A meta-analysis of dexamethasone use with tonsillectomy

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Authors' objectives
To determine the quantitative impact of intravenous dexamethasone on recovery after tonsillectomy.

Searching
MEDLINE was searched from 1966 to 1998 using 'tonsil' and 'tonsillectomy' separately as a keyword, textword, title word, MeSH and exploded. Sets were then combined using the operator 'or'. The same principles were applied using 'steroid' and 'steroids', and results were cross-referenced against the database for 'tonsil' and 'tonsillectomy' using the operator 'and'. No language restrictions were applied. References in identified articles were reviewed.

Study selection
Study designs of evaluations included in the review
All types of studies were eligible for inclusion. Parallel group, double-blind randomised controlled trials (RCTs) were eligible for inclusion in the meta-analysis if patients were treated identically except for the intervention under investigation, and complete data were available for end points in the control and treatment groups.

Specific interventions included in the review
Studies examining the use of intravenous, peri-operative administration of dexamethasone were eligible for inclusion in the meta-analysis, as were those examining the use of any method of peri-operative steroid administration. Non-steroid treatments such as ondansetron and midazolam were excluded.

Included studies administered a single intravenous dose of dexamethasone in either doses ranging from 150 microg/kg to 1 mg/kg (maximum 8 to 25 mg) or in a dose of 8 mg/m2 of body surface area. All included studies were placebo-controlled.

Participants included in the review
Tonsillectomy patients were eligible. Studies concentrating on anaesthetic technique, upper airways obstruction, obstructive sleep apnoea and other paediatric diseases were excluded. The participants appear to have all been children, although this was not stated explicitly. Techniques for tonsillectomy included cold knife dissection or electrocautery dissection.

Outcomes assessed in the review
Studies that assessed any post-operative outcomes were eligible. The outcomes actually assessed were post-operative emesis (assessed 'after surgery', 'in hospital', day of discharge, day after discharge or at between 3 and 24 hours), oral intake (assessed as soft or regular, or solid diet on first and third post-operative day), post-operative pain, and hours till first post-operative oral intake. Outcomes were assessed at 24 hours, and 3 to 7 days post-operatively.

How were decisions on the relevance of primary studies made?
Each of the identified articles was independently reviewed by two of the authors, and any discrepancies were resolved through mutual discussion and review of the article; foreign language article was reviewed with a translator.

Assessment of study quality
Only double-blind RCTs were eligible. The degree and adequacy of randomisation and degree of blinding were assessed. Two authors independently assessed validity for studies included in the meta-analysis, and any discrepancies resolved through mutual discussion and review of the article.

Data extraction
Two authors independently extracted the following data: type of study, group comparisons, type of medication given, other treatments given, and outcome measures for pain, emesis, and diet. Discrepancies were resolved through mutual discussion and review of the article. The effect size for studies meeting criteria for pooling was measured using the absolute rate difference (RD) and 95% confidence interval (CI).

**Methods of synthesis**

How were the studies combined?
A pooled absolute RD with 95% CI and the number-needed-to-treat (NNT) were calculated using a random-effects model. Publication bias was assessed by examining if the 95% CI of the pooled RD approached zero.

How were differences between studies investigated?
Homogeneity was assessed by examining whether the 95% CIs for RD results from individual studies encompassed the pooled estimate of RD.

**Results of the review**

Twenty studies were included in the review and six RCTs were included in the meta-analysis (493 patients).

Sample size ranged from 25 to 133 patients.

Emesis after tonsillectomy (5 RCTs, 466 patients): dexamethasone significantly reduced emesis; RD -27 (95% CI: -42, -12, p<0.0001); NNT 3.7. The authors state that studies appear relatively homogeneous. Publication bias was considered unlikely.

Return to soft or regular diet on post-operative days one (3 RCTs, 191 patients) and three (3 RCTs, 135 patients): dexamethasone significantly increased the likelihood of return to soft or regular diet on the first post-operative day, but had no significant effect by the third post-operative day; pooled RD were 22 (95% CI: 1, 44, p<0.001) and 12 (95% CI: -19, 43, p=0.281), respectively. The individual results suggested heterogeneity was present and publication bias was considered likely.

Post-operative pain (4 RCTs): inconsistent results with 2 studies reporting a beneficial effect for dexamethasone and 2 studies reporting no significant effect.

**Authors’ conclusions**

Peri-operative dexamethasone administration had a positive impact on recovery from tonsillectomy.

**CRD commentary**

The aims were stated and the inclusion criteria were defined in terms of the participants, intervention, study design and outcomes. No language restrictions were applied, but only one relevant database was searched and no attempt was made to locate unpublished material, thus raising the possibility of publication bias. Twenty studies seem to have been eligible for the systematic review, but the article only reports the findings of 6 RCTs included in the meta-analysis. Methods used for part of the study selection process were described. Only double-blind RCTs were eligible for the meta-analysis and although validity was assessed, results of the assessment were not reported. Methods used to extract data and assess validity were reported. Some relevant details of the included studies were presented in tabular format, though patient characteristics were not described, no mention was made of drop-outs, no reasons were given for the variation in number of patients in individual studies reported for different outcomes, and methods used to measure outcomes in the individual studies were not reported. Data were pooled using a random-effects model in the presence of heterogeneity. However, pooling data even using a random-effects model is inappropriate when it does not make clinical sense to do so. In this case, the authors note that studies using electrocautery techniques differed from those using cold knife. One potential cause for heterogeneity was discussed but no investigation was conducted. The discussion included consideration of the following limitation of the review: potential for publication bias, heterogeneity among studies, and the potential influence of the method of tonsillectomy on the results.
In view of the above limitations, the conclusion should be interpreted with caution.

**Implications of the review for practice and research**

Practice: The authors recommend that an appropriate dose of intravenous dexamethasone be given peri-operatively during tonsillectomy.

Research: The authors state that further randomised, placebo-controlled, double-blind studies will help to clarify the degree of benefit offered by intravenous dexamethasone on dietary tolerance and other clinical outcomes.

**Bibliographic details**


PubMedID
11112957

DOI
10.1067/mhn.2000.111354

**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Antiemetics /pharmacology /therapeutic use; Dexamethasone /pharmacology /therapeutic use; Diet; Double-Blind Method; Humans; Infusions, Intravenous; Intraoperative Care /methods; Morbidity; Postoperative Nausea and Vomiting /etiology /prevention & control; Prospective Studies; Randomized Controlled Trials as Topic; Reproducibility of Results; Research Design; Tonsillectomy /adverse effects; Treatment Outcome

**AccessionNumber**

12001000070

**Date bibliographic record published**

31/10/2001

**Date abstract record published**

31/10/2001

**Record Status**

This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.