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RESEARCH ARTICLE

Effect of transcutaneous electroacupuncture at Neiguan (PC 6) on refractory vomiting in patients in intensive care unit

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Abstract

OBJECTIVE: To observe the effect of transcutaneous electroacupuncture (TEA) at Neiguan (PC 6) on refractory vomiting in critically ill patients in intensive care (ICU) setting.

METHODS: Ten patients admitted in ICU and presenting vomiting refractory to one or more antiemetic drugs were prospectively included in the study. TEA was applied at acupoint of Neiguan (PC 6) during 30 min with a neuromuscular transmission monitor (single-twitch stimulation with 1 Hz at a constant current of 10 mA). Nausea and Vomiting were evaluated at the following intervals: immediately after 30 min of TEA at Neiguan (PC 6), 30 min-6h and 6-24 h. The presence of nausea and/or vomiting throughout the observational period was defined as the primary end point.

RESULTS: The presence of nausea or vomiting throughout the observational period was 10% at the end of TEA, 40% between 30 min and 6 h, and 50% between 30 min and 24 h ($P < 0.001$, $P = 0.01$ and $P = 0.03$ *vs* pre-TEA, respectively). There were no complications or side effects related to TEA.

CONCLUSION: TEA at Neiguan (PC 6) seems effective in reducing refractory vomiting in the patients in ICU setting, even if larger trials are needed to define optimal modalities.

Keywords: Electroacupuncture; Point PC 6 (Neiguan); Nausea; Vomiting; Antiemetics

INTRODUCTION

Various antiemetic drugs reduce but not eliminate nausea and vomiting. There is no completely effective therapy, and even newly investigated drugs do not abolished vomiting. Antiemetics include 5-HT_3 receptor antagonists, glucocorticoids, dopamine receptors antagonists, anti-psychotic drugs. These drugs are only partly effective and may produce undesirable adverse effects such as mild headache, transient increase in hepatic transaminase level, and constipation.[1] Moreover, persisting vomiting may lead to dehydration and electrolyte imbalance, aspiration of gastric contents, increase intracranial pressure, suture dehiscence, and bleeding.[2]

As an alternative approach to treat vomiting, acupuncture has gained increasing attention for its value in reducing the requirement for antiemetics, with minimal adverse effects. The most commonly used acupoints for the treatment of gastrointestinal symptoms are Neiguan (PC 6), Jianshi (PC 5) and Zusanli (ST 36).[3] A large number of studies have demonstrated that acu-

puncture can reduce nausea and vomiting under various conditions, such as post-operative nausea and vomiting,[4,5] pregnancy,[6] and chemotherapy induced nausea and vomiting.[3] However, the usefulness of acupuncture to treat refractory vomiting in critically ill patients admitted in intensive care units (ICU) is unknown.

The aim of this study was to investigate the antiemetic affect of transcutaneous electroacupuncture (TEA) at Neiguan (PC 6) on refractory vomiting in critically ill patients in ICU setting.

MATERIALS AND METHODS

Study population

This single centre prospective observational study was conducted in the intensive care of Narbonne Hospital (France). This study was approved by the local ethics committee and informed consent was obtained from all the patients (Comité d'Ethique Local, Narbonne Hospital, France, AR2015-01). The inclusion criteria were: all patients admitted in ICU and presenting vomiting persisting at least 2 hours after one or more antiemetic drugs. Patients were excluded if they were unconscious or unable to accept electroacupuncture treatment.

Measured variables

Patients characteristics (age, sex, height, and weight), Simplified Acute Physiology Score (SAPS2), history of motion sickness or post-operative nausea or vomiting, smoking history, use of morphinomimetic analgesics, use of vasoactive agents, hemodynamic data, i.e. heart rate, mean arterial pressure were collected. Pain was evaluated by Numerical Rating Pain Score (NRPS). Electrolytes were measured on blood sample. Nausea and Vomiting were evaluated at the following intervals: immediately after 30 min of TEA at Neiguan (PC 6), 30 min-6 h and 6-24 h. As a primary end point, we defined the presence of nausea and/or vomiting throughout the observational period. Nausea is the desire to vomit without the presence of expulsive muscular movements and was evaluated categorically as yes or no. Vomiting was the active expulsion of gastric contents and retching was an active attempt to vomit without expulsion of gastric contents. Retching and vomiting were summarized under emetic episode and report as vomiting. During the 24 h observation period, we evaluated the possible side effect of TEA such as muscle ache, irritation, or local dermatitis.

Transcutaneous electroacupuncture at Neiguan (PC 6)

Neiguan (PC 6) was first described in Miraculous Pivot Meridians, where Neiguan (PC 6) was stated as a point located 2 cun above the transverse crease of the wrist and between the tendons of the palmaris longus and flexor carpi radialis muscles.[7] The pregelled electrodes (diameter 0.5 cm) were placed over the left median nerve at Neiguan (PC 6), also know as Master of the Heart 6. The first electrode was placed between the two tendons 1 cm proximal to Neiguan (PC 6) and the second electrode was placed 1 cm distal to Neiguan (PC 6). A commercially available neuromuscular transmission monitor was used for the acupuncture point stimulation. Single-twitch stimulation with 1 Hz, over 0.2 ms, at a constant current of 10 mA was applied in each patient during 30 min. Rescue antiemetic treatment, using ondansetron (4 mg intravenous) (Mylan™, Saint-Priest, France), was given if one episode of vomiting or persistent nausea was reported after TEA.

Statistical analysis

Quantitative data were expressed as median [range]. Categorical data were expressed as number (percentage). Fisher's exact test was used to assess categorical outcome among group. A P-value < 0.05 was considered significant. The statistical analysis was performed using R software (R Foundation, Vienna, Austria).

RESULTS

Demographic data

Ten patients were prospectively included in our study (Figure 1). The group was composed of 4 women and 6 men with a median age of 73 years (range 18-85 years). The median Simplified Acute Physiology Score was 42 (range 11-102). One patient had a history of motion sickness, 4 patients were smokers. Norepinephrine was used on 2 patients, morphinomimetic analgesics were used on 3 patients. The median NRPS was 0 (range 0-6). The median C-reactive protein level was 69 mg/L (range 5-600 mg/L). The median body temperature was 37 ℃ (range 36-38 ℃). Hemodynamic data showed a median arterial pressure of 85 mm Hg (range 65-112 mm Hg) and a median heart rate of 96 beats/min (range 64-134 beats/min).

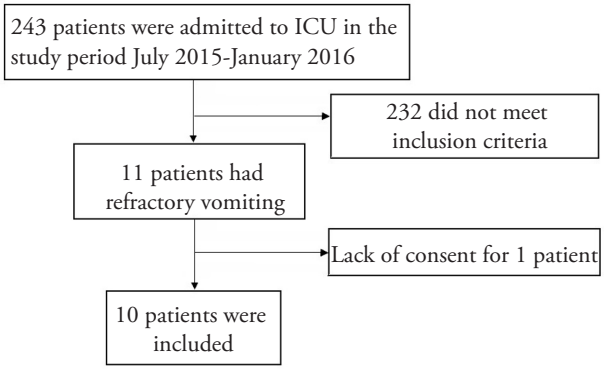

Figure 1 Enrollment of the study participants
ICU: intensive care unit.

Change in main symptoms

For all patients enrolled in the study, the overall inci-