British Journal of Medicine & Medical Research
3(4): 2247-2255, 2013

SCIENCEDOMAIN *international*
www.sciencedomain.org

Transcutaneous Electrical Acupoint Stimulation versus Acupressure on Postoperative Nausea and Vomiting after Abdominal Hysterectomy

Asmaa M. El-Bandrawy[1*], Hala M. Emara[1] and Hassan O. Ghareeb[2]

[1]Departement of Physical Therapy for Obstetrics and Gynecology, Cairo University, Giza, Egypt.
[2]Faculty of Medicine, departement of Obstetrics and Gynecology, Cairo University, Giza, Egypt.

Authors' contributions

This work was carried out in collaboration between all authors. Author AME designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author HME managed the literature searches and performed the statistical analysis. Authors AME and HOG managed the analyses of the study. All authors read and approved the final manuscript.

Research Article

Received 23rd March 2013
Accepted 27th June 2013
Published 28th July 2013

ABSTRACT

Aims: To compare between the effectiveness of transcutaneous electrical acupoint stimulation versus Acupressure on post-operative nausea and vomiting in women scheduled for abdominal hysterectomy.
Place and Duration of Study: Department of obstetrics and gynecology, Kasr El-Aini University Hospital, and outpatient clinic of faculty of Physical Therapy, Cairo University, between July 2012 and January 2013.
Methodology: We included 150 patients (age ranged 45-65 years) with post-operative nausea and vomiting after abdominal hysterectomy, their body mass index was less than 30 kg/m^2 without medical history of gastrointestinal diseases. Patients were equally divided into three groups. Group (A), received trancutaneous electrical acupoint stimulation (TEAS10Hz was applied on the P6 point of the dominant hand 30min before induction of anesthesia and continued for 8 h postoperatively) in addition to post operative anti-emetic drug. In group (B), acupressure (elastic wrist bands with a sphere to apply pressure on P6 point) was performed exactly in the same way as in group (A) in addition to post operative anti-emetic drug. Patients of group (C) received post operative

**Corresponding author: Email: asma_elbandrawy@yahoo.com;*

anti-emetic drug only. Post-operative metoclopramid 10mg/iv was administrated for all patients in groups (A, B & C) as antiemetic. Assessment of all patients in all groups (A, B&C) was carried out after 4h and 8h of the treatment through Mc Gill assessment for postoperative nausea and vomiting.

Results: Showed a statistically more significant decrease (P<.0001) in nausea and vomiting scales for group A than both groups B&C after 4 and 8 hours.

Conclusion: Trancutaneous electrical acupoint stimulation of P6 point appears to be more effective than acupressure in alleviating post-operative nausea and vomiting after abdominal hysterectomy.

Keywords: TEAS; acupressure; nausea; vomiting; hysterectomy.

1. INTRODUCTION

A hysterectomy is the surgical removal of the uterus, usually performed by a gynecologist. Hysterectomy may be total (removing the body, fundus, and cervix of the uterus; often called "complete") or partial (removal of the uterine body while leaving the cervix intact; also called "supracervical"). It is the most commonly performed gynecological surgical procedure [1].

Postoperative nausea & vomiting (PONV) complicates the lives of both patients and health care providers. The incidence of PONV varies between 20% and 30% [2]. It can be especially troublesome in day surgery. At the very least the patient experiences discomfort, but persistent symptoms causing a delay in returning to normal activities for greater than one day has been reported [3].

The incidence of PONV varies depending on multiple risk factors. Associated patient factors include increasing age, female sex, obesity, emotions/stress, history of motion sickness, and previous PONV. Treatment factors include operative procedure, inhalation anesthetic agents, and opioids [4,5].

Postoperative nausea and vomiting (PONV) add to morbidity through dehydration, electrolyte disturbance, aspiration, and wound pain, causing unnecessary delay in recovery, increased costs, and poor satisfaction among patients [6,7].

Recommended strategies for minimizing the incidence of PONV include identification of high risk patients and avoidance of emetogenic stimuli [8].

According to traditional chinese medicine doctrines, illness results from an imbalance in the flow of energy through the body. This energy or Qi (chee) is restored with the use of acupuncture and acupressure on certain points in the body which have been identified through critical observations and testing over 4000 years. In scientific terms, neurochemicals such as endorphin, serotonin, gamma-aminobutyric acid (GABA), and cortisol released are regulated after needling or pressure in a specific point. The most commonly used point for nausea and vomiting is Pericardium 6 (Neiguan or P6) [9].

The P6 (Neiguan) acupuncture point is located 2 "Chinese inches" (the width of the proximal interphalyngeal thumb joint) proximal to the distal wrist crease, approximately 1 cm deep to the skin, between the tendons of the flexor carpi radialis and the palmaris longus. Stimulation of this point is reported to reduce nausea, and anti-sea sickness [9].

Transcutaneous electrical acupoint stimulation (TEAS) is non-invasive and effective stimulation in treating nausea (morning sickness). It decreases peristaltic velocity and increases the basal tonus of the oesophagus as well as reduces the preparation during gut distention, indicating that somatic stimulation may increase the visceral threshold [10].

Transcutaneous electrical acupoint stimulation is effective in controlling nausea and vomiting in the postoperative period [6]. Also, the use of self-administered TEAS of P6 had been evaluated in alleviation of emetic squeal following opoid analgesia in orthopedic surgery [18]. Typically, PONV is treated with antiemetics, but pharmacological interventions may be only partially effective. Some patients may not tolerate antiemetics because of adverse effects such as headache, agitation, or tachycardia, whereas PONV develops in others despite use of antiemetics [11]. Nonpharmacological methods have shown promise in lessening PONV [12].

Results highlight the important role of safe and convenient non-pharmacological complementary therapies, such as acupressure, in the management of the complex symptoms of chemotherapy-related nausea and vomiting [9].

1.1 Hypothesis

Trancutaneous electrical acupoint stimulation of P6 point will be more effective than acupressure in alleviating post-operative nausea and vomiting after abdominal hysterectomy.

2. MATERIALS AND METHODS

2.1 Design

A randomised controlled trial design was used for the purposes of the current study. Patients were randomised to either group A, B or C by simple randomization using the envelope method. Accordingly, a pack of sealed envelopes including a card with either the word 'TEAS plus antiemetic group', 'Acupressure plus antiemetic group' or 'antiemetic only' written on it, was given to a staff physical therapist unrelated to the study; she/he picked one envelope after patients agreed to take part in the study. Depending on which card was selected patients were allocated to their respective group.

150 patients scheduled for abdominal Hysterectomy were selected from inpatient clinic of gynecology of Kasr El-Aini University Hospital. All patients were operated upon the same team and duration of surgery was ranged from (40-50) min after induction of complete anesthesia. They were randomly assigned into three equal groups (A, B & C).

Group (A) consisted of fifty patients, with an average age (52.65±5.26 Yrs), and BMI (27.83±1.12 kg/m^2). TEAS10Hz was applied on the P6 point of the dominant hand 30min before induction of anesthesia and continued for 8 h postoperatively in addition to post operative anti-emetic drug for patients of group (A). Group (B) consisted of fifty patients, with an average age (53.75 ±5.63 Yrs), and BMI (27.93±1.15 kg/m^2), acupressure (elastic wrist bands with a sphere to apply pressure on P6 point) was performed exactly for group (B) in the same way as in group (A) in addition to post operative anti-emetic drug. Group (C) consisted of fifty patients, with an average age (52.3 ±6.52Yrs), and BMI (27.8±1.1 kg/$m^{2)}$. Patients of group (C) received only post operative anti-emetic drug. Post-operative anti-

emetic drug (metoclopramid 10mg/iv) was administrated for all patients in all groups (A, B & C) as antiemetic.

Patients with gastric or intestinal diseases causing nausea and vomiting were excluded from the study. Incidence of nausea and vomiting were assessed throughout Mc Gill assessment for nausea and vomiting at 4 and 8 h postoperatively.

Assessment of nausea and vomiting were obtained for all patients that, all patients completed the study.

Mc Gill assessment for nausea [18]:

0= no nausea; 1= mild nausea; 2=discomforting nausea; 3=Distressing nausea; 4=Horrible nausea; 5=excruciating nausea.

Mc Gill assessment for vomiting [18]:

0= no vomiting; 1= mild vomiting; 2=discomforting vomiting; 3=Distressing vomiting; 4=Horrible vomiting; 5=excruciating nausea.

Informed consent form was signed by each patient before starting the treatment.

3. RESULTS AND DISCUSSION

3.1 Physical Characteristics of the Patients

Table 1. Physical characteristics of the patients before the treatment

Groups	Age (yr.)	BMI(kg/m^2)
Group (A)	52.65±5.26	27.83±1.12
Group (B)	53.75 ±5.63	27.93±1.15
Group (C)	52.3 ±6.52	27.8±1.1

3.2 Statistical Analysis

The changes in nausea and vomiting scale from before treatment to 4 and 8 hours after treatment were revealed by using the Friedman test in each group. KRUSKAL-WALLIS TEST was conducted to compare between the three groups then pair wise comparisons was conducted using the Mann-Whitney *U* test to compare between every two groups. Statistical analysis was performed using SPSS version17.P <.05 is considered to be significant.

The results of this study showed that, nausea and vomiting scales improved in all groups after treatment as shown in Tables 1 and 2.

3.2.1 Comparison between the three groups:

3.2.1.1 Nausea scale

There was no significant difference between the three groups in nausea scale before the treatment as p value was (0.81) as revealed by Kruskal-Wallis test. While there was a

significant difference between the three groups after 4 and 8 hours of treatment as p value was (.0001) and (.0001) respectively. Then a pair wise comparison was conducted using the Mann-Whitney *U* test to compare between every two groups at 4 hours and 8 hours after treatment. 4 hours after treatment, group (A) showed statistically significant improvement than group (B) and group (C) as p value was (.02) and (.0001) respectively. Group (B) showed statistically significant improvement than group (C) as p value was (.03).

8 hours after treatment, group (A) showed statistically significant improvement than group (B) and group (C) as p value was (.01) and (.0001) respectively. Group (B) showed statistically significant improvement than group (C) as p value was (0.006) Table 2.

Table 2. Friedman test of nausea scale before, and after 4and 8 hours of treatment

Groups	Before treatment (median)	After 4 hours (median)	After 8 hours (median)	Friedman test	Significant
Group (A)	2	1	0.5	37.65	.0001
Group (B)	2	2	1	29.15	.0001
Group (C)	2	2	2	22.28	.0001

3.2.1.2 Vomiting scale

There was no significant difference between the three groups in vomiting scale before the treatment as p value was (0.92) as revealed by Kruskal-Wallis test. While there was a significant difference between the three groups after 4 and 8 hours of treatment as p value was (.0001) and (.0001) respectively. Then a pair wise comparison was conducted using the Mann-Whitney *U* test to compare between every two groups at 4 hours and 8 hours after treatment. At 4 hours after treatment group (A) showed statistically significant improvement than group (B) and group (C) as p value was (.03) and (.0001) respectively. Group (B) showed statistically significant improvement than group (C) as p value was (.03).

At 8 hours after treatment group (A) showed statistically significant improvement than group (B) and group (C) as p value was (.001) and (.0001) respectively. Group (B) showed statistically significant improvement than group (C) as p value was (.03) Table 3.

Table 3. Friedman test of vomiting scale before, and after 4and 8 hours of treatment

Groups	Before treatment (median)	After 4 hours (median)	After 8 hours (median)	Friedman test	Significant
Group (A)	2	1	0	37.73	.0001
Group (B)	2	2	1	25.72	.0001
Group (C)	2	2	2	19.6	.0001

3.3 Discussion

Results of the presenting study revealed that, trancutaneous electrical acupoint stimulation of P6 point appears to be more effective than acupressure in alleviating post-operative nausea and vomiting after abdominal hysterectomy.

There was statistically significant decrease in nausea and vomiting scales for group A, that was treated by TEAS in addition to anti-emetic drug, this was supported by Wang et al. [13] who concluded that, the prevalence of nausea, vomiting was significantly lower with TEAS at the P6 acupoint. TEAS at the P6 meridian points are an effective adjunct to standard antiemetic drug therapy for prevention of nausea and vomiting in patient undergoing supratentorial craniotomy.

Liu et al. [14] evaluated the efficacy of transcutaneous electroacupoint stimulation for the prevention of postoperative nausea and vomiting (PONV) in patients undergoing laparoscopic cholecystectomy. The incidence of nausea and vomiting, the dose of antiemetics and the occurrence of severe nausea were all significantly lower in the treated group compared with the control group and the score for pain was reduced in patients of the treated group at 24 hours post-operation.

Cekmen et al. [15] stated that, TENS decreased postoperative nausea and vomiting, frequency of dizziness, additional antiemetic and analgesic needs as well as PONV scores were lower. Also, Electrical stimulation of the vestibular system may be useful in the prevention of PONV.

These come in consistent with Fang et al. [6] who stated that, TEAS combined with general anesthesia can improve the recovery of gastric dynamics and the functional protection of stomach in hypertensive dogs.

Lee and Done [16] showed that non-pharmacologic techniques (acupuncture, electroacupuncture, transcutaneous electrical nerve stimulation, acupoint stimulation, and acupressure) were equivalent to commonly used antiemetic drugs in preventing vomiting after surgery. Non-pharmacologic techniques were more effective than placebo in preventing nausea and vomiting within 6 h of surgery in adults, but there was no benefit in children.

The results of the present study revealed that, there was a significant decrease in nausea and vomiting scales for group B, which was treated by acupressure in addition to anti-emetic drug, this was supported by White et al. [17] who suggested that acupressure was at least as effective as anti-emetics for preventing nausea. Time was another important variable, with significant effects of acupressure in the first 6 hours.

Acupressure seems to be a good way to complement anti-emetic pharmacotherapy, as it is safe, convenient and with minimal (bands) or no costs (finger acupressure) involved. These make it a cost-effective intervention Molassiotisa et al. [9].

Also, Klein et al. [18] demonstrated positive effects of Sea Bands acupressure at acupoint P6 for prevention of postoperative nausea and vomiting outcomes in female cardiac surgical patients.

Use of the acupressure device in combination with antiemetic drugs provided a reduction in the incidence of vomiting after surgery; also, patients were satisfied with an associated improvement in their PONV management, White et al. [19].

Also, P6 acupressure with nurse-provided counseling appeared to be effective in reducing chemotherapy-induced nausea and vomiting in patients with breast cancer, Suh [20].

Kim et al. [21] added that Nei-Guan acupressure is recommended for nursing practice as a way for alleviating the opioid-induced nausea and accelerating the recovery of patients after surgery.

Acupressure at P6 causes a significant reduction in the incidence of PONV and the requirement for rescue medication in the first six hours following laparoscopic cholecystectomy, Agarwal et al. [22].

Liodden et al. [23] indicated the effectiveness of acustimulation as an adjunct to standard treatment for postoperative vomiting in children undergoing adenoidectomy or tonsillectomy.

Dundee et al. [24] research has almost consistently shown that adding acupuncture to anti-emetic therapy can significantly decrease nausea and vomiting. In a more recent well-designed randomised trial of breast cancer patients receiving high emetogenic chemotherapy, Shen et al. [7] have shown that vomiting decreased from a median of 15 episodes in the antiemetics only group to a median of 5 episodes in the antiemetics plus electroacupuncture group . However, the non-invasive form of acupuncture, acupressure, has received little attention in oncology. Acupressure involves using pressure instead of needling to the same points used in acupuncture, but it is safer than acupuncture, less expensive and patients can easily learn to apply pressure on their own.

In contrast, Majholm and Møller [25] did not find the Vital-Band effective in preventing either nausea or vomiting after operation in women undergoing breast surgery.

Also, Sinha et al. [26] added that, acupressure wristbands applied bilaterally did not reduce the incidence of nausea and vomiting during labour and delivery.

4. CONCLUSION

In conclusion, Trancutaneous electrical acupoint stimulation of P6 point appears to be more effective than acupressure in alleviating post-operative nausea and vomiting after abdominal hysterectomy.

RECOMMENDATIONS FOR FURTHER RESEARCH

Transcutaneous electrical acupoint stimulation (TEAS) and acupressure is easily applied and patients should be informed about their potential role and taught how to apply them. Leaflets about TEAS and acupressure for the management of nausea and vomiting could be available in post-operative units so that patients who are interested to use such a technique are encouraged to come forward and learn more from physical therapist or other health professionals. This can add to the patients' options of their anti-emetic approaches and empower them to be involved in the management of these distressing side effects .Future research should shed light in other acupuncture points for nausea and vomiting management. Most studies to date have been conducted with women; studies should be directed to men, as gender issues. The role of TEAS and acupressure in managing pregnancy-related nausea and vomiting should be explored in future research.

CONSENT

All authors declare that 'written informed consent was obtained from the patient before starting the study for publication of this case report.

ETHICAL APPROVAL

This study was approved by ethical committee of faculty of Physical Therapy, Cairo University.

ACKNOWLEDGEMENTS

Many thanks, to all patients who participated in this study for their co-operation.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Wu JM, Wechter ME, Geller EJ, Nguyen TV, Visco AG. Hysterectomy rates in the United States, 2003. Obstet Gynecol. 2007;110(5):1091-93.
2. Watcha M, White P. Postoperative nausea and vomiting. Its etiology, treatment and prevention. Anesthesiology. 1992;77:162-84.
3. Carroll N, Miederhoff P, Cox F, Hirsch, J. Post operative nausea and vomiting from outpatient surgery centers. Anesth Analg. 1995;80(5):903-909.
4. Hickman A, Bell D, Preston J. Acupressure and postoperative nausea and vomiting. AANA J. 2005;73(5):379–385.
5. Philip BK. Etiologies of postoperative nausea and vomiting. P & T. 1997;18S–25S.
6. Fang JQ, Zhang LL, Shao XM, Lian LL, Yu XJ, Dong ZH, Mo YD. Effects of transcutaneous electrical acupoint stimulation combined with general anesthesia on changes of gastric dynamics in controlled hypotension dogs. Zhen Ci Yan Jiu. 2011;36(6):397-402.
7. Shen N, Wegner J, Glaspy A. Electroacupuncture for control of myeloablative chemotherapy-induced emesis: a randomized controlled trial. JAMA. 2000;284:2755–2761.
8. Dundee JW, Ghaly RG. Does the timing of P6 acupuncture influence its efficacy as a postoperative antiemetic? Br J Anaesthesia. 1998;63:630-632
9. Molassiotisa AM, Helinb R, Dabboura S. The effects of P6 acupressure in the prophylaxis of chemotherapy-related nausea and vomiting in breast cancer patients. Complement Ther Med. 2007;15(1):3-12.
10. Coffin B, Azpiroz F, Malagelada J. Somatic stimulation reduces perception of gut distension in human. Gastroenterology. 1994;107:1636-1642.
11. Dundee J. Acupuncture/Acupressure studies of its use in postoperative vomiting, cancer chemotherapy and sickness of early pregnancy. Complementary Medical Research. 1988;3:2-14.
12. Abraham J. Acupressure and acupuncture in preventing and managing postoperative nausea and vomiting in adults. J Periop Practice. 2008;18(12):543–551.

13. Wang XQ, Yu JL, Du ZY, Xu R, Jiang CC, Gao X. Electroacupoint stimulation for postoperative nausea and vomiting in patients undergoing supratentorial craniotomy. J Neurosurg Anesthesiol. 2010;22(2):128-131.
14. Liu YY, Duan SE, Cai MX, et al. Evaluation of transcutaneous electroacupoint stimulation with the train-of-four mode for preventing nausea and vomiting after laparoscopic cholecystectomy. Chin JIntegr Med. 2008;14(2):94-97.
15. Cekmen N, Salman B, Keles Z, Aslan M, Akcabay M. Transcutaneous electrical nerve stimulation in the prevention of postoperative nausea and vomiting after elective laparoscopic cholecystectomy. J Clin Anesth. 2007;19(1):49-52.
16. Lee A, Done M. The use of nonpharmacologic techniques to prevent postoperative nausea and vomiting: a meta-analysis. Anesth Analg. 1999;88:1362–1369.
17. White P, Issioui T, Jones S. Comparative efficacy of acustimulation Relief Band versus ondansetron in combination with droperidol for preventing nausea and vomiting. Anesthesiology. 2002;97(5):1075–1081.
18. Klein A, Djaiani G, Karski J. Acupressure wristbands for the prevention of postoperative nausea and vomiting in adults undergoing cardiac surgery. J Cardiothorac Vasc Anesth. 2004;18(1):68–71.
19. White PF, Zhao M, Tang J, Wender RH, Yumul R, Sloninsky AV, Naruse R, Kariger R, Cunneen S. Use of a disposable acupressure device as part of a multimodal antiemetic strategy for reducing postoperative nausea and vomiting. Anesth Analg. 2012;115(1):31-37.
20. Suh EE. The effects of P6 acupressure and nurse-provided counseling on chemotherapy-induced nausea and vomiting in patients with breast cancer. Oncol Nurs Forum. 2012;39(1):1-9.
21. Kim NC, Yoo JB,Cho MS, Shin EJ, Hahm TS. Effects of Nei-Guan acupressure on nausea, vomiting and level of satisfaction for gynecological surgeryin patients who are using a patient-controlled analgesia. J Korean Acad Nurs. 2010;40(3):423-32.
22. Agarwal A, Bose N, Gaur A. Acupressure and ondansetron for postoperative nausea and vomiting after laparoscopic cholecystectomy. Can J Anesth. 2002;49(6):554–560.
23. Liodden I, Howley M, Grimsgaard AS, Fønnebø VM, Borud EK, Alraek T, Norheim AJ. Perioperative acupuncture and postoperative acupressure can prevent postoperative vomiting following pediatric tonsillectomy or adenoidectomy: a pragmatic randomised controlled trial. Acupunct Med. 2011;29(1):9-15.
24. Dundee G, Ghaly T, Fitzpatrick P, Abram A. Acupuncture prophylaxis of cancer chemotherapy-induced sickness.J R Soc Med. 1989;82:268–271.
25. Majholm B, Møller AM. Acupressure at acupoint P6 for prevention of postoperative nausea and vomiting: a randomised clinical trial. Eur J Anaesthesiol. 2011;28(6):412-419.
26. Sinha A, Paech MJ, Thew ME, Rhodes M, Luscombe K, Nathan E. A randomised, double-blinded, placebo-controlled study of acupressure wristbands for the prevention of nausea and vomiting during labour and delivery. Int J Obstet Anesth. 2010;20(2):110-117.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history.php?iid=205&id=12&aid=1765