An Asian regional analysis of cost-effectiveness of early irbesartan treatment versus conventional antihypertensive, late amlodipine, and late irbesartan treatments in patients with type 2 diabetes, hypertension, and nephropathy

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 cost-effectiveness of early irbesartan compared with late irbesartan, late amlodipine or no additional therapy, all in addition to standard treatment in hypertensive type 2 diabetes patients, with nephropathy, in five Asian countries. It was concluded that, despite wide variations in epidemiology, patient management, and costs, early irbesartan treatment was a cost-effective strategy. The study was based on valid methodology and the authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study assessed the cost-effectiveness of early irbesartan compared with late irbesartan, late amlodipine or no additional therapy, all in addition to standard treatment in hypertensive type 2 diabetes patients with early stage nephropathy (microalbuminuria).

Interventions
The four treatments were early irbesartan (300mg per day, at the onset of microalbuminuria), late irbesartan (300mg per day, at the advanced diabetic nephropathy stage), late amlodipine (10mg per day, at the advanced diabetic nephropathy stage), and no additional therapy. All four treatments included standard antihypertensive therapy, which excluded drugs affecting the renin-angiotensin system and dihydropyridine calcium-channel blockers.

Location/setting
China, Malaysia, Thailand, South Korea, and Taiwan/primary and secondary care.

Methods
Analytical approach:
This economic evaluation was based on a published Markov model with a lifetime horizon of 25 years. The authors stated that the economic analysis was carried out from the perspective of the health care system in each country.

Effectiveness data:
The clinical data came from known, relevant studies, which were selected by the authors. The baseline characteristics of the patient population, data on treatment efficacy, which was the key clinical endpoint, and data for transition probabilities were based on two clinical trials, which were the Irbesartan in Reduction of Microalbuminuria-2 (IRMA-2) trial and the Irbesartan in Diabetic Nephropathy Trial (IDNT). Other data came from local sources, such as national registries and statistics, and peer-reviewed articles, whenever possible and supplemented by experts’ opinions. The mortalities were country-specific in all cases.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The primary benefit measure was the number of life-years (LYs) gained with the treatments. Other model outputs such
as the cumulative incidence of end-stage renal disease (ESRD), number of years the patients lived free of ESRD, and number of days in dialysis were also reported. A 3% annual discount rate was applied to future benefits.

Cost data:
The economic analysis included the costs of drugs, management of a diabetic patient, and renal transplantation in a diabetic patient. The costs of concomitant medications were assumed to be similar between treatments and were not included. These costs were derived from different sources depending on local availability (published data for China and Malaysia and insurance or hospital databases in Taiwan, Thailand, and South Korea). The costs were gathered in local currencies and were then converted to US dollars ($) using official purchasing power parity. The price year was 2004 and future costs were discounted at an annual rate of 3%.

Analysis of uncertainty:
The issue of uncertainty was investigated using both a deterministic and a probabilistic sensitivity analysis. The former varied all the model inputs, including the time horizon, by 50%. The latter was based on a second-order Monte Carlo simulation which generated confidence intervals around the costs, benefits, and incremental cost-effectiveness ratios, and cost-effectiveness acceptability curves were produced.

Results
All clinical and economic outputs of the model favoured the early irbesartan strategy for all countries. The early irbesartan strategy yielded life expectancies ranging from 10.8 years in South Korea to 12.8 years in Taiwan. The LYs for early irbesartan were an average of 4% to 6% higher than those reported for any other treatment strategy.

The total costs associated with early irbesartan were $8,455 in Malaysia, $12,961 in South Korea, $29,737 in Thailand, $25,790 in Taiwan, and $42,990 in China. The increase in costs, compared with early irbesartan, depending on the country considered, ranged from $2,980 to $13,484 with late irbesartan, from $6,189 to $21,148 with standard therapy, and from $8,200 to $29,732 with late amlodipine.

Thus, under the base-case conditions, early irbesartan was a dominant strategy, which means it was less expensive and more effective than the other strategies.

The one-way sensitivity analysis corroborated the dominance of early irbesartan, except, in Thailand and when increasing the cost of early irbesartan by 50% or reducing the cost of dialysis by 50%.

The simulation analysis indicated that early irbesartan had a high probability of being cost-effective in all countries in comparison with the alternative treatments. For example, it had a 66% (Thailand) to 95% (Taiwan) probability of being dominant over standard treatment.

Authors' conclusions
The authors concluded that, despite wide variations in epidemiology, patient management, and costs, early irbesartan treatment was a cost-effective strategy in the Asian setting.

CRD commentary
Interventions:
The selection of the comparators was appropriate and reflected the available therapies in these countries. The dosages were appropriately reported.

Effectiveness/benefits:
The clinical evidence came from selected studies, which were presumably known to the authors. Some key information was given on the two trials used to derive the bulk of the evidence. The validity of the estimates should have been enhanced by the strengths of the designs of these trials. No details of the other sources of clinical data were provided, which limits the possibility of judging the validity of these estimates. However, data were taken from a model that had already been validated in European countries and in the USA. A variety of both disease-specific and more general benefit measures was used, which makes the findings relevant to different decision makers.
Costs:
The analysis of costs reflected the perspective, and the authors provided a justification for the exclusion of some cost categories. However, the economic analysis was not presented in detail. The costs and quantities were not reported separately and some costs were presented as macro-categories only. Little information on the sources of the data was provided, and the details of the assessment of resource use were not reported.

Analysis and results:
The costs and benefits were not combined, given the dominance of early irbesartan over the other treatments, but incremental results were presented for the few non-dominant cases. The issue of uncertainty was investigated using appropriate methods, and the key findings were presented. The authors discussed the potential differences between their findings and those from studies carried out in Western countries.

Concluding remarks:
On the whole, the study was based on valid methodology and the authors’ conclusions appear to be robust.

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