# Effect of P-6 acupressure on prevention of nausea and vomiting after epidural morphine for post-Cesarean section pain relief

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**Background:** Nausea and vomiting are important side effects following administration of epidural morphine for post-Cesarean section pain relief. Stimulation of the P-6 (Neiguan) acupoint is a traditional Chinese acupuncture modality used for antiemetic purpose; it has been found to be effective. The aim of this study was to evaluate the antiemetic effect of P-6 acupressure in parturients given epidural morphine for post-Cesarean section pain relief.
**Method:** In a randomized, double-blind and controlled trial, sixty parturients receiving epidural morphine for post-Cesarean section pain relief were investigated. Parturients were allocated to receive the acupressure bands or placebo bands on the P-6 acupoint bilaterally before the administration of spinal anesthesia and were observed over a 48-hour study period.
**Results:** The incidence of nausea and vomiting was significantly decreased from 43% and 27% in the control group, to 3% and 0% in the acupressure group, respectively ($P<0.05$).
**Conclusion:** The results demonstrate that prophylactic use of acupressure bands bilaterally on the P-6 acupoint can significantly reduce incidence of nausea and vomiting after epidural morphine for post-Cesarean section pain relief.

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**Key words:** Acupuncture: P-6 (Neiguan) acupressure; analgesia: postoperative; analgesics: epidural morphine; vomiting: nausea.



Epidural morphine provides excellent pain relief after Cesarean section (1, 2), while nausea or vomiting is the major side effect with an incidence as high as 40–60% (2, 3). Nausea and vomiting may distress the parturient and decrease her overall satisfaction with pain relief. Routine use of antiemetic drugs in parturients after epidural morphine for post-Cesarean section pain relief is not recommended because of adverse effects (4). Dundee et al. reported an antiemetic effect of the P-6 (Neiguan) acupuncture (5), which is used for treatment of nausea and vomiting in traditional Chinese medicine. Recently, many clinical investigations have shown that stimulation of the P-6 acupoint with non-invasive acupressure can prevent vomiting caused by early pregnancy (6, 7), surgical procedures (8, 9) and chemotherapy (10, 11). However, the antiemetic effect of the P-6 stimulation by using an acupressure band in postoperative pain relief with epidural morphine has not been elucidated. The aim of this study was to evaluate the antiemetic effect of P-6 acupressure in a parturient receiving epidural morphine for post-Cesarean section pain relief.

## Patients and methods

The protocol was approved by the Hospital Committee for Human Investigation and prior informed consent was obtained from each parturient. Sixty parturients, ASA I physical status, aged between 21 and 35, scheduled for elective Cesarean section were enrolled in the study. Those who had previous carpal tunnel syndrome, or those who had experienced nausea or vomiting within 24 h prior to Cesarean section were excluded from the study. Parturients fasted for at least eight hours. No premedication was given, except for 15 ml oral antacid (sodium citrate 0.3M) within 1 h before surgery. Parturients were randomized into two groups before being given spinal anesthesia in the operating room. Randomization was conducted by computer, with each code sealed in an envelope to be opened upon

*Table 1*

Patient characteristics in the two groups, mean and (range)

| | Control group (n=30) | | Acupressure group (n=30) | |
|---|---|---|---|---|
| Age (years) | 31.7 | (21–33) | 32.4 | (21–35) |
| Weight (kg) | 70.5 | (48–80) | 71.1 | (53–87) |
| Height (cm) | 159.3 | (150–173) | 160.8 | (147–170) |
| Duration of operation (min) | 76.6 | (45–103) | 71.4 | (55–93) |
| Blood loss in operation (ml) | 550.0 | (400–1300) | 570.0 | (400–1200) |
| Duration of pain relief (h) | 15.3 | (6.3–26.5) | 15.9 | (7.5–21.3) |
| Total epidural morphine dosage (mg) | 8.6 | (6–12) | 8.4 | (6–12) |
| Parturients requiring additional analgesics (%) | 6.7 | | 3.3 | |
| Total time spent wearing bands (h) | 46.3 | (45–47) | 46.0 | (45–47.5) |

There were no significant differences between the two groups.

the parturient's arrival in the operating room. Before spinal anesthesia, the control group (n=30) received placebo wrist bands bilaterally at the P-6 acupoint; the acupressure group (n=30) received "Sea Band®" (Sea-Band Ltd., Leicestershire, England) at the same point. The "Sea Band®" is a commercially available elastic wrist band which has a small round plastic button on the inner side. The placebo wrist band and "Sea Band®" are identical, except that when used as placebo the functional plastic button was blunted in order not to exert pressure on the P-6 acupoint. The parturients in both groups were allowed to remove the bands for 30 min in each 2-h period if they felt unbearable discomfort. According to traditional Chinese acupuncture textbooks, the P-6 acupoint is located two "Chinese inches" (4–5 cm) proximal to the transverse crease of the wrist, and half a "Chinese inch" (1–1.3 cm) deep from the skin, between the tendons of flexor carpi radialis and palmaris longus. A "Chinese inch" is equal to the width of the interphalangeal joint of the thumb of the patient.

Following an intravenous pre-load of 1000 ml of lactated Ringer's solution, all parturients received spinal anesthesia with 0.5% hyperbaric bupivacaine 10–14 mg, to achieve a T-4 sensory level for Cesarean section. Following lumbar puncture, an epidural catheter was placed through a 16-gauge Tuohy needle (Portex, Spinal/Epidural Set) via the $L_{2-3}$ or $L_{3-4}$ interspace with a length allowance of 4–6 cm cephalad. Nothing was given epidurally until a parturient complained of pain in the post-anesthesia care unit. No opioid was given during the operation. After delivery of the baby, routine use of 10 units intravenous oxytocin and 0.2 mg intramuscular ergonovine were given to all parturients to enhance uterine contraction. Estimated fluid deficit and maintenance requirement were replaced with lactated Ringer's solution intravenously, and blood transfusion was given if necessary.

In the post-anesthesia care unit, epidural morphine 3 mg diluted in 10 ml normal saline was given to all parturients when the 10 cm Visual Analogue Scale (VAS) pain score reached 5. The subsequent dose of epidural morphine was given when the VAS pain score reached above 5 again and after a minimum 8-h interval since the first dose. Analgesia with 25 mg intramuscular ketoprofen was given if indicated. Parturients who suffered from intractable vomiting were treated with 10 mg of intravenous metoclopramide, and those who suffered from severe pruritus were treated with 5 mg of intramuscular chlorpheniramine.

An independent anesthesiologist blinded to the parturient groups followed up all parturients. Vital signs; VAS pain score; all post-operative analgesic requirements; respiratory rate; and side effects including pruritus, dizziness, herpes simplex labialis, nausea and vomiting were evaluated at 0, 5, 15, 30, 45 min, 1, 2, 4, 8, 12, 24, 36, and 48 h after the first dose of epidural morphine. Retching was regarded as vomiting. Total time in the 48-h study period spent wearing bands was recorded. Duration of pain relief was counted from the first dose of epidural morphine to the next dose. Respiratory depression was defined as a respiratory rate which fell below 8 per minute.

The data are presented as the mean and range (within brackets) or absolute values. Statistical analyses were done using unpaired Student's *t*-test, the Chi-square test and Fisher's exact test. A *P*-value $<0.05$ was considered statistically significant.

## Results

There were no statistically significant differences with respect to age, weight, height, duration of oper-

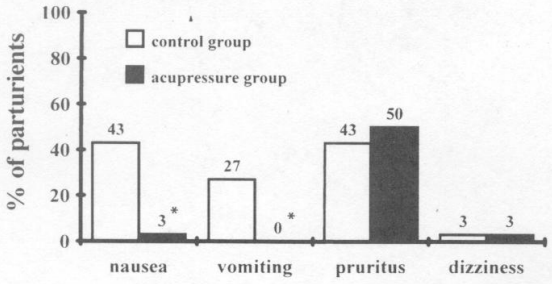


*Fig. 1. Incidence of side effects after Cesarean section with epidural morphine pain relief. *Significant difference ($P<0.05$) compared with the two groups.*

ation, intraoperative blood loss, duration of pain relief, total epidural morphine dosage, percentage of parturients requiring additional analgesics and total time spent wearing bands between the two groups. Data are shown in Table 1.

Two of the 30 parturients in the control group received intravenous metoclopramide for treatment of intractable vomiting, while no such treatment was given in the acupressure group.

The incidence of nausea after epidural morphine in the acupressure group was 3% compared to 43% of the control group ($P<0.05$). The incidence of vomiting after epidural morphine was 0% in the acupressure group and 27% in the control group ($P<0.05$). There were no statistically significant differences between the two groups in the incidence of pruritus and dizziness. No respiratory depression nor herpes simplex labialis was noted. Data are shown in Fig. 1.

All parturients completed the trial and tolerated the bands well. No side effect was noted following the use of either "Sea band®" or placebo wrist band.

## Discussion

This study showed that P-6 acupressure can effectively reduce the incidence of nausea and vomiting after epidural morphine for post-Cesarean section pain relief. In a manner similar to ours, many clinical investigations have recently proved that P-6 acupressure is effective in preventing vomiting caused by early pregnancy (6, 7), surgical procedures (8, 9) and chemotherapy (10, 11). The P-6 acupuncture which serves as an antiemetic remedy has been used in traditional Chinese medicine for a long time, although its mechanism is still a unclear. Costello & Borison suggested that the antiemetic effect of acupuncture may be mediated by the release of an endogenous morphine-like substance with antiemetic tone into the central nervous system (12).

In contrast with these results, Lewis et al. and Yentis & Bissonnette found that acupuncture was ineffective in preventing vomiting following strabismus repair in children (13, 14). Their findings may be explained by their using nonspecific acupoint for eye surgery. According to traditional Chinese medical theory, every sign or symptom of a disease can be related to a specific acupoint along specific meridians. It is important to ascertain the specific meridians which are related to the organ in question. For example, the P-6 acupoint may act only on hollow organs, not the eye. The acupoints of UB-10 (Tianzhu), UB-11 (Dazhu) or GB-34 (Yanglingquan) may be specifically related to vomiting resulting from strabismus correction (15).

One study found that P-6 stimulation was ineffective as an antiemetic in patients under general anesthesia (16). Theoretically, an intact nervous system is required to produre acupuncture effect. General anesthesia may suppress, to some extent, the antiemetic effect of acupuncture. Injection of local anesthetic around the acupoint may abolish the electrophysiologic response in the spinal cord (17) and decrease the antiemetic effect of acupuncture (18). The effect of acupuncture is slow in onset and long in duration. The induction period of acupressure during surgery may not be long enough. In addition to the need for an intact nervous system, a long induction time and use of the dominant hand are also required during acupuncture. Current evidence confirms that the best results are obtained by using the dominant hand as target (19). Therefore, all parturients in our study received acupressure treatment bilaterally, beginning 30 min before induction of anesthesia.

In summary, prophylactic use of bilateral acupressure bands on the P-6 acupoint has an antiemetic effect after epidural morphine for post-Cesarean section pain relief. The mechanism was not investigated. In clinical use, acupressure is safe, simple, noninvasive and readily acceptable by awake patients.

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