

P6 Acupressure Does Not Prevent Emesis During Spinal Anesthesia for Cesarean Delivery

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Nausea and vomiting are major adverse effects during spinal anesthesia for cesarean delivery. Stimulation of the P6 (Neiguan) acupoint is a traditional Chinese acupuncture technique used for effective antiemetic purposes. In this study, we evaluated the antiemetic effect of P6 acupressure in parturients during spinal anesthesia for cesarean delivery. In a randomized, double-blind, controlled trial, 110 parturients scheduled for elective cesarean delivery were enrolled in the study. Thirty minutes before initiation of spinal anesthesia, parturients were randomized to acupressure bands or placebo bands bilaterally on the P6 acupoint and nausea and vomiting were

observed over the study period. There were no statistically significant differences in maternal characteristics. Incidence rates for intraoperative nausea were 64% (acupressure group) and 71% (control group) ($P = 0.416$), with an incidence of intraoperative vomiting of 22% (acupressure group) and 27% (control group) ($P = 0.506$). The results suggest that prophylactic use of acupressure bands bilaterally on the P6 acupoint failed to prevent nausea and vomiting during spinal anesthesia for cesarean delivery.

(Anesth Analg 2006;102:900-3)

Nausea and vomiting are major adverse effects during spinal anesthesia for cesarean delivery (1). These effects may distress the parturient, decrease her overall satisfaction with anesthesia, and interrupt surgery. The incidence of intraoperative emesis under spinal anesthesia is up to 50% to 80% of parturients who are not given prophylactic antiemetic drugs (1-3). However, routine use of prophylactic antiemetics in this patient population is not recommended because of adverse effects (1,4). Acupuncture, which can be traced back at least 3000 yr (5), is an ancient Chinese method to treat illness, including nausea and vomiting. Several evidence-based reviews of the clinical literature concluded that P6 (Neiguan) acupuncture, including acupressure, was effective against postoperative nausea and vomiting (6-8). In addition, Lee and Done (9) demonstrated, in a meta-analysis,

that P6 acupoint stimulation appears to prevent postoperative nausea and vomiting in adults. Our previous study (10) showed that P6 acupressure was effective in preventing emesis after epidural morphine for postcesarean delivery pain relief. We hypothesized that P6 acupressure could be effective for the prevention of nausea and vomiting during cesarean delivery under spinal anesthesia. Only a few clinical trials have investigated P6 acupressure as a preventive method for intraoperative emesis during spinal anesthesia for cesarean delivery (11-13). The aim of the current study was to evaluate antiemetic effects of P6 acupressure in parturients undergoing spinal anesthesia for cesarean delivery.

Methods

The IRB approved the protocol; informed consent was obtained from each woman before entrance into the study. A total of 110 parturients, ASA physical status I-II and aged between 23 and 40 yr, who were scheduled for elective cesarean delivery were enrolled. Women with a history of carpal tunnel syndrome and women who had experienced nausea or vomiting within 24 h before cesarean delivery were excluded. Participants were prospectively randomized via an

Support was provided solely by institutional and departmental sources.

Accepted for publication October 5, 2005.

Presented, in part, at the 58th Annual Meeting of the Canadian Anesthesiologists' Society, Victoria, Canada, June 25, 2002.

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DOI: 10.1213/01.ane.0000195553.82409.00

envelope system into one of two groups. No premedication was given except for 15 mL oral antacid, sodium citrate 0.3 M, within 1 h of surgery. More than 30 min before initiation of spinal anesthesia, the acupressure group ($n = 55$) had Sea Band[®] (Sea-Band Ltd., Leicestershire, UK) wristbands placed bilaterally at the P6 acupoint; the control group ($n = 55$) had placebo wristbands placed at the same point. The Sea Band[®] is a commercially available elastic wrist band with a small round plastic button on the inner side. The placebo wrist band and Sea Band[®] were identical, except that the placebo band had had the functional plastic button blunted so that it would not exert pressure on the P6 acupoint (10). The P6 acupoint is located two "body inches" (4–5 cm) proximal to the transverse crease of the wrist, and half a body inch (1–1.3 cm) deep from the skin between the tendons of the flexor carpi radialis and palmaris longus (10). A body inch is equal to the width of the interphalangeal joint of the thumb of the patient. Sea Band[®] and the placebo wrist band were applied by an author (Ho), a licensed acupuncturist, who was not involved in administration of anesthesia for acupressure or control groups.

After IV administration of 1000 mL lactated Ringer's solution, all parturients received bilateral lower-leg wrapping with elastic bandages to prevent hypotension (14). After placement of standard monitors, spinal anesthesia was initiated with the parturient in the left lateral decubitus position with 0.5% hyperbaric bupivacaine (12–14 mg). An adequate surgical block (T4 sensory level) was confirmed by absence of bilateral cold sensation in all parturients before operation. No opioids were added to the bupivacaine. After induction of spinal anesthesia, the parturient was placed supine with left uterine displacement. Supplementary oxygen (2 L/min) was administered via nasal cannula. Noninvasive arterial blood pressure monitoring was done every 2.5 min until delivery of the neonate, then every 5 min for the remainder of the procedure. Maternal hypotension after spinal anesthesia was treated aggressively with additional IV fluid, more uterine tilt, and increments of IV ephedrine (4–8 mg). Hypotension was defined as a decrease in systolic blood pressure of >20% from baseline or pressure <90 mm Hg. After delivery of the baby, routine use of 10 U of IV oxytocin and 0.2 mg IM ergonovine were given to all parturients to enhance uterine contraction. In addition, patients who complained of shivering were given 25–50 mg meperidine, and complaints of pain related to surgical manipulation were treated with up to 100 μ g IV fentanyl. We offered conversion to general anesthesia if fentanyl provided inadequate pain relief for the patient. Estimated fluid deficit and maintenance fluid requirements were managed with IV lactated Ringer's solution, and blood transfusion was given if necessary.

Nausea and vomiting were evaluated and recorded intraoperatively by an independent research nurse who was blinded as to all parturient groups at the following four sequential intervals during the procedure: spinal induction until skin incision, skin incision until delivery, delivery until skin closure, and skin closure until arrival in the postanesthesia care unit. At these four sequential intervals, patients were asked about the presence or absence of any unpleasant sensation in the previous time period, including nausea, and were observed for vomiting. Parturients who experienced intractable vomiting (vomiting occurred more than once within the study period) were treated with 10 mg of IV metoclopramide. Patients in both groups were allowed to remove the wrist bands, and legs were unwrapped after arrival in the postanesthesia care unit.

The number of parturients required in each group was determined before the study. On the basis of previous investigations (2,3), the incidence of nausea and vomiting during cesarean delivery under spinal anesthesia was assumed to be 65%; we expected a 40% difference in the incidence of nausea and vomiting between groups based on the Lee and Done meta-analysis (9). Thus, an improvement in incidence rate from 65% to 39% would be considered of clinical importance. The α error was set at 0.05 (two-sided) with a power of 0.8. A projected minimum sample size was 52 patients in each group (15). Therefore, we recruited 55 parturients to each experimental group. Data are presented as the mean and range or absolute values. Statistical analyses were done using unpaired Student's *t*-test, the χ^2 test, and Fisher's exact test. A *P* value <0.05 was considered statistically significant. Data analysis was performed using SPSS for Windows version 12 (SPSS Inc., Chicago, IL).

Results

There were 55 parturients in each of the 2 study groups; there were no statistically significant differences with respect to age, height, weight, baseline arterial blood pressure, duration of surgery, or intraoperative blood loss between the two groups (Table 1, Table 2). The level of spinal anesthesia was sufficient for the surgical procedure; no patient in either group required conversion to general anesthesia.

Of the 55 parturients in the acupressure group, 1 received IV metoclopramide for intractable vomiting, whereas 2 of the 55 parturients in the control group required the same treatment (difference not statistically significant). The number of patients receiving fentanyl for intraoperative pain relief and meperidine for treatment of shivering were similar in both groups (Table 2). In addition, the number of parturients given ephedrine for treatment of hypotension was not significantly different between the two groups (Table 2).

Table 1. Parturient Characteristics

	Control group (n = 55)	Acupressure group (n = 55)
Age (yr)	31.3 (24–40)	31.9 (23–40)
Height (cm)	158.7 (150–176)	160.0 (150–172)
Weight (kg)	70.9 (53–96)	72.9 (55–88)
Smoking (n)	6 (10.9%)	4 (7.3%)
Motion sickness (n)	4 (7.2%)	3 (5.4%)
Prior postoperative emesis (n)	7 (12.7%)	9 (16.3%)
Gestational age (wk)	38.7 (35–41)	38.7 (35–41)
Multiparous (n)	39 (70.9%)	38 (69.1%)
Prior Cesarean (n)	28 (50.9%)	33 (60%)
Baseline systolic blood pressure (mm Hg)	121 (94–146)	119 (96–152)

Values are presented as mean (range) or number of patients (percentage of study group). There were no significant differences between the two groups in any characteristic.

Table 2. Operative Management

	Control group (n = 55)	Acupressure group (n = 55)
Duration of operation (min)	74.1 (40–100)	73.5 (45–95)
Estimated blood loss (mL)	611.8 (350–1300)	634.6 (400–1400)
Tubal ligation performed (n)	4 (7.27%)	8 (14.55%)
Bupivacaine dose (mg)	12.6 (12–14)	12.7 (12–14)
Ephedrine given (n)	22 (40%)	18 (32.7%)
Fentanyl given (n)	4 (7.27%)	6 (10.9%)
Meperidine given (n)	2 (3.63%)	2 (3.63%)
Metoclopramide given (n)	2 (3.63%)	1 (1.81%)

Values are presented as mean (range) or number of patients (percentage of study group). There were no significant differences between the two groups in any aspect of the procedure.

The incidence of intraoperative nausea in the acupressure group was 64% compared with 71% in the control group ($P = 0.416$); the incidence of intraoperative vomiting was 22% in the acupressure group and 27% in the control group ($P = 0.506$). There were no statistically significant differences between the two groups. Data are shown in Figure 1.

All parturients completed the trial and tolerated the wrist bands well. No adverse effect was noted after the use of either Sea Band® or placebo wrist band.

Discussion

Despite P6 acupressure’s known efficacy in reducing postoperative nausea and vomiting (6–9), our study showed that P6 acupressure did not prevent nausea and vomiting intraoperatively with cesarean delivery under spinal anesthesia. The overall incidence rates of nausea and vomiting in our study (64% in the acupressure group and 71% in the control group) were in agreement with previous studies in this patient population (1–3).

In contrast to our result, Stein et al. (11) and Harmon et al. (13) found that P6 acupressure was effective for prevention of nausea and vomiting during spinal anesthesia for cesarean delivery, but the current finding was

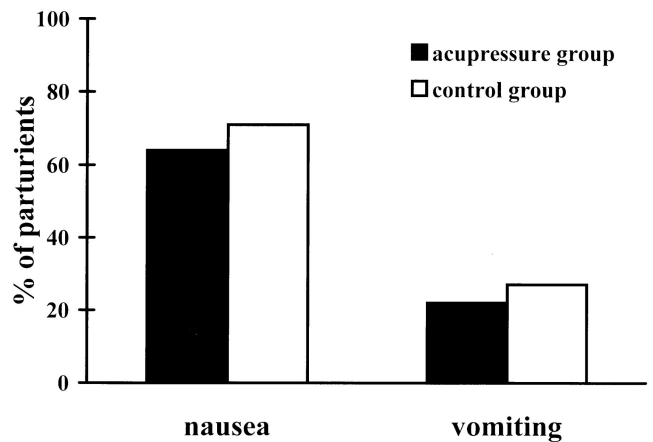


Figure 1. Incidence of nausea and vomiting in parturients during spinal anesthesia for cesarean delivery. Note that no significant difference ($P < 0.05$) was found in comparing control and acupressure groups.

in agreement with the study by Duggal et al. (12). However, the results of these studies were debated because intrathecal morphine (13), intrathecal fentanyl (11), or both (12) were used as part of the procedure protocol, and this usage may have affected the incidence of intraoperative emesis. Gastrointestinal motility was influenced early on approximately 30 minutes after intrathecal morphine administration (16). Thus the use of

intrathecal morphine is associated with intraoperative nausea and vomiting. Therefore, the effectiveness of P6 acupressure in the study of Harmon et al. (13) did not represent true efficiency in reducing nausea and vomiting under spinal anesthesia because of the possible interference of intrathecal morphine administration. Inversely, intrathecal lipophilic opioids, such as fentanyl and sufentanil, have been found to decrease intraoperative nausea and vomiting under spinal anesthesia (17). Moreover, intrathecal fentanyl is superior to IV ondansetron for prevention of intraoperative nausea during spinal anesthesia for cesarean delivery (18). Accordingly, intrathecal fentanyl might have increased the apparent antiemetic efficiency of P6 acupressure in the study by Stein et al. (11). Duggal et al. (12) showed that P6 acupressure did not decrease nausea or vomiting during cesarean delivery under spinal anesthesia with administration of intrathecal morphine and intrathecal fentanyl at the same time. In comparison with the previous three studies, the present research protocol differed in terms of intrathecal drugs. To avoid the potential adverse effects of intrathecal opioids (19) and the issue of opioids confounding the results, spinal anesthesia with 0.5% bupivacaine alone is routinely used to provide anesthesia for elective cesarean delivery in our department.

A primary question regarding a negative study is whether the intervention and timing were adequate. This clinical trial was designed with appropriate methodology and conduct according to the criteria of Lee and Done (9) proposed for good clinical practice on acupressure. Sea Band[®] and the placebo wrist band were applied by the same author (Ho), a licensed acupuncturist, who was not involved in anesthesia for either the acupressure or control group. Because the occurrence of nausea and vomiting after spinal anesthesia for cesarean delivery is mainly intraoperative (1), the timing of acupressure is important. Functional magnetic resonance imaging has demonstrated that an acupoint stimulated after 20 minutes produced identifiable effects in the human brain (20). Furthermore, acupuncture produced an increase in pain threshold, with peak increase occurring 20–40 minutes after needle insertion (21). In our study, all parturients received wrist bands at least 30 minutes before induction of spinal anesthesia. We believe that times of onset and peak effect of acupressure were compatible with the occurrence of emesis in our clinical setting. Moreover, the characteristics (Table 1) and operative management (Table 2) of the 110 patients in both groups were similar. We believe that the only difference between the two groups was whether or not they had acupressure as prophylaxis.

In conclusion, the prophylactic use of bilateral acupressure bands on the P6 acupoint was ineffective for

preventing nausea and vomiting during spinal anesthesia with 0.5% bupivacaine alone for elective cesarean delivery.

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