An economic analysis of aspirin desensitization in aspirin-exacerbated respiratory disease

Shaker M, Lobb A, Jenkins P, O’Rourke D, Takemoto S K, Sheth S, Burroughs T, Dykewicz M S

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 study assessed the cost-effectiveness of aspirin desensitisation (AD); in the treatment of moderate to severe aspirin-exacerbated respiratory disease (AERD), and to allow the use of aspirin for the prevention of secondary cardiovascular events. AD was cost-effective in patients with AERD. For secondary CV events, clopidogrel was marginally more effective, but AD remained a less expensive strategy. The quality of the study methodology appears satisfactory despite the limited reporting of clinical sources. The authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The study assessed the cost-effectiveness of aspirin desensitisation (AD) with subsequent aspirin therapy for the treatment of moderate to severe aspirin-exacerbated respiratory disease (AERD) in a typical 30 year old patient. In addition the cost-effectiveness of AD was examined for the prevention of secondary cardiovascular (CV) events in a typical 50 year old patient who has already experienced a myocardial infarction.

Interventions
AD was compared with usual care for persistent asthma and chronic rhinosinusitis in the AERD analysis and with both non-intervention and an alternative therapy (clopidogrel) in the CV analysis.

Location/setting
USA/outpatient care.

Methods
Analytical approach:
This economic evaluation was based on two Markov models (one for the AERD analysis and one for the CV analysis) which were developed to simulate the clinical and economic impact of the different strategies under examination. The time horizon of the analysis was not clearly stated but appears to have been lifetime. The authors stated that a societal perspective was adopted.

Effectiveness data:
The clinical data were derived from a selection of known, relevant studies. In the AERD model, data for risk reduction of exacerbations with AD were taken from randomised controlled trials (RCTs), the details of which were not provided. The treatment effect for AD and clopidogrel in the CV model was mainly obtained from a meta-analysis of RCTs. The details of other studies used to populate the Markov models were not given. Some assumptions were also made.

Monetary benefit and utility valuations:
The utility valuations were derived from published studies the details of which were not given. The utility weights for each health state were reported.

Measure of benefit:
The summary benefit measures were quality-adjusted life-years (QALYs) and symptom-free days (SFDs). QALYs were discounted at an annual rate of 3%.

Cost data:
The analysis of costs included the following items: hospitalisations (for acute myocardial infarction, gastrointestinal haemorrhage, asthma, and polypectomy), ambulatory services (office visits, spirometry, desensitisation), medications (aspirin, clopidogrel, antibiotics, and asthma-related drugs), and disability. Disability costs were estimated using average hourly earnings for non-supervisory non-farm workers on private payrolls. Other data on resource use and costs were derived from the 2003 Healthcare Utilization Project Nationwide Inpatient Sample and from average reimbursements from medical claims data, including all individuals enrolled in a large Midwestern health care plan. The costs of AERD therapies were derived from an on-line pharmacy. Unit costs were presented separately from quantities of resources used for most items. The costs were in US dollars ($) and those incurred after the first year were discounted at an annual rate of 3%. The price year was not explicitly reported.

Analysis of uncertainty:
The issue of uncertainty focused on variations in the costs of AD, which was modelled as an inpatient procedure whilst in the base-case analysis, AD was ambulatory. Also, the most influential model inputs were varied in a threshold analysis.

Results
In the AERD model, ambulatory AD led to a gain of 0.71 QALYs over no intervention with additional costs of $4,812 ($13,803 for inpatient AD), resulting in an incremental cost per QALY gained of $6,768 ($19,413 for inpatient AD or $18.54 per SFD). AD remained cost-effective (cost per QALY below the threshold of $50,000) in all scenarios considered in the sensitivity analysis.

In the CV model, the QALYs gained over no antiplatelet therapy were 1.87 with aspirin in patients with no allergy, 1.86 with AD, and 2.00 with clopidogrel. The additional costs over no antiplatelet therapy were $5,234 with aspirin in patients with no allergy, $5,818 with ambulatory AD, $10,318 with inpatient AD, and $20,402 with clopidogrel.

In comparison with no intervention, the incremental cost per QALY gained was $2,796 with aspirin in patients with no allergy, $3,125 with ambulatory AD, $5,541 with inpatient AD, and $10,206 with clopidogrel.

In the direct comparison between AD and clopidogrel, the incremental cost per QALY gained with clopidogrel over AD was $106,453. This finding was sensitive to variations in the baseline CV risk, the degree of risk reduction afforded by antiplatelet therapies, procedural risk, setting of AD, and patient age.

Authors’ conclusions
The authors concluded that AD was a cost-effective strategy in patients with moderate to severe AERD. For the prevention of secondary CV events, clopidogrel was marginally more effective, but AD remained a less expensive strategy.

CRD commentary
Interventions:
The selection of the comparators in each of the two models was appropriate in terms of reflecting the standard of care against which AD was evaluated.

Effectiveness/benefits:
Most of the clinical analysis was based on RCTs and meta-analysis of RCTs which represent valid sources from which to derive treatment effectiveness due to their robust design. However, the approach used to select these sources was not described. Moreover, the authors did not provide any information on the characteristics of these studies in terms of the patients enrolled, follow-up, and outcomes used. Given this lack of information, it is not possible to fully assess the validity of the clinical data. Similarly, the authors did not describe the approach used to derive the utility valuations needed to calculate QALYs.

Costs:
The authors stated that a societal perspective was adopted and this was reflected in the categories of costs included which were relevant from the perspective of the third-party payer and patient (disability costs). Extensive information on cost items, unit costs, quantities of resources used, and the use of discounting was provided, which enhances the
transparency of the economic side of the analysis. The use of alternative costs was tested in the sensitivity analysis.

Analysis and results:
The synthesis of costs and benefits was appropriately performed and reported. The sensitivity analysis was restricted to the deterministic evaluation of the most influential model inputs, the impact of which was illustrated graphically. The authors noted some limitations of the analysis. For example, in patients with comorbid conditions such as osteoarthritis, the AD might be associated with further cost-savings and improvements in quality of life. The cost-effectiveness of AD might also be improved by taking into account the considerable cost of omalizumab, which may be given to patients requiring asthma therapy.

Concluding remarks:
The quality of the study methodology appears to be satisfactory, although the clinical analysis was not extensively reported. In general, the authors’ conclusions are likely to be robust.

Funding
Not stated.

Bibliographic details

PubMedID
17716716

DOI
10.1016/j.jaci.2007.06.047

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Anti-Inflammatory Agents, Non-Steroidal /adverse effects /economics /therapeutic use; Aspirin /adverse effects /economics /therapeutic use; Asthma /etiology /therapy; Cardiovascular Diseases /prevention & control; Cost-Benefit Analysis; Desensitization, Immunologic /economics /methods; Drug Hypersensitivity /etiology /therapy; Humans; Markov Chains; Middle Aged; Models, Biological; Platelet Aggregation Inhibitors /therapeutic use; Quality-Adjusted Life Years; Respiration Disorders /etiology /therapy; Ticlopidine /analogs & derivatives /economics /therapeutic use

AccessionNumber
22008000223

Date bibliographic record published
23/12/2008