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Research Article / Araştırma

The effects of preoperative anxiety and acupressure on postoperative nausea and vomiting in breast surgery

Meme cerrahisinde preoperatif anksiyete ve akupresürün postoperatif bulantı ve kusmaya etkisi

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ABSTRACT

Aim: Postoperative nausea and vomiting are common complications following surgery and anesthesia. Antiemetic drugs are highly effective for preventing postoperative nausea and vomiting, but there may be increased costs and undesirable side effects may occur. Acupuncture stimulation methods successfully prevent postoperative nausea and vomiting and are non-invasive. The aim of this study is to evaluate the effectiveness of acupuncture point on postoperative nausea and vomiting in patients undergoing breast surgery. **Materials and Methods**: Patients aged between 18 and 60 years were included in the study. Patients were randomized into one of two groups: acupressure and control. In the acupressure group, 30 minutes before surgery, acupressure wrist bands were placed at the P6 point. In the controls, wrist bands were placed at a non-acupoint site. **Results**: Fifty patients received acupressure and 50 were controls. There was no significant difference between the groups in terms of demographic characteristics. At the postoperative 24th hour, 46% of patients in the acupressure group had nausea and vomiting compared to 74% controls. The difference between the groups was significant ($p<0.05$). There was no significant difference between postoperative nausea and vomiting scores at 1, 4, 12, 18, and 24th hours. The severity of postoperative nausea and vomiting was significantly lower with acupressure ($p<0.05$). The incidence of antiemetic use was significantly lower with the acupressure group. **Conclusions**: Compared to antiemetic drugs there are no side effects or drug interaction with acupressure. Thus patients may easily accept it. Therefore, acupressure may be an effective alternative therapy for postoperative antiemetic therapy.

ÖZ

Amaç: Bulantı ve kusma, ameliyat ve anestezi sonrası sık görülen komplikasyonlardır. Antiemetik ilaçlar postoperatif bulantı ve kusmayı önlemede oldukça etkilidir, ancak maliyetler artabilir ve istenmeyen yan etkiler ortaya çıkabilir. Akupunktur stimülasyon yöntemleri, ameliyat sonrası bulantı ve kusmayı başarılı bir şekilde önler ve invaziv değildir. Bu çalışmanın amacı meme cerrahisi geçiren hastalarda akupunktur noktasının postoperatif bulantı ve kusma üzerindeki etkinliğini değerlendirmektir. **Gereç-Yöntem:** Çalışmaya 18-60 yaş arası hastalar dahil edilmiştir. Hastalar iki gruptan birine randomize edilmiştir: akupresür ve kontrol. Akupresür grubunda ameliyattan 30 dakika önce P6 noktasına akupresür bileklikleri yerleştirilmiştir. Kontrollerde, akupunktur noktası olmayan bir bölgeye bilek bantları yerleştirilmiştir. **Bulgular**: Elli hasta akupresür aldı ve 50 hasta kontrol olarak incelendi. Gruplar arasında demografik özellikler açısından anlamlı fark yoktur. Postoperatif 24. saatte akupresür grubundaki hastaların %46'sında, kontrol grubunun %74'ünde bulantı ve kusma görülmüştür. Gruplar arasındaki fark anlamlıdır ($p<0.05$). 1, 4, 12, 18 ve 24. saatlerde postoperatif bulantı kusma skorları arasında anlamlı fark yoktur. Akupresür grubunda ameliyat sonrası bulantı ve kusma şiddeti anlamlı olarak daha düşüktür ($p<0.05$). Benzer şekilde antiemetik kullanım insidansı da anlamlı olarak daha düşüktür. **Sonuç**: Antiemetik ilaçlarla karşılaştırıldığında, akupresür ile herhangi bir yan etki veya ilaç etkileşimi yoktur. Böylece hastalar kolaylıkla kabul edebilirler. Bu nedenle, akupresür postoperatif antiemetik tedavi için etkili bir alternatif tedavi olabilir.

INTRODUCTION

Postoperative nausea and vomiting (PONV) is one of the most common side effects after surgery and anesthesia. PONV is very uncomfortable for patients. It can also lead to other complications after surgery. PONV management mainly covers risk assessment and prophylactic measures (1).

The post-operative frequency of PONV is considered to be approximately 30% (2). This risk may increase up to 80% in high-risk patient groups or high-risk surgical procedures (3). This is the reason for the negative effects on patient satisfaction. The length of stay in the post-anesthesia care unit may be prolonged due to PONV. Maintenance costs increase due to extended periods (2).

The incidence of PONV after breast surgery in women is higher than normal and is approximately 70%. Female

patients have higher anxiety, which increases the risk. PONV after breast surgery can cause complications such as dehydration, electrolyte imbalance and esophageal rupture (4).

Nausea and vomiting are common symptoms that negatively affect the life comfort of patients. It can develop due to defense against a toxin. It can be caused by drugs, anesthesia and psychiatric disorders (5). Antiemetic drugs used against nausea and vomiting and premedication have various side effects and high costs. Antiemetics have a wide spectrum of side effects, from headaches and dizziness to anaphylaxis. Among its side effects, tardive dyskinesia, akathisia, and dystonia are well-defined extrapyramidal symptoms (6). Prolongation of the QT axis on EKG is one of the life-threatening complications of these agents (7). For this reason, the search for alternative treatments that are cost-effective and have fewer side effects continues.

One of the alternative treatment approaches is acupuncture applications. The World Health Organization has accepted acupuncture as a complementary medical technique. It is used to reduce postoperative pain, prevent PONV, and sedation. Stimulation of the nei guan (pericardium 6) acupoint effectively prevents PONV (8,9).

Acupressure is a complementary therapy that uses the fingers and hands to stimulate acupuncture points. Acupressure has been shown to be effective in relieving a variety of pain in different populations (10).

The aim of this study is to evaluate the effectiveness of acupressure, a non-invasive method, on postoperative nausea and vomiting in patients undergoing breast surgery.

MATERIAL AND METHODS

Participants

A total of 100 patients, 50 in the acupressure group and 50 in the control group, completed the study. 100 female patients aged between 18 and 60, whose physical status was ASA (American Society Of Anesthesiologist) I and II, who had undergone breast surgery, were included in the study. Participants were randomly divided into the treated group (acupressure group) and the control group. This study is randomized and double-blind.

Exclusion Criteria

Participants with a history of PONV or motion sickness, kidney or liver failure, diabetes, smoking, obesity (BMI>35kg/m2), use of antiemetic or H2 receptor antagonist drugs, and age <18 or >60 were excluded from the study.

Anesthesia Technique

It is standardized for all patients. After ECG, heart rate, SpO2 and non-invasive blood pressure monitoring, thiopental 5 mg/kg IV and fentanyl 1-2 µg/kg IV induction were performed. 0.6 mg/kg rocuronium was used for neuromuscular blockade. Anesthesia was provided with 1-2% sevoflurane, 60% N2O-40% O2. At the end of the operation, the residual block was reversed with 0.04-0.08 mg/kg neostigmine and 0.15 mg/kg atropine, and all surgical procedures were completed by experienced surgeons. Antiemetic drugs were not used at the end of the operation. When the patients were taken to the recovery room, they were evaluated in terms of nausea and vomiting scores at 0, 1, 2, 4, 6, 12, 18 and 24 hours.

Nausea Vomiting Scores

A five-point scale system was used to measure the PONV score. Accordingly, 0: no nausea; 1: light; 2: medium; 3: severe; 4: vomiting once; 5: classified as vomiting more than once. If the PONV score was three or more, 4mg IV ondansetron was used. If the VAS (Visual Analogue Scale) score was three or more, 75 mg IM diclofenac was used for analgesia.

Acupressure Process

Acupuncture point P6 (pericardial meridian, Nei guan) was determined on both arms 30 minutes before

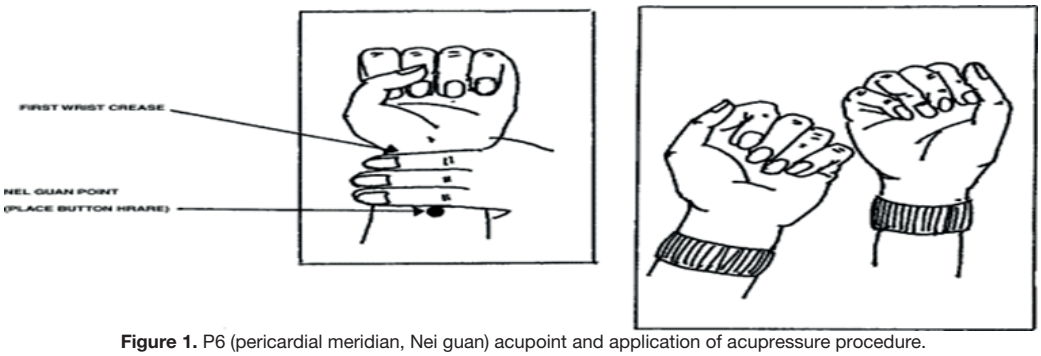

Figure 1. P6 (pericardial meridian, Nei guan) acupoint and application of acupressure procedure.

surgery. The P6 acupoint is located 2 inches proximal to the distal wrist crease between the flexor carpi radialis and palmaris longus tendons (Figure 1). In the acupressure group, pressure was applied to the P6 point of both wrists with plastic beads. In the control group, acupressure was not performed, and pressure was applied to the dorsal face with a plastic bead.

Ethic

Participation in the study took place on a voluntary basis. There was no compulsion to participate. Voluntary consent forms were obtained from the participants. It was obtained from the local hospital ethics committee with the necessary ethical permission for the study.

Statistical analysis

SPSS 16.0 was used to analyze the collected data. The mean parameters were demonstrated as "arithmetic mean± standard deviation." The qualitative parameters were assessed using the chi-square test. The quantitative parameters were assessed by the Mann-Whitney U-test and Kruskal Wallis variance analysis. Pearson's and Spearman's correlation analysis were used for correlation analysis. The tests were processed at a significance level of 0.05.

RESULTS

Nine patients were ASA I and 91 were ASA II. There was no significant difference between the groups in terms of age and duration of operation (Table 1).

During the first 24 postoperative hours, nausea and vomiting were observed in 37 (74%) and 18 (36%) patients in the control and acupressure groups, respectively. PONV frequency was statistically significantly different between acupressure and control groups (p=0.0001). The ratio of patients who did not experience nausea or vomiting was 64% and 26% in the acupressure and control groups, respectively.

Table 1. Demographic data

	Acupressure Group	Control	p
Mean age (years)	49±7.3	47±6.4	0.187
Duration of operation (min)	111±32	117±31	0.367
ASA I / II (n)	7 / 43	2 /48	0.160

Table 2. PONV scores in the first 24 hours according to the groups

PONV score	Acupressure Group	Control
0 (no nausea)	32 (64%)	13 (26%)
1 (ligh)	10 (20%)	3 (6%)
2 (moderate)	2 (4%)	2 (4%)
3 (severe)	1 (2%)	22 (44%)
4 (vomiting once)	4 (8%)	8 (16%)
5 (>1 vomiting)	1 (2%)	1 (2%)

Table 3. Number of patients requiring postoperative antiemetic administration

	Acupressure Group	Control	p
0 hours	4	13	0.033
1 hours	2	11	0.017
2 hours	0	6	0.027
4 hours	0	2	0.495
6 hours	0	6	0.027
12 hours	0	3	0.242
18 hours	0	1	1.0
24 hours	0	0	

The highest PONV scores recorded during the first 24 postoperative hours were 3 in case and control group (P=0.0001). PONV severity was lower in the acupressure group. The number of patients with a PONV score of 3 and above was 6 (12%) and 31 (62%) in the acupressure and control groups, respectively (p=<0,01) (Table 2). Antiemetic (ondansetron) therapy use was more common among the patients in the control group. Table 3 shows the hourly antiemetic requirements.

CONCLUSION

The incidence of PONV in patients undergoing breast surgery without prophylactic antiemetic therapy is 50-80% (11,12) and in patients who receive one or two component prophylaxis is 10-50% (1,13).

Nausea, retching, and vomiting are the most uncomfortable postoperative complications after local, regional, or general anesthesia. Many patients reported PONV is more uncomfortable than pain. Several antiemetic drugs are used to prevent PONV (14). Droperidol is effective, but has side effects such as agitation, sedation, extrapyramidal reaction, and delayed recovery (15). Phenothiazine and antihistaminic can cause sedation and lethargy. Metoclopramide, which is an effective antiemetic, can cause dystonic reaction, stupor, and tachycardia (6). 5HT3 receptor antagonists have fewer side effects but an increased cost (16). Contrary to drugs, noninvasive acupressure techniques have fewer side effects, no drug interactions, and are easily accepted and costeffective. Therefore, they are suitable for routine antiemetic therapy and prophylaxis (17).

Agarwal et al. reported the effectiveness of acupuncture-acupressure therapy, which is a non-pharmacological technique to prevent PONV comparative placebo and antiemetics (metoclopramide, droperidol, and ondansetron) (18).The mechanism of acupressure-acupuncture is not clear, but it has been reported that it can increase -endorphins in cerebrospinal fluid and potentiates the endogen antiemetic effect on μ receptors (19). Serotoninergic and norepinephric activation and the changes in serotonin transmission can contribute to the antiemetic activity of acupuncture (20). The increase observed in gastric motility upon acupuncture-acupressure stimulation indicates the potential roles of central dopaminergic receptors in antiemetic activity (21). The P6 (Nei guan) acupuncture point, on the pericardium meridian, is used to treat vomiting and other gastric conditions in traditional Chinese medicine. The P6 acupuncture point is stimulated invasively by a needle or by transcutaneous electrical stimulation, and noninvasively by acupressure represent the optimum techniques (22).

Dundee et al. showed a lack of efficacy of acupuncture-acupressure in the prevention of PONV and further demonstrated that the localization or activation timing of the P6 point was incorrect (23). It has been previously reported that stimulation of the P6 point before induction of anesthesia and before opioid administration provides antiemetic activity, and this technique is as effective as antiemetics like droperidol and ondansetron in the prevention of postoperative nausea and vomiting after various surgical interventions (24). Weightman et al indicated that the antiemetic activity of Nei guan point was not reproducible in terms of reducing PONV (25). This observation established the basis for the discussions on the importance of initiating acupuncture before the induction of general anesthesia (26). In the present study, the acupressure band was applied 30 minutes before induction and was not removed for 24 hours postoperatively. In all of the studies in which acupuncture was performed after the induction of anesthesia, stimulation of this point was found to have similar or even less efficacy compared to the control group. In contrast, statistical superiority to the control group was demonstrated when acupuncture was performed while the patients were still conscious. Vickers performed a secondary analysis of 12 high-quality, randomized, and placebo-controlled studies investigating the stimulation of the Neiguan point in conscious patients. In 11 studies involving almost 2000 patients, stimulation of this point provided significant positive effects in terms of preventing nausea and vomiting, and the results were still consistent, even though the patient groups were different and the investigators preferred different techniques to stimulate the acupuncture point (27). Although there are alternative explanations asserting that the placebo effect is responsible for the antiemetic effects of acupuncture in conscious patients, the concept of the placebo effect has been opposed by several studies involving adequate placebo-control groups. In a better designed study, presumably performed using more advanced techniques, Shenkman et al. interestingly reported that bilateral stimulation of Nei guan point in children, even after the induction of general anesthesia, was effective in reducing PONV (28). The Nei guan point is considered to be the effective point for PONV (22). Although the specific effects of all points and their combinations have not been extensively studied, there are in fact more than 30 usual meridian acupuncture points that are known to be effective on nausea and vomiting (29).

Compared to traditional Chinese acupuncture, the Korean Hand Acupuncture system is more recent and less studied. In their randomized, double-blind, placebo-controlled trial, Kim et al. reported a 50% reduction in PONV by the application of capsicum (Capsaicin) plaster

on the lateral distal phalanxes of the index fingers of both hands after abdominal hysterectomy (30).

While it is unclear whether to use unilateral (dominant, non-dominant) or bilateral arms for acupressure application, bilateral stimulation is so far considered to be more effective. In the present study, bilateral P6 point stimulation was initiated before the induction of anesthesia and the bilateral acupressure technique was preferred, as it can be used in the postoperative long-term compared to invasive acupuncture. Bilateral acupressure bands were applied to both groups in order to eliminate potential psychological and placebo effects. Acupressure was found to be an option that can be preferred for PONV prophylaxis. While acupressure reduced the frequency and severity of PONV, it could not completely prevent PONV when used alone. Therefore, acupressure can be preferred as a component of combination therapy in high-risk patients.

While no specific complications of needling acupuncture points has been defined, it should be kept in mind that needling still bears the risk of injury to blood vessels or nerves, and sepsis (31). De-Qi sensation, as the patients define using the words such as pain, sensibility, numbness, heating, tenderness, and dullness, should be experienced when the correct acupuncture points are needled (32) Acupressure does not induce the De-Qi sensation and position of the proper acupuncture points can be suboptimal.

This represents a limitation of the present study. However, the present study including 100 patients who underwent breast surgery indicated that prophylactic acupressure stimulation of the P6 point provided significant reduction in PONV frequency and severity, similar to the needling technique. We believe that the application of the acupressure bands at acupuncture points can be a useful option for preventing postoperative nausea and vomiting, as this method represents a non-invasive, simpler, easier, and painless method compared to the invasive acupuncture needling technique and does not require any special training.

Prophylactic therapy is not given to patients with low PONV risk, unless they have a risk of developing a medical sequel (such as intracranial pressure increase or fundoplication surgery) due to vomiting. Regional anesthesia should be preferred in patients with moderate and high PONV risk, and risk factors should be minimized if general anesthesia cannot be avoided. Non-pharmacological techniques such as acupuncture, acupressure, transcutaneous electrical nerve stimulation, and acupoint stimulation should be considered as the first choice, and double or triple combinations of the techniques with different effects should be applied to high-risk patients.

The present study showed that the non-pharmacological prophylactic acupressure technique, which was applied at the P6 point, was effective in preventing PONV. We believe that this technique can be preferred in clinical practice as an alternative to standard antiemetics, particularly in patients with a high risk of PONV.

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