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Effect of Acupressure on Emesis Post Cesarean Section

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Abstract:
Purpose: To investigate the effect of acupressure on post cesarean section emesis.
Methods: Forty-eight patients who are diagnosed with mild to moderate emesis post cesarean section under spinal anesthesia with age ranged from 25-35 years were assigned randomly into 2 equal groups. Study Group (Group A): It consisted of 24 patients who received acupressure in addition to anti emetic drugs post-operative. Control Group (Group B): It consisted of 24 patients received the anti-emetic drugs as in group A post- operative. Postoperative nausea and vomiting intensity of each woman in both groups was measured by using 4-point verbal descriptive scale. And simplified post- operative nausea and vomiting scale.
Results: There was a significant decrease in 4-point verbal descriptive scale and simplified postoperative nausea and vomiting intensity scale of study group compared with that of control group post treatment.
Conclusion: Acupressure with antiemetic drugs is better than antiemetic drugs alone on decreasing nausea and vomiting post caesarean section.
Key words: Emesis, Cesarean section, Acupressure.

1. Introduction:

Postoperative emesis describes the occurrence of nausea and/or vomiting, as well as retching, within the post-anesthesia care unit (PACU) and during the initial 24 hours following surgery. Postoperative nausea and vomiting (PONV) represent a prevalent and troubling complication frequently encountered within the PACU. Persistent PONV may contribute to extended PACU stays and unplanned hospital admissions, raising healthcare expenditures and lowering patient satisfaction (1).

Vomiting, also known as emesis, occurs when the stomach contents are forcefully ejected out of the mouth. It is caused by coordinated contractions and relaxations of the respiratory and gastrointestinal (GI) muscles. When the duodenum is overdistended or excessively stimulated, it provides a robust signal that precipitates the vomiting reflex. The transmission of impulses occurs via vagal and sympathetic afferent pathways to the medullary emetic center, triggering automatic motor responses that ultimately result in the act of vomiting. Motor signals are sent from the emetic center to the upper GI tract via the 5th, 7th, 9th, and 12th cranial nerves and to the diaphragmatic and abdominal musculature via the spinal nerves. The diaphragmatic hiatal section undergoes relaxation, leading to the transfer of intra-abdominal pressure to the thoracic cavity. The anterior abdominal wall muscles, specifically the rectus abdominis and external oblique, contract. This is accompanied by relaxation of the esophageal sphincter, triggering retrograde peristaltic contractions. This process is accompanied by the opening of the glottis and mouth, facilitating the expulsion of stomach contents (2).

PONV resulted in patient distress, postsurgical adverse events, extended hospital stays, and elevated medical expenditures (3).

The clinical significance of PONV is often downplayed, since it is rarely life-threatening and tends to resolve spontaneously. Nevertheless, it can lead to substantial physical and emotional discomfort

and negatively impact prognosis and recovery time. In fact, numerous patients expressed a preference for experiencing postsurgical pain over PONV, if given the option (4).

PONV can lead to substantial morbidity, encompassing issues like inadequate hydration, imbalances in electrolytes, incisional site disruption, elevated venous pressure, bleeding, esophageal complications, and, although rare, fatal respiratory compromise. The variability in PONV rates can be attributed to differences in anesthetic technique, surgical procedure, and anatomical site of operation. Specifically, surgical interventions on the breasts and female reproductive organs tend to provoke greater rates of PONV in adult patients (5).

The caesarean section, a prevalent mode of delivery, accounts for approximately 15-19% of all childbirths. PONV are distressing symptoms experienced by 87-92% of women following Caesarean Sections. The causes of PONV in patients undergoing spinal anesthesia for Caesarean deliveries are multifaceted. They encompass physiological alterations associated with pregnancy, low blood pressure during surgery, heightened vagal activity and visceral stimulation, along with the use of neuraxial opioids and oxytocic medications. Numerous strategies have been explored to enhance patient outcomes. Emphasis has been primarily directed towards the exploration of cost-effective and non-invasive techniques. Concerns regarding costs have prompted a shift towards investigating alternative methods for emesis prevention (6).

In addition to pharmaceutical treatments, complementary healing modalities have been incorporated to aid patients in reducing PONV and enhancing postsurgical results. Acupuncture has been utilized for millennia in Eastern medicine to treat nausea and vomiting. Targeting a precise acupuncture point (NeiGuan, situated on the volar forearm aspect, 2 cm superior to the horizontal wrist line, between the tendons of palmaris longus and flexor carpi radialis) has shown efficacy in managing PONV (7).

Acupressure, a variant of acupuncture, involves applying pressure, often without the use of penetrating needles, to specific acupuncture points (7).

Dexamethasone has demonstrated efficacy as a prophylactic antiemetic with minimal postoperative side effects. Additionally, it has been noted to offer the supplementary benefit of diminishing postoperative fatigue, alleviating pain, and reducing the overall need for analgesics. Administering dexamethasone to cases undergoing complete surgical removal of the uterus via abdominal incision diminishes the occurrence of nausea and vomiting, subsequently decreasing the necessity for antiemetic agents in the postsurgical phase. This resulted in greater patient satisfaction (8).

Excessive use of dexamethasone can potentially lead to complications like compromised glycemic control, increased vulnerability to Infections at the incision site, slowed wound healing, stomach ulcers, and potential avascular necrosis. These are possible risks associated with prolonged dexamethasone use. Administering a low dose of dexamethasone is a successful strategy for PONV prevention. It may cause a minor rise in blood sugar concentrations within the first day, followed by a substantial reduction in cortisol levels. Consequently, dexamethasone is generally regarded as a safe and efficient antiemetic intervention (9). So, this study aimed to explore the effect of acupressure on post cesarean section emesis.

2. Patients and Methods:

2.1. Study Design

The study was designed as a randomized controlled trial with two group's pertest, posttest design. Participants were randomly chosen from El-Gomhouria General Hospital. This study received ethical approval from the institutional Review Broad of the faculty of Physical Therapy, Cairo University prior to study beginning (No: P.T.REC/012/003462). The study`s protocol was elucidated to each patient and informed consent was acquired before participation. The study was carried out from January 2022 till August 2022.

2.2. Participants

Forty-eight patients who are diagnosed with mild to moderate emesis post cesarean section with spinal anesthesia with age ranging from 25-35 years, body mass index below 30 kg/m^2 participated in this study. Women having history of severe nausea and vomiting, dermatological problems on wrist crease and fourth (ring) finger, diabetes and hyper tension were excluded from the study.

2.3. Sample size calculation

Samples size was calculated prior to the study utilizing G Power and Sample Size Calculations software, version 3.0.11 for MS Windows, it was done by using the comparison of vomiting times between women with post gynecological operation emesis treated with acupressure and those treated with anti-emetic drugs (10). As reported in previous publications, the mean ± SD of vomiting times for 24 hours in acupressure group was approximately 0.16 ± 0.62, while in control group it was approximately 1.16 ± 1.57. Hence, we determined that a minimum sample size of 24 women in each group was necessary to have sufficient statistical power (80%) to reject the null hypothesis at a significance level (α) of 0.05, assuming an effect size of 0.83. This

calculation was based on employing Student's t test for independent samples.

2.4. Randomization

Participants were allocated randomly to two equally sized groups (referred to as Group A and Group B) using a computer-based randomization program. No subject dropouts were observed following the randomization process.

2.5. Interventions

Group A consisted of 24 patients who suffering from mild to moderate emesis post cesarean section, each patient received acupressure in addition to anti emetic drugs post-operative. Group B consisted of 24 patients who suffering from emesis post cesarean section, each patient received the anti-emetic drugs as in group A.

2.5.1. Antiemetic drugs:

All women in both groups (A and B) received antiemetic drugs (Dexamethasone: 4mg /kg) as prescribed by the physician.

2.5.2. Acupressure:

Each woman in group A received acupressure on:

- Pericardium 6 (P6) point: Anatomical location is on the palmer side of the hand 2cuns superior to the horizontal wrist line between tendons of Palmaris longus and flexor carpi radials using acupressure wrist band (11). The therapist located the P6 point and before putting the wrist band skin were cleaned by antiseptic solution then therapist located P6 point in each hand. It was left for 6 hours.
- Korean hand k-k9 point: Anatomical location is on the intermediate phalange of the 4th finger. Rather than needles, small acupressure seeds with a diameter of 2 mm were secured to the k_k9 acupoint using adhesive tape (12).

The skin was cleaned with an antiseptic solution then therapist located k-k9 point then put acupressure seeds and fixed it with adhesive tape. The treatment session started after a 1-hour post-operative following recovery from anesthesia. The bands were left in place for 6 hours but periodically the points were inspected for the radial pulse, color and temperature of the hand were examined. Every hour the band was loosen for 10 min and then tight it again (13).

2.6. Outcome measures

2.6.1. 4-Point verbal descriptive scale (VDS):

was employed to evaluate the intensity of postoperative nausea both before and after treatment (6 hours). This scale employs a verbal descriptor with four points ranging from 0 to 3, where 0 signifies the absence of nausea, 1 indicates mild nausea, 2 signifies moderate nausea, and 3 represents severe nausea (14). Each participant was instructed to select a number corresponding to the severity of their nausea. Boogaerts et al. (15) demonstrated that the 4-Point VDS exhibits satisfactory validity, ensuring consistent and reliable results.

2.6.2. Simplified postoperative nausea and vomiting intensity scale:

PONV intensity of each woman in both groups was assessed by using Simplified postoperative nausea and vomiting intensity scale, before and after treatment (6 hours), and Eberhart et al. (16) showed that simplified PONV score successfully validated and can use to demonstrate PONV. The scale employed an ordinal response system to measure the intensity or impact of nausea on the patient. Specifically, (i) represented 0, (ii) stood for 1, (iii) indicated 2, and (iv) denoted 3. Furthermore, the vomiting count was utilized to measure the intensity of vomiting. This was evaluated by recording the count of vomiting episodes, based on the following scoring: no incidents = 0, one vomiting or retching incident = 1, two vomiting incidents = 2, and three or more vomiting incidents = 3 (17). The duration of moderate to severe nausea refers to instances where nausea significantly hinders daily activities, either intermittently or persistently. Nausea was quantified using the following scale: none = 0; < 1 hour = 1; 1–2 hours = 2; 3–4 hours = 3; > 4 hours = 4. The total SPONV intensity scale score was derived by summing the scores for both nausea and vomiting. (18).

Data analysis:

An unpaired t-test was employed to compare subject characteristics between the groups. The normal distribution of the data was assessed using the Shapiro-Wilk test. Additionally, Levene's test was conducted to assess the homogeneity of variances between the groups. An unpaired t-test was performed to compare 4-point VDS and Simplified PONV intensity scale between groups. A paired t-test was employed to compare the pre- and post-treatment measures within each group. The level of significance for all statistical tests was set at $p < 0.05$. All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 25 for Windows.

3. Results:

Table (1) provides an overview of the subject characteristics for both Group A and Group B. No significant disparities in age, weight, height, and BMI were observed between the two groups ($p>0.05$).

As shown in **Table (2)**: the results revealed that:

- *Within group comparison:*

There was a significant decrease in the mean value of 4-point VDS and simplified PONV intensity scale in group A and B post treatment compared with that pre-treatment ($p>0.01$).

- *Between group's comparison:*

Pretreatment, there was no significant difference between groups (A, B) in the mean value of 4-point VDS and simplified PONV intensity scale ($p>0.05$) while post treatment, there was significant difference between both groups and more decrease in 4-point VDS and simplified intensity scale of group A compared with that of group B ($p<0.001$).

Table 1. Subject characteristics.

	Group A	Group B	MD	t-value	p-value
	Mean ± SD	Mean ± SD			
Age (years)	29.45 ± 1.79	28.79 ± 1.79	0.66	1.28	0.20
Weight (kg)	76.17 ± 6.49	76.79 ± 6.60	-0.62	-0.33	0.74
Height (cm)	166.08 ± 4.25	165.75 ± 4.98	0.33	0.24	0.80
BMI (kg/m²)	27.63 ± 2.33	27.94 ± 1.93	-0.31	-0.51	0.62

SD, standard deviation; MD, mean difference; p-value, level of significance

Table 2. Mean 4-point VDS and Simplified postoperative nausea and vomiting intensity scale pre and post treatment of group A and B.

	Pre treatment	Post treatment	MD	% of change	t-value	p-value
	Mean ± SD	Mean ± SD				
4-point VDS						
Group A	2.79 ±0.72	1.25 ±0.79	1.54	55.2	14.8	0.001
Group B	2.88 ±0.74	2.46 ±0.72	0.42	14.6	3.1	0.005
MD	-0.09	-1.21				
t- value	-0.39	-5.52				
	p = 0.69	***p = 0.001***				
Simplified PONV intensity scale						
Group A	62.83 ±5.90	10.88 ±3.44	51.95	82.7	31.4	0.001
Group B	65.33 ±6.86	38.54 ±10.64	26.79	41.0	11.5	0.001
MD	-2.5	-27.66				
t- value	-1.35	-12.12				
	p = 0.18	***p = 0.001***				

SD, standard deviation; MD, mean difference. p-value, probability value

4. Discussion:

The majority of women giving birth by Caesarean section prefer and are administered regional anesthesia over general anesthesia for the operative delivery. Nausea and vomiting, notable adverse effects during and following Caesarean sections under spinal anesthesia, which can negatively impact patient comfort and decrease satisfaction with perioperative analgesia (19).

Numerous factors affect the prevalence of intrasurgical and postsurgical nausea and vomiting during Caesarean section. These variables need to be carefully regulated when investigating PONV in this context, since the causes of emetic symptoms tend to differ based on timing relative to the operation (20).

The limited efficacy and side effects of current antiemetic drugs have prompted a search for more effective approaches to manage PONV. There is a rising trend in contemporary medicine towards adopting alternative therapies like acupuncture, which is gaining popularity among patients. Among its various applications, acupuncture's potential in addressing PONV has garnered considerable research interest (21).

In accordance with Chinese tradition, acupuncture is founded on the principles of equilibrium and interconnection of nature, living organisms, and the flow of energy. The fundamental concept of acupuncture revolves around restoring a state of bodily harmony and balance (22).

Acupressure is a non-invasive and save traditional Chinese technique that replaces the use of acupuncture needles with the application of pressure on the skin (23).

Acupressure represents the only non-pharmacological method incorporated within the guidelines for managing PONV; acupressure is a safe and efficacious method for both the prophylaxis and management of PONV in adult subjects (24).

The results of our study showed that the basic demographic, anthropometric and clinical data including age, medical history, weight, height and BMI, showed insignificant difference between the two studied groups, the patients in the two groups was matched regarding basic data, this result was important to eliminate the effect of basic demographic and clinical data on the outcome and the only affect factor was the method of management of nausea and vomiting.

4-point VDS, there was no statistically significant difference between two studied groups regarding before treatment of 4-point VDS. ($p>0.05$), while after treatment with 4-point VDS, there was statistically significant decrease in group A compared with that of group B.

Simplified PONV intensity scale, there was no statistically significant difference between two

studied groups regarding before treatment of simplified PONV intensity scale, while after treatment there was statistically significant decrease in group A than group B regarding after treatment of simplified PONV intensity scale.

The most likely mechanism underlying acustimulation is linked to endogenous opioid release and neurotransmitter modulation within the body (25).

Acupuncture activates both type I and type II sensory fibers, leading to subsequent stimulation of the spinal cord. Such impulses project to the midbrain, periaqueductal gray matter, and raphe nucleus, influencing the chemoreceptor trigger zone (CTZ) which innervates vomiting centers (26).

Zou et al. (27) suggested an additional mechanism, positing that P6 functions via a somatovisceral reflex. Electro-stimulation at P6 suppressed the occurrence of temporary relaxations of the lower esophageal sphincter induced by stomach distension in healthy subjects.

Our findings align with a study demonstrating comparable effectiveness between electro-acupoint stimulation and ondansetron in prophylactic use for women having major breast operation. Additionally, Yin et al. (28) noted a 50% lowering in PONV through needle-based acupuncture at the P6 point.

Our findings align with those of Eslami et al. (29) from Shiraz, Iran, whose study similarly concluded that females utilizing the p6 acupressure wristband experienced reduced nausea and vomiting intensity. The present results are in accordance with the research conducted by Unulu and Kaya (30) in the United States. Their study demonstrated that the application of p6 acupressure with a wristband significantly reduced nausea intensity and improved postoperative patient comfort, even providing complete relief in some cases.

In addition, Hanafy et al. (31) conducted a study in Egypt, demonstrating statistically significant influences of both unilateral and bilateral wristband methods in reducing nausea and vomiting following cesarean section, with bilateral being more successful. Moreover, the current results are consistent with the findings of Moghadam and Khoravi (32) in the United States, who discovered that women who got p6 acupressure experienced decreased nausea and vomiting.

5. Conclusion:

Acupressure with antiemetic drugs is better than antiemetic drugs alone on decreasing nausea and vomiting post caesarean section.

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Conflict of Interest:
Authors declare no potential conflicts of interest.

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