Post-tonsillectomy bleeding: a meta-analysis

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Authors' objectives
To assess the predictive value of pre-operative coagulation studies for patients undergoing tonsillectomy and adenoidectomy.

Searching
MEDLINE was searched from January 1966 to October 2000 for publications in the English language. The initial search terms were 'tonsillectomy' and 'bleeding'. The search results were supplemented with review articles, source articles and textbook bibliographies. Unpublished data or trials were not sought. The authors also used the Cochrane Library, but no details were given.

Study selection
Study designs of evaluations included in the review
Prospective trials were included in the review. Retrospective studies meeting all other inclusion and exclusion criteria were included for a sensitivity analysis of the results.

Specific interventions included in the review
Studies of pre-operative coagulation tests (prothrombin time and activated partial thromboplastin time) in patients undergoing tonsillectomy and/or adenoidectomy were eligible for inclusion.

Reference standard test against which the new test was compared
No inclusion criteria relating to the reference standard were specified. The reference standard used by the review was post-operative bleeding.

Participants included in the review
Studies including participants of all ages undergoing tonsillectomy, or tonsillectomy and adenoidectomy were eligible for inclusion. Studies of patients with concomitant illnesses were excluded.

Outcomes assessed in the review
No inclusion criteria relating to the outcome measures were specified. The outcome measures used in the review were the sensitivity, specificity, and positive and negative predictive values.

How were decisions on the relevance of primary studies made?
Two reviewers screened the titles and abstracts of each citation independently. They identified all citations for full review.

Assessment of study quality
Each study was given a score (from 0 to 2) for six items: description of patient sample, diagnostic criteria for bleeding, randomisation protocol, statistical analysis, results presentation and compliance check. An overall quality score (from 0 to 1) was calculated by dividing points accrued by the maximum attainable points. This value was used to assign relative weights to the sensitivity analysis. Two reviewers independently rated each study.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction. The following data were extracted: sample size, definition of bleeding, type of study, the total number of post-operative bleeds, the total number of abnormal coagulation studies, the number of patients with normal coagulation tests and bleeding, and the number of patients with abnormal coagulation tests and bleeding. The sensitivity, specificity,
and positive and negative predictive values were extracted or calculated from the included studies.

**Methods of synthesis**

How were the studies combined?  
Pooled estimates of the sensitivity, specificity, and positive and negative predictive values were obtained by combining the results of index and reference standard tests from patients in four different studies. Similarly, the rate difference for post operative bleeding in patients with abnormal and normal index test results was obtained using the test results of patients from all of the included studies.

How were differences between studies investigated?  
A sensitivity analysis was conducted, including patients from retrospective studies.

**Results of the review**

Four prospective studies with 3,384 patients were included in the primary analysis. Eight retrospective studies with 8,988 patients were included in the sensitivity analysis.

The analysis of the pooled result of 3,384 patients (4 studies) revealed 9 patients with an abnormal coagulation profile and peri-operative bleeding, and 107 patients with normal coagulation profiles and peri-operative bleeding. This produced a sensitivity of 0.08 and a specificity of 0.97, with a positive predictive value of 0.10 and a negative predictive value of 0.97. The sensitivity analysis of the 8,988 patients from the retrospective studies showed a sensitivity of 0.02, a specificity of 0.98, a positive predictive value of 0.01 and a negative predictive value of 0.98. The difference in rates was 8.7% (95% confidence interval, CI: 1.5, 15.9) for patients with abnormal tests and post-operative bleeding, and 3.3% (95% CI: 2.5, 4.1) for patients with normal tests and post-operative bleeding. The overlap in CI implies no rate difference between the two groups of patients.

**Authors' conclusions**

There is no difference in the rate of post-tonsillectomy bleeding for patients with abnormal coagulation studies and patients with normal coagulation studies that are obtained pre-operatively.

**CRD commentary**

The review addressed a common surgical procedure. The descriptions of the methods employed in the review were brief. The literature search appears to have been restricted to one database, although the authors mentioned a second, and there was no attempt to seek out either unpublished data or trials. Therefore, the possibility remains that studies may have been missed. The authors acknowledged some of the shortcomings of the review, such as the numbers of studies included and the fact that the participants spanned all ages and that there was no evaluation of surgical technique, and clearly described them in the paper. The analysis of the coagulation tests as a diagnostic tool was poorly described and conducted. No diagnostic threshold for a positive coagulation test was described, and no criteria for defining a post-operative bleed (the reference standard) were reported. Few study details were provided, and no formal assessment of between-study heterogeneity or threshold effect was reported.

Estimates of test performance were presented, which were apparently calculated directly from the test results of the patients in all of the included studies, treated as a single population group. This approach would always be questionable and cannot be justified where no attempt has been made to assess the differences between the studies. This and the limited description of the review process and analysis means that, overall, the findings should be treated with a considerable degree of caution.

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

Practice: The authors recommend that routine prothrombin time and partial thromboplastin time tests should not be ordered as a matter of course, but that family and patient histories should be carefully noted; should there be any indication of coagulation problems, coagulation studies can then be ordered.
Research: The authors note that the role of clinical histories in predicting post-operative bleeding needs to be delineated.

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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.