al.*, the acupressure failed to decrease intra-operative nausea, but it was effective on post-operative nausea and vomiting (25). Both two studies deployed the elastic band of acupressure 15 minutes prior to spinal anesthesia. It seems that the low time interval between deploying the elastic band and induction of spinal anesthesia may be responsible for the relatively poor findings for acupressure in both two mentioned studies. As stated above, if the chemoreceptor trigger zone was stimulated, its deactivation would be very difficult.

Ho *et al.* claimed that the acupressure at P6 point did not prevent vomiting during the C/S with spinal anesthesia. They deployed the elastic band on the Nei-Guan point half an hour prior to spinal anesthesia, but the poorer findings for acupressure in decreasing the nausea and vomiting may be attributed to the inappropriate place of band, the inappropriate pressure of the band on the wrist of patient, or other factors (26). The findings of the rest of available studies were in accordance with our findings in related to the use of acupressure to decrease PONV.

In general, considering the lower rate of complications (e.g. opened sutures of the operation site, aspiration of the gastric contents, esophageal rupture, subcutaneous emphysema, and pneumothorax resulting from PONV), acupressure is an appropriate method in preventing nausea and vomiting in candidates for C/S under spinal anesthesia. This tool may be used to prevent motion sickness, nausea and vomiting resulted from other surgical operations, hyperemesis gravidarum, and chemotherapy related nausea & vomiting.

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