The use of nonpharmacologic techniques to prevent postoperative nausea and vomiting: a meta-analysis

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Authors' objectives
To assess the efficacy of non-pharmacologic techniques to prevent postoperative nausea and vomiting (PONV).

Searching
The authors searched the MEDLINE (1980-1997) and EMBASE (1988-1997) electronic databases in September 1997 using the search terms (MeSH and text search) 'postoperative complications', 'nausea and vomiting', 'acupuncture', and 'acupressure'. The authors also searched the reference lists of retrieved articles and the Cochrane register of controlled trials. Retrieved studies were compared with an existing database of published trials provided by the National Library of Medicine in October 1997. There were no language restrictions.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) which evaluated the effect of non-pharmacologic techniques compared with control (placebo or antiemetic drugs) in preventing PONV. Cost-effectiveness studies were excluded. Reports without an adequate method of randomisation were excluded.

Specific interventions included in the review
Invasive (manual rotation of the needles, electrical stimulation of needle) and noninvasive (transcutaneous electrical stimulation and acupressure) non-pharmacologic techniques. The comparison groups received antiemetics (metoclopramide, cyclizine, prochlorperazine, or droperidol) and/or placebo (sham or no treatment). The non-pharmacologic interventions were administered preoperatively, interoperatively and postoperatively.

Participants included in the review
Adults and children undergoing surgery.

Outcomes assessed in the review
The incidence of nausea, vomiting, or both, 0-6 hours (early efficacy) or 0-48 hours (late efficacy) after surgery.

How were decisions on the relevance of primary studies made?
The authors met to agree on the inclusion of studies for the meta-analysis. Disagreement was resolved by reviewing the study and discussing the discrepancy.

Assessment of study quality
A scale was used (see Jadad, in Other Publications of Related Interest no.1) to assess the included studies on randomisation, double-blinding, and withdrawals. The minimal and maximal scores for a study were 1 and 5 respectively. An intraclass correlation coefficient for the study quality was calculated using an analysis of variance method for studies published in English. The raters met to agree consensus scores. Disagreement was resolved by reviewing the study and discussing the discrepancy.

Data extraction
Data were abstracted independently by the authors using a standardised collection form. Disagreement was resolved by reviewing the study and discussing the discrepancy.

Data were extracted for the categories of antiemetic drugs used, patient population, type of surgery, and anaesthetic details.
Methods of synthesis
How were the studies combined?
Pooled relative risk (RR) with 95% confidence intervals (CIs) and number-needed-to-treat (NNT) were calculated using the DerSimonian and Laird random-effects model. Meta-regression to adjust for confounders associated with PONV was not performed because of its limitations.

How were differences between studies investigated?
The chi-square test for heterogeneity was used to assess the differences between studies.

A sensitivity analysis was used in the following situations:
1. Sham and no-treatment groups were used separately as controls.
2. High-quality studies (quality score > 2) versus low-quality studies (quality score < or equal to 2).
3. Large studies (sample size > 50) versus small studies (sample size < or equal to 50).

A subgroup analysis was performed on pediatric studies because children as twice as likely as adults to experience PONV.

Results of the review
Nineteen RCTs were included in the meta-analysis with 1,679 patients (739 given non-pharmacologic techniques).

Non-pharmacologic techniques were better than placebo in 5 trials at preventing early nausea (RR = 0.40, 95% CI: 0.23, 0.71; NNT = 5) but there was statistically significant heterogeneity in this group. Without the smallest study the heterogeneity was removed with a RR = 0.34, 95% CI: 0.20, 0.58; NNT = 4, which was statistically significant.

Non-pharmacologic techniques were better than placebo in 8 trials at preventing early vomiting in adults (RR = 0.47, 95% CI: 0.34, 0.64; NNT = 5) which was statistically significant.

Non-pharmacologic techniques were similar to antiemetics in 3 studies in preventing early vomiting (RR = 0.89, 95% CI: 0.47, 1.67; NNT = 63) and late vomiting (RR = 0.80, 95% CI: 0.35, 1.81; NNT = 25) in adults but this was not statistically significant.

Non-pharmacologic techniques were similar to placebo in preventing late vomiting in adults (RR = 0.81, 95% CI: 0.46, 1.42; NNT = 14) but this was not statistically significant.

Using pharmacologic techniques, 20-25% of adults will not have early PONV compared with placebo.

In children, no benefit was found.

Authors' conclusions
The authors state that non-pharmacologic techniques were equivalent to commonly used antiemetic drugs in preventing vomiting after surgery. Nonpharmacologic techniques were more effective than placebo in preventing nausea and vomiting within 6 hours of surgery in adults, but there was no benefit in children.

CRD commentary
The authors have clearly stated their research question and some inclusion and exclusion criteria. The literature search appears thorough. However, the authors do not mention the inclusion of unpublished data in the review. The quality of the included studies was assessed and the authors have reported on how the articles were selected, and how many of the reviewers were involved in the data selection and extraction.
The data extraction is reported in tables and text. The statistical pooling was appropriate and there were tests for heterogeneity. The authors have also discussed several of the methodological and data limitations in the review.

The authors conclusions appear to follow from the results but these should be viewed with caution because some of the confidence intervals are wide and those results are not statistically significant.

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

**Practice:** The authors did not state any implications for practice.

**Research:** The authors state that further randomised controlled trials with better study methodology are needed in adults, as are studies of acupressure wristbands versus placebo acupuncture needle with adequate power. Studies are also required on the additive and/or synergistic effects of combining nonpharmacologic techniques and various types of antiemetics, including 5-HT3 antagonists in patients at high risk of PONV. Economic evaluations of non-pharmacologic techniques are also needed.

**Bibliographic details**


**PubMedID**

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**Original Paper URL**

http://www.anesthesia-analgesia.org

**Other publications of related interest**


This additional published commentary may also be of interest. White AR. Time to offer PC6 stimulation routinely. FACT 2000;5:18-9.

**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Acupressure; Acupuncture Therapy; Adult; Age Factors; Child; Humans; Models, Statistical; Postoperative Nausea and Vomiting /prevention & control; Randomized Controlled Trials as Topic; Risk Assessment; Transcutaneous Electric Nerve Stimulation

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on
the reliability of the review and the conclusions drawn.