



Effects of Korean hand acupressure on opioid-related nausea and vomiting, and pain after caesarean delivery using spinal anaesthesia^{☆,☆☆}

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ABSTRACT

Objective: This study examined the effects of Korean hand acupressure on opioid-related nausea and vomiting, and pain after caesarean delivery.

Methods: Fifty participants were randomly assigned to an acupressure group or a control group. Korean hand acupressure discs were applied for 24 h onto 12 acupressure points (K-9, F-4 for nausea and vomiting; M-3, M-4, L-4, H-2, H-3, H-7 for abdominal pain; and I-38, J-2 for back pain). Nausea and vomiting incidences, the opioid-related symptom distress scale scores, and pain scores were analysed using chi-square test, Fisher's exact test, Mann-Whitney *U* test, or the repeated-measures analysis of variance.

Results: The acupressure group had lower incidences of nausea and vomiting, as well as significant improvements in the opioid-related symptom distress scores for nausea, vomiting, and pain. The acupressure group required fewer rescue antiemetics and analgesics.

Conclusion: Korean hand acupressure can relieve nausea and vomiting, as well as pain after caesarean delivery.

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1. Introduction

Caesarean delivery is an increasingly common surgical procedure, although the high incidence of caesarean delivery is a global health problem [1]. The overall caesarean birth rate is approximately 38.4% of all live births in Korea [2]. During a caesarean delivery, spinal anaesthesia is commonly used because it offers many advantages, such as ease of manoeuvring, rapid onset, effective sensory and motor blockage, low failure rate, low systemic toxicity, and minimal transfer of the drug to the foetus [3]. However, lower back pain is common after delivery, and may be related to the spinal puncture that is used to achieve analgesia and the prolonged bed

rest that is used to prevent post-spinal puncture headache [3–6]. In addition, pain from the surgical site commonly persists after caesarean delivery [6]. Furthermore, afterpains from the uterine involution process begin immediately after expulsion of the placenta, with contraction of the uterine smooth muscle [7]. Periodic relaxation and vigorous contraction may also cause uncomfortable cramping that persists throughout the early puerperium [8]. Uncontrolled postoperative pain can also activate the sympathetic nervous system and adversely influence health outcomes, such as myocardial oxygen consumption and the return of gastrointestinal motility [9]. Moreover, persistent pain may impair the mother's ability to provide optimal care for her infant during the immediate postpartum period and adversely affect early interactions between mother and infant [10]. Therefore, it may be important to achieve good analgesia after a caesarean delivery [11].

Opioid-based intravenous patient-controlled analgesia (IV-PCA) is an effective way to support postoperative analgesia and has gained wide acceptance among patients undergoing spinal surgery [12,13]. Despite the excellent analgesic effect, opioids increase the incidence of nausea and vomiting by decreasing gastrointestinal mobility and stimulating the chemoreceptor trigger zone [14,15]. In

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addition, opioid-related nausea and vomiting can be difficult to manage [16], and non-smoking female patients have a high incidence of postoperative nausea and vomiting (56%) that is related to IV-PCA after lumbar spinal surgery [17]. However, the routine and prophylactic use of antiemetic drugs is not recommended for women undergoing caesarean delivery, because of its adverse effects and inability to prevent nausea and vomiting [18]. Moreover, opioid use is usually greatest during the first 24 h after surgery, when the patient has the highest risk of opioid-related adverse effects [19]. Thus, medical management and nursing care should focus on postoperative opioid-related nausea and vomiting symptom distress, in addition to pain relief after a caesarean delivery.

Acupuncture or acupressure as complementary therapy may help reduce pain, decrease postoperative analgesic requirements, and decrease the incidence of postoperative nausea and vomiting [20,21]. In addition, acupuncture or acupressure using low-frequency skin stimulation may activate nerve fibres (A- β and A- δ) that influence neurotransmission in the dorsal horn or higher centres [22]. Korean hand acupuncture or acupressure (consisting of 16 humors and 345 pulses as acupressure points) has been developed based on the theory that all internal organs are reflexively represented at points on the hands, and stimulation of the acupressure points can be used to control various organ functions [23]. These points can be stimulated using Korean acupressure discs that have a 2-mm diameter acupressure seed fixed on adhesive tape (which is known as Seoambong) [23–26]. Previous reports have confirmed that Korean hand acupressure is very simple, inexpensive, easy-to-use, and effective in relieving pain and post-operative nausea and vomiting, without any adverse effects in clinical practice [15,23–28]. Moreover, this type of acupressure can control specific symptoms at the same time by placing several acupressure discs on the corresponding finger sites [23]. However, there is limited research regarding the effects of Korean hand acupressure on opioid-related nausea and vomiting, abdominal pain (incisional pain and uterine contraction pain), and back pain (related to the spinal puncture and postoperative bed rest) after caesarean delivery using spinal anaesthesia. Therefore, the present study aimed to examine the effects of Korean hand acupressure on pain and opioid-related postoperative nausea and vomiting among women who received IV-PCA after caesarean delivery using spinal anaesthesia.

2. Methods

2.1. Study design

This study used a non-equivalent control pre-post quasi-experimental design.

2.2. Ethical considerations

The researchers provided information to the participants regarding the study's aims and methods, the participants' right to withdraw at any time without reprisal, and their privacy rights. The study's protocol was approved by our institutional ethics review board. All participants provided informed consent before being enrolled in the study.

2.3. Participants and setting

Parturient women were recruited using convenience sampling from the inpatient units at a Korean women's hospital on the day before they were scheduled to undergo caesarean delivery because of breech status, cephalopelvic disproportion, elderly gravida, or repeated caesarean delivery. The eligibility criteria were parturient

women with an American Society of Anaesthesiologists physical status of I–II, haemoglobin levels of ≥ 10 g/dL, stable vital signs, singleton pregnancy without obstetric complications, the ability to communicate, and agreeing to use IV-PCA after the caesarean delivery. The exclusion criteria were patients who had a skin allergy to the Seoambong adhesive, gastrointestinal problems, chronic back pain, and prophylactic administration of antiemetics within 24 h before the caesarean delivery. The required sample size was calculated using G power analysis (version 3.1; $\alpha = 0.05$, $1 - \beta = 0.80$, effect size = 0.50, independent *t*-test model), and was found to be 26 for each group. Fifty-two eligible participants were randomly assigned to receive either Korean hand acupressure ($n = 26$) or conventional care ($n = 26$). Furthermore, the required sample size was found to be 18 patients per group using a repeated measures within-between interaction model ($\alpha = 0.05$, $1 - \beta = 0.80$, effect size = 0.35, correlation among repeated measures = 0.50, non-sphericity correction $\varepsilon = 0.50$). In the acupressure group, 25 participants completed the study and 1 participant dropped out of the study because she could not keep the Seoambong on her skin. The final control group also included 25 women, as 1 woman was excluded after being transferred to the intensive care unit.

2.4. Korean hand acupressure

The Korean hand acupressure was administered by an obstetric nursing specialist who had 7 years of nursing experience and who was certified through a Korean hand acupressure training course. Yoo's guidelines [23] were used to select the 12 acupressure sites (Fig. 1) for relieving nausea and vomiting (K-9 and F-4), abdominal pain (M-3, M-4, L-4, H-2, H-3, and H-7), and back pain (I-38 and J-2). The acupressure points are mainly associated with internal organs that regulate blood flow, sympathetic activity, and hormones: K9 (heart, brain); F4 (pancreas, gastrointestinal tract); H2, H3, and H7 (uterus, lower abdomen); L4 (body muscles); M3 and M4 (carotid artery, pain receptors); J2 (kidney, spine); and I38 (body muscles, pain receptors) [23]. The 12 points were located on the dorsal and palmar aspects of fingers on both hands, and were validated by a group of experts that included 2 specialists in Korean hand acupressure. To determine the effect of Korean hand acupressure, the researchers performed a feasibility study of 16 parturient women after obtaining their consent and consulting an anaesthetist and obstetrician to ensure the women's safety. The findings from the preliminary test revealed that Korean hand acupressure at the 12 selected sites was effective for reducing nausea, vomiting, and pain among women who received IV-PCA after caesarean delivery using spinal anaesthesia. In the main study, postoperative pain, nausea, and vomiting were assessed immediately after completing the caesarean delivery and before the start of IV-PCA and acupressure. Seoambong was applied to the 12 acupressure points immediately after the patient arrived in the recovery room and was maintained for at least 24 h. Postoperative pain, nausea, and vomiting were assessed at 30 min, 1 h, 2 h, and 24 h after applying the Seoambong and starting the IV-PCA.

2.5. Measurements

2.5.1. Demographic and clinical characteristics

The participants' demographic characteristics were collected using a self-administered questionnaire that evaluated age, employment, religion, educational level, economic status, monthly income, and marital status. Obstetric and clinical data were also assessed, such as motion sickness, morning sickness, back pain, gestational period, reason(s) for the caesarean delivery, duration of the operation, height, pre-pregnancy weight, current weight, body

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