Cost-effectiveness of pediatric epilepsy surgery compared to medical treatment in children with intractable epilepsy

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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.

CRD summary
This study assessed the cost-effectiveness of epilepsy surgery in children with intractable epilepsy. The authors concluded that surgical treatment was cost-effective compared with medical therapy, but larger samples and longer follow-up were required to validate these results. Most patients in the control group were not eligible to receive the intervention, so the study groups were not comparable and the results should be treated with caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The study assessed the cost-effectiveness of epilepsy surgery compared with medical treatment in children with intractable epilepsy.

Interventions
The authors compared pediatric epilepsy resective surgery against medical treatment for children with intractable epilepsy.

Location/setting
Canada/in-patient tertiary care.

Methods
Analytical approach:
A decision analytic tree model was used to estimate the cost-effectiveness of surgery relative to medical treatment of pediatric epilepsy. The time horizon of the study was one year following the surgical eligibility decision date. The authors did not explicitly report the perspective.

Effectiveness data:
Effectiveness data were derived from a cohort of children under 18 years with epilepsy intractable to medication identified from a magnetoencephalography database. Fifteen children who had undergone respective epilepsy surgery were selected randomly and recruited retrospectively. Fifteen children who were evaluated for epilepsy surgery during the same period and received medical treatment only were identified, selected randomly, and recruited. The main effectiveness estimate used in the model was percentage seizure reduction at one-year follow-up. This estimate was obtained by review of patient charts for each patient included in the study.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The measure of benefit was percentage seizure reduction at one-year follow-up.

Cost data:
Direct costs included in the analysis were in-patient care (nursing, professional services, diagnostic imaging, laboratory, pharmacy, physician fees, and other in-patient costs), out-patient care (visits to neurology, neurosurgery,
psychiatric and emergency departments, and diagnostic tests) and medications. In-patient and out-patient hospital costs were obtained from the hospital’s finance department. All medication costs included initial drug price, mark-up, and pharmacist and dispensing fees. All costs were collected for the period April 2007 to September 2009. All costs were reported in Canadian dollars (CAD).

Analysis of uncertainty:
A series of one-way sensitivity analyses was undertaken to assess the impact of uncertainty around key model inputs. A probabilistic sensitivity analysis was undertaken to obtain 95% confidence intervals for costs and seizure reduction and create an incremental cost-effectiveness scatter plot.

Results
Average costs per patient were CAD 30,664 in the surgical group and CAD 15,085 in the medical treatment group.

Seizure reduction was 76.53% in the surgical group and 34.33% in the medical treatment group.

Compared with medical treatment, the additional cost per 1% seizure reduction in the surgical group was CAD 369.

The authors reported that the one-way sensitivity analysis showed that none of the changes altered the cost-effectiveness status of surgical treatment.

Authors' conclusions
The authors concluded that surgical treatment was cost-effective, compared with medical therapy, but larger samples and longer follow-up were required to validate the results.

CRD commentary
Interventions:
The interventions appeared to be appropriate comparators. The surgical intervention was described. Little information was provided about the treatment and medication received by patients in the medical management group.

Effectiveness/benefits:
Effectiveness data were derived from a small cohort of patients. The patients were shown to be comparable in terms of age, age at seizure onset, epilepsy duration and epilepsy frequency. But the authors reported that 11 of the 15 children in the medical group were considered unsuitable for surgical treatment which meant that the patients in each study group were not comparable. The seizure reduction measure of outcome was not widely generalisable. This made comparisons with other interventions difficult and so it was difficult to judge whether or not the intervention was cost-effective.

Costs:
Although the perspective was not reported explicitly, it appears that a health care payer perspective was adopted. For this perspective, all the relevant costs were included in the analysis. The sources from which the resource use and costs were derived were reported clearly. The price year was not reported, which would hamper future inflationary exercises. The time horizon of the study was reported.

Analysis and results:
Information from the cohort study on costs and outcomes was combined using a decision tree model; adequate details and a diagram were provided. Uncertainty was assessed in a series of one-way sensitivity analyses and in a probabilistic sensitivity analysis. The authors reported that the main limitations were the small sample and that most patients in the medical management group were not eligible for surgery.

Concluding remarks:
The study groups were not comparable as most of the control group were not eligible to receive the intervention. The results of this study should be treated with caution.
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