An economic evaluation of sevelamer in patients new to dialysis  
Taylor M J, Elgazzar H A, Chaplin S, Goldsmith D, Molony D A

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 investigated the cost-effectiveness of sevelamer for hyperphosphataemia in comparison with calcium-based binders in patients with chronic kidney disease who had recently started haemodialysis. The authors concluded that, from the perspective of the UK National Health Service, treatment with sevelamer was a cost-effective alternative to calcium-based binders for these patients. The study was based on robust methodology and was clearly presented. In general, the authors’ conclusions appear to be valid.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of sevelamer for hyperphosphataemia in comparison with calcium-based binders in patients with chronic kidney disease (CKD) who had recently started haemodialysis.

Interventions
Treatment with sevelamer hydrochloride was compared with calcium carbonate and calcium acetate binders. Sevelamer was given at an average dose of 10 tablets per day (8g) while calcium carbonate was given at a dose of 11.5, or calcium acetate at a dose of 13.6, tablets per day (2.3g of elemental calcium).

Location/setting
UK/hospital and secondary care.

Methods
Analytical approach:
This economic evaluation was based on a Markov model which simulated the natural history of the disease and the impact of treatment. The time horizon of the analysis was five years. The authors stated that the perspective was that of the UK National Health Service (NHS).

Effectiveness data:
Most of the clinical data were derived from a single published study. Specifically, treatment effectiveness, which was measured in terms of mortality, was obtained from a recently published long-term outcomes trial, which enrolled 129 adults recruited between 2000 and 2002 with a median follow-up of 44 months. The mean age of patients was 61 years and 61% were male. The reduction in relative risk of hospitalisation with the two treatments was taken from a retrospective, case-controlled study.

Monetary benefit and utility valuations:
The utility valuations were derived from other published studies by calculating the mean of all the available values. The instruments used to obtain the utility weights in the original studies were not reported.

Measure of benefit:
Life-years (LYs) and quality-adjusted life-years (QALYs) were used as the summary benefit measures, and these were combined with costs. A 3.5% annual discount rate was applied.

Cost data:
The health service costs included drugs, general practitioner visits, and days as an inpatient. The costs and quantities of
resources used were presented separately for several items. The costs were derived from published UK sources including unit costs of health and social care, the Health Service Financial Database, and the British National Formulary. The resource use data were taken from the clinical trial used for the effectiveness data and from other published sources. The price year was 2007. All costs were in UK pounds sterling (£) and were discounted at an annual rate of 3.5%.

Analysis of uncertainty:
A univariate sensitivity analysis was performed by varying key model inputs. The ranges of values were either defined by the authors or derived from the literature.

Results
The five-year total costs per patient were £24,216 with sevelamer and £17,695 with calcium (difference: £6,521).

The discounted LYs were 4.48 with sevelamer and 4.06 with calcium (difference: 0.42). The discounted QALYs were 2.70 with sevelamer and 2.46 with calcium (difference: 0.24).

The incremental cost per LY gained with sevelamer over calcium was £15,508 and the incremental cost per QALY gained was £27,120.

The sensitivity analysis showed that reducing the time horizon to one year resulted in sevelamer becoming dominant (i.e. more effective and less expensive). The inclusion of the cost of dialysis increased the incremental cost per QALY to £80,289. In patients with significantly lower mortality and hospitalisation rates, unfavourable cost-effectiveness values were observed. Other changes in model parameters did not substantially alter the results of the base-case analysis.

Authors' conclusions
The authors concluded that, from the perspective of the UK NHS, treatment with sevelamer was a cost-effective alternative to calcium-based binders for patients who had CKD and who had recently started haemodialysis.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear. The two strategies were appropriately selected because they reflected the available treatments for this patient population.

Effectiveness/benefits:
The single study used as the source of treatment effect was arbitrarily identified by the authors, who justified this selection as being a recent study, which provided new and reliable long-term evidence on the effectiveness of this treatment. Some key aspects of this study were provided, such as the size of the sample enrolled and the duration of follow-up. However, little information on the study design was provided. The authors acknowledged that the relatively small size of the sample of patients might limit the validity of the clinical data. They also acknowledged that the risk of hospitalisation was taken from a study with a weak design, but stated that this was the only available source. The derivation of both benefit measures was clear but the instrument used to derive the utility weights not reported. LYs and QALYs are appropriate and validated benefit measures, which allow cross-disease comparisons with the benefits of other interventions.

Costs:
The analysis of costs was consistent with the perspective stated by the authors. The cost categories were described. Furthermore, extensive information on the resources used, and the unit costs were presented. However, the authors noted that the cost of a day as an inpatient was presented as a macro-category in the primary database used to derive it. Thus, it was not broken down into individual items. Other characteristics of the economic analysis such as the price year and discounting were reported.

Analysis and results:
The costs and benefits were appropriately combined. The issue of uncertainty was partially addressed in the
deterministic sensitivity analysis, which investigated the impact of changes in individual model inputs. The results of the study were clearly presented and discussed. The authors noted some limitations of their analysis, which were mainly related to the issue of compliance and the estimation of some model inputs. However, it was noted that the sensitivity analysis addressed these issues.

Concluding remarks:
The study was based on robust methodology and was clearly presented. In general, the authors’ conclusions appear to be valid.

Funding
Funded by Genzyme Therapeutics.

Bibliographic details

PubMedID
18205996

DOI
10.1185/030079908X260853

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Antacids /therapeutic use; Calcium Carbonate /therapeutic use; Chelating Agents /economics /therapeutic use; Cost-Benefit Analysis; Decision Support Techniques; Drug Costs; Humans; Hyperphosphatemia /drug therapy /economics; Kidney Failure, Chronic /therapy; Markov Chains; Polyamines /economics /therapeutic use; Quality-Adjusted Life Years; Renal Dialysis; Sevelamer

AccessionNumber
22008000773

Date bibliographic record published
03/02/2009

Date abstract record published
31/03/2009