Metaanalyses of acustimulations: effects on nausea and vomiting in postoperative adult patients
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CRD summary
This review concluded that acupoint stimulation modalities are as effective as medication in reducing and preventing symptoms of post-operative nausea and vomiting symptoms in adult patients. However, given the potential for publication bias, the poor quality of some studies and differences between the studies, the authors’ conclusions may not be reliable.

Authors' objectives
To evaluate the effects of acupoints stimulations (AS) on post-operative nausea and vomiting symptoms (PONVS) in adult patients.

Searching
MEDLINE (via PubMed), EMBASE, CINAHL, CISCOM, the Cochrane Library and Dissertation International were searched from 1986 to May 2005; the search terms were reported. References were crosschecked with the reference lists of previous systematic reviews, surveys, meta-analyses and the retrieved primary studies. The authors did not state that they limited inclusion by language, but all of the included studies were published in English.

Study selection
Study designs of evaluations included in the review
The authors did not explicitly state which types of studies were eligible for inclusion. However, the search strategy, methods and results sections implied that only randomised controlled trials (RCTs) were included in the review.

Specific interventions included in the review
Studies that assessed AS modalities for the prevention of PONVS were eligible for inclusion. The studies included in the review reported the use of acupressure, acupuncture and electrical transcutaneous stimulation (ETS) techniques. The majority of included studies investigated the P6 acupoint; mainly assessing the use of bilateral or unilateral P6 acupressure bands. The duration of acupressure and ETS for the majority of studies ranged from 6 to 24 hours. The average duration of acupuncture treatment on P6 points ranged from 5 to 20 minutes. The majority of interventions were compared against placebo. The authors stated that they included placebo points that were known to be active AS points or non-active AS points that were excluded from two previous, published meta-analyses.

Participants included in the review
Studies that included post-operative adult patients were eligible for inclusion. The patients included in the review underwent mainly abdominal and gynaecological or obstetric surgeries which were often performed using laparoscopy. The participant ages reported in the trials ranged from 16 to 84 years; most participants were in the 30- to 50-year-old range. Fifteen studies (45.5%) reported the use of morphine and fourteen (42.4%) the use of prophylactic anti-emetics (10 mg ondansetron; 1.25 mg droperidol; 4 mg ondansetron; prochlorperazine; temazepam, midazolam or antacids).

Outcomes assessed in the review
Studies that reported the incidence of PONVS were eligible for inclusion. The review also reported the use of rescue anti-emetics.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.
Assessment of study quality
The quality of the studies was evaluated using criteria taken from five published sources. A score between 0 and 5 points was awarded for the quality of randomisation (five items) and treatment condition (five items). Studies scoring zero or one point were described as 'poor quality' and were subsequently excluded from the review. The authors did not report how many reviewers performed the validity assessment. The authors also stated that they evaluated the description of participant characteristics; the accuracy, validity and reliability of data collection methods; and the completeness of reporting (methods not reported).

Data extraction
Two reviewers independently reviewed and evaluated all the relevant information from the studies, and the data were double-checked to ensure the accuracy of the analyses. Absolute values and percentage values for the incidence of PONVS and rescue anti-emetic use were reported, and subsequently used to calculate the relative risks (RRs) with 95% confidence intervals (CIs) and the number-needed-to-treat.

Methods of synthesis
How were the studies combined?
The RRs (with 95% CIs) were pooled using a fixed-effect model. Publication bias was assessed using funnel plots and Egger's test of coefficient for the intercept.

How were differences between studies investigated?
Statistical heterogeneity was assessed using the chi-squared test. Subgroup analyses examined the effects of different AS modalities (acupressure, acupuncture, ETS), population subgroups (Caesarean sections, gynaecological surgery, gynaecological surgery using Korean Handpoints, use of medication) and comparisons (medication, placebo).

Results of the review
Thirty-three RCTs (n=4,214) were included in the review.

The quality scores ranged from 1.0 to 4.5 points for randomisation and from 1.5 to 5.0 for treatment conditions. All trials used random assignment (five using computers) and all but 8 trials attempted concealment of allocation; only 3 trials failed to use double-blind methods. All but one trial were judged to 'likely have valid and trustworthy findings'.

All modalities.

Compared with control groups, AS modalities overall significantly reduced nausea (RR 0.60, 95% CI: 0.54, 0.67, p<0.0001; 24 studies), vomiting (RR 0.51, 95% CI: 0.45, 0.57, p<0.0001; 29 studies) and the use of rescue anti-emetics (RR 0.63, 95% CI: 0.54, 0.74, p<0.0001; 19 studies). Some evidence of publication bias was found for the assessment of nausea and rescue anti-emetics, but no evidence of bias was found for the assessment of vomiting.

Acupressure.

Compared with control groups, acupressure overall significantly reduced nausea (RR 0.60, 95% CI: 0.53, 0.69, p<0.0001; 18 studies), vomiting (RR 0.54, 95% CI: 0.45, 0.64, p<0.0001; 19 studies) and the use of rescue anti-emetics (RR 0.62, 95% CI: 0.52, 0.74, p<0.0001; 17 studies). Subgroup analyses for Caesarean sections, gynaecological surgery, gynaecological Korean Handpoints and other surgery trials also showed similar significant differences in all three outcomes. Some evidence of publication bias was found for the assessment of rescue anti-emetics. However, no such evidence was found for the assessment of nausea or vomiting, or for any of the subgroup analyses, with the exception of gynaecological Korean Handpoints where bias could not be assessed because of the low numbers of included studies.

Acupuncture.

There were significant differences in vomiting (RR 0.47, 95% CI: 0.38, 0.59, p<0.0001; 6 studies) favouring the use of ETS in comparison with control. Differences in nausea (RR 0.75, 95% CI: 0.58, 0.97, p=0.0277; 4 studies) and the use
of rescue anti-emetics (RR 0.69, 95% CI: 0.49, 0.97; 1 study) were barely significant. Evidence of publication bias was found for the assessment of nausea, but not for vomiting; there were insufficient numbers of included studies to assess the risk of publication bias in the assessment of rescue anti-emetics.

ETS.

There were significant differences in nausea (RR 0.38, 95% CI: 0.26, 0.57, p<0.0001; 2 studies) and vomiting (RR 0.47, 95% CI: 0.34, 0.66, p<0.0001; 4 studies), favouring the use of ETS in comparison with control. However, there was no significant difference in the use of rescue anti-emetics (RR 0.50, 95% CI: 0.11, 0.57; 1 study). There were insufficient numbers of included studies to assess the risk of publication bias in the assessment of both nausea and rescue anti-emetics; there was no evidence of bias in the assessment of vomiting.

Effects of medication.

There were significant differences in nausea (RR 0.33, 95% CI: 0.19, 0.57, p<0.0001; 3 studies) and vomiting (RR 0.41, 95% CI: 0.27, 0.62, p<0.0001; 6 studies), favouring the use of medication in comparison with placebo. However, placebo groups were associated with a lower use of rescue anti-emetics in comparison with medication groups (RR 1.43, 95% CI: 1.05, 2.00, p=0.0352; 2 studies). There were insufficient numbers of included studies to assess the risk of publication bias in the assessment of both nausea and rescue anti-emetics; there was no evidence of bias in the assessment of vomiting.

Effects of medication versus AS.

There were no significant difference in nausea or vomiting between medication and AS modalities, but medication groups were associated with a significant increase in the use of rescue anti-emetics (RR 2.27, 95% CI: 1.48, 3.49, p=0.0002; 2 studies). No evidence of publication bias was found for nausea or vomiting, and bias could not be assessed for the use of rescue anti-emetics because of the low numbers of included studies.

Placebo effects.

Significant placebo effects in comparison with control groups were observed for both reductions in nausea (RR 0.67, 95% CI: 0.50, 0.90, p=0.0069; 4 studies) and vomiting (RR 0.39, 95% CI: 0.19, 0.80, p=0.0106; 3 studies); no significant differences were found for the use of rescue anti-emetics. No evidence of publication bias was found for the assessment of nausea; bias could not be assessed for vomiting and rescue anti-emetic use because of the low numbers of included studies.

Authors' conclusions

The evidence suggests that all AS modalities are effective in preventing PONVS in adults. They are as effective as medication in reducing PONVS and more effective in preventing PONVS, thus reducing the need for rescue anti-emetics.

CRD commentary

This review was based on a clear review question, defined in terms of the intervention, population and outcomes. The authors' literature searches involved a number of electronic databases which included both published and unpublished study data. However, the authors' own assessments suggested that publication bias may be a problem in some of the subgroup analyses. Language bias may also be an issue as all of the included studies were published in English, although the authors did not explicitly report using language limitations. It was also unclear whether appropriate methods were used to prevent error and bias when selecting and assessing the quality of the studies, although such steps were taken when extracting and analysing the data.

Differences between the included studies were evident, particularly in terms of the interventions, control groups, study quality and study populations, but the authors carried out a number of subgroup analyses to investigate this further. However, given the low numbers of studies included in some of the analyses, it was difficult to assess the reliability of the statistical tests for heterogeneity and publication bias. Overall, given the differences between the studies, the poor
quality of some of the studies and the potential for publication bias, the authors’ conclusions should be treated with caution. However, the authors' recommendations for further well-conducted research to further define effective modalities appear reasonable.

**Implications of the review for practice and research**

Practice: The authors stated 'non-invasive acupressure treatment is safe and effective for PONVS in adults'.

Research: The authors stated the need for further well-conducted, good-quality trials to define the most effective dose, frequency and duration of the different acupressure modalities. Such trials require proper placebo comparison groups and need to distinguish effects in different population subgroups.

**Bibliographic details**

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