Switch strategies in the management of hypertension: a cost minimisation analysis of angiotensin receptor blocker based regimen

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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 investigated the economic implication of switching a hypothetical cohort of uncontrolled mild to moderate hypertensive patients, on long-term therapy, to the lowest price drugs, assuming that these were equally effective, and considering their current price and some anticipated patent expiries. A strategy of maintaining or switching patients to losartan was most cost saving over five years. The study was well reported and the author’s conclusions appear to be valid despite it being a cost-minimisation analysis.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to investigate the economic implication of switching a hypothetical cohort of uncontrolled mild to moderate hypertensive patients on long-term therapy, to agents with the lowest acquisition price on the grounds of the assumed equal effectiveness of these therapies. The analysis considered the current prices and the anticipated patent expiry for some drugs.

Interventions
The four angiotensin receptor blockers (ARBs) under examination were losartan, candesartan, valsartan, and irbesartan. Losartan could be administered at 50mg or 100mg, candesartan at 8mg or 16mg, valsartan at 80mg or 160mg and irbesartan at 150mg or 300mg. Dose titration was also considered.

Location/setting
UK/primary care.

Methods
Analytical approach:
This economic evaluation was based on a Markov model. A five-year time horizon was considered. The author did not state explicitly which perspective was adopted in the study.

Effectiveness data:
The author assumed equal blood-pressure lowering efficacy across the class of ARBs. This assumption was supported by the available literature, which consisted of two meta-analyses that had shown no statistically significant differences between the four agents. The characteristics of the patient population reflected the age and sex distributions of hypertensive patients observed in the Health Survey for England 2003. The key clinical outcome was the reduction in diastolic blood pressure.

Monetary benefit and utility valuations:
None.

Measure of benefit:
No summary benefit measure was used. In effect, a cost-minimisation analysis was carried out.

Cost data:
The analysis included only drug costs. Drug dosages were based on two published meta-analyses. The analysis considered that, during the five-year follow-up period, the patents for several of the ARBs were expected to expire (losartan in September 2009, valsartan in May 2001, and candesartan in April 2012). Assumptions were made for the price reduction due to loss of patent protection, based on the pattern observed in the UK for the recent patent expiry of ramipril. All costs were in UK pounds sterling (£). A 3.5% discount rate was applied to costs but undiscounted costs were also presented. The price year was not clearly reported (note that, since this abstract was written, the author has confirmed that the price year was 2007).

Analysis of uncertainty:
A stochastic approach based on Monte Carlo microsimulations was developed in order to determine the median and interquartile ranges (IQRs) for the expected costs. A deterministic univariate sensitivity analysis was also carried out to account for differences in drug efficacy.

Results
The median discounted cost per patient was £506 (IQR: £441, £650) with losartan, £610 (IQR: £542, £766) with candesartan, £809 (IQR: £796, £1,078) with valsartan, and £696 (IQR: £694, £934) with irbesartan. The mean discounted cost per patient was £561 with losartan, £659 with candesartan, £927 with valsartan, and £805 with irbesartan.

The univariate sensitivity analysis suggested that, when increasing the efficacy of candesartan relative to losartan, only an increase of more than 50% in potency would ensure the economic superiority of candesartan.

Authors' conclusions
The author concluded that, considering patent expiry, a strategy of maintaining or switching patients to losartan was most cost saving over five years and switching hypertensive patients taking ARBs to the drug with the lowest current acquisition cost may produce only transient savings.

CRD commentary
Interventions:
The selection of the comparators was appropriate in that the author stated that the four drug therapies represented the most commonly used ARBs in the UK.

Effectiveness/benefits:
The clinical assumption for treatment effectiveness was made on the grounds of published evidence. The use of meta-analyses of clinical trials should have ensured high internal validity. However, the author underlined the contrasting results found in single clinical trials. This key assumption was varied in the sensitivity analysis. Other minor clinical inputs to the model were derived from a few sources which were selected by the author. No summary benefit measure was derived which was appropriate, given the cost-minimisation design.

Costs:
The study was centred on the cost analysis, which focused on drug consumption. Other costs were not considered given the assumption of equal efficacy and safety of the four medications. The sources of costs and quantities of resources used were reported and reflected the author's setting. Monthly drug costs were presented taking into consideration drug titration and the use of concomitant medications. The price year was not explicitly reported (note that, since this abstract was written, the author has confirmed that the price year was 2007).

Analysis and results:
The results of the analysis were clearly presented. A synthesis of costs and benefits was not carried out in accordance with a cost-minimisation analysis. The issue of uncertainty was only partially addressed in the sensitivity analysis, which was restricted to the investigation of a few assumptions. The author noted some potential limitations. First, only prescribing costs were considered and not the clinical or economic impact of the therapies on cardiovascular outcomes. Second, ARBs were considered as first-line therapy for hypertensive patients, but this might not be the case in real-world settings. Finally, the assumptions for the cost-decay curve following patent expiry might not reflect the actual price changes.
Concluding remarks:
The study was well reported, but the use of a cost-minimisation analysis is a potential limitation. Nevertheless, this was the objective of the author, and the conclusions appear to be valid.

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