Dexamethasone to prevent postoperative nausea and vomiting: an updated meta-analysis of randomized controlled trials

De Oliveira GS, Castro-Alves LJS, Ahmad S, Kendall MC, McCarthy RJ

CRD summary
This review concluded that a 4mg to 5mg dose of dexamethasone appeared to have similar clinical effects in the reduction of postoperative nausea and vomiting as a 8mg to 10mg dose. This was generally a well-conducted review and the authors’ conclusions are likely to be reliable although only a few studies directly compared the two different doses.

Authors’ objectives
To examine the effects of different doses (4mg to 5mg and 8mg to 10mg) of single dose systemic dexamethasone for the prevention of postoperative nausea and vomiting. A secondary objective was to assess whether the effect changed when dexamethasone was administered alone or in conjunction with another antiemetic drug.

Searching
PubMed, EMBASE, Cochrane Database of Systematic Reviews and Google Scholar were searched to October 2011; search terms were reported. Reference lists of identified studies were searched for additional relevant studies. Language restrictions were not applied. Only published studies were sought.

Study selection
Randomised controlled trials (RCTs) that evaluated the administration of a single perioperative intravenous dose of systemic dexamethasone, compared with placebo or no treatment, as prophylaxis for postoperative nausea and/or vomiting were eligible for inclusion. Only studies conducted in adults (18 years or older) were included. Studies in which dexamethasone was administered in combination with another antiemetic versus the same other antiemetic alone were included. Studies had to report early (six hours or less) or 24-hour incidence of postoperative nausea and/or vomiting. Studies that used weight-dependent doses of dexamethasone were excluded; only fixed dose studies were included. Studies of emergency medicine and non-surgical patients were excluded. Studies by an author whose studies were reported to have questioned validity were excluded.

The included studies were published between 1994 and 2011. Studies included patients who underwent various surgical procedures including tonsillectomy, mastectomy, laparoscopic cholecystectomy and caesarean delivery. Patients were given single dose dexamethasone either preoperatively or intraoperatively and either as a single drug or in combination with another antiemetic. Most studies used a dexamethasone dose of 8mg to 10mg. Types of anaesthesia varied between studies and often included fentanyl and/or propofol.

Two reviewers selected studies for inclusion; disagreements were resolved by discussion, with the involvement of a third reviewer where necessary.

Assessment of study quality
Two reviewers independently assessed study quality using a modified version of the Jadad five-point scale of randomisation, blinding, concealment of allocation and drop-outs. Discrepancies were resolved by discussion, with the involvement of a third reviewer when necessary.

Data extraction
Data were extracted on incidence of early nausea and/or vomiting (six hours or less) and 24-hour nausea and/or vomiting, and early and 24-hour need for rescue antiemetics. Study authors were contacted for missing data where necessary. Continuous data were extracted as means and standard deviations.

Two reviewers independently extracted data from the included studies; discrepancies were resolved by discussion, with the involvement of a third reviewer where necessary. Another reviewer checked the data extraction for accuracy.

Methods of synthesis
Comparisons were stratified into two dose groups: 4mg to 5mg and 8mg to 10mg. The lower dose range was derived from the Society for Ambulatory Anesthesia (SAMBA) guidelines. The higher dosage group represented twice the dose range recommended in the SAMBA guidelines.

Data were pooled using a random-effects model and reported as odds ratios with 95% confidence intervals for dichotomous data and weighted mean differences with 95% confidence intervals for continuous data. The number needed to treat (NNT) was estimated. Heterogeneity was quantified using the I² statistic and considered present if I² was more than 30%. Subgroup assessment was planned based on whether dexamethasone was administered alone or in combination with another antiemetic and by type of anaesthesia (general versus regional/local).

Publication bias was assessed using funnel plots and Egger's regression test.

**Results of the review**

Sixty RCTs (6,696 participants) were included in the review. The median modified Jadad score was 4 (three studies scored 2, 19 scored 3, 25 scored 4 and 13 scored 5).

A single dose of 4mg to 5mg dexamethasone was statistically significantly more effective than control at reducing the incidence of 24-hour nausea and/or vomiting (OR 0.31, 95% CI 0.24 to 0.42; NNT=3.7; 14 RCTs). Heterogeneity was low (I²<30%).

A single dose of 8mg to 10mg dexamethasone was statistically significantly more effective than control at reducing the incidence of 24-hour nausea and/or vomiting (OR 0.27, 95% CI 0.22 to 0.35; NNT=3.8; 27 RCTs). Heterogeneity was low (I²<30%).

Pooling results for 4mg to 5mg and 8mg to 10mg dexamethasone together resulted in an odds ratio of 0.29 (95% CI 0.24 to 0.35).

Five RCTs directly compared the effectiveness of 4mg to 5mg and 8mg to 10mg dexamethasone and found no statistically significant difference between groups in terms of 24-hour nausea and/or vomiting.

Dexamethasone in combination with another antiemetic was more effective than the other antiemetic alone at reducing the incidence of 24-hour nausea and/or vomiting (4mg to 5mg dose OR 0.50, 95% CI 0.35 to 0.72; NNT=6.6; three RCTs and 8mg to 10mg dose OR 0.35, 95% CI 0.22 to 0.53; NNT=6.2; seven RCTs).

Funnel plots suggested the possibility of publication bias for the analyses of 8mg to 10mg dexamethasone.

The effect of dexamethasone on incidence of 24-hour nausea and/or vomiting was not significantly different for studies performed under general anaesthesia (OR 0.29, 95% CI 0.24 to 0.35) compared with studies performed under regional/local anaesthesia (OR 0.26, 95% CI 0.17 to 0.38).

Results were presented for early nausea and/or vomiting, 24-hour nausea, early nausea, 24-hour vomiting, early vomiting and postoperative need for rescue antiemetics over a 24-hour period and early postoperative period.

**Authors' conclusions**

A 4mg to 5mg dose of dexamethasone for prevention of nausea and vomiting appeared to have similar clinical effects in the reduction of postoperative nausea and vomiting as a 8mg to 10mg dose when dexamethasone was used as a single drug or as a combination therapy.

**CRD commentary**

The review question and inclusion criteria were clearly stated. The search was adequate but unpublished studies were not sought and funnel plot asymmetry suggested the possibility of publication bias for some analyses. Study selection, data extraction and quality assessment were all undertaken in duplicate, which reduced potential for reviewer bias and error. The quality of the included trials was assessed using appropriate criteria, overall quality assessment scores were presented for each trial and the quality of the included trials was generally good. The synthesis appeared appropriate and suitable methods were used to assess heterogeneity.
This was generally a well-conducted systematic review and the authors' conclusions are likely to be reliable although only a few studies compared the two different dose regimens directly.

Implications of the review for practice and research
Practice: The review's findings supported Society for Ambulatory Anesthesia (SAMBA) guidelines for postoperative nausea and vomiting which recommend a 4mg to 5mg dose of dexamethasone for the prevention of postoperative nausea and vomiting.

Research: The authors did not make any recommendations for further research.

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Department of Anesthesiology, Northwestern University, Chicago, Illinois, USA.

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