AT(1) receptor blockers: cost-effectiveness within the South African context

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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.

Health technology
AT1 receptor blockers (ARBs). These were candesartan 16mg (Atacand), losartan 50mg (Cozaar), valsartan 80mg (Diovan), and irbesartan 150mg (Aprovel).

Type of intervention
Treatment and secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Patients suffering from hypertension.

Setting
Primary care in South Africa.

Dates to which data relate
Clinical data were extracted from studies published between 1996 and 1998. Economic data were based on a source published in 2000.

Source of effectiveness data
A systematic literature review carried out by the authors generated the effectiveness data used in the study.

Modelling
It is likely that a decision analytic model was used but details were not provided.

Outcomes assessed in the review
The outcome measure chosen in the review was reduction in sitting diastolic blood pressure (SDBP (mmHg)).

Study designs and other criteria for inclusion in the review
The review included only double-blind randomised controlled trials, published in peer-reviewed journals. Additional inclusion criteria were:

(1) a threshold of a minimum 30 patients per arm was required;
(2) a treatment period of between 4 and 12 weeks per clinical trial was needed;

(3) only studies stating a clear diagnosis and including the clinical indicator ‘reduction in SDBP’ were included;

(4) for inclusion of a particular comparator drug, more than one suitable trial was required.

Sources searched to identify primary studies
MEDLINE and Cochrane databases were searched, supplemented by an Internet search of the US National Library of Medicine.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
In total 13 papers were included in the analysis: 2 candesartan, 7 losartan, 2 valsartan, and 2 irbesartan.

Methods of combining primary studies
A meta-analysis was used to combine the selected studies. The clinical outcome for each drug was estimated calculating the weighted average of the results reported in the respective trials.

Investigation of differences between primary studies
The authors assessed the possibility of combining the studies by testing for homogeneity in the data (ANOVA).

Results of the review
The estimated clinical effectiveness from the meta-analytic exercise produced the following estimates of mean reduction in SDBP: 10.57 (95% CI: 9.6 - 11.54) for candesartan; 8.89 (95% CI: 8.37; 9.41) for losartan; 7.11 (95% CI: 6.13 - 8.08) for valsartan; 9.07 (95% CI: 8.26 - 9.87) irbesartan.

Measure of benefits used in the economic analysis
The economic analysis used the clinical outcome reduction in SDBP as a measure of health benefit.

Direct costs
The only relevant direct cost, from the perspective of the private sector funders of health care, was the drugs cost. No discounting was carried out, which was appropriate, given that the treatment period did not exceed 1 year. Resource use only accounted for drugs used, the price of which was calculated using retail prices from the South African "Blue Book", inclusive of 14% VAT. No information was provided regarding the source of quantity data. The price year was probably 2000 ("Blue Book" reference).

Statistical analysis of costs
Costs were treated deterministically. No specific statistical analysis was conduced. Mean expected costs and 95% confidence intervals around the means were reported.
Indirect Costs
Not included in the analysis.

Currency
South African Rand (R).

Sensitivity analysis
Sensitivity analysis was performed using derived 95% confidence intervals (CI) from the literature. Once it had been assessed which drug was the most cost-effective (i.e. candesartan), the authors compared its lower 95% CI with the upper 95% CI of the next best comparator (i.e. losartan).

Estimated benefits used in the economic analysis
The reader is referred to the “Measure of benefits used in the economic analysis” section above.

Cost results
Monthly expenses for candesartan, losartan, valsartan, and irbesartan, were respectively R236.08, R235.98, R233.55, and R268.83. Incremental costs were not calculated.

Synthesis of costs and benefits
Average cost-effectiveness ratios for each drug were calculated. Candesartan had a cost-effectiveness ratio of R22.34, losartan resulted in a ratio of R26.54, whereas the cost-effectiveness ratio of valsartan amounted to 32.86. Finally, irbesartan's cost-effectiveness ratio was 29.65. The analysis was also conducted assessing the reduction of SDBP (mmHg) achieved for every R100 spent per month. The highest benefit/cost ratio was associated with candesartan (4.48 mmHg). The next best ratio was that of losartan, with a 3.77 mmHg reduction for R100 spent monthly. The incremental cost was calculated comparing candesartan versus losartan and based on one year treatment for 100,000 successfully treated patients. Candesartan was calculated to generate an incremental cost saving of R5 million compared to losartan.

Authors’ conclusions
After having stressed that there are significant differences in the clinical effectiveness and in the costs of ARB drugs in terms of reducing SDBP, the authors concluded that candesartan was shown to be the most cost-effective regimen, potentially resulting in significant savings.

CRD COMMENTARY - Selection of comparators
The choice of the comparators was based on the assumption that a decision to treat patients with ARBs was already made, and therefore no other class of antihypertensive drugs was included in this study.

Validity of estimate of measure of benefit
The authors stated that a systematic literature review had been undertaken and the methods and conduct of the review were satisfactorily reported. To reflect differences in sample size, effectiveness measures from the primary studies were combined using weighted averages. The validity of the results is therefore likely to be high.

Validity of estimate of costs
Due to the uncertainty surrounding the perspective relevant to this study, it is not possible to assess whether the authors included all the relevant costs. A good feature of the cost analysis was that costs and quantities were reported separately, but sensitivity analysis of quantities was not conducted. Drug prices were take from a single published source.
Other issues
Some limitations of the study were that the authors did not compare their results with those of other similar studies, and the issue of generalisability to other settings was not addressed. In summarising their study the authors argued that in order to extend the results, additional clinical benefits and long term health outcomes for the ARBs need to be assessed.

Implications of the study
More research is needed to assess health related benefits from the use of ARBs. In addition, the value for money of ARB drugs in comparison with other classes of anti-hypertensive medications needs to be assessed in the South African health care sector.

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