The cost effectiveness of zonisamide as adjunctive therapy in adult partial seizure 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
The study evaluated the cost-effectiveness of zonisamide as treatment for adults with uncontrolled partial epilepsy in Scotland. The authors concluded that zonisamide was a cost-effective treatment for adults with refractory partial epilepsy. The methodology of the study appears appropriate and, on the whole, was clearly reported. The authors’ conclusions reflect the scope of the analysis.

Type of economic evaluation
Cost-utility analysis

Study objective
The study evaluated the cost-effectiveness of zonisamide as a treatment for adults with uncontrolled partial epilepsy in Scotland.

Interventions
Zonisamide 300 mg/day plus lamotrigine 300 mg/day was compared with levetiracetam 2,000 mg/day plus lamotrigine 300 mg/day.

Location/setting
Scotland, UK/secondary care.

Methods
Analytical approach:
A Markov model was used to capture the long-term costs and benefits of the two alternative treatment options. The time horizon of the study was 15 years. The authors stated that the perspective was that of the Scottish National Health Service.

Effectiveness data:
The effectiveness data were derived from published literature. The authors searched MEDLINE and EMBASE for randomised controlled trials of zonisamide, levetiracetam and lamotrigine. The search was restricted to trials conducted in patients with partial epilepsy refractory to two or three antiepileptic drugs, and which utilised placebo as a control and employed the doses selected. The main clinical parameter was the probability of response to treatment.

Monetary benefit and utility valuations:
The utilities were derived from a published prospective observational study of 125 patients with refractory epilepsy. The EuroQol-5D was the questionnaire administered to these patients.

Measure of benefit:
The measure of benefit was the quality-adjusted life-years (QALYs) gained.

Cost data:
The cost categories included were drugs, general practitioner visits, specialist visits, routine electroencephalogram tests, biochemistry tests, intensive care and hospital stay. The costs of complications were included within these cost categories. Given the lack of published resource use data specific to Scotland, resource use data were derived from four Scottish clinical experts. The unit costs were derived from National Health Service trusts, unit cost databases, the British National Formulary and the Chartered Institute of Public Finance and Accountancy. The price year was 2004.
The costs were reported in UK pounds sterling (£). Both the costs and benefits were discounted at an annual rate of 3.5%.

Analysis of uncertainty:
A series of one- and two-way sensitivity analyses were performed. The variables investigated were the discount rate, time horizon, proportion of patients responding to treatment, cost of drugs, proportion of patients responding to zonisamide and levetiracetam, and utilities.

Results
The average cost was £15,630 per patient treated with zonisamide and £15,610 per patient treated with levetiracetam.

The QALYs gained per patient were 7.932 with zonisamide and 7.897 with levetiracetam.

The incremental cost-utility ratio (i.e. the additional cost per QALY gained) when patients were treated with zonisamide instead of levetiracetam was £761 per QALY gained.

The results of the sensitivity analyses showed the results to be most sensitive to changes in the costs of the study drugs. For example, the incremental cost-utility ratio increased above £20,000 when the cost of zonisamide was increased by 50% or the cost of levetiracetam was decreased by 50%.

Authors' conclusions
The authors concluded that zonisamide was a cost-effective treatment for adults with refractory partial epilepsy.

CRD commentary
Interventions:
Both interventions were well described. An explicit justification was given for the comparator used: levetiracetam is the leading antiepileptic drug for adjunctive therapy in Scotland.

Effectiveness/benefits:
The effectiveness data were derived from a review of the literature, the methods of which were appropriately reported. The data came from randomised controlled trials, which are considered to be the 'gold' standard study design when comparing health care interventions. The authors also reported the source of the utilities used to construct QALYs, giving appropriate details of the study used to derive utilities.

Costs:
The perspective was clear and it would appear that all the relevant costs were considered. Given the lack of published evidence for Scotland, resource use was derived from the opinions of four experts. The authors, however, provided no details of the composition of the panel group. The source of the unit costs was appropriately reported. Discounting was relevant, owing to the long time horizon, and was appropriately performed.

Analysis and results:
Overall, the analytical approach was well reported, with the model structure described and a graphical representation of it provided. In addition, the results were presented clearly and in full, as were the results of the one- and two-way sensitivity analyses. These types of sensitivity analyses go some way in addressing parameter uncertainty. However, probabilistic sensitivity analyses are a more thorough way to fully capture parameter uncertainty. Overall, the level of reporting was good, with cost and clinical data being appropriately presented. The authors acknowledged and highlighted the main limitations of the study in their discussion.

Concluding remarks:
The methodology of the study appears appropriate and, on the whole, was clearly reported. The authors' conclusions reflect the scope of the analysis.

Funding

NHS Economic Evaluation Database (NHS EED)
Produced by the Centre for Reviews and Dissemination
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Funded by Eisai Ltd.

**Bibliographic details**

**Other publications of related interest**

**Indexing Status**
Subject indexing assigned by CRD

**MeSH**
Anticonvulsants /administration & dosage /economics /therapeutic use; Cost-Benefit Analysis; Epilepsies, Partial /drug therapy; Humans

**AccessionNumber**
22008008015

**Date abstract record published**
09/08/2008