The analgesic effects of perioperative gabapentin on postoperative pain: a meta-analysis

CRD summary
The authors concluded that peri-operative oral gabapentin is a useful addition to post-operative pain management. The evidence appears to support the authors’ conclusions, but the lack of reporting of concomitant analgesic regimens and control treatments makes it difficult assess the settings in which these findings might apply.

Authors' objectives
To evaluate the analgesic effects of peri-operative gabapentin in surgical patients.

Searching
PubMed (1966 to November 2005) and abstracts from the Society of Neuroscience (1998 to 2004) and the American Society of Anesthesiologists were searched; some details of the search terms were reported. No language restrictions were applied.

Study selection
Randomised controlled trials (RCTs) that evaluated the effects of peri-operative oral gabapentin on post-operative pain in adult surgical patients were eligible for inclusion. The primary review outcome was the pain score (visual analogue or numeric score) at 20 to 24 hours post-operatively. The review also assessed pain at 0 to 4 hours post-operatively, post-operative analgesic use and adverse effects (sedation, nausea/vomiting and dizziness/lightheadedness).

The included studies evaluated oral gabapentin, most commonly given as a single dose 1 to 2 hours before surgery: the doses ranged from 300 to 1,200 mg. Almost 50% of the included studies included only women; other studies included patients of both sexes. The patients were undergoing a variety of different surgical procedures, predominantly hysterectomy, lumbar discectomy and breast surgery. The duration of follow-up ranged from 4 to 56 hours.

The authors stated that three reviewers independently reviewed all articles; this might have referred to the study selection process.

Assessment of study quality
In their discussion the authors stated that three reviewers independently reviewed all articles, but it was unclear whether this referred to the validity assessment. Validity was apparently assessed using Cochrane and Jadad criteria.

Data extraction
In their discussion the authors stated that three reviewers independently reviewed all articles; this might have referred to the data extraction process. Data on post-operative analgesic use and post-operative pain were extracted or extrapolated from figures.

Methods of synthesis
Pooled weighted mean differences (WMDs) with 95% confidence intervals (CIs) were calculated using a random-effects model. The number of unpublished studies required to invalidate the findings was calculated. The results of assessments of heterogeneity using \( \chi^2 \) and \( I^2 \) statistics were presented in forest plots, but were not mentioned in the text.

Results of the review
Twelve RCTs (n=896) were included.

All of the studies were of a high quality: all scored 6 or 7 out of 7 for the Cochrane Quality Score and 5 out of 5 on the Jadad scale.

Oral gabapentin was associated with a statistically significant reduction in post-operative pain at 20 to 24 hours (WMD -0.74, 95% CI: -1.03, -0.45) and at 0 to 4 hours (WMD -1.57, 95% CI: -2.14, -0.99) compared with the control. Forest
plots showed significant heterogeneity ($I^2=79.6\%$ and $I^2=89.6\%$, respectively).

Gabapentin was also associated with a statistically significant reduction in post-operative analgesic use (WMD -17.84, 95% CI: -23.50, -12.18) and a significantly increased incidence of sedation (WMD 3.28, 95% CI: 1.21, 8.87) compared with control.

There was no statistically significant difference between gabapentin and control in nausea, vomiting or dizziness/lightheadedness.

An estimated 119 studies (n=107,814) would be required to invalidate the findings of the meta-analysis.

**Authors' conclusions**
Peri-operative oral gabapentin is a useful addition to post-operative pain management and may be a reasonable addition to multi-modal analgesic regimens.

**CRD commentary**
The review question was stated clearly and inclusion criteria were specified. Several relevant sources were searched and attempts were made to minimise language bias. Methods appear to have been used to minimise reviewer error and bias during parts of the review process, but the methods were not explicitly described. Only RCTs were included and validity was assessed. No information was provided about the control treatment or the type of concomitant analgesia used in the included studies; this makes it difficult to assess the general applicability of the results. The pooling of data statistically appears appropriate, but no mention was made of the heterogeneity among studies in the text and potential reasons for differences were not discussed; forest plots suggested that the size of the treatment effect varied among studies. The evidence appears to support the authors' conclusions, but the lack of reporting of concomitant analgesic regimens and control treatments makes it difficult to assess the settings in which these findings might apply.

**Implications of the review for practice and research**
Practice: The authors stated that peri-operative oral gabapentin may be a useful addition to multi-modal post-operative treatment plans.

Research: The authors stated that future research could examine the dose-response relationship of peri-operative gabapentin, the effects of post-operative gabapentin, and the effects of gabapentin in chronic persistent pain.

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