The efficacy of 5-HT3 receptor antagonists for the prevention of postoperative vomiting following craniotomy: two studies in children and young adults

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CRD summary
The authors concluded that perioperative ondansetron did not show a large effect in reducing postoperative vomiting in paediatric patients following craniotomy. Small sample sizes were acknowledged as a potential limitation to the meta-analysis. Appropriate further research was recommended. The reliability of the authors’ conclusion discounting any large effect is unclear because it was based a limited number of small studies.

Authors’ objectives
To evaluate the efficacy of 5-hydroxytryptamine type 3 (5-HT3) receptor antagonists for the prevention of postoperative vomiting in paediatric craniotomy patients.

Searching
MEDLINE, EMBASE, CINAHL, The Cochrane Library, DARE, Web of Science and Dissertation Abstracts were searched from January 2006 to November 2008 without language restrictions. Search terms were reported. Grey literature was sought from OCLC and through Google Scholar.

Study selection
Randomised controlled trials (RCTs) of paediatric patients aged between two and 20 years who underwent craniotomy with a dural opening were eligible for inclusion in the review if they compared an intraoperative 5-HT3 receptor antagonist with placebo. The primary outcome of interest for the meta-analysis was an emetic event within 24 hours post surgery. The secondary outcome of interest was use of a rescue anti-emetic within 24 hours post surgery.

Included were studies of ondansetron (0.15mg/kg) in patients who underwent infratentorial and supratentorial scheduled craniotomy for brain tumour, with similar anaesthetic protocols. There was significantly more males than females and a higher age range in one of the two included studies conducted in USA and India. Other differences between the studies were noted in terms of measurements of vomiting and use of dexamethasone. Rescue anti-emetics used were droperidol or metoclopramide.

One reviewer carried out the initial screening of abstracts. Two reviewers independently selected studies for final inclusion.

Assessment of study quality
Trial quality was assessed using the Jadad scale of randomisation, blinding and withdrawals and dropouts. The maximum achievable score was 5, which indicated high quality.

The authors did not state how many reviewers carried out the quality assessment.

Data extraction
Data were extracted to enable calculation of the relative risk (RR) of harm and 95% confidence intervals (CI).

Two reviewers independently extracted data.

Methods of synthesis
Relative risks and 95% CIs were combined in a DerSimonian and Laird random-effects meta-analysis. Heterogeneity was assessed using the I² statistic: values of 25%, 50% and 75% represented low, moderate and high levels of variation.
Results of the review
Two RCTs were included in the meta-analysis (n=135). Both trials were considered to be high quality (Jadad scores 5 and 4).

The pooled analysis showed no statistically significant difference for use of ondansetron compared with placebo in terms of reductions in postoperative vomiting (RR 0.77, 95% CI 0.50 to 1.19; $I^2=17\%$) and use of rescue anti-emetics (RR 0.71, 95% CI 0.34 to 1.49, $I^2=0\%$).

Authors' conclusions
Peri-operative ondansetron did not show a large effect in reducing postoperative vomiting in paediatric patients following craniotomy.

CRD commentary
The research question and inclusion criteria were clearly stated. The search strategy included several relevant sources and there was evidence of attempts to minimise language and publication biases. The review process was reported to be carried out with attempts to minimise error and bias at all stages except validity assessment. A relevant validity assessment tool was applied and the results were clearly reported. The chosen method of synthesis appeared appropriate in light of the low level of heterogeneity. Small sample sizes were acknowledged as a potential limitation to the meta-analysis, and appropriate further research was recommended.

This was a reasonably well-conducted review. The reliability of the authors' conclusion discounting any large effect is unclear because the conclusion was based a limited number of small studies.

Implications of the review for practice and research
Practice: The authors stated that a combination of drugs and non-pharmacologic interventions was likely to provide the best therapy for paediatric patients following craniotomy.

Research: The authors stated that a small number of further high-quality trials would be sufficient to add to the present meta-analysis to explore the presence of any clinically relevant effect. Inclusion of higher-risk groups from the paediatric population of interest and assessment of nausea as an outcome were warranted.

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Other publications of related interest

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