Cost-effectiveness of therapeutic hypothermia to treat neonatal encephalopathy

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 aim was to estimate the cost-effectiveness of total body hypothermia plus intensive care versus intensive care alone, in the treatment of neonatal encephalopathy. The authors concluded that the likelihood that cooling was cost-effective was finely balanced over the first 18 months after birth, but increased substantially when national incidence data, or an extended time horizon, were considered. Assuming that the clinical evidence was the best available, the conclusions are likely to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The aim was to evaluate the cost-effectiveness of total body hypothermia plus intensive care versus intensive care alone, in the treatment of neonatal encephalopathy.

Interventions
Intensive care plus cooling was compared with intensive care alone for moderate-to-severe neonatal encephalopathy.

Location/setting
UK/tertiary care.

Methods
Analytical approach:
A decision-analytic model based on a clinical trial, the Total Body Hypothermia for Neonatal Encephalopathy Trial (TOBY), with a prospective economic evaluation and a meta-analysis, was used to evaluate the costs and benefits over an 18-month time horizon. The authors stated that the perspective was that of the British NHS health care and personal social services.

Effectiveness data:
The clinical evidence came from three randomised controlled trials. These data were synthesised using a Bayesian approach. The data from two trials were used as prior information for the likelihood data from the TOBY.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The benefit was measured in terms of disability-free life-years (DFLY). To be disability free was defined as being free from neurological abnormality. The benefits were discounted at an annual rate of 3.5%.

Cost data:
The cost categories were the costs of the interventions; the unit costs were assigned to each resource item to obtain a cost per child, for each health state. The main sources of costs were NHS Reference Costs and the British National Formulary. All costs were expressed in 2006 to 2007 UK pounds sterling (£) and they were discounted at a rate of 3.5% per year.

Analysis of uncertainty:
Probabilistic sensitivity analyses were conducted and cost-effectiveness acceptability curves were presented to show the parameter uncertainty in four different scenarios, including a time horizon of 18 years. The ranges and distributions used in these analyses were reported.

**Results**

Cooling led to a cost increase of £3,787 (95% CI -2,516 to 12,360) and a DFLY gain of 0.19 (95% CI 0.07 to 0.31) over the first 18 months after birth. The incremental cost per DFLY gained was £19,931.

Acceptability curves for the baseline scenario showed that there was a 69% likelihood of cooling being cost-effective if decision-makers were willing to pay £30,000 for an additional DFLY.

This likelihood increased when the throughput of infants was increased to reflect the national incidence of neonatal encephalopathy or when the time horizon was extended to 18 years.

**Authors’ conclusions**

The authors concluded that the likelihood that cooling was cost-effective for neonatal encephalopathy was finely balanced over the first 18 months after birth, but increased substantially when national incidence data, or an extended time horizon, were considered.

**CRD commentary**

**Interventions:**

The interventions were well reported and adequately defined.

**Effectiveness/benefits:**

This economic evaluation was based on one trial, with a prospective economic evaluation. The data from two other trials were synthesised with the data from this main trial. There was no indication that a systematic review of the literature was performed, so it is not certain that all the relevant evidence available was used. The method of evidence synthesis was not described in detail. Few details of the trials were reported. The measure of benefit was adequately described.

**Costs:**

The resource use came from the main clinical trial that provided the clinical evidence, which should ensure valid estimates. The unit cost data came from appropriate local sources. The costs included were consistent with the stated perspective. The price year and cost adjustment details were stated.

**Analysis and results:**

The analysis and reporting of the results was adequate. The main limitations acknowledged by the authors included using a DFLY metric instead of QALYs and the exclusion of the costs borne by other relevant sectors (informal caregivers, education services, and medical-legal costs). The authors used four different and relevant scenarios for the probabilistic sensitivity analysis and these were well described.

**Concluding remarks:**

Assuming that the clinical evidence was the best available, the conclusions are likely to be appropriate.

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