Irbesartan and amlodipine in the treatment of patients with microalbuminuria, hypertension and type 2 diabetes in Taiwan: a modelling projection over 25 years

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 evaluate the long-term cost-effectiveness of early irbesartan, late irbesartan, amlodipine, and standard hypertensive treatment in patients with diabetes, hypertension and microalbuminuria in Taiwan. The authors concluded that treating patients with early irbesartan was cost-effective. The methodology was, on the whole, appropriate and clearly reported. The conclusions reached appear to reflect the scope of the analysis.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to evaluate the long-term cost-effectiveness of early irbesartan, late irbesartan, amlodipine, and standard hypertensive treatment, in patients with diabetes, hypertension, and microalbuminuria in Taiwan.

Interventions
This study compared four treatments.

1) Control therapy, which consisted of treatment with standard antihypertensive medications.
2) Early irbesartan, which was 300mg of irbesartan administered to patients daily when they first developed microalbuminuria.
3) Late irbesartan, in which patients received the standard therapy whilst in a state of microalbuminuria and, when they developed overt nephropathy, they received irbesartan titrated from 75 to 300mg per day.
4) Amlodipine, which consisted of the standard therapy, with the addition of amlodipine titrated from 5 to 10mg per day when patients developed overt nephropathy.

Location/setting
Taiwan/secondary care.

Methods
Analytical approach:
A published Markov model, which simulated the progression of end-stage renal disease (ESRD), was adapted to the Taiwanese setting. The details of the structure of this model were published by Palmer and colleagues in 2004 (see 'Other Publications of Related Interest' below for bibliographic details). The time horizon of the study was 25 years. The authors reported that the perspective was that of the Taiwan National Health Insurance programme.

Effectiveness data:
The effectiveness data were derived from multiple sources including clinical trials, the Taiwan Renal Registry, and published evidence. The main clinical effectiveness estimate was the treatment specific progression of ESRD, which was derived from two published clinical trials.

Monetary benefit and utility valuations:
None.
Measure of benefit:
The measure of benefit used was the number of life-years saved.

Cost data:
The direct costs were those of amlodipine, irbesartan, renal transplant, and dialysis. The resource use data were derived from published evidence and the two clinical trials used to derive the effectiveness data. The unit costs were derived from the Taiwan Bureau of National Health Insurance. The price year was 2004 and all costs were converted from New Taiwan dollars to US dollars ($). As the costs could be incurred over a 25-year time period, future costs were discounted using a 3% annual rate.

Analysis of uncertainty:
A one-way sensitivity analysis was performed by varying the time horizon.

Results
Over a period of 25 years, the average discounted life-years gained were: 12.003 for early irbesartan; 11.332 for late irbesartan; 11.224 for amlodipine; and 11.223 for control therapy.

Over a period of 25 years, the average cost per patient was: $8,915 for early irbesartan; $13,285 for late irbesartan; $16,818 for amlodipine; and $16,518 for control therapy.

Early irbesartan was found to be dominant, i.e. it was both more effective and less costly than the three other treatment options.

The results of the sensitivity analysis showed that, when a time horizon of 10 years was used, early irbesartan remained the most effective strategy, but yielded higher costs than late irbesartan and control therapy.

Authors' conclusions
The authors concluded that treating hypertensive diabetic patients with early irbesartan was projected to be life extending and cost-effective.

CRD commentary
Interventions:
All the interventions were well described. The justification given, for using the control therapy as the comparator, was that it represented the standard antihypertensive therapy in Taiwan.

Effectiveness/Benefits:
The effectiveness data were derived from multiple sources. The methods of the literature review were not reported, which makes it impossible to ascertain whether the best available evidence was used. However, the main clinical effectiveness estimates were derived from two randomised controlled trials, which are considered to be the gold-standard study design when comparing health interventions.

Costs:
The perspective was clearly reported and it would appear that all the major relevant costs were considered. The costing was well reported, with all relevant unit costs identified and stated. As the costs were incurred over a long time period, discounting was necessary and was appropriately performed.

Results and Analysis:
Overall, the analytical approach was well reported, with the bibliographic reference for the model details, as well as a brief summary and diagram of the model. The results were transparently presented making them easy to follow. However, the authors did not perform a thorough sensitivity analysis. A sensitivity analysis which varied all the parameters used in the model, or a probabilistic sensitivity analysis, would have been a more comprehensive assessment of parameter uncertainty. The authors acknowledged and highlighted the main limitations to their study.

Concluding remarks:
The methodology was, on the whole, appropriate and clearly reported. The conclusions reached appear to reflect the scope of the analysis.

**Funding**
Funding received from Sanofi-Aventis.

**Bibliographic details**

**Other publications of related interest**


**Indexing Status**
Subject indexing assigned by CRD

**MeSH**
Amlodipine; Antihypertensive Agents; Cost-Benefit Analysis; Diabetes Mellitus, Type 2; Diabetic Nephropathies; Humans; Hypertension; Taiwan

**AccessionNumber**
22008008020

**Date bibliographic record published**
01/09/2008

**Date abstract record published**
22/04/2009