Prevention of vomiting after paediatric strabismus surgery: a systematic review using the numbers-needed-to-treat method

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Authors' objectives
To compare the effectiveness and incidence of adverse effects of pharmacological interventions to prevent vomiting after paediatric strabismus surgery.

Searching
MEDLINE was searched from January 1966 to December 1994 using the keywords 'strabismus' and 'vomiting'. Reference lists of retrieved studies and review articles were searched for additional reports. Unpublished studies and abstracts were not considered.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials with a definable control group were included.

Specific interventions included in the review
Anti-emetics used for prophylaxis in paediatric strabismus surgery. Drugs used in the studies were: butyrophenone (droperidol), metoclopramide, anticholinergics (atropine, hyoscine), phenothiazine (dixyrazine), 5-HT3 antagonist (ondansetron), benzodiazepine (lorazepam), lignocaine and propofol. All the above were given intravenously before, during or at the end of surgery. Scopolamine patches (hyoscine) were applied the evening before surgery.

Participants included in the review
Tables containing the number, age and type (in- or out-patient) of patients are available from the authors, but details are not stated in the paper.

Outcomes assessed in the review
Emesis (nausea, retching, vomiting) and adverse effects (extrapyramidal symptoms, oculocardiac reflex, and minor effects such as sedation, drowsiness, restlessness and agitation). Vomiting was split into early and late vomiting (up to 6 and 48 hours after the operation, respectively).

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection. Each report was read independently by each of the authors.

Assessment of study quality
The quality of the reports was described using a 3-item scale, designed previously by Jadad (see Other Publications of Related Interest). It was unclear how the papers were assessed for validity, although each report was read independently by each of the authors.

Data extraction
The following information was extracted: the number, age and type of patients; dose, route and time of administration of antiemetics; anaesthetic techniques; definition of emesis; and adverse effects. Tables containing the extracted information are available from the authors.

Methods of synthesis
How were the studies combined?
Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated using a fixed-effect model. Numbers-needed-to-treat (NNT) and 95% CIs were also calculated for individual reports and by combining single treatment or control arms.

How were differences between studies investigated?
The authors do not state how differences between the studies were investigated.

Results of the review
Twenty-four studies with 38 treatment arms were included. The number of patients available for each analysis varied.

There was no significant difference between the rates of both early and late vomiting in children in placebo control groups compared to no-treatment control groups, therefore no distinction was made between the 2 groups. Four doses of droperidol were analysed (10, 20, 50 and 75 microg/kg). Only the highest dose of droperidol (75 microg/kg) gave a statistically-significant OR for the absence of both early and late vomiting. The OR for early vomiting was 3.3 (95% CI: 2.4, 4.7), and the corresponding NNT was 3.5 (95% CI: 2.8, 4.8); the OR for late vomiting was 2.5 (95% CI: 1.7, 3.6), and the corresponding NNT was 4.4 (95% CI: 3.1, 7.1). There was also significantly more minor adverse effects at this dose (OR 3.1, 95% CI: 1.9, 4.9; NNT 6.3, 95% CI: 4.6, 10.2). Three doses of metoclopramide were analysed (0.1, 0.15 and 0.25 mg/kg). For the 2 higher doses, there was a statistically-significant OR for the absence of early vomiting. The OR for early vomiting was 2.8 (95% CI: 1.7, 4.6) for a 0.15 mg/kg dose, and 5.0 (95% CI: 2.4, 10.3) for a 0.25 mg/kg dose; the corresponding NNT were 4.0 (95% CI: 2.7, 7.6) and 2.5 (95% CI: 1.8, 4.3), respectively. The ratios for late vomiting were only based on small numbers. For some combinations of propofol there were significant improvements in both early and late vomiting, but the CIs were relatively wide. Propofol had a statistically-significantly higher rate of oculocardiac reflex compared with halogenated inhalation anaesthetic (OR 3.2, 95% CI: 1.9, 5.4; NNT 3.6, 95% CI: 2.6, 6.3). All other drugs were poorly documented with information only obtained from a small number of patients.

Authors’ conclusions
The benefits of prophylactic anti-emetic therapy are not proven. Any conclusive comparative information is lacking details of the effectiveness and adverse effects of the various prophylactic treatments. It is unclear whether no report of adverse effect means no adverse effect. Propofol should not be considered as a worthwhile prophylaxis due to its relatively poor effectiveness and the risk of oculocardiac reflex. The question of whether it would be better to wait and see who vomits and then treat needs to be answered, and possibly defines the research agenda.

CRD commentary
The methodology of the systematic review is unclear. Insufficient details of the individual studies are provided in the report, although tables are available from the authors. The search strategy was not particularly comprehensive and it would be useful to assess the risk of publication bias, given the decision to exclude unpublished reports and abstracts. The studies are scored for quality, but the results of the scoring do not appear to be used in the analysis, e.g. either to include or exclude studies, or to favourably weight the results of higher quality studies. The authors state that the results are from 27 studies with 2,033 children, and that 3 of these studies were excluded from the analysis.

Bibliographic details

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Other publications of related interest
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Subject indexing assigned by NLM

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