Tonsillectomy: a cost-effective option for childhood sore throat? Further analysis of a randomized controlled trial

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.

CRD summary
The study assessed the cost-effectiveness of (adenoid) tonsillectomy when compared with medical therapy for recurrent sore throats in school-age children. The authors concluded that tonsillectomy could save up to eight sore throats at a reasonable cost. They recommended further prospective data collection. The quality of the study methodology was good. The study had some important limitations, but these were adequately highlighted by the authors. The authors conclusions appear appropriate and reflected the study's limitations.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
To assess the cost-effectiveness of (adenoid) tonsillectomy when compared with medical therapy for recurrent sore throats in school-age children.

Interventions
The interventions under study were: tonsillectomy with or without adenoidectomy (surgical interventions took place within 12 weeks of randomisation with preference to surgery according to local wait times at participating hospitals); and medical management (patients managed by their family doctor according to usual practice).

Location/setting
UK/Secondary in-patient care and primary care.

Methods
Analytical approach:
The economic analysis was based on a comprehensive cohort study in which patients were offered the possibility to enter a randomised controlled trial (where they were randomised either to surgery or usual practice). The time horizon was two years. The perspective was that of the National Health Service (NHS).

Effectiveness data:
Effectiveness data were derived from a randomised trial and a non-randomised study from an overall cohort study. A detailed report of the study methodology and full results had been published elsewhere (see Other Publications of Related Interest). Recruitment into the study was from 2002 to 2006. Patients were offered the possibility to enter a randomised controlled trial (where they were randomised either to surgery or usual practice). Those who declined participation in the trial were offered their preferred treatment and invited to participate in the parallel non-randomised study. Of the 1,546 children who were eligible for the study, 729 were enrolled: 268 in the randomised controlled trial and 461 in the non-randomised cohort study. The main effectiveness measure was episodes of sore throat defined as a minimum of three consecutive days of sore throat. This information was collected using 24 one-month structured sore throat health diaries completed by patients daily and returned monthly. At three, 12 and 24 months patients were assessed using the PedsQL (Pediatric Quality of Life) inventory with two generic core scales for physical and psychosocial health.

Monetary benefit and utility valuations:
None.
Measure of benefit:
The benefit measure was sore throats prevented.

Cost data:
Direct costs included in the study were for NHS contacts and included general practitioner contacts (consultation, phone calls and home visits), nurse contacts, outpatient visits and in-patient hospital visits. Direct costs also included the costs of prescribed analgesics. Data on consultation rates and prescribed medications were derived from family doctor records at the end of the two-year follow-up period. Sources for unit costs were not reported. The price year was 2006. All costs were reported in UK pounds (£).

Analysis of uncertainty:
The authors conducted an intention-to-treat analysis. The number of episodes of sore throat in each of the two years of follow-up was evaluated using a Poisson regression model with a log link function. There was a large cross-over between treatment arms and a large proportion of patients did not consent to the trial but agreed to be followed-up. The authors determined the difference in expected outcome if all study children had received either tonsillectomy or medical management. For this the authors used a Poisson regression model with clinical and patient characteristics as covariates.

Results
Over the two-year period, the trial medical group had a mean of 11.4 sore throat episodes compared with 7.4 episodes in those randomised to surgery. Poisson regression indicated that the incidence rate ratio in patients randomised to the surgical group was 0.70 (95% CI 0.61 to 0.80) in year one and 0.54 (95% CI 0.42 to 0.70) in year two, with an overall reduction of 3.5 episodes over two years (95% CI 1.8 to 5.2) in the surgical group compared with the trial medical group.

Over the two-year period, the trial medical group had an estimated mean cost of £463.22 compared with £1,402.15 for surgical management. Surgery had incremental costs of £939 per patient.

Costs and benefits were combined using an incremental cost-effectiveness ratio (additional cost per sore throat avoided). When compared with medical management, the incremental cost-effectiveness ratio of surgery was £261 (95% CI £161 to £586) per sore throat avoided.

In the "as treated" model, the authors found that an average of more than eight sore throats were saved with tonsillectomy when the procedure was performed within 10 weeks of consultation. Assuming an incremental cost of surgery compared with medical management of £939, this gave a lower incremental cost-effectiveness ratio than that identified in the trial.

Authors' conclusions
The authors concluded that in UK school-age children, tonsillectomy could save up to eight sore throats at a reasonable cost. The authors recommended further prospective data collection.

CRD commentary
Interventions:
The interventions under study were reported clearly and appeared to be appropriate comparators.

Effectiveness/benefits:
Effectiveness data were derived from a multicentre randomised controlled trial. Details and results of the main trial had been published elsewhere. Adequate details were provided of the sample size, power calculations, randomisation and follow-up. Although the trial results were likely to be internally valid, the high rates of cross-over from medical management to surgery meant that treatment effectiveness as estimated using the intention to treat analysis was likely to be biased downward. The authors used sore throats avoided as the main measure of benefit. This was a very narrow outcome measure and hampered decision making as it was unclear what the willingness to pay threshold for a sore throat avoided was, unlike other more broad measures of outcome such as the Quality Adjusted Life Year (QALY).

Costs:
The perspective adopted in the economic analysis was reported explicitly. It appeared that all relevant major costs were included for this perspective. Methods used to evaluate resource use and the sources from which unit costs were derived were reported adequately. The price year and time horizon were reported adequately. It was unclear whether the costs were appropriately discounted and this may have increased the uncertainty of the estimates.

Analysis and results:
Clinical, outcome and resource-use data were derived from a single trial and appeared to be combined appropriately in the analytical approach. The authors appropriately assessed uncertainty in their results by performing an additional analysis to estimate the impact of cross-over between treatment groups in the analysis. The results were described adequately. The authors reported the decreasing rates of recording of the primary outcome data in sore throat diaries and completing the quality-of-life measure as the main limitation to their study.

Concluding remarks:
Overall the quality of the study methodology was good. Although the study had some important limitations, these were adequately highlighted by the authors. The authors conclusions appear appropriate and reflected the study's limitations.

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