Transdermal scopolamine for the prevention of postoperative nausea and vomiting: a systematic review and meta-analysis

CRD summary
The authors concluded that transdermal scopolamine compared with placebo was associated with significant reductions in postoperative nausea and vomiting during the first 24 hours post anaesthesia but there was a higher prevalence of visual disturbances at 24 to 48 hours after surgery. Due to the unknown quality of included studies, the reliability of the authors' conclusions is unclear.

Authors' objectives
To evaluate the efficacy and tolerability of transdermal scopolamine for prevention of postoperative nausea and vomiting in adults.

Searching
PubMed, EMBASE and The Cochrane Library were searched without language restrictions to July 2010. Search terms were reported. Reference lists of relevant studies were scanned and weekly email alerts were activated to retrieve newly published studies.

Study selection
Randomised controlled trials (RCTs) that compared transdermal scopolamine with placebo in adult patients for prevention of postoperative nausea and vomiting were eligible for inclusion.

Where reported, patients were classed largely as having mild systemic disease (American Society of Anaesthesiologists grading) and underwent various different surgeries. Some patients received prophylactic ondansetron. Outcomes were presence or absence of postoperative nausea, postoperative vomiting and postoperative nausea and vomiting from arrival at the postanaesthesia care unit and for up to 48 hours after surgery. Other outcomes included adverse events and need for rescue treatment. Some RCTs contained active comparators.

Two reviewers independently selected studies for inclusion.

Assessment of study quality
The authors did not report any quality assessment of included studies.

Data extraction
Data were extracted on the outcomes of interest to enable calculation of relative risks (RRs) and 95% confidence intervals (CIs). Authors were contacted for missing data.

Three reviewers independently extracted data. Disagreements were resolved by discussion.

Methods of synthesis
Relative risks and 95% CIs were pooled in a random-effects meta-analysis (Mantel Haenszel). Statistical heterogeneity was assessed with $\chi^2$ and $I^2$. Publication bias was assessed using a funnel plot.

Results of the review
Twenty-five RCTs (3,298 participants, range 24 to 620) were included in the review.

In the first 24 hours after surgery, significantly reduced risks were reported for patients who received transdermal scopolamine compared to placebo for postoperative nausea (0.59, 95% CI 0.48 to 0.73; 16 RCTs, $I^2$=64%), postoperative vomiting (RR 0.68, 95% CI 0.61 to 0.76; 15 RCTs) and postoperative nausea and vomiting (RR 0.73, 95% CI 0.60 to 0.88; seven RCTs). Postoperative nausea (RR 0.77 95% CI 0.61 to 0.98; eight RCTs, $I^2$=35%), postoperative vomiting (RR 0.75, 95% CI 0.64 to 0.87; 11 RCTs) and postoperative nausea and vomiting (RR 0.84,
95% CI 0.73 to 0.96; four RCTs) in the postanaesthesia care unit were also significantly reduced but these outcomes were not significant at 24 to 48 hours post surgery.

There was a significantly reduced need for rescue treatment as a result of transdermal scopolamine (RR 0.68, 95% CI 0.50 to 0.93; number of trials unknown). Within 24 hours post surgery, early and late application of patches were associated with reduced postoperative nausea (early application RR 0.56, 95% CI 0.41 to 0.75; seven RCTs, $I^2 = 16\%$ and late application RR 0.61, 95% CI 0.47 to 0.79; eight RCTs, $I^2 = 66\%$). Similar trends were noted for postoperative vomiting (early application RR 0.56, 95% CI 0.42 to 0.75; eight RCTs, $I^2=18\%$) and late application RR 0.67, 95% CI 0.53 to 0.86; six RCTs, $I^2 = 59\%$).

Where it was possible to pool the data, there were significantly more frequent visual disturbances in the transdermal scopolamine group during the 24 to 48 hour period after surgery (RR 3.35, 95% CI 1.78 to 6.32; three RCTs). Non-significant differences between study groups were reported for various other adverse events.

There was no evidence of publication bias for the outcomes of nausea or adverse events.

Authors' conclusions
Compared with placebo, transdermal scopolamine was associated with significant reductions in postoperative nausea and vomiting with both early and late patch application during the first 24 hours after the start of anaesthesia. Transdermal scopolamine was associated with a higher prevalence of visual disturbances at 24 to 48 hours after surgery.

CRD commentary
The review question was clear. Inclusion criteria were potentially reproducible. Not all included RCTs were placebo-controlled, which contradicted the inclusion criteria. Relevant data sources were accessed. Attempts were made to minimise language bias. There was no apparent search for unpublished studies, but publication bias was assessed and no evidence of it was found for selected outcomes. Study selection and data extraction were carried out with sufficient attempts to minimise error and bias. The absence of a quality assessment of included trials made their reliability unclear.

Adequate study details were provided, statistical heterogeneity was assessed and the chosen method of synthesis appeared appropriate.

This was a largely well-conducted review but due to the unknown quality of included studies, the reliability of the authors' conclusions is unclear.

Implications of the review for practice and research
Practice: The authors stated that transdermal scopolamine may be a favourable option in clinical practice but antiemetic prophylaxis should take account of the baseline risk of the patient. Prior to application, patients should be advised to remove the patch should adverse events occur and be made aware of the gradual resolution of these events.

Research: The authors stated that future research should evaluate the effects of transdermal scopolamine during the 24 to 48 hour follow-up.

Funding
No funding.

Bibliographic details

PubMedID
21118734

DOI
10.1016/j.clinthera.2010.11.014

Original Paper URL

Indexing Status
Subject indexing assigned by NLM

MeSH
Administration, Cutaneous; Antiemetics /administration & dosage /adverse effects /therapeutic use; Humans; Postoperative Nausea and Vomiting /chemically induced /prevention & control; Scopolamine Hydrobromide /administration & dosage /adverse effects /therapeutic use

AccessionNumber
12011000069

Date bibliographic record published
09/03/2011

Date abstract record published
08/08/2012

Record Status
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.