Propofol anaesthesia and postoperative nausea and vomiting: quantitative systematic review of randomized controlled studies

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Authors' objectives
To compare the incidence of post-operative nausea and vomiting after propofol anaesthesia with nausea and vomiting after other anaesthetics.

Searching
MEDLINE was searched from 1966 to 1995 and reference lists and review articles. Only published articles were sought, with no language restriction.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) with adequate randomisation which evaluated the effect of propofol compared with other anaesthetics and reported the outcome in dichotomous form.

Specific interventions included in the review
Propofol, used for induction or maintenance of anaesthesia. Control anaesthetics were not specified.

Participants included in the review
Children and adults undergoing surgery in a variety of settings were included.

Outcomes assessed in the review
The outcomes assessed were post-operative nausea and vomiting (PONV), as separate events or combined, distinguishing early (0 to 6 hours) and late (0 to 48 hours) PONV.

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.

Assessment of study quality
The authors do not state that they assessed validity.

Data extraction
Information on patients, anaesthetics, surgery and definition of PONV was taken from each report. Three outcomes were extracted in dichotomous form: nausea, vomiting (including retching) and any emetic event. Incidences of early and late PONV were recorded.

Methods of synthesis
How were the studies combined?
Data from the studies were used to construct a series of graphs (L’Abbe plots) showing emetic event rates with interventions in relation to event rates with controls. For each condition, odds ratios and the number of patients needed to be treated to prevent an event (NNT) were calculated, with 95% confidence intervals. Comparisons were made for both early and late outcomes.

How were differences between studies investigated?
Subgroup analyses were carried out to compare the effects of propofol in types of surgery with different control rates.
of early vomiting. L’Abbe plots also revealed differences between studies.

**Results of the review**

A total of 84 studies involving 6,069 patients, 3,098 treated with propofol, were included.

Propofol used as a maintenance regimen reduced early (<6 hours) postoperative nausea and vomiting. NNTs for the 3 types of early emetic event were as follows:

Propofol used for induction of anaesthesia: nausea: 5 (95% CI, 2.7 to 35); vomiting: 7 (95% CI, 4.4 to 17); any emetic event: 14 (95% CI, 5 to ). Propofol for anaesthesia maintenance: nausea 4.7 (95% CI, 3.8 to 6.3); vomiting 4.9 (95% CI, 4 to 6.1); any emetic event: 4.9 (95% CI, 3.7 to 7.1).

Analysis of early and late outcomes after propofol as an induction agent, or late outcomes after propofol maintenance, produced NNTs greater than 9 in every case. Late outcomes showed that although propofol maintenance led to significantly less nausea and vomiting (reported as separate events) than control anaesthetics (NNTs 6.1, 95% CI, 3.9 to 15, and 8.3, 95% CI, 4.9 to 28, respectively) there were no other significant differences between propofol and controls. Subgroup analyses revealed that the advantage of propofol was greater with major gynaecological surgery than with minor surgery, with NNTs for prevention of early vomiting of 4.2 (95% CI, 3 to 8) and 16 (95% CI, 11 to 32), respectively. These subgroups had different control rates of vomiting: 32% with major surgery, 10% with minor.

**Authors’ conclusions**

Propofol maintenance anaesthetic may have a clinically relevant effect, reducing post-operative nausea and vomiting, but only in the short term, when given as a maintenance regimen and when the event rate without prophylaxis is more than 20%. In all other situations - propofol for induction, late outcomes, low control event rates - differences between propofol and control may be statistically-significant but clinically unimportant.

**CRD commentary**

The search was not comprehensive and some studies (particularly those published in mainland Europe) may have been missed. It is not possible to judge whether this would have had any impact on the findings. In other respects, this seems to be a reliable review.

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