Results of a Markov model analysis to assess the cost-effectiveness of a single tablet of fixed-dose amlodipine and atorvastatin for the primary prevention of cardiovascular disease in Korea

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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 examined the cost-effectiveness of a single-tablet fixed-dose combination of amlodipine and atorvastatin for the primary prevention of cardiovascular disease in patients aged 45 years or older. The authors concluded that the combination of amlodipine and atorvastatin was cost-effective for primary prevention in comparison with the usual care from the perspective of the Korean health care system. The analysis was well conducted and generally reported satisfactorily. The authors' conclusions appear to be robust, but country specific.

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

Study objective
The objective was to examine the cost-effectiveness of a single-tablet fixed-dose combination of amlodipine and atorvastatin for the primary prevention of cardiovascular disease in patients aged 45 years or older without a history of myocardial infarction or stroke.

Interventions
The single-tablet fixed-dose combination of amlodipine (weighted mean dose 5mg) and atorvastatin (weighted mean dose 10.25mg) was compared with the current observed patterns of blood-pressure and lipid-lowering medication prescription and use.

Location/setting
Korea/primary care.

Methods
Analytical approach:
The analysis was based on a Markov model with a 40-year time horizon. The authors stated that the perspective of the health care system was taken.

Effectiveness data:
The clinical evidence came from a selection of known, relevant studies. The data on treatment efficacy, which was the key model input, were derived from the Respond Trial, a randomised placebo-controlled trial with 1,660 hypertensive patients with dyslipidaemia. The baseline characteristics of eligible patients were from 244 patients included in the 2005 Korean National Health and Nutrition Examination Survey (KNHNES), which was a cross-sectional national survey carried out by the Korean health authority. Other official Korean sources and published studies were used for additional clinical inputs. For example, most of the transition probabilities were from a published observational study, with more than 11,000 Chinese participants, called the United States and People's Republic of China Collaborative Study of Cardiovascular and Cardiopulmonary Epidemiology.

Monetary benefit and utility valuations:
The utility values were from an analysis of the KNHNES, using the European Quality of life (EQ-5D) questionnaire.

Measure of benefit:
Life-years (LYs) and quality-adjusted life-years (QALYs) were the summary benefit measures and they were discounted at an annual rate of 5%.

Cost data:
The economic analysis included the costs of drugs and treatment of (the incidence or prevalence of) cardiovascular disease. Drug costs were derived from official pharmaceutical price lists, using dosages reported in the Respond Trial, while cardiovascular disease treatment costs and resource consumption were based on reimbursements made by the Korean Health Insurance Review and Assessment Services. All costs were in South Korean won (KRW) and the exchange rate was KRW 1,300 equalled one US dollar. A 5% annual discount rate was applied and the price year was not explicitly reported; some of the costs were from 2008 sources.

Analysis of uncertainty:
One-way sensitivity analyses were carried out on key model inputs, including the efficacy (which was varied using a published 95% confidence interval), cardiovascular risk predictions (± 25%), utility weights (± 25%), cardiovascular disease costs (± 25%), discount rate (0% to 7.5%), annual increase in cardiovascular disease costs (0% to 9%), and the one-year persistence rate (alternative assumptions). A multivariate sensitivity analysis, with 2,000 Monte Carlo simulations, was also carried out.

Results
The combination strategy led to a gain of 0.32 QALYs and 0.24 LYs per patient at an additional cost of KRW 2,521,215 per patient in comparison with usual care.

The incremental cost per QALY gained with combination therapy over usual care was KRW 7,773,063, while the incremental cost per LY gained was KRW 10,378,230.

The sensitivity analysis confirmed that these findings were robust and were not altered by variations in the key model inputs. There was more than a 90% probability of being cost-effective for the combination therapy at a threshold of KRW 10,000,000 per QALY.

Authors' conclusions
The authors concluded that the administration of a single-tablet fixed-dose combination of amlodipine and atorvastatin was a cost-effective primary prevention strategy, in comparison with the usual care, from the perspective of the Korean health care system.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear as the current pattern of care in the authors’ setting was compared with the proposed preventive strategy.

Effectiveness/benefits:
The sources were selected to include the most relevant data for the model, particularly country-specific databases, which was appropriate for the epidemiological characteristics of the eligible patient population. This data might not be transferable to other settings, with different clinical characteristics. The drug efficacy was from a large randomised placebo-controlled trial and this should ensure high internal validity. The authors made some assumptions, which were investigated in the sensitivity analyses. Both benefit measures were appropriate, especially QALYs because the disease has a strong impact on the quality of life. Details of the derivation of the utility values were reported and an appropriate tool was used to derive the patient preferences for health states.

Costs:
The cost categories and sources of data reflected the economic viewpoint of the study and were clearly presented. The unit costs and quantities of resources used were not presented separately, which reduces the transparency of the analysis. Cardiovascular disease treatment costs were reported as a whole. The price year was not explicitly reported, which might limit the possibility of making reflation exercises in other time periods.
Analysis and results:
The analytic approach used to examine the cost-effectiveness of the two strategies was appropriate. The issue of uncertainty was satisfactorily investigated and, in general, the results were clearly presented and discussed. Conventional discounting for both costs and benefits was applied and the use of alternative discounting or no discounting was tested in the sensitivity analyses. The authors acknowledged some limitations of their analysis, such as the need for some assumptions and the use of Chinese population data rather than Korean data for most of the transition probabilities.

Concluding remarks:
The analysis was well conducted and generally reported satisfactorily. The authors’ conclusions appear to be robust, but country specific.

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