Economic evaluation of ASCOT-BPLA: antihypertensive treatment with an amlodipine-based regimen is cost effective compared with an atenolol-based regimen


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 objective was to compare the cost-effectiveness of an amlodipine-based strategy and an atenolol-based strategy in the treatment of hypertension in the UK and Sweden. The authors concluded that an amlodipine-based regimen was cost-effective compared with an atenolol-based regimen. The methodology appears to have been appropriate and, on the whole, was clearly and transparently reported. The conclusions reached by the authors appear to be appropriate.

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

Study objective
The objective was to compare the cost-effectiveness of an amlodipine-based strategy with an atenolol-based strategy in the treatment of hypertension in the UK and Sweden.

Interventions
The two medications were amlodipine 5 to 10mg plus perindopril 4 to 8mg as needed and atenolol 50 to 100mg plus bendroflumethiazide 1.25 to 2.5mg plus potassium as needed for patients with moderate hypertension and three or more additional risk factors.

Location/setting
UK and Sweden/primary care.

Methods
Analytical approach:
Two approaches were taken. In the first, a within-trial analysis estimated the costs and benefits during the trial period and, in the second, a modelling approach extrapolated these costs and benefits over the lifetime of the patients. The model assumed that the patients were treated for six years and followed up for the remainder of their life. The authors did not clearly report the perspective.

Effectiveness data:
The effectiveness data came from the Blood Pressure Lowering Arm of the Anglo-Scandinavian Cardiac Outcomes Trial. A total of 19,257 patients were included and 19% were female. They were aged between 40 and 79 years, with either untreated hypertension, defined as a systolic blood pressure greater than 160mmHg or a diastolic blood pressure greater than 100mmHg, or treated hypertension and a systolic blood pressure greater than 140mmHg or a diastolic blood pressure greater than 90mmHg, and with at least three risk factors. The risk factors were male sex, age above 55 years, smoking, left ventricular hypertrophy, type 2 diabetes, and other factors. The trial was stopped after a median of 5.5 years. Analyses were conducted for the UK and Sweden, the two largest contributors of patients to the trial. Further details of the trial were reported in another paper (Dahlof, et al. 2005, see ‘Other Publications of Related Interest’ below for bibliographic details). The main clinical endpoints were silent and non-silent myocardial infarction and fatal coronary heart disease.

Monetary benefit and utility valuations:
The health-state utility weights were derived from the literature and the instruments used to derive them were not reported.
Measure of benefit:
The main summary measure of benefit was quality-adjusted life-years (QALYs). These were discounted at a rate of 3.5% per year in the UK and 3% per year in Sweden.

Cost data:
The costs were those for the drugs, event-related hospitalisations, non-event-related hospitalisations, and concomitant drugs. For full details of the costing approach readers were referred to Lindgren, et al. 2005 (see ‘Other Publications of Related Interest’ below for bibliographic details). Those costs caused by lost production (indirect costs) were only included in the Swedish analysis. Prices were expressed in Euros (EUR) and were converted from UK pounds and Swedish kronor to EUR using the average exchange rates during 2006, with one EUR equal to 0.68 pounds or 9.25 kronor. These costs were discounted at 3.5% per year for the UK and 3% per year for Sweden.

Analysis of uncertainty:
Uncertainty was addressed through a probabilistic sensitivity analysis, using second-order Monte Carlo simulation. This was reported in the form of cost-effectiveness acceptability curves (CEACs). One way sensitivity analysis was also conducted.

Results
In the UK, the total cost was lower with atenolol (EUR 3,540) compared with amlodipine (EUR 5,376) and the QALYs gained per patient were lower with atenolol (8.76) than with amlodipine (8.84), which generated an incremental cost-effectiveness ratio of EUR 21,875 per QALY gained for amlodipine over atenolol.

Amlodipine also produced a higher life expectancy (11.69 years compared with 11.59 years for atenolol) generating an incremental cost per life-year gained of EUR 17,857.

The corresponding figures for Sweden were also reported.

The CEACs were presented, but no summary results were reported. The one-way sensitivity analysis indicated that the results were most sensitive to the proportion of women in the population and the discount rate.

Authors' conclusions
The authors concluded that an amlodipine-based regimen was cost-effective when compared with an atenolol-based regimen in the UK and Sweden.

CRD commentary
Interventions:
The interventions were clearly reported, with their dosage. The selection of the interventions was justified and their coverage was thorough for the setting.

Effectiveness/benefits:
The use of a randomised controlled trial as the source of the effectiveness data was appropriate given the strengths of its design, but only limited details of the methods were given. It may be necessary to consult the trial report to assess the validity of this study. QALYs and life-years were appropriate benefit measures to show the impact of the disease on both the quality of life and survival. However, only the bibliographic details of the sources used to derive the utility estimates were given, which hinders any assessment of the validity of the utilities for the setting and population.

Costs:
The authors did not explicitly report the viewpoint of the economic analysis, but the categories of costs suggest that the perspective of the health care system was used for the UK and a societal perspective for Sweden. The unit costs and the resource quantities were not presented separately, which limits the generalisability of the analysis and the possibility of replicating the analysis in other settings. The price year was reported, which is useful for reflation exercises.

Analysis and results:
The model structure was clearly described along with all the relevant details and modelling assumptions. The authors
conducted an incremental analysis and the results were adequately presented. Sensitivity analyses were conducted on the modelling assumptions and parameters, enhancing the generalisability of the study findings. Overall, the reporting was adequate and transparent.

Concluding remarks:
The methodology appears to have been appropriate and, on the whole, was clearly and transparently reported. The conclusions reached by the authors appear to be appropriate.

Funding
Supported by Pfizer, New York, USA.

Bibliographic details

PubMedID
17916665

DOI
10.1136/hrt.2007.127217

Original Paper URL
http://heart.bmj.com/cgi/reprint/94/2/e4

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Aged; Amlodipine /economics /therapeutic use; Antihypertensive Agents /economics /therapeutic use; Atenolol /economics /therapeutic use; Cost-Benefit Analysis; Diabetes Mellitus, Type 2 /complications; Diabetic Angiopathies /complications /etiology /mortality; Disease-Free Survival; Drug Costs; Female; Humans; Hypertension /drug therapy /economics /mortality; Hypertrophy, Left Ventricular /complications; Male; Markov Chains; Middle Aged; Myocardial Infarction /complications /mortality; Peripheral Vascular Diseases /complications; Prospective Studies; Quality-Adjusted Life Years; Smoking /adverse effects; Stroke /complications /mortality

AccessionNumber
22008006055

Date bibliographic record published
24/06/2009

Date abstract record published
26/08/2009