Cost-effectiveness of 2 approaches to managing nasolacrimal duct obstruction in infants: the importance of the spontaneous resolution rate
Frick KD, Hariharan L, Repka MX, Chandler D, Melia BM, Beck RW, Pediatric Eye Disease Investigator Group (PEDIG)

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
This study assessed the impact of the rate of spontaneous resolution of congenital nasolacrimal duct obstruction on the cost-effectiveness of deferred nasolacrimal duct probing in a surgical facility versus immediate office-based surgery, in infants. The authors concluded that the relative cost-effectiveness of these strategies depended on the spontaneous resolution rate following diagnosis. There were a number of limitations to the evidence, but the methods and reporting were satisfactory. The authors’ conclusions appear to be consistent with the evidence presented.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to assess the impact of the rate of spontaneous resolution of congenital nasolacrimal duct obstruction on the relative cost-effectiveness of deferred nasolacrimal duct probing in a surgical facility, compared with immediate office-based surgical probing, in infants.

Interventions
Immediate office-based probing surgery aimed to clear the nasolacrimal duct blockage, in the physician's office, using topical anaesthesia. This was compared with delayed facility-based probing surgery, where surgery was delayed for six months, to allow spontaneous resolution; if this did not occur, surgery was undertaken in the hospital out-patient department, using general anaesthesia.

Location/setting
USA/primary and secondary care.

Methods
Analytical approach:
The authors used a decision-tree model to combine the cost and effectiveness data from a range of sources, including data on spontaneous resolution. The model evaluated infants aged six to nine months. The time horizon was until the age of 18 months. The authors stated that the perspective was that of the health care insurer.

Effectiveness data:
The evidence came from a range of sources including unpublished data on patients who took part in a published study by the Pediatric Eye Disease Investigator Group (PEDIG), a prospective observational study, and expert opinion. The main clinical parameters were the rate of spontaneous resolution and treatment success, which was defined as the absence of: epiphora (watery eye), increased tear lake, and mucus discharge.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measure of benefit was the cost per additional treatment success at 18 months old. The months of symptoms avoided were reported.
Cost data:
The direct medical costs of surgery (including procedure costs, physician visits, and drugs) were based on the 2009 Medicare Fee Schedule and a prospective observational cohort study. The price year was 2009 and all costs were reported in US dollars ($).

Analysis of uncertainty:
One-way and multivariate sensitivity analyses were performed by varying the key parameters of the model, such as the rate of spontaneous resolution, each procedure’s probability of success, and the costs of surgery. Probabilistic sensitivity analyses were performed.

Results
The average cost of delayed surgery was $641 compared with $771 for immediate office-based surgery. The incremental cost of delayed surgery was $130.

The probability of success was estimated to be 97.5% with delayed surgery and 93% with immediate surgery. Delayed surgery was dominant, as it was more effective and less costly, compared with immediate surgery.

The average duration of symptoms was 3.9 months with delayed surgery and 0.9 months with immediate surgery; an average of three months of symptoms averted with immediate surgery. The incremental cost-effectiveness ratio for immediate compared with delayed surgery was $44 per month of symptoms avoided.

At rates of spontaneous resolution of 68% or more, delayed surgery was dominant. Its incremental cost-effectiveness ratio was $16,709 per additional treatment success at a spontaneous resolution rate of 50%.

At a spontaneous resolution rate of 90%, the incremental cost-effectiveness ratio of immediate compared with delayed surgery was $169 per month of symptoms avoided. At spontaneous resolution rates lower than 69%, immediate surgery dominated delayed surgery.

Authors’ conclusions
The authors concluded that the cost-effectiveness of delayed versus immediate surgery depended on the spontaneous resolution rate following diagnosis. At a rate of 75%, the two options were about equally successful and costly.

CRD commentary
Interventions:
Both interventions were well described and appear to have been the treatments available in the study setting at the time. It was not clear which one was the usual practice.

Effectiveness/benefits:
The effectiveness data were published data from an observational study, which was of moderate methodological quality, and unpublished data and expert consensus. Insufficient detail was provided on these data sources to fully assess the quality of the evidence. There was no indication that a systematic review was performed to identify the sources, making it unclear if the best available evidence was used. The sources of data appear to have been relevant to the study setting.

Costs:
The authors reported the perspective and appear to have included the appropriate cost categories. The cost estimates were reported in a table and they were relevant to the study population and the setting. The price year and currency were reported, allowing future inflationary exercises.

Analysis and results:
The analytic approach was satisfactorily reported. The model structure was described and a diagram was given. The authors evaluated the uncertainty thoroughly in one-way, multivariate, and probabilistic sensitivity analyses. The results of the base case and sensitivity analyses were extensively reported. The authors discussed the limitations of their study, such as the lack of primary data, collected during an effectiveness-oriented randomised trial, for the model inputs. The authors stated that the PEDIG network had launched such a prospective randomised trial, to better estimate the rate of
spontaneous resolution.

Concluding remarks:
There were a number of limitations in the evidence used in the model, but the methods and reporting of the study were satisfactory. The authors’ conclusions appear to be consistent with the evidence presented.

Funding
Supported by a grant from the National Eye Institute, National Institutes of Health, USA.

Bibliographic details

PubMedID
21555614

DOI
10.1001/archophthalmol.2011.80

Original Paper URL
http://archopht.ama-assn.org/cgi/content/abstract/129/5/603

Indexing Status
Subject indexing assigned by NLM

MeSH
Ambulatory Surgical Procedures; Catheterization /economics; Cost-Benefit Analysis; Dacryocystorhinostomy; Decision Trees; Health Care Costs; Humans; Infant; Intubation /economics; Lacrimal Duct Obstruction /congenital /economics; Models, Economic; Nasolacrimal Duct /surgery; Ophthalmologic Surgical Procedures /economics; Probability; Remission, Spontaneous; Treatment Outcome

AccessionNumber
22011001371

Date bibliographic record published
21/09/2011

Date abstract record published
21/12/2011