Cost-effectiveness of anticoagulation in nonrheumatic atrial fibrillation in the primary prevention of ischemic stroke

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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
Anticoagulation in nonrheumatic atrial fibrillation (NRAF) in the primary prevention of ischemic stroke.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Patients with NRAF with no contraindication to anticoagulation.

Setting
Hospital. The study was set in the UK.

Dates to which data relate
Effectiveness and resource use data were collected from studies previously published between 1989 and 1994. The price year was 1997.

Source of effectiveness data
Various single studies (BAATAF study) and a review of previously published studies (including the BAATAF study).

Link between effectiveness and cost data
Costs were derived from a literature review and data from a district general hospital. The costing was carried out prospectively alongside the effectiveness study.

Study sample
420 subjects with no contraindication to anticoagulation were randomised in the BAATAF study to treatment with warfarin or treatment with placebo or no treatment. No power calculations or exclusion criteria were reported.

Study design
The study design was a randomised controlled trial. Patients were followed up for four years.

Analysis of effectiveness
The primary health outcomes used included cumulative survival rates for the warfarin and no-treatment groups, hazard rates for each group, severity and fatality from stroke, and the number, type, and severity of bleeding events.

Effectiveness results
There was a total of 15 strokes over the follow-up period. A mortality from stroke of 6.7% at 3 months was detected. It was assumed that there was 1 bleeding event per year in the warfarin group and 0.5 events per year in the no-treatment group. The probability of intracerebral haemorrhage, of sudden death, of gastrointestinal bleed, and of a two-unit transfusion was assumed to be 0.17, 0.17, 0.17, 0.5, respectively.

Modelling
A decision tree was constructed to model pathways of costs and stroke outcomes.

Outcomes assessed in the review
The outcomes assessed in the review were the hazard rate, mortality from stroke, and rate of admission to hospital after stroke.

Study designs and other criteria for inclusion in the review
5 studies included in the review were randomised controlled trials (RCTs).

Sources searched to identify primary studies
Not stated.

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
5 RCTs, OCSP study, South of England study, and the Royal College of Physicians report were included.

Methods of combining primary studies
Not stated

Investigation of differences between primary studies
Not stated.

Results of the review
In case 3, hazard rates for stroke of 0.045 for the control group and 0.015 for the warfarin group were used. In case 4, hazard rates for stroke of 0.081 for the control group and 0.012 for the warfarin group were used. In the OCSP study, 30-day and 1-year mortality from stroke were 10% and 31%, respectively. The annual risk of death after the first year was 9.1% up to 5 years.71% of patients were admitted to hospital after stroke in the South of England study compared with 54% in the OCSP study.

Measure of benefits used in the economic analysis
The measure of benefit was life-years gained free from stroke over a 10-year period.

Direct costs
Costs were discounted at a 6% rate. Quantities and costs were not reported separately. Direct costs included costs of treatment of bleeding events, cost of treatment of stroke, and costs of treatment with warfarin in the experimental group. The quantity/cost boundary adopted was that of the health service. The estimation of quantities and costs was based on actual data. Unit costs were taken from a literature review and data from a district general hospital. The price year was 1997.

Statistical analysis of costs
Not reported.

Indirect Costs
Not included.

Currency
UK pounds sterling ().

Sensitivity analysis
A sensitivity analysis was conducted on the following parameters: cost of monitoring anticoagulation less frequently, length of stay for stroke, percentage of patients admitted to hospital after stroke, percentage of patients discharged to hospital continuing care, unit costs for hospital bed-days, and incidence of bleeding events in base case 4.

Estimated benefits used in the economic analysis
Life-years gained (undiscounted) varied between 0.41879 and 2.662. Life-years gained (discounted) ranged from 0.33061 to 1.908.

Cost results
Discounted costs varied between 316,422.81 and 743,974.58 for the warfarin group and between 696,531.87 and 1,484,875.90 for the no-treatment group.

Synthesis of costs and benefits
Discounted costs per life-year gained free from stroke ranged from -287.20 in base case 4 to 10,437.43 in base case 1. If benefits were also discounted, the range of costs per life-year gained free from stroke were -400.45 to 13,221.29. The results of the cost-effectiveness analysis were most sensitive to alteration in the frequency of monitoring of anticoagulation.

Authors' conclusions
Anticoagulation in the primary prevention of ischemic stroke is cost-effective in patients aged over 65 years. Although subjects in the group aged over 75 years are more at risk of adverse events while undergoing anticoagulation, anticoagulation is more cost-effective in this group.

CRD COMMENTARY - Selection of comparators

The rationale for the choice of the comparator was clear.

Validity of estimate of measure of benefit
The relevant measure of benefit was examined, although another possible approach would be to measure utility values. The model which was constructed for the routine care of stroke patients had some limitations. The description of routine care was derived from professional opinions and a literature review. A more accurate description of routine care is needed. The effects of rare events (such as systemic embolism) or relatively insignificant events (minor haemorrhage) were not considered. There were very few stroke events over the follow-up period in the BAATAF study. Hence, hazard rates were imprecisely estimated. The study did not include data from secondary prevention trials.

Validity of estimate of costs
Only direct costs were included. Moreover, costs incurred in long-term continuing care of a disabled adult in the community were not included. It should be noted that prices do not always reflect costs because of imperfect information in the health care market.

Other issues
The generalisability of the cost and outcome results to other settings or countries was not discussed.

Source of funding
None stated.

Bibliographic details
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Other publications of related interest
1. Gustafsson C, Asplund K, Briton M, Norwing B, Olsson B, Marke L. Cost-effectiveness of primary stroke prevention in atrial fibrillation: Swedish national perspective. BMJ 1992;305:1457-1459.

2. Gage B F, Cardinalli A B, Albers G W, Owens D K. Cost-effectiveness of warfarin and aspirin for prophylaxis of stroke in patients with nonvalvular atrial fibrillation. JAMA 1995;274:1839-1844.

Indexing Status
Subject indexing assigned by NLM

MeSH
Aged; Aged, 80 and over; Anticoagulants /economics /therapeutic use; Atrial Fibrillation /complications /drug therapy; Brain Ischemia /economics /etiology /prevention & control; Cerebral Hemorrhage /chemically induced /economics; Cerebrovascular Disorders /economics /etiology /prevention & control; Cost-Benefit Analysis; Humans; Longevity; Risk Assessment; Sensitivity and Specificity; Thrombosis /drug therapy /economics /prevention & control; Warfarin /economics /therapeutic use

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