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The effects of P6 acupressure in the prophylaxis of chemotherapy-related nausea and vomiting in breast cancer patients ☆

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Summary

Background

Nausea, and to a lesser extend vomiting, remain significant clinical problems after the administration of chemotherapy, with up to 60% of patients reporting nausea despite use of antiemetics. Combining antiemetics with other non-pharmacological treatments may prove more effective in decreasing nausea than antiemetics alone. Hence, the aim of the current study was to evaluate the effectiveness of using acupressure in Pericardium 6 (Neiguan) acu-point in managing chemotherapy-induced nausea and vomiting.

Methods

This was a randomised controlled trial. Acupressure was applied using wristbands (Sea-Band™) which patients in the experimental group had to wear for the 5 days following the chemotherapy administration. Assessments of nausea, retching and vomiting were obtained from all patients daily for 5 days. Thirty-six patients completed the study from two centres in the UK, with 19 patients allocated to the control arm and 17 to the experimental arm.

Results

It was found that nausea and retching *experience*, and nausea, vomiting and retching *occurrence* and *distress* were all significantly lower in the experimental group compared to the control group ($P < 0.05$). The only exception was with the vomiting experience, which was close to significance ($P = 0.06$).

Discussion

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.

Keywords: Nausea; Vomiting; Retching; Chemotherapy; Cancer; Acupressure; Intervention; Complementary therapies; Breast cancer

Introduction

Despite advances in antiemetic research over the past decade or so and the introduction of 5-HT_3 and NK_1 receptor antagonists, chemotherapy-related nausea and (to a lesser extent) vomiting remain significant problems for the patients, decreasing their quality of life and negatively affecting their treatment experience.[1 and 2] As many as 60% of patients receiving moderately high emetogenic chemotherapy still experience nausea and it seems that, while newer antiemetic treatments have decreased vomiting, they had an inverse effect in relation to nausea.[3] Our difficulty in completely managing chemotherapy-related nausea and vomiting may stem from the multiple pathways involved in the development of nausea and vomiting including the chemoreceptor trigger zone in the brain, dopamine receptors, personality, vestibular dysfunction, age, anxiety and psychological mechanisms.[4] Since pharmacological treatments have failed to completely manage nausea and vomiting, exploring the complementary role of other, non-pharmacological, approaches that can be used in addition to pharmacological approaches becomes paramount.

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 released after needling or pressure in a specific point may be responsible for its effect. The most commonly used point for nausea and vomiting is Pericardium 6 (Neiguan or P6), located above the wrist.

Since the early studies by Dundee et al.[5 and 6] research has almost consistently shown that adding acupuncture to antiemetic 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 ($n = 104$). 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.

A large number of studies have demonstrated that acupressure can relieve nausea and vomiting postoperatively[8 and 9] or after laparoscopy,[10] during pregnancy[11 and 12] and for motion sickness.[13] Furthermore, a systematic review of 26 postoperative trials ($n = 3347$) confirms that acupuncture stimulation in general at point P6 significantly reduces the risk of nausea, vomiting and the need for rescue antiemetics.[14] Nevertheless, negative studies do exist[15 and 16] but these are significantly outnumbered by the number of studies showing positive results. Also, differences in the technique used and the use of sham acupressure may be responsible for such findings.

Only a handful of such studies have been published using chemotherapy patients. An electronic search in MEDLINE, CINAHL and PubMed between 1990 and May 2005 using the search terms ‘acupressure’ and ‘nausea’ or ‘vomiting’ and ‘chemotherapy’ or ‘cancer’ revealed 10 published studies. Seven of these studies showed positive findings and a further two studies

closely approached statistical significance. Only 1 study showed negative results with an acustimulation method. Among the studies showing significant (or the two close to significance) reductions in chemotherapy-related nausea and vomiting, three trials used a Relief Band (a small battery-operated TENS device designed to stimulate the P6 acupoint) with samples from 18 to 50 patients,[17, 18 and 19] three used a Sea-Band (an elastic wristband with a round plastic button applying pressure to P6 acupoint) using small samples,[20, 21 and 22] and two used direct pressure at the P6 acupoint[23] or a combination of P6 and ST36 acupoints.[24] Roscoe et al.[25] using a large sample of 739 patients testing acupressure and acustimulation showed that men using acustimulation had less nausea and vomiting compared to the control group, whilst women using acupressure wristbands on the day of treatment had reductions closely approaching statistical significance. However, a recent randomised trial by Roscoe et al.[26] using acustimulation wristbands showed no effects in controlling nausea and vomiting after chemotherapy in 96 breast cancer patients. Another negative study was also found but this was published in conference proceedings and used bone marrow transplant patients receiving high doses of chemo-radiotherapy, although details of the study were not available for assessment.[27] However, past studies are hampered by the different types of antiemetics used, differences in the risk factors for nausea and vomiting, the chemotherapy regime used and sampling issues. Also, although most studies were randomised trials, some used cross over or observational designs.

The aim of the current study was to assess the effectiveness of acupressure wristbands in decreasing nausea and vomiting in a homogeneous group of breast cancer patients receiving chemotherapy. As vomiting is currently managed quite effectively with the use of antiemetics while nausea is still a major problem,[1 and 2] the primary endpoint of this study is occurrence of and distress from *nausea.*

Hypothesis

Breast cancer patients undergoing their first cycle of chemotherapy using acupressure wristbands in addition to antiemetics over 5 days will have significantly lower nausea, retching and vomiting (in terms of experience, occurrence and distress) compared to breast cancer patients receiving antiemetics only.

Methods

Design

A randomised controlled trial design was used for the purposes of the current study. Patients were randomised to either the experimental or control group by simple randomisation using the envelope method. Accordingly, a pack of sealed envelopes including a card with either the word ‘acupressure group’ or ‘control group’ written on it, was given to a staff nurse 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.

Patients and settings

Patients were recruited from two centres in the UK, one of them being a cancer centre of a general hospital and the other being a cancer specialist hospital. All subjects were newly diagnosed and chemotherapy naïve, starting their first cycle of chemotherapy. Inclusion criteria were a breast cancer diagnosis, stage of cancer I–III, no prior experience of chemotherapy, receiving Doxorubicin and Cyclophosphamide or equivalent Epirubicin protocols, and willing to

sign a consent form and be randomised to one of the two groups. Patients were excluded if they received palliative chemotherapy, life expectancy was less than 3 months, had metastatic disease, suffered from bowel obstruction, were undergoing concurrent radiotherapy or had lymphoedema of the arms. All patients received standard antiemetics before chemotherapy with a 5-HT_3 receptor antagonist plus dexamethasone for acute nausea and vomiting, although prescribed antiemetics for delayed nausea and vomiting varied among patients and included metoclopramide, dexamethasone or cyclizine as needed. Based on the large effect size observed in past studies, 50 patients were required to achieve a power of 80% at an alpha value set at 0.05.[28]

Intervention

Acupressure wristbands (Sea-Band™, Sea-Band Ltd., Leicestershire, UK) were used (Fig. 1). These bands are elastic wrist bands with a 1 cm protruding round plastic button (stud), available in two sizes, the standard and a larger size. Patients wear the wristband with the stud pressing the P6 acupoint, which is located on the anterior surface of the forearm, approximately three-finger width up from the crease of the wrist between the tendons of the palmaris longus and flexor carpi radialis. Wristbands were used bilaterally.

Figure 1. Acupressure Sea-Bands™.

Measures

The revised Rhodes Index of nausea, vomiting and retching (INVR) was used to collect the data.[29] This is an eight-item five-point Likert-type self-report pencil and paper instrument measuring the patient's perceived nausea, vomiting and retching experience, occurrence and distress, reporting high reliability.[29] Subjects are instructed to mark through or draw around the sentence in each row what most clearly corresponds to their experience. Subscale scores can be calculated for nausea, vomiting and retching experience, occurrence and distress separately as well as scores for total experience, occurrence and distress. Scores for individual items can range from 0 to 4 with higher scores indicating more nausea, vomiting or retching.

In addition to INVR, data was collected about the patients' age, marital status and education, history of nausea and vomiting, body mass index, and personal use of acupressure in the past. Clinical data included the chemotherapy regime and antiemetics used. Patients in the experimental group were also given a daily log with the hours of the day on it and were asked to tick the corresponding hour every time they pressed the wristband's stud.

Procedures

The researchers provided those patients randomised to the experimental group with training about what acupressure is, how to identify the P6 acupoint and how to wear the wrist band. Patients had the opportunity to practice with the researchers several times. Following this, patients were given a set of acupressure wristbands and were instructed to wear them bilaterally throughout the following 5 days taking them off only when they were having a shower or a bath. Wristbands could not easily move about the arm, as they have a relatively tight fit. They were also instructed to press the acupressure stud with light pressure for 2–3 min every 2 h, and note this in their daily log.

Patients in the control group received antiemetics only, although they were told that they will receive the acupressure instructions and be given the wristbands to use from their next cycle of chemotherapy onwards, thus serving as a waiting list group. Although asking the patients in the control group to wear the wristbands without pressing the stud may seem a more appropriate technique to decrease placebo effects than a waiting list control group, this was not appropriate, as the wristband studs are constantly pressing the P6 point as a result of their tight fit. All patients completed the INVR every evening after the chemotherapy administration and for five consecutive evenings. Completed questionnaires were returned either directly to the researchers when coming for their second cycle or using pre-paid envelopes. Sociodemographic and clinical data were collected from the patients' medical notes. The study was approved by the Research and Ethics Committees of both participating hospitals and patients had to sign a consent form.

Data analysis

Data were coded and entered into SPSS (v.11) for statistical analysis. Descriptive statistics were calculated with all sociodemographic and clinical data, and nausea, vomiting or retching subscale scores. Repeated measures analysis of variance (R-ANOVA) was used to assess the levels of nausea, vomiting and retching between the two study groups. Pearson's correlation coefficients were calculated between the demographic data and nausea or vomiting variables. Chi-square tests were also used to test any differences in sociodemographic data between the two groups.

Results

Sample characteristics

Fifty-four patients were recruited and randomised into the study, but 36 subjects completed the study (attrition = 34%). Among those not returning questionnaires, 6 were part of the control group and 12 part of the experimental group. Among the 36 patients who did return all study questionnaires, 19 were allocated in the control group and 17 in the experimental group. Twenty-four subjects were recruited from centre 1, and 12 from centre 2. Only 1 patient had used wristbands before, but she was randomised to the control group. The sample's mean age was 49.5 years (S.D. = 10.5, range = 32–76). Most (n = 28, 77.6%) had received high school/secondary education, while 8 (22.3%) had college or university education. Most were also married (n = 30, 82.5%) with only one being single (5.9%) and 5 being divorced or separated (22.3%). The majority (61.1%) had experienced nausea and/or vomiting (pregnancy, motion sickness, etc.) before although only 8 (22.3%) reported problems with managing nausea and vomiting in the past. Subjects received Doxorubicin plus Cyclophosphamide (n = 15, 41.7%), 5-FU, Epirubicin and Cyclophosphamide (n = 15, 41.7%) or Epirubicin with CMF

($n = 6$, 16.6%). There were no differences ($P > 0.05$) in the sociodemographic and chemotherapy variables between the experimental and control groups (Table 1). Patients in the experimental group pressed the studs from a median of 5–8 times every day (range = 0–11 times).

Table 1.

Sample demographic data

	Experimental group [*N* (%)]		**Control group [*N* (%)]**
Previous experience with nausea/vomiting	Yes	10 (58.8)	12 (63.2)
	No	7 (41.2)	7 (36.8)
Difficulty managing nausea/ vomiting in the past	Yes	5 (29.4)	3 (15.8)
	No	12 (70.6)	16 (84.2)
Education	Secondary	13 (76.4)	15 (78.9)
	College and above	4 (23.6)	4 (21.1)
Marital Status	Single	1 (5.9)	–
	Married	15 (86.2)	15 (78.9)
	Separated/divorced	1 (5.9)	4 (21.1)
Chemotherapy	Doxorubicin + Cyclophosphamide	5 (29.4)	10 (52.6)
	FEC	9 (52.9)	6 (31.6)
	Epirubicin + CMF	3 (17.6)	3 (15.8)
Mean age (S.D.)	51 (12.2)		48.2 (8.9)
Mean body mass index (S.D.)	26 (3.4)		25.5 (2.9)

Reliability of the INVR was assessed with Cronbach alpha coefficients. Coefficients were consistently high, with alpha of 0.93 at day 1, 0.89 for each of days 2–4, and 0.85 at day 5.

Nausea, vomiting and retching experience

Nausea was experienced significantly less often in the experimental group compared to the control group ($F = 21.6$, $P < 0.001$) across the five assessment days. Only at day 3 both groups had similar levels of nausea (Table 2). Similar results were observed with regards to retching experienced ($F = 5.8$, $P = 0.02$). Vomiting experience closely approached significance ($F = 3.8$, $P = 0.06$) although the power observed for this particular result was low at 0.47 (Table 2). Total experience of nausea, vomiting and retching (all items of the scale) was also significantly better in the experimental group ($F = 13.3$, $P = 0.001$) (Fig. 2).

Table 2.

Descriptive statistics for nausea, vomiting and retching between the experimental and control groups [mean (S.D.)]

		Day 1	Day 2	Day 3	Day 4	Day 5	Possible range
Nausea experience**	Experimental group	0.87 (2.2)	0.93 (2)	2.46 (3.5)	1.53 (2.7)	1.46 (3.1)	0–12
	Control group	2.72 (3.1)	2.94 (2.9)	2.55 (2.9)	3.22 (3.4)	2.5 (3.4)	
Vomiting experience[a]	Experimental group	0.66 (2.6)	0.46 (1.8)	0.73 (1.5)	0.2 (0.5)	0	0–12
	Control group	0.94 (2.75)	0.66 (2.2)	0.66 (2.2)	0.6 (1.9)	0.5 (1.54)	
Retching experience*	Experimental group	0.06 (0.2)	0.40 (1.05)	0.80 (1.5)	0.46 (0.9)	0.13 (0.35)	0–8
	Control group	0.50 (1.7)	0.78 (1.8)	0.66 (1.5)	0.78 (1.7)	0.50 (1.3)	
Nausea occurrence**	Experimental group	0.66 (1.6)	0.80 (1.61)	1.93 (2.9)	1.20 (2.2)	1.20 (2.6)	0–8
	Control group	2.16 (2.4)	2.27 (2.1)	2.05 (2.4)	2.55 (2.5)	1.94 (2.3)	
Vomiting occurrence*	Experimental group	0.53 (2.1)	0.33 (1.3)	0.46 (0.99)	0.13 (0.5)	0	0–8
	Control group	0.66 (1.94)	0.39 (1.2)	0.44 (1.5)	0.39 (1.2)	0.22 (0.6)	
Retching	Experimental	0.06 (0.3)	0.26	0.33	0.13	0	0–4

		Day 1	Day 2	Day 3	Day 4	Day 5	Possible range
occurrence*	group		(1.03)	(1.04)	(0.35)		
	Control group	0.17 (0.7)	0.38 (0.8)	0.39 (0.8)	0.50 (1.04)	0.22 (0.5)	
Nausea distress*	Experimental group	0.20 (0.6)	0.13 (0.5)	0.53 (0.8)	0.33 (0.6)	0.27 (0.6)	0–4
	Control group	0.55 (1.04)	0.67 (0.9)	0.50 (0.8)	0.57 (0.9)	0.55 (1.1)	
Vomiting distress*	Experimental group	0.12 (0.5)	0.12 (0.5)	0.25 (0.6)	0.06 (0.25)	0.31 (0.4)	0–4
	Control group	0.28 (0.8)	0.28 (0.95)	0.22 (0.7)	0.22 (0.7)	0.67 (0.9)	
Retching distress*	Experimental group	0.12 (0.5)	0.12 (0.3)	0.43 (0.7)	0.44 (0.7)	0.19 (0.4)	0–4
	Control group	0.33 (1.02)	0.39 (0.9)	0.28 (0.75)	0.28 (0.75)	0.28 (0.95)	

[a] $P = 0.06$.
[*] $P < 0.05$.
[**] $P < 0.001$.

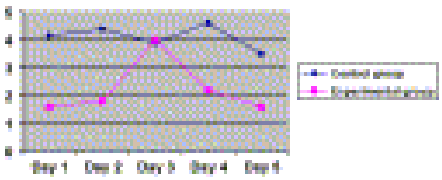

Figure 2. Total scores for nausea, vomiting and retching experience between the control and experimental group.

Nausea, vomiting and retching occurrence

Nausea occurred significantly less frequently in the experimental group compared to the control group ($F = 23.4$, $P < 0.001$) across the five assessment days. Again, day 3 had similar levels of nausea occurrence in both groups. Significant improvement was found with regards to vomiting ($F = 4.26$, $P = 0.047$), with days 4 and 5 being the ones with the most notable differences. Retching occurrence was also significantly lower in the experimental group ($F = 5.5$, $P = 0.026$) (Table 2). Total occurrence of nausea, vomiting and retching (all five items of occurrence) was also significantly less frequent in the experimental group ($F = 16.9$, $P < 0.001$) (Fig. 3).

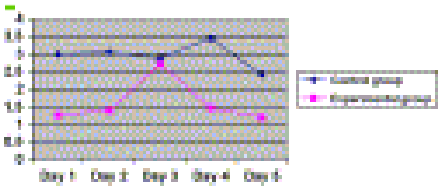

Figure 3. Total nausea, vomiting and retching occurrence scores between the control and experimental group.

Nausea, vomiting and retching distress

Both nausea and vomiting produced significantly less distress in the experimental group than the control group ($F = 11.05$, $P = 0.002$ and $F = 6.22$, $P = 0.018$, respectively), with only day 3 of chemotherapy being similar in both groups. While distress from retching was significantly lower in the experimental group ($F = 6.4$, $P = 0.017$), the control group had less distress than the experimental group at days 3 and 4 (Table 2). Total distress scores (all three distress items) were significantly lower in the experimental group (Fig. 4). Results overall reflected low levels of nausea, vomiting and retching in all areas at assessment. Looking at the nausea and vomiting reports from the control group, 37% of the patients did not experience nausea at all across all days, whereas 89% did not experience vomiting at all.

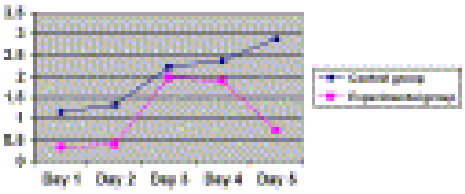

Figure 4. Total nausea, vomiting and retching distress scores between the control and experimental groups.

Correlations

Significant correlations were shown between age on one hand and nausea experience at day 2 ($r = -0.50$, $P = 0.004$) and day 5 ($r = 0.41$, P = 0.02), retching experience at day 2 ($r = -0.35$, $P = 0.049$) and day 3 ($r = -0.37$, $P = 0.03$), nausea occurrence at day 2 ($r = -0.50$, $P = 0.004$), and nausea occurrence at day 5 ($r = -0.42$, $P = 0.02$) with all suggesting younger age being associated with more nausea and retching experience and/or occurrence. Correlations were not observed with any other day of assessment and nausea, vomiting or retching variables. The subject's body mass index had no association with any nausea, vomiting or retching variables either. There were also no correlations between the frequency of pressing the studs and the levels of nausea and vomiting.

There were no side effects from the use of the wristbands, but one patient reported that she had to take the bands off because they were too tight and left her with marks for a few days.

Discussion

Findings from the present study confirmed that chemotherapy-related nausea experience, occurrence and distress were significantly lower in the acupressure group than the control group.

This is in accordance with the accumulating body of evidence related to acupressure during chemotherapy[18, 23 and 24] and shows that acupressure is a safe and complementary option in the management of chemotherapy-related nausea and vomiting.

The strengths of the study include the use of a homogeneous group receiving the same antiemetics for acute nausea and vomiting, control of patient clinical and demographic characteristics (i.e. chemotherapy type, susceptibility to nausea or vomiting, and alcohol use), and a prospective assessment of nausea and vomiting experience using a validated and widely used scale in a group of patients who had no previous experience of chemotherapy-related nausea and vomiting. It is also one of the few studies conducted outside an American context, supporting the cross-cultural transferability of the American data.

However, findings should be viewed in light of the study's limitations, including a small sample size due to funding constraints. Furthermore, although antiemetics given before chemotherapy were standardised, antiemetics for days 2–5 were not controlled, as there is no standard clinical practice (despite the availability of clinical antiemetic guidelines) and controlling for such use would have been unethical and would have conflicted with the experience of the physicians. The influence of anticipatory symptoms in the development of post-chemotherapy nausea and vomiting was also not accounted for in the present study and may have somewhat negated the effects of the wristbands. Nausea and vomiting is also strongly related to patient expectation before the chemotherapy,[4] and this may have affected the outcome of this study. The study did not use a blinded design, as this was not feasible, but such a design would have minimised placebo effects and the effects from selection biases.

The effect size in relation to nausea was large with the power being over 0.80 for all nausea variables. Similar results were shown for the vomiting and retching variables, with the exception of vomiting experience which did not reach statistical significance. This may be due to the fact that few patients vomited, and hence a larger sample was necessary to capture the effects of acupressure on the variable of vomiting experience. Indeed, the power for this variable was 0.47, suggesting high possibility of a type II error. Nevertheless, vomiting occurrence and distress were significantly lower in the acupressure group.

Age is a well-documented risk factor for nausea and vomiting with younger age (i.e. <40 years) being associated with more nausea and vomiting.[4 and 30] However, we did not use age as a covariate in the data analysis, as correlations between age and nausea or vomiting variables were not consistent. Also, there were no differences in the age spread between the experimental and control groups.

The attrition in our study was higher than that observed in other similar studies.[25 and 26] Surprisingly, more patients in the experimental group rather than in the control group did not return all study questionnaires. It may be that the subjects' experience was different from their initial expectations, they may have stopped wearing their wristbands during the course of the study, or they may have failed to complete the daily questionnaires. Such experiences should be explored in future studies, as they provide valuable information beyond whether something works or not.

The largest study of acupressure use for chemotherapy-related nausea and vomiting ($n = 739$) to date[25] showed that acupressure was better for the control of acute nausea rather than delayed nausea and vomiting, men benefited more than women and the use of antiemetic pills was lower in the acupressure group (mean pills = 5.1) compared to the control group (mean pills = 9.7). The authors attributed part of the benefit the patients derived from the use of the wristbands to a

placebo/expectancy effect. However, there were some key differences between this study and our study in that some patients in the latter study (number not reported) received cisplatin-based chemotherapy, which is considerably more emetogenic and difficult to manage than the types of chemotherapy used in the present study. Also, the Roscoe et al. study[25] used patients with different cancer diagnoses, hence it was not as homogeneous as our study. It also seemed that their patients used mainly dexamethasone/other corticosteroids for the management of delayed nausea and vomiting (number also not reported), whereas few of our patients received dexamethasone, with metoclopramide being more commonly used. It is well known that dexamethasone is highly effective in managing delayed nausea and vomiting,[31] although many clinicians, as in our case are sceptical of the use of steroids for prolonged periods of time. Hence, the use of dexamethasone may have contributed to the better control of nausea and vomiting in the study by Roscoe et al.,[25] minimising the possible effect of wristbands. Such use of dexamethasone is a key factor to consider in future antiemetic trials of this kind. Furthermore, in the Roscoe et al. study,[25] nausea and vomiting have been measured with a non-validated self-developed scale, raising concerns over the validity of such measurement.

Although other studies have also shown positive (and negative) effects with the use of acupressure in managing chemotherapy-induced nausea and vomiting, they are not easily comparable with the current study, as the method of acupressure differed. Past studies have used either finger acupressure and use of more than the P6 point,[24] palliative care populations,[22] or use of the Reliefband/transcutenuous electrical nerve stimulation at the P6 point.[17, 19 and 26] Mixed chemotherapy protocols and antiemetics used also make comparisons difficult. Furthermore, in another study by Roscoe et al.,[26] where gender and type of chemotherapy were controlled, the placebo control group used an active wristband, which may have led to the negative findings reported. It may be that constant pressure on the P6 point (as in the acupressure wristbands) may produce better results than pressing the stud only or using electrical nerve stimulation to the point (as in the Reliefband).

A puzzling finding was the high level of nausea, retching and vomiting at day 3 in the acupressure group, equal to that experienced by the control group. This finding has been reported elsewhere too.[18 and 25] This may be related to GI disturbance associated with use of dexamethasone, or more remotely because of constipation secondary to granisetron. Indeed the latter was something communicated to us by a couple of women in the study in follow up appointments. It may also be that day 3 is the peak for nausea and vomiting related to the types of chemotherapy given to the study's subjects, a day difficult to manage with complementary techniques only. As women in the study were prescribed antiemetics on a PRN basis, many may have stopped using them or relaxed their use being already a couple of days post-chemotherapy with low levels of nausea and vomiting the previous 2 days. It would be interesting to see whether use of antiemetics at day 3 at regular intervals combined with acupressure would lead to different results, or whether the outcome of acupressure is affected by the presence of side effects from antiemetics used. It does show, however, that day 3 post-chemotherapy is a day that deserves more attention in terms of antiemetic management.

Acupressure seems to be a good way to complement antiemetic pharmacotherapy, as it is safe, convenient and with minimal (bands) or no costs (finger acupressure) involved. These make it a cost-effective intervention. It is not known why acupressure works, and partly these results may be attributed to a placebo effect, as also highlighted in the study by Roscoe et al.[25] Also, as development of nausea and vomiting follow classical conditioning mechanisms,[32] psychological reasons may also partly explain these results. Indeed, we have previously reported that relaxation and distraction techniques have significantly improved nausea and vomiting in breast cancer patients receiving chemotherapy.[33] Acupressure is easily learnt and taught and patients

should be informed about its potential role and taught how to apply it. Leaflets about acupressure for the management of nausea and vomiting could be available in chemotherapy units so that patients who are interested to use such a technique are encouraged to come forward and learn more from nurses or other health professionals. This can add to the patients' options of their antiemetic approaches and empower them to be involved in the management of these distressing side effects.

Recommendations for further research

Acupressure may have a wider usefulness and future research should shed light in other areas of nausea and vomiting management. Most studies to date have been conducted with women receiving chemotherapy. Studies should be directed to men receiving chemotherapy, as gender issues, as shown in the study by Roscoe et al.,[18] and [25] may exist. In addition, there may be a role for acupressure in the management of nausea and vomiting in palliative care, as shown in the observational study by Wright.[22] Anticipatory nausea and vomiting are still not well managed; psychological therapies are recommended as an appropriate way for managing anticipatory symptoms.[34] As acupressure may act on a psychological level and classical conditioning is the mechanism behind anticipatory symptoms, it would be useful to assess the effect of acupressure in alleviating such symptoms. Also, future studies could investigate the effects of managing better nausea and vomiting in one chemotherapy cycle with acupressure over the following cycles and in relation to anticipatory symptoms. Using the same design over repeated cycles of chemotherapy would have shed light into this argument. Antiemetic management in radiotherapy patients has received little attention with few and mostly low quality studies[35] and the role of acupressure in managing radiotherapy-related nausea and vomiting should be explored in future research.

References

1 A. Molassiotis, Managing nausea and vomiting after cancer treatments: patients still suffer unnecessarily, *Eur J Oncol Nurs* **9** (2005), pp. 4–5.

2 A. Molassiotis and S. Börjeson, Nausea and vomiting. In: N. Kearney and A. Richardson, Editors, *Nursing Patients with Cancer: Principles & Practice*, Churchill, Livingstone, Edinburgh, UK (2005), pp. 415–438.

3 J.A. Roscoe, G.R. Morrow, J.T. Hickok and R.M. Stern, Nausea and vomiting remain a significant clinical problem: trends over time in controlling chemotherapy-induced nausea and vomiting in 1413 patients treated in community clinical practices, *J Pain Symptom Manage* **20** (2000), pp. 113–121.

4 A. Molassiotis, B.M. Yam, H. Yung, F.Y. Chan and T.S. Mok, Pretreatment factors predicting the development of postchemotherapy nausea and vomiting in Chinese breast cancer patients, *Support Care Cancer* **10** (2002), pp. 139–145.

5 J.W. Dundee, R.G. Ghaly, K.T. Fitzpatrick, G.A. Lynch and W.P. Abram, Acupuncture to prevent cisplatin-associated vomiting, *Lancet* **1** (1987) (8541), p. 1083.

6 J.W. Dundee, R.G. Ghaly, K.T. Fitzpatrick, W.P. Abram and G.A. Lynch, Acupuncture prophylaxis of cancer chemotherapy-induced sickness, *J R Soc Med* **82** (1989), pp. 268–271.

7 J. Shen, N. Wegner and J. Glaspy *et al.*, Electroacupuncture for control of myeloablative chemotherapy-induced emesis: a randomized controlled trial, *JAMA* **284** (2000), pp. 2755–2761.

8 A. Alkaissi, K. Evertsson, V.A. Johnson, L. Ofenbartl and S. Kalman, P6 acupressure may relieve nausea and vomiting after gynaecological surgery: an effectiveness study in 410 women, *Can J Anaesth* **49** (2002), pp. 1034–1039.

9 P.F. White, T. Issioui and J. Hu *et al.*, Comparative efficacy of acustimulation (ReliefBand) versus ondansetron (Zofran) in combination with droperidol for preventing nausea and vomiting, *Anesthesiology* **97** (2002), pp. 1075–1081.

10 D. Harmon, J. Gardiner, R. Harrison and A. Kelly, Acupressure and the prevention of nausea and vomiting after laparoscopy, *Br J Anaesth* **82** (1999), pp. 387–390.

11 N.M. Steele, J. French, J. Gatherer-Boyles, S. Newman and S. Leclaire, Effect of acupressure by Sea-Bands on nausea and vomiting of pregnancy, *J Obstet Gynecol Neonatal Nurs* **30** (2001), pp. 61–70.

12 E. Werntoft and A.K. Dykes, Effect of acupressure on nausea and vomiting during pregnancy. A randomized, placebo-controlled, pilot study, *J Reprod Med* **46** (2001), pp. 835–839.

13 P. Bertalanffy, K. Hoerauf and R. Fleischhackl *et al.*, Korean hand acupressure for motion sickness in prehospital trauma care: a prospective, randomized, double-blinded trial in a geriatric population, *Anesth Analg* **98** (2004), pp. 220–223.

14 A. Lee and M.L. Done, Stimulation of the wrist acupuncture point P6 for preventing postoperative nausea and vomiting, *Cochrane Database Syst Rev* (2004) (3) CD003281.

15 A. Agarwal, A. Pathak and A. Gaur, Acupressure wristbands do not prevent postoperative nausea and vomiting after urological endoscopic surgery, *Can J Anaesth* **47** (2000), pp. 319–324.

16 A.A. Klein, G. Djaiani and J. Karski *et al.*, Acupressure wristbands for the prevention of postoperative nausea and vomiting in adults undergoing cardiac surgery, *J Cardiothorac Vasc Anesth* **18** (2004), pp. 68–71.

17 M.L. Pearl, M. Fischer, D.L. McCauley, F.A. Valea and E. Chalas, Transcutenuous electrical nerve stimulation as an adjunct for controlling chemotherapy-induced nausea and vomiting in gynecologic oncology, *Cancer Nurs* **22** (1999), pp. 307–311.

18 J.A. Roscoe, G.R. Morrow, P. Bushunow, L. Tian and S. Matteson, Acustimulation wristbands for the relief of chemotherapy-induced nausea, *Altern Ther Health Med* **8** (2002), pp. 56–63.

19 I. Treish, S. Shord and J. Valgus *et al.*, Randomized double-blind study of the Reliefband as an adjunct to standard antiemetics in patients receiving moderately-high to highly emetogenic chemotherapy, *Support Care Cancer* **11** (2003), pp. 516–521.

20 J.W. Dundee and J. Yang, Prolongation of the antiemetic action of P6 acupuncture by acupressure in patients having cancer chemotherapy, *J R Soc Med* **83** (1990), pp. 360–362.

21 J.W. Dundee, J. Yang and C. McMillan, Non-invasive stimulation of the P6 (Neiguan) antiemetic acupuncture point in cancer chemotherapy, *J R Soc Med* **84** (1991), pp. 210–212.

22 L.D. Wright, The use of motion sickness bands to control nausea and vomiting in a group of hospice patients, *Am J Hosp Palliat Care* **22** (2005), pp. 49–53.

23 Y.H. Shin, T.I. Kim, M.S. Shin and H.S. Juon, Effect of acupressure on nausea and vomiting during chemotherapy cycle for Korean postoperative stomach cancer patients, *Cancer Nurs* **27** (2004), pp. 267–274.

24 S.L. Dibble, J. Chapman, K.A. Mack and A.S. Shih, Acupressure for nausea: results of a pilot study, *Oncol Nurs Forum* **27** (2000), pp. 41–47.

25 J.A. Roscoe, G.R. Morrow and J.T. Hickok *et al.*, The efficacy of acupressure and acustimulation wrist bands for the relief of chemotherapy-induced nausea and vomiting. A University of Rochester Cancer Center Community Clinical Oncology Program Multicenter Study, *J Pain Symptom Manage* **26** (2003), pp. 731–742.

26 J.A. Roscoe, S.E. Matteson and G.R. Morrow *et al.*, Acustimulation wrist bands are not effective for the control of chemotherapy-induced nausea in women with breast cancer, *J Pain Symptom Manage* **29** (2005), pp. 376–384.

27 S.J. Noga, J.L. Tolman and R.W. Warrell *et al.*, Acupressure as an adjunct to pharmacologic control of nausea, vomiting and retching (N/V) during blood and marrow transplantation (BMT): a randomized, placebo-controlled, algorithm based study, *Proc Annu Meet Am Soc Clin Oncol* **21** (2002), p. 362a [abstract #1443].

28 J. Cohen, A power primer, *Psychol Bull* **112** (1992), pp. 155–159.

29 V.A. Rhodes and R.W. McDaniel, The index of nausea, vomiting, and retching: a new format of the index of nausea and vomiting, *Oncol Nurs Forum* **26** (1999), pp. 889–894.

30 G.R. Morrow, J. Lindke and P.M. Black, Predicting development of anticipatory nausea in cancer patients: prospective evaluation of eight clinical characteristics, *J Pain Symptom Manage* **6** (1991), pp. 215–223.

31 F. Roila, P.J. Hesketh and J. Herrstedt, Antiemetic Subcommitte of the Multinational Association of Supportive Care in Cancer, *Prevention of chemotherapy- and radiotherapy-induced emesis: results of the 2004 Perugia International Antiemetic Consensus Conference*, *Ann Oncol* **17** (2006), pp. 20–28.

32 T.G. Burish and D.M. Tope, Psychological techniques for controlling the adverse side effects of cancer chemotherapy: findings from a decade of research, *J Pain Symptom Manage* **7** (1992), pp. 287–301.

33 A. Molassiotis, H. Yung, B.M. Yam, F.Y. Chan and T.S. Mok, The effectiveness of progressive muscle relaxation training in managing chemotherapy-induced nausea and vomiting

in Chinese breast cancer patients: a randomised controlled trial, *Support Care Cancer* **10** (2002), pp. 237–246.

34 M.S. Aapro, A. Molassiotis and I. Olver, Anticipatory nausea and vomiting, *Support Care Cancer* **13** (2005), pp. 117–121.

35 PCh. Feyer, E. Maranzano and A. Molassiotis *et al.*, Radiotherapy-induced nausea and vomiting (RINV): antiemetic guidelines, *Support Care Cancer* **13** (2005), pp. 122–128.