Harmonic scalpel tonsillectomy: a systematic review of evidence for postoperative hemorrhage

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CRD summary
The authors concluded that low-quality evidence provided no support for any significant difference between harmonic scalpel and other methods of tonsillectomy in the rates of post-operative haemorrhage, and more research is required. Overall, this was a well-conducted review and the authors’ conclusions are likely to be reliable.

Authors' objectives
To compare post-operative haemorrhage rates for harmonic scalpel tonsillectomy (HST) and other conventional methods of tonsillectomy.

Searching
The Cochrane Library, MEDLINE, EMBASE, CINAHL, the Centre for Reviews and Dissemination's databases, and related databases were searched to September 2006; the search terms were reported. In addition, conference proceedings and reference lists were screened. Manufacturers of harmonic scalpel technology were contacted for details of unpublished studies. No language restrictions were applied. Conference proceedings were not included in the review; the authors stated that there was insufficient information to assess quality.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion in the review. Some of the included studies randomised patients and others randomised tonsils.

Specific interventions included in the review
Studies that compared HST with other conventional methods of tonsillectomy were eligible for inclusion; eligible comparators were reported. Studies that used tonsillotomy or radiofrequency tonsil reduction were excluded. The comparators in the included studies were cold steel tonsillectomy and ‘hot’ tonsillectomy (diathermy for both dissection and haemostasis), bipolar scissors, monopolar cautery plus coblator, electrocautery and bipolar diathermy. Studies used different additional haemostatic procedures.

Participants included in the review
Studies of adults or children who were undergoing bilateral tonsillectomy were eligible for inclusion. Studies of tonsillectomy for malignant disease or unilateral tonsillectomy for histology were excluded. Some of the included studies excluded patients with recurrent tonsillitis, chronic tonsillitis and quinsy; other studies included patients with acute peritonsillar abscess. Some studies only included adults, some included children and adolescents, and others included adults and children.

Outcomes assessed in the review
Studies that reported numerical data for post-operative primary (first 24 hours) or secondary (1 to 14 days post-operatively) bleeding were eligible for inclusion. The included studies used different definitions of post-operative haemorrhage.

How were decisions on the relevance of primary studies made?
Two reviewers independently selected the studies and resolved any disagreements on inclusion through discussion.

Assessment of study quality
Two reviewers independently assessed validity using the criteria described by Chalmers: adequacy of randomisation, potential for selection bias, blinding of the outcome assessors, and quality of the outcome assessment (definition of primary and secondary bleeding, definition of bleeding, and follow-up sufficient to detect outcome). The studies were
graded from A where bias was minimised, to C where one or more of the quality criteria were not met. The review also assessed the power of some studies to detect a statistically significant difference between treatments.

**Data extraction**
Two reviewers independently extracted the data.

**Methods of synthesis**
How were the studies combined?
The studies were grouped by comparator and combined in a narrative.

How were differences between studies investigated?
Differences between the studies were discussed.

**Results of the review**
The authors stated that 11 RCTs were included, but only 10 RCTs (n=1,258) were presented in the tables and referred to in the text.

The studies were poorly reported. Two studies were awarded a B grade and the others a C grade. All of the studies were underpowered, and the majority did not define primary and secondary haemorrhage. Potential confounding factors included the selection of patients, additional haemostatic interventions and expertise of the surgeon.

HST versus cold steel tonsillectomy (5 studies, n=508): all of the studies used a 'hot' haemostatic method to control bleeding in the cold steel group. One study reported no significant difference in the proportion returned to theatre. One study reported a significant reduction in secondary haemorrhage in patients in the HST group (p=0.01), whereas another study reported no significant difference in this outcome between treatments. Statistical significance was not reported for the other 3 studies.

HST versus 'hot' tonsillectomy (5 studies, n=750): the studies reported no significant difference in secondary haemorrhage between HST and bipolar scissors (1 study), no significant difference in post-operative bleeding between HST and monopolar cautery plus coblator (1 study), and no difference in rate of return to theatre for secondary haemorrhage between HST and electrocautery (2 studies). One study reported the same number of secondary tonsillar bleeds in patients allocated to HST and bipolar diathermy.

**Authors' conclusions**
Low-quality evidence provided no support for any significant difference between harmonic scalpel and other methods of tonsillectomy in the rates of post-operative haemorrhage. More research is required.

**CRD commentary**
The review addressed a clear question that was defined in terms of the participants, intervention, outcomes and study design. Several relevant sources were searched and attempts were made to minimise publication and language bias. Validity was assessed using specified criteria and the results of this assessment reported. Methods were used to minimise reviewer error and bias in the study selection, validity assessment and data extraction processes. In view of the differences between the studies, a narrative synthesis with studies grouped by comparator was appropriate. However, the results from studies comparing harmonic scalpel with cold steel tonsillectomy were presented in a table and not synthesised. The conclusion took stu

**Implications of the review for practice and research**
Practice: The authors stated that good-quality evidence is required before HST can be safely accepted into clinical practice.

Research: The authors stated that since large RCTs to evaluate the effects of HST on post-operative bleeding are likely to be impractical, a large well-controlled cohort study may be more appropriate. Studies could compare HST with cold steel dissection plus ties (without the use of ‘hot’ techniques) for haemostasis and follow up patients for at least 14 days;
clearly define primary and secondary haemorrhage; report the experience of the surgeon; and evaluate economic outcomes, as well as patient-related measures such as post-operative pain, return to normal diet and normal activity.

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