Harmonic scalpel tonsillectomy versus hot electrocautery and cold dissection: an objective comparison

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Three strategies for performing tonsillectomy (or adenotonsillectomy) were examined. These were harmonic scalpel (HS), electrocautery (EC) and cold surgical dissection (CSD).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients undergoing tonsillectomy (or adenotonsillectomy).

Setting
The setting was a tertiary care centre. The economic study was carried out in Michigan, USA.

Dates to which data relate
The effectiveness, resource use and cost data were gathered from September 2000 to August 2001. The price year was not reported.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was carried out retrospectively on the same sample of patients as that used in the clinical study.

Study sample
Power calculations, if performed, were not reported. A sample of 316 patients was identified at the authors’ institution. This comprised 175 males and 141 females aged 1 to 23 years (mean age: 7.3 years) undergoing tonsillectomy alone (n=48) or adenotonsillectomy (n=268). There were 75 patients in the HS group, 109 in the EC group and 132 in the CSD group. It was not stated whether some patients were excluded for any reasons from the study sample.

Study design
This was a retrospective cohort study that was carried out at the Children’s Hospital of Michigan in Detroit. All
procedures were performed by one of three experienced otolaryngologists. The patients were followed up until discharged. No patients were lost to the follow-up assessment. Children aged 3 years or younger remained in the hospital for overnight observation, while all other patients were discharged home once they were able to tolerate oral fluid and after they had undergone a physical examination of the tonsillar fossae.

Analysis of effectiveness
All of the patients included in the initial study sample were accounted for in the analysis. The outcomes used were:

the mean operating time (OT),
the rate of postoperative bleeding,
the rate of dehydration,
the rate of combined complications, and
the mean length of stay (LOS).

The baseline comparability of the study groups was not discussed.

Effectiveness results
The mean OT for adenotonsillectomy was 42.4 minutes with HS, 43 minutes with EC and 49.2 minutes with CSD.

The mean OT for tonsillectomy was 23.6 minutes with HS, 30.2 minutes with EC and 35.3 minutes with CSD.

The rate of postoperative bleeding was 1.3% with HS, 2.8% with EC and 3% with CSD.

The rate of dehydration was 1.3% with HS, 2.8% with EC and 3% with CSD.

The rate of combined complications was 2.7% with HS, 5.5% with EC and 6.1% with CSD.

The mean LOS for patients with bleeding was 2 days with HS, 1 day with EC and 0.7 days with CSD.

The mean LOS for patients with dehydration was 1 day with HS, 1.3 days with EC and 1.5 days with CSD.

Clinical conclusions
The effectiveness results showed that shorter OTs and lower complication rates were associated with HS in comparison with other surgical approaches.

Measure of benefits used in the economic analysis
The health outcomes were left disaggregated and no summary benefit measure was used in the economic evaluation. In effect, a cost-consequences analysis was carried out.

Direct costs
Discounting was not relevant since the costs per patient were incurred during a short timeframe. The unit costs were not presented separately from the quantities of resources used. The economic evaluation considered only emergency room time and the use of disposable and non-disposable equipment. The cost/resource boundary of the study was unclear. Resource use was estimated on the basis of retrospectively collected data, which were derived from the same sample of patients as that included in the clinical study. The costs came from the authors’ institution. The price year was not reported.
Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The indirect costs were not considered.

Sensitivity analysis
Sensitivity analyses were not carried out.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The mean institutional per-patient cost of surgery was $460 with HS, $310.75 with EC and $300 with CSD.

Synthesis of costs and benefits
A synthesis of the costs and benefits was not relevant since a cost-consequences analysis was carried out.

Authors' conclusions
The authors concluded that their experience with harmonic scalpel (HS) was positive and that the use of HS was efficacious, safe and cost-effective (considering potential cost-savings associated with lower complication rates).

CRD COMMENTARY - Selection of comparators
The authors explained the choice of the comparators, which reflected the surgical approaches available in different eras. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness evidence came from a cohort study, which had some limitations. For example, the use of a retrospective design, the lack of information on the comparability of the study groups at baseline, and the fact that no justification for the size of the sample was provided. Further, the rationale for treatment allocation was not reported and the lack of randomisation could have introduced some selection bias. The authors noted that the number of patients in some of the groups was very small, and thus limited the statistical power of the whole analysis.

Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis because a cost-consequences analysis was conducted. Please refer to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
The perspective adopted in the study was unclear. However, only medical costs relevant to the authors' institution were included. It was not stated whether charges or other sources of costs were used. No details of the unit costs, resource use or price year were provided, which limits the possibility of replicating the analysis and reflating the results of the study in other settings and time periods. The costs were treated deterministically and were specific to the study setting. Overall, the information provided on the cost analysis was limited.
Other issues
The authors stated that, to their knowledge, their study was the first to carry out an overall evaluation of surgical approaches (including HS) for tonsillectomy. The results of other studies were assessed and the authors pointed out the potential limitations of such published studies. The issue of the generalisability of the study results to other settings was not addressed and no sensitivity analyses were performed. This reduces the external validity of the analysis. The authors highlighted that, as they gained more experience with HS, the procedure could become even faster, thus reducing the risk associated with longer OR times.

Implications of the study
The authors recommended that any institution involved with a significant number of paediatric tonsillectomies should consider using HS.

Source of funding
None stated.

Bibliographic details

PubMedID
15586875

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Adenoidectomy /instrumentation /methods; Adolescent; Adult; Child; Child, Preschool; Electrocoagulation /methods; Female; Humans; Infant; Length of Stay; Male; Michigan; Retrospective Studies; Tonsillectomy /economics /instrumentation /methods

AccessionNumber
22005000180

Date bibliographic record published
31/10/2005

Date abstract record published
31/10/2005