Screening for renovascular hypertension in a population with relatively low prevalence

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
Screening hypertensive patients for renovascular hypertension with captopril challenge test (CCT) and captopril renographies (CRG). CCT consisted of measurement of cubital vein plasma renin activity before and 60 minutes after a 50mg tablet of captopril. Positive result from CCT was defined as a rise of plasma renin activity to more than 12microg/l per hour, an absolute increase of more than 10microg/l per hour and a relative increase to more than 150% of the baseline value (more than 400% if baseline value was less than 3microg/l per hour). CRG was performed as a single post-captopril gamma-camera study 60 minutes after a 50 mg tablet of captopril (25mg if initial blood pressure was less than or equal to 140/90mmHg) and using 99mTc-diethylenetriaminepentacetic acid as a tracer. Positive result was defined as a mean parenchymal transit time of more than 3.5 minutes or a difference of > 20% in the relative clearance between two kidneys.

Type of intervention
Screening and diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
Patients aged from 18 to 77 referred to the hospital due to problems in the treatment of hypertension or due to suspected secondary hypertension.

Setting
University hospital. The study was carried out in Helsinki, Finland.

Dates to which data relate
The data on the effectiveness of the screening tests were collected during the period 1994-1996. The dates to which the effectiveness and resource use data for pharmacological treatment alternative refer were not reported. Prices of the medical procedures and drugs were obtained from documents published in 1997, although the price year was not explicitly stated.

Source of effectiveness data
Effectiveness data were derived from a single study and opinion.

Link between effectiveness and cost data
Costing was based on the same patient sample as the effectiveness data for the screening alternative and was carried out prospectively.
Study sample
The intervention group consisted of 519 patients referred to the study hospital by general practitioners. 405 underwent CCT and 450 CRG. No power calculation was used to determine the sample sizes.

Study design
Cohort study. Follow up period for the patient group which underwent invasive treatment was 2-3 months. Losses to follow up were not reported.

Analysis of effectiveness
The analysis of effectiveness was based on intention to treat. Primary health outcomes were systolic blood pressure (SBP) and diastolic blood pressure (DBP) and serum creatinine level. The sensitivity and specificity of the screening strategies were also analysed.

Effectiveness results
The sensitivity of screening was estimated to be 67% for CCT and 100% for CRG, the specificity of CCT being 40% and that of CRG 72%. Among patients undergoing the invasive treatment (n=16) mean SBP decreased from 157mmHg to 140mmHg, mean DBP from 99mmHg to 87mmHg, and serum creatinine from 115micromol/l to 106micromol/l.

Clinical conclusions
CRG is superior to CCT in screening patients to invasive treatment. Renal angioplasty improved blood pressure significantly in 13 out of 16 patients, although in 12 cases patients were unable to discontinue antihypertensive medication.

Modelling
The costs were estimated over the remaining life time of patients using mean life-expectancy adjusted for the hypertension and smoking prevalence.

Methods used to derive estimates of effectiveness
Authors’ implicit assumptions were also included in the paper.

Estimates of effectiveness and key assumptions
The effectiveness of combined screening and invasive treatment was assumed equal to pharmacological treatment only alternative.

Measure of benefits used in the economic analysis
Since the authors assumed equal effectiveness for the alternative strategies the economic study was based on an analysis of cost only.

Direct costs
Direct costs included costs of screening tests, cost of abdominal angiographies and treatment costs. Quantities and costs were reported separately. The costs of side effects were taken into account. Costs were not discounted. The cost boundary adopted was the hospital. The estimation of resource quantities was based on actual data. Costs were obtained from published sources. The price date was not explicitly stated, but the prices appear to be expressed in 1997 levels.

Statistical analysis of costs
Costs were not treated stochastically.

**Indirect Costs**
Indirect costs were accounted for as cost of absence from work for the patients because of the screening test and treatment, and also cost arising from treatment of complications. Quantities and costs were reported separately. No discounting was needed as the treatment period was shorter than a year.

**Currency**
US dollars ($). Conversion was made from Finnish Marks at a rate of $1=FIM5.4 (December 1997).

**Sensitivity analysis**
No sensitivity analysis was performed.

**Estimated benefits used in the economic analysis**
Not applicable.

**Cost results**
The total cost for the screening alternative was estimated to be $247,543 for the 450 patients initially screened (equal to $15,471 per patient). This figure appeared to include short term costs of screening, treatment, and complications as well as those relating to absence from work, but ignored longer term effects of the alternative. The cost of the screening alternative decreased to $7,342 when limited to a subgroup of patients more likely to screen positive (30 year or younger, or whose diastolic blood pressure remained >95mmHg - or "elevated" - during treatment with two antihypertensive drugs). The life-long pharmacological treatment was estimated to cost $10,408 per patient. The costs due to side effects of drug treatment were not included. Costs were not discounted.

**Synthesis of costs and benefits**
Not applicable.

**Authors' conclusions**
Screening with CRG is cost-effective when limited to patients with no obvious renal parenchymal disease and with hypertension which does not respond to two drugs or is detected in patients no older than 30 years.

**CRD COMMENTARY - Selection of comparators**
It is not clear from the paper why the authors selected CRG and CCT from the range of non-invasive imaging tests available. You, as a user of this database, should consider whether the tests studied are widely used in your own setting.

**Validity of estimate of measure of effectiveness**
The authors assumed that there was no difference between the combined screening and renal angioplasty alternative and drug treatment only, but no evidence was presented to justify this assumption. This assumption warrants a great deal of caution, especially as it is crucial to the subsequent cost-minimisation analysis.

**Validity of estimate of costs**
Costs and resource use were reported separately and, in general, the sources and methods were reported in satisfactory detail. The invasive treatment alternative included only short term treatment costs whereas drug treatment was estimated over the remaining life time but was not discounted, which may cause the comparability of these averages to be questionable.
Other issues
Given the methodological uncertainties both in estimates of benefits and costs it cannot be determined whether the authors conclusions are justified. As the authors acknowledged, the results may not be generalisable to other settings, and especially to other countries.

Source of funding
Financially supported by the Academy of Finland and by the Aarne Koskelo Foundation.

Bibliographic details

PubMedID
9814625

Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Adult; Aged; Angiography /economics; Angioplasty, Balloon; Angiotensin-Converting Enzyme Inhibitors /therapeutic use; Captopril /therapeutic use; Cost-Benefit Analysis; Female; Finland /epidemiology; Follow-Up Studies; Humans; Hypertension, Renovascular /diagnosis /epidemiology /therapy; Male; Middle Aged; Nephrectomy; Prevalence; Radioisotope Renography /economics; Renal Artery Obstruction /diagnosis /therapy; Retrospective Studies

AccessionNumber
21998001643

Date bibliographic record published
30/11/1999

Date abstract record published
30/11/1999