Cost-effectiveness of rosuvastatin in the prevention of ischemic heart disease in Portugal

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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 assessed the clinical and economic impact of rosuvastatin (ROS) versus other statins in the treatment of hypercholesterolaemia and prevention of ischaemic heart disease, in untreated individuals over 35 years of age with previously untreated hypercholesterolaemia. The authors concluded that ROS was a cost-effective strategy in the Portuguese setting. The study methodology was good, the analysis transparent and well reported, and the authors’ conclusions robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective of the study was to assess the clinical and economic impact of rosuvastatin (ROS) versus other statins in the treatment of hypercholesterolaemia and prevention of ischaemic heart disease (IHD), in untreated individuals aged more than 35 years with previously untreated hypercholesterolaemia (low-density lipoprotein levels above 115 mg/dL).

Interventions
The study examined ROS (10 mg daily), atorvastatin (ATO; 10 mg daily), pravastatin (PRA; 20 mg daily) and simvastatin (SIM; 20 mg daily). Doses were doubled if the low-density lipoprotein level exceeded 115 mg/dL after 12 weeks.

Location/setting
Portugal/primary prevention.

Methods
Analytical approach:
This economic evaluation was based on a probabilistic Markov model that simulated the management of the eligible population and the risk of IHD (myocardial infarction and death). A lifetime horizon (60 years) was adopted. The authors stated that the perspective of the payer was adopted.

Effectiveness data:
The clinical data were derived from multiple sources, which appear to have been identified selectively. Treatment effectiveness was based on head-to-head trials in which ROS was directly compared with another statin. Basically, pooled data from 5 double-blind, randomised, clinical trials (RCTs) were used for the first 12 weeks of treatment. Longer-term data on pravastatin and simvastatin were derived from a single open-label RCT; data on atorvastatin and rosuvastatin were based on a randomized double-blind clinical trial. The impact of LDL levels on IHD events was based on a meta-analysis of 58 selected RCTs. Epidemiological data (mortality rates, life-expectancy and incidence of myocardial infarction) came from Portuguese sources.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The summary benefit measure was survival (i.e. life-years, LYs). The LYs were estimated using the decision model. An annual discount rate of 5% was applied.
Cost data:
The health services included in the analysis were statins and treatment of a nonfatal myocardial infarction. The latter category consisted of the diagnosis-related group price for hospital services plus the cost of ambulatory care. The unit costs were based on official Portuguese sources. Resource consumption was based on the estimation of a Delphi panel of 8 Portuguese cardiologists with at least 15 years of clinical practice. The price year was not explicitly reported. The costs were in euros (EUR) and were discounted at an annual rate of 5%.

Analysis of uncertainty:
The uncertainty in input parameters was addressed by means of 10,000 Monte Carlo simulations. All model inputs, except the price of statins, were assigned specific probabilistic distributions. These were described clearly.

Results
ROS patients had an increase in life expectancy of 5.5 days over ATO, 12.1 days over PRA and 6.3 days over SIM.

ROS generated savings over ATO (EUR 1,034 per patient) but increased costs in comparison with PRA (EUR 1,004 per patient) and SIM (EUR 684).

The incremental analysis showed that ROS dominated ATO, which was both more expensive and less effective, and had an incremental cost per LY gained of EUR 30,350 over PRA and EUR 39,340 over SIM.

The probabilistic sensitivity analysis confirmed the dominance of ROS over ATO. It also showed that the incremental cost-effectiveness ratio was below the commonly accepted threshold of EUR 50,000 per LY in 95.7% of simulations when compared with PRA and in 67.0% of simulations when compared with SIM.

Authors’ conclusions
The authors concluded that ROS was a cost-effective strategy for the prevention of IHD in Portugal.

CRD commentary
Interventions:
The rationale for the choice of the comparators was clear in that the authors stated that four drugs under examination represented almost 90% of the statins marketed in Portugal. They are likely to be valid comparators in many countries.

Effectiveness/benefits:
The authors justified the studies they selected for the derivation of clinical data. The best available evidence appears to have been selected for each model input. The authors noted that the use of head-to-head clinical trials enhances the validity of the effectiveness estimates since the potential for bias is minimised. Epidemiological data were appropriately taken from local sources. The use of a meta-analysis of RCTs to estimate disease progression represents the best level of clinical evidence.

Costs:
The categories of costs included in the analysis were relevant given the perspective stated in the study. The costs of adverse events were not considered as they were assumed to have been similar among statins. The authors stated that the exclusion of productivity costs because of the lack of reliable data means that the analysis was likely to have been conservative, as further savings could be achieved with more effective strategies. A breakdown of the cost items was provided, which will help if replicating the analysis in other contexts. The authors provided extensive information on the unit costs and sources of the data. Treatment patterns reflected the Portuguese setting as resource use was based on the experience of local cardiologists. With the exception of drug costs, the prices of which were fixed, the costs were subjected to probabilistic analysis. Overall, the cost analysis appears to have been satisfactorily carried out and was presented clearly.

Analysis and results:
The synthesis of the costs and benefits was appropriate. The results of both the base-case and the sensitivity analysis were discussed. Moreover, there was a clear description of the Markov model; the stochastic distributions applied to the model parameters appear appropriate.
Concluding remarks:
Overall, the quality of the study methodology was very good. The methods and results of the study were presented clearly, and the selection of sources used in the analysis was appropriately discussed. The authors' conclusions appear valid.

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Bibliographic details

Other publications of related interest


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