

Acustimulation of the neiguan point during gastroscopy: Its effects on nausea and retching

Gastroskopi esnasında neiguan noktasının akustimulasyonu: Bulantı ve öğürme üzerine etkileri

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Background/aims: Gastroscopic procedure causes nausea and retching in many patients. Recently, alternative methods have been employed in an effort to reduce these symptoms. The Neiguan point (P6) is an acupuncture point that has been used for approximately 3,000 years to overcome gastric symptoms including nausea and retching. The aim of this study was to investigate the effects of the stimulation of the P6 acupoint on swallowing, nausea and retching during the gastroscopic procedure. **Methods:** Three hundred and twenty-seven patients who visited the gastroenterology unit for dyspeptic complaints were included in the study. A portable transcutaneous electrical nerve stimulation device (Reliefband; Maven Lab, Yuba City, CA) was used for acustimulation. The device was attached 15 minutes before the endoscopic procedure and no sedation was applied. The device was turned on in 78 patients (Group 1). The device was attached but not turned on in another 79 patients (Group 2). In Group 3, the device was attached to the Sham point (n: 79). In Group 4 the procedure was performed with no attachments (n: 77). Fourteen patients dropped out of the study because esophagogastroduodenoscopy could not be completed due to patient intolerance or to obstruction in the upper gastrointestinal tract. After the procedure, each patient's opinion about the severity of nausea and retching was measured on a visual analogue scale. Distress in swallowing and the impression of the endoscopist during the procedure were scored from 1 to 4. Patients were queried regarding their willingness to undergo re-endoscopy. **Results:** Groups were compared regarding their distress in swallowing the endoscope, nausea and retching, the impression of the endoscopist during the procedure and their acceptance of re-endoscopy. Groups 1, 2, 3 and 4 were compared using the chi-square test, and no significant difference was observed between the groups ($p>0.05$). **Conclusions:** Acustimulation of the Neiguan (P6) acupoint does not relieve patients of the nausea observed during gastroscopy, and its application does not facilitate the procedure.

Amaç: Gastroskopik işlemler bir çok hastada bulantı ve öğürmeye neden olmaktadır. Son zamanlarda bu semptomları azaltmak için alternatif yöntemler denenmektedir. Neiguan (P6) noktası bulantı ve öğürme gibi gastrik semptomların üstesinden gelmek için 3000 yıldan beri kullanılan bir yöntemdir. Bu çalışmanın amacı P6 akupunktur noktasının stimülasyonunun gastroskopi esnasında ortaya çıkan bulantı ve öğürme üzerine olan etkilerini araştırmaktır. **Yöntem:** Dispeptik yakınmalarla Gastroenteroloji servisine başvuran 327 hasta çalışmaya dahil edildi. Akusitumulasyon için taşınabilir elektriksel sinir stimülasyon cihazı (Reliefband; Maven Lab, Yuba City, CA) kullanıldı. Cihaz sedasyon uygulanmadan endoskopik işlemin 15 dakika öncesinde bağlandı ve 78 hastada çalıştırıldı (Grup 1). 2. Gruba (n:79) cihaz bağlandı fakat çalıştırılmadı. 3. Gruptaki hastalarda (n: 79) cihaz sham akupunktur noktasına bağlandı. 4. Gruptaki hastalara (n: 77) cihaz bağlanmadan işlem yapıldı. İşlemden sonra hastaların bulantı ve öğürme hakkındaki fikirleri görsel analog skala kullanılarak ölçüldü. Yutma güçlüğü ve endoskopistin işlem hakkındaki kanaati 1'den 4'e kadar skorlandı. Hastalara tekrar endoskopi yaptırtıp yaptırmayacakları soruldu. **Bulgular:** Gruplar endoskobu yutma güçlüğü, bulantı- öğürme, endoskopistin işlem hakkında kanaati ve hastaların yeni bir endoskopik işlemi kabulleri açısından karşılaştırıldı. Ki-kare testi kullanılarak yapılan istatistiksel hesaplamalar sonucunda gruplar arasında anlamlı bir fark gözlenmedi. **Sonuç:** P6 noktasının akustimulasyonu gastroskopi esnasındaki bulantı kusmayı azaltmamakta ve işlemi kolaylaştırmamaktadır.

Key words: Neiguan, acustimulation, gastroscopy, nausea, retching

Anahtar kelimeler: Neiguan, akustimulasyon, gastroskopi, bulantı, öğürme

INTRODUCTION

Esophagogastroduodenoscopy (EGD) is an unpleasant examination because of the retching and nausea experienced during the procedure (1). During

EGD, because of air insufflation and gastric irritation caused by the endoscope, the gastric walls are distended and this stimulates the vomiting center

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via sympathetic and vagal afferents (2). Then, regardless of the emetic stimulus or the mechanism by which the vomiting center is activated, the act of vomiting and retching are initiated from the vomiting center, and efferent pathways are mainly somatic, involving the vagus, the phrenic nerves, and the spinal nerves that supply the abdominal musculature (3). During retching and vomiting, the antrum and pylorus of the stomach contract while the fundus and cardia relax (4). Increased intragastric pressure forces gastric contents into the esophagus. The abnormal motility patterns observed throughout retching and vomiting preclude an optimum field of vision during EGD. Although conscious sedation with diazepam or midazolam, which are given alone or with an opioid such as meperidine intravenously, is used to overcome these effects, these medications are sometimes not helpful, and most sedated patients are still able toretch (1). Furthermore, these medications may lead to respiratory insufficiency, hypotension, cardiac arrhythmias, pain on injection, phlebitis and allergy. These sedatives may affect coordination and judgement, requiring that patients not drive or operate machinery on the same day (5). Occasionally some patients refuse the medications. Thus, alternative methods to prevent retching and nausea are being investigated.

Acupuncture, a traditional method of treatment, has been used for more than 3,000 years. This method has been used to relieve pain and sometimes to prevent nausea and vomiting. The procedure is simple, inexpensive and has no major side effects. The Neiguan point (P6 point) is used in acupuncture to prevent emesis and is located between the tendons of the flexor carpi radialis and palmaris longus muscles, 3 fingerbreadths above the wristline (6, 7). Acupuncture needles, acupressure method or acustimulation of P6 can be used for the stimulation of this point (8).

The effect of acustimulation of P6 point on nausea and vomiting is not well understood, but it has been suggested that increased hypophyseal release of beta-endorphins and ACTH along with chemoreceptor trigger zone (CTZ) inhibit the vomiting center (9). Also, placebo and psychogenic effects may play a role (10).

Research has shown the efficacy of both acustimulation and the acupressure band in reducing postoperative nausea and vomiting (PONV) after minor or major gynecological procedures (10-12), as well as nausea due to cancer chemotherapy (13)

and motion sickness. In studies that investigated the effect of this method in motion sickness (14, 15), electrogastrography was also used, and reduction in gastric motility and increment in regular gastric myoelectrical activity were observed (16).

These findings suggested that nausea-retching, tachygastria and gastric dysrhythmia during EGD may be reduced by acustimulation of P6.

The aims of our study were to determine whether the acustimulation of P6 reduces nausea-retching and increases the quality of the endoscopic procedure with respect to patients and the endoscopist during EGD.

MATERIALS AND METHODS

Three hundred and twenty-seven patients who attended the gastroenterology units of GATA Haydarpaşa and Gümüşsuyu Military Hospital with dyspeptic complaints were included in the study. Institutional Review Board approval for the study and written informed consent from the patients were obtained prior to the study. Before study procedures, information on previous history of predisposition to nausea and vomiting, smoking, gastric complaints, alcohol usage, use of medications, motion sickness and previous experience with nausea and vomiting was obtained. Patients with a history of gastroscopy and gastric, intestinal or gall bladder surgery; pregnant women; diabetic, hypertensive, uremic patients; patients with renal insufficiency; patients who received chemotherapy; and patients with gastrointestinal obstruction; infection in upper extremities; and neurological or vascular disorders were excluded. Before the procedures, the patients were informed about differences between the terms "nausea", "retching" and "vomiting", and they were instructed not to use these terms interchangeably. Vomiting was not used as an index because the patient's stomach was empty. Nausea was defined as a subjective unobservable phenomenon of an unpleasant sensation experienced in the back of the throat and the epigastrium, which may or may not result in vomiting (also referred to as "feeling sick in the stomach". Retching is the attempt to vomit without expelling any material, also called "dry heaves" (17-19).

The choice of acupoint and Sham-point

A point on the dorsal side of the right forearm, four fingerbreadths proximal to the proximal flexor palmar crease was used for Sham stimulation.

Two physicians were trained about the P6 point and Sham point by an anesthesiologist experienced in the field of acupuncture, and following the training session, these two physicians (fellows of Internal Medicine) were asked to find the location of acupoint and Sham point on 63 patients. A concordance rate of 97% was achieved between the two physicians, who were informed whether the device was applied or turned on. Endoscopists were blinded as to the application or the state of the device in accordance with Kaptchuk's suggestions (20). To provide complete blinding, the patient's right wrist was totally covered with a band.

Acustimulation was applied on the right hand unilaterally with a portable, watch-like, battery-powered acustimulation device (Reliefband; Maven Lab, Yuba City, CA), which provides a low-frequency, low-intensity, burst-train type of stimulation to the specific acupoint. The operating voltage is 4-4.5 volt, and the stimulation pulse intensity level is 0-28 mA. In this study, the reliefband was operated selectively at mode B, which provides a moderate frequency (4 Hz) of stimulation. The skin contact surface has two metal electrodes. Before the device is attached, a conductive gel is applied.

Patients

The patients were randomly assigned without stratification and classified into four groups. Acustimulation device was attached and turned on 15 minutes prior to the procedure in Group 1 (n: 78). In Group 2, the device was attached but not turned on (n: 79). In Group 3, the device was attached to the Sham point (n: 79). And in Group 4 the procedure was performed with no attachments (n: 77). Patients in Groups 1, 2 and 3 were informed about the device before the procedure, but they were not aware of whether or not the device was turned on.

Local anesthesia with xylocaine was applied to the pharynx, but no sedation was used. At the end of the procedure, the patients were asked about the degree of difficulty in swallowing the endoscope (easy, moderately easy, difficult, very difficult). The patient's opinion about the severity of nausea and retching was measured on a visual analogue scale (VAS), which was divided into four main parts. The endpoints were assigned "no nausea" to the left and "worst possible nausea" to the right (10). The endoscopists were also asked to rate the procedure considering the following: 1. no nausea and retching; 2. a duration of nausea and retching

of less than 25% of the total procedure; 3. a duration of nausea and retching of between 25% and 50% of the total procedure; and 4. a duration of nausea and retching of between 50% and 100% of the procedure. A concordance rate of 94% between the two endoscopists was observed when they were queried about the degree of difficulty experienced during the first 50 procedures.

Patients were asked if they could undergo re-endoscopy if required. The data were compared using the chi-square test.

RESULTS

There were no significant differences between patient groups with regard to age, gender, educational status, marital status, use of alcohol, body mass index, previous experience of nausea-vomiting, and motion sickness. The mean age was 48±11 y (range: 17-86), and 46% of all patients were older than 40 years of age. The female: male ratio was 1:1.1. In general, nausea and retching scores showed a moderate severity in all groups. Severe nausea-retching was infrequent (Table 1), and there were no differences between the groups in this respect (p>0.05). The "difficulty in swallowing" scores usually showed a similar distribution among the four groups (Table 2), and there again were no significant differences between the groups (p>0.005). Generally, endoscopists regarded the procedure as "easy" (Table 3), and the groups did not differ in this regard (p>0.005). The majority of patients in all four groups declared that they would undergo re-endoscopy if required (Table 4), and there were no significant differences among the proportion of the patients declaring an affirmative response (p>0.05). Fourteen patients drop-

Table 1. Nausea-retching scores

Scoring	Group 1	Group 2	Group 3	Group 4
1	16 (20%)	21 (26%)	20 (25%)	25 (32%)
2	41 (52%)	27 (34%)	32 (40%)	25 (32%)
3	16 (20%)	20 (25%)	21 (26%)	20 (25%)
4	5 (6%)	11 (13%)	6 (7%)	7 (9%)

Scoring: By visual analogue scale divided into four main parts

Table 2. Swallowing scores

Scoring	Group 1	Group 2	Group 3	Group 4
1	28 (35%)	31 (39%)	26 (32%)	32 (41%)
2	25 (32%)	23 (29%)	27 (34%)	20 (25%)
3	22 (28%)	19 (24%)	24 (30%)	23 (29%)
4	3 (3%)	6 (7%)	2 (2%)	2 (2%)
Total	78	79	79	77

Scoring: 1: easy, 2: moderately easy, 3: difficult, 4: very difficult

Table 3. Endoscopist opinion regarding the procedure

Scoring	Group 1	Group 2	Group 3	Group 4
1	48 (61%)	44 (55%)	50 (63%)	47 (61%)
2	23 (29%)	29 (36%)	24 (30%)	19 (24%)
3	7 (8%)	6 (7%)	4 (5%)	10 (12%)
4	0 (0%)	0 (0%)	0 (0%)	1 (1%)
Total	78	79	79	77

Scoring: 1. no nausea and retching; 2. a duration of nausea and retching of less than 25% of the procedure; 3. a duration of nausea and retching of between 25% and 50% of the procedure; and 4. a duration of nausea and retching of between 50% and 100% of the procedure

Table 4. Patients who accept re-endoscopy

Responses	Group 1	Group 2	Group 3	Group 4
Yes	66	60	57	54
No	12	19	22	23
Total	78	79	79	77

ped out of the study because EGD could not be completed due to patient intolerance or to obstruction in the upper gastrointestinal tract.

DISCUSSION

Because of the studies suggesting that P6 stimulation is effective in relieving nausea and vomiting after chemotherapy and surgical procedures, and in several disorders including morning sickness and motion sickness, we decided to evaluate the usefulness of this method in preventing the nausea and retching commonly observed in patients undergoing gastroscopy. This method should be considered superior to modern endoscopic premedications with respect to adverse effects, comfort, cost and simplicity. In the literature, various methods for acupuncture have been reported, including needling, acupressure and acustimulation. Considering the results of studies that reported no significant differences between these approaches (8, 21), we preferred the acustimulation method as best fitting a double-blind design. Nausea and retching are the major quality factors for patients undergoing gastroscopy, but there is a weak correlation between the nurse's observations and patient's experience (22). Therefore, after patients assessed the severity of nausea and retching they had experienced, an additional assessment was made by endoscopists unaware of patient-rated scores. Nausea questionnaires, verbal categorical scales or VAS can be used to evaluate nausea. Studies have reported a strong correlation among these three methods (23). The Index of Nausea, Vomiting and Retching (INVR), and the Index of Nausea and Vomiting Form 2 (INV-2) are used to evaluate nausea and vomiting in oncology and

gynecology patients and in patients undergoing surgical procedures (17, 18, 19). These indexes were inappropriate for application in our study since the nausea and retching due to gastroscopy are acute and temporary. We preferred to use the VAS for the assessment of nausea and retching, which would be convenient for both older and lower-educated patients.

The assessment of the anti-emetic efficacy of the stimulation of the P6 point is controversial, because it is a non-pharmacological method, and this poses difficulties with regard to a double-blind, placebo and Sham-controlled study design. Some of the work on this topic has focused on postoperative nausea and vomiting (PONV). A meta-analysis (24) including 19 studies and 1,679 patients showed that acupuncture was effective in reducing nausea and vomiting in the immediate postoperative period in adult patients, but not in children. A systematic review of randomized studies evaluating the use of this technique in surgical patients, pregnant women and chemotherapy patients found that this approach was ineffective when used under general anesthesia, but that it was superior to Sham techniques in 11 of 12 studies (25). These studies comprised different acupuncture techniques and patient groups, but investigators nevertheless reached similar conclusions. Roscoe and Matteson (11) prepared a brief review including 16 studies that used wristbands to relieve nausea and vomiting, and concluded that in spite of the insufficient number of studies, the positive results warranted further investigation. The results regarding the efficacy in motion sickness are controversial; some studies reported positive effects (14, 15, 16), while other double-blind, placebo-controlled studies (26, 27, 28) reported negative results. Zarate et al. (29) found that acustimulation was able to prevent nausea but not vomiting in endoscopic-laparoscopic cholecystectomy. Allen et al. (30) reported that in patients using patient-controlled analgesia after major gynecological surgery, acupressure on the P6 point reduced the use of anti-emetics, but it failed to reduce the number of nausea and vomiting episodes. Some studies found that acustimulation of P6 in PONV is ineffective (31). Another study suggested that a placebo effect exists for acupuncture (10). In endoscopic urological procedures, acupressure was used on the basis of the assumption that tension in the renal pelvis and bladder may contribute to PONV, but this method failed to improve it (32).

Mechanical effects caused by the gastroscopy device and the air used during the procedure initiate afferent stimuli, which cause nausea and retching. There are no studies investigating the utility of the P6 point in gastrointestinal endoscopic procedures to date. In our study, we found that acusti-

mulation of the P6 point was ineffective in reducing nausea and retching during EGD, and that it did not increase the quality of the endoscopic procedure with respect to patients and the endoscopist.

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