Acupuncture and Related Therapies 1 (2013) 42–45

Contents lists available at ScienceDirect

Acupuncture and Related Therapies

journal homepage: www.elsevier.com/locate/arthe

Acupressure and metoclopramide comparison in postoperative nausea and vomiting prevention on laparatomy patients

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ARTICLE INFO

Article history:
Received 25 August 2013
Accepted 8 October 2013

Keywords:
Acupressure
Epidural analgesia
Metoclopramide
Postoperative nausea and vomiting

ABSTRACT

Objectives: Incidence of postoperative nausea and vomiting (PONV) ranges from 20 to 30% in, routine procedures, up to 70–80% in high-risk patients. Prevention of PONV is usually based on, antiemetic drugs but pharmacological interventions are only partially effective, so we tested efficiency, of acupressure in PONV prevention.
Design: We included 180 patients American Society of Anaesthesiologists physical status classification, I and II, who underwent a laparotomy. The study was prospective, and placebo controlled. Nausea and, vomiting were separately monitored on patients with intravenous and epidural analgesia. Patients were allocated in six groups, with 30 patients in each group: group I (epidural analgesia + acupressure), group II (epidural analgesia + metoclopramide), group III (epidural analgesia + sham acupressure), group IV (intravenous analgesia + acupressure), group V (intravenous analgesia + metoclopramide) and, group VI (intravenous analgesia + sham acupressure).
Results: Acupressure reduced PONV from 57 to 37% ($P < 0.001$) in patients with intravenous, postoperative analgesia, and from 63 to 20% ($P < 0.001$) in patients with epidural postoperative, analgesia compared to placebo. Metoclopramide has also reduced the incidence of PONV from 57 to 40% ($P = 0.003$) in patients with intravenous postoperative analgesia and in patients with epidural, postoperative analgesia from 63 to 17% ($P < 0.001$) compared to placebo.
Conclusions: Our study confirmed positive effect of acupressure in PONV prevention in patients after, elective laparotomy, regardless of the type of postoperative analgesia, intravenous or epidural. Thus, since acupressure is a simple and inexpensive method of PONV prevention, without side effects, it, should be considered as standard for PONV prevention on laparatomy patients.

1. Introduction

Postoperative nausea and vomiting (PONV) is very common anaesthetic complication, whose incidence ranges from 20 to 30% in routine procedures [1–4] up to 70–80% in high-risk patients [5]. Ethiology of PONV is multifactorial, including individual, surgical, and anaesthetic risk factors [2,5,6].

Apfel [7] have introduced a simplified score system for predicting PONV, which involved 4 main risk factors: female, motion sickness, PONV in anamnesis, non-smokers and postoperative usage of opioids. For patients without any of these factors, PONV risk is 10%, for one risk factor 20%, for two risk factors 40%, for three risk factors 60%, and for four risk factors PONV risk reaches 80%.

PONV increases morbidity because of dehydration, electrolytic disbalance, and aspiration of gastric secretion. The postoperative pain is stronger, and there is a delay of postoperative recovery, higher hospital costs, and unsatisfied patient [8,9]. Traditionally, PONV is prevented by antiemetic drugs (usually metoclopramide), but pharmacological interventions are only partially effective. Some of the patients do not tolerate antiemetics because of their adverse effects that include headache, agitation, or fast cardiac rhythm [10], while others suffer from PONV regardless the use of antiemetics [10].

The use of non-pharmacological methods, such as acupressure, had good results in prevention of nausea and vomiting in pregnancy and chemotherapy. Although, there is number of studies that proved efficacy of Pc6 stimulation in prevention of PONV [11–13] after laparoscopy, none of them investigated prevention of PONV with acupressure in patients receiving epidural postoperative analgesia. Namely, epidural postoperative analgesia provides adequate pain reduction without central sedation, but there is still very high rate of PONV. Overall incidence of PONV in patients who receive continuous epidural analgesia is 3–60% [14]. As the acupressure is non-invasive procedure with minimal cost input, our aim was to test the efficacy of acupressure in prevention of PONV in patients after laparotomy and to compare it's efficacy with metoclopramide.

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http://dx.doi.org/10.1016/j.arthe.2013.10.001

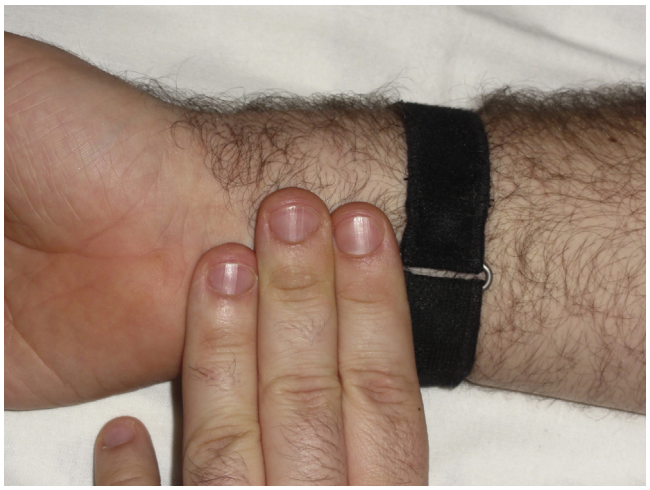

Fig. 1. Pericard (Pc) 6 acupressure point. Position of acupressure bracelet on Pc6 point. The bracelet is located on volar site of metacarpus, 2 cun proximal to the transverse crease of the wrist.

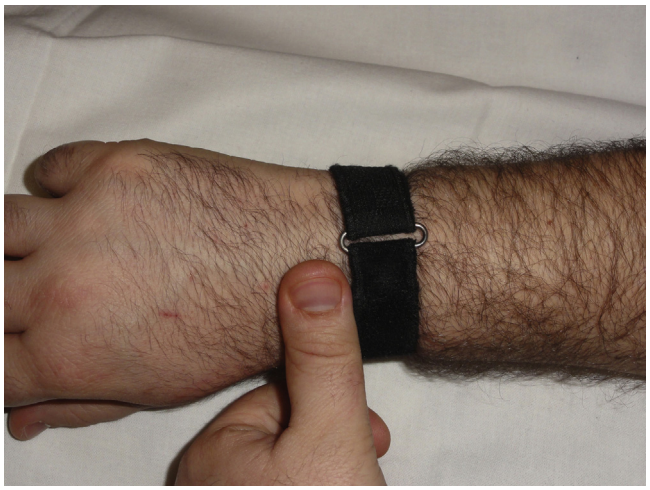

Fig. 2. Placebo acupressure. Acupressure bracelet on non-functional place (placebo acupressure). Bracelet is placed 1 cun proximal to the dorsal crease of the wrist.

2. Materials and methods

The study was completed in general Hospital Varaždin, Croatia. It was approved by hospital's Ethic Committee and each patient signed informed consent statement. There were 180 patients "American Society of Anaesthesiologist physical status classification" (ASA) I and II included in the study, on whom laparotomy operative procedure was performed. The study was prospective and placebo controlled.

Postoperative nausea and vomiting was separately monitored in patients with epidural and patients with intravenous analgesia. Exclusion criteria for the study were: use of antiemetics prior surgery; psychotropic drugs, hormones, and steroids within three days before surgery; nausea and vomiting on the day of surgery; renal and hepatal impairment; alcoholism or opioid addiction (Fig. 1).

Patients were allocated in six groups, with thirty patients in each one: group I (epidural + acupressure), group II (epidural analgesia + metoclopramide), group III (epidural analgesia + sham acupressure), group IV (intravenous analgesia + acupressure), group V (intravenous analgesia + metoclopramide) and group VI (intravenous analgesia + sham acupressure). Allocation was made by the "Equal groups allocation" principle: each "first" patient was allocated in acupressure group, each "second" patient to metoclopramide, and each "third" patient to control group. In groups I, III, IV, and VI acupressure wristband was placed 10 min before induction in anaesthesia. We used BioBand bracelets with adhesive tape so each patient could receive the right amount of pressure through individual adjustment: the bracelet was tightened just enough for the patient to feel the pressure but without tingling or discomfort. In groups I and IV the bracelet was placed on pericard 6 (Pc6) acupuncture point of one arm, located on volar site of metacarpus, 2 cun proximal to the transverse crease of the wrist. In control groups (III and IV) acupressure wristband was put on non-functional place on the dorsum of metacarpus (Fig. 2), 1 cun proximal to the dorsal crease of the wrist. In groups II and V metoclopramide was given 10 min before wakening from anaesthesia,

Group sizes were calculated on the basis of PONV incidence of 70% [5], and PONV reduction of 50% in our pilot study that included 60 subjects (unpublished data).

All the patients were fasting between 6 and 12 h, and were given 7.5 mg of midazolam per oral half an hour before the scheduled operation. The induction of anaesthesia was made with propofol 2 mg/kg, fentanyl 0.05 mg/kg and vecuronium 0.1 mg/kg. The anaesthesia was continued with sevoflurane, Minimal Alveolar Concentration (MAC) 1 by N_2O:O_2 at 60:40% proportion, and with fentanyl and vecuronium as needed. At the end of surgical procedure reversal of neuromuscular block was performed with neostigmine 50 μg/kg and atropine 10 μg/kg.

Postoperative analgesia was started immediately after the laparotomy. Patients treated with epidural postoperative analgesia (groups I–III) received initial bolus of 10 ml, 0.125% chirocaine + sufentanyl 5 μg followed by the infusion of 0.1% chirocaine 3–5 ml/h + sufentanyl 3–5 μg/h. Patients treated with intravenous postoperative analgesia (groups IV–VI) received initial bolus of 2.5–5 μg of sufentanyl followed by continuous infusion of sufentanyl in the dosage of 4–6 μg/h and 1 g of paracetamol was given every 6 h.

PONV was monitored during 24-h period, and was checked 30 min, 2 h, 6 h, and 24 h after extubation. Recovery room, intensive care unit or ward nurse noted two entities: nausea alone and nausea combined with vomiting.

There was no "rescue drug" for PONV, as it was clearly stated in the Informed consent statement; all the patients agreed to it by singing the statement. All the patients completed the study, and there were no drop-outs.

2.1. Statistical analysis

Data about patients' age and gender, "American Society of Anaesthesiologist physical status classification" and the occurrence of PONV were summarized using descriptive statistics. Categorical variables were compared using Fisher's exact test, while continuous variables were compared using the *t*-test for independent samples. Bonferroni's correction was applied for multiple comparisons. All statistical analyses were performed using MedCalc9.5.1.0 (MedCalc Software, Mariakerke, Belgium).

3. Results

There were 35 ASA I and 145 ASA II patients included in the study. Mean age of the patients was 58 ± 13 years. Sex and age distribution through groups are presented in Table 1.

3.1. PONV in patients treated with intravenous postoperative analgesia

Acupressure in patients with intravenous postoperative analgesia reduced incidence of PONV, from 57 to 37% ($P < 0.001$) compared