The cost-effectiveness of prophylaxis for Mycobacterium avium complex in AIDS
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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
Clinical drug regimens in the setting of zidovudine monotherapy and prophylaxis for Mycobacterium Avium Complex (MAC) in patients with AIDS.

Type of intervention
Treatment, secondary prevention.

Economic study type
Cost-effectiveness analysis and cost-utility analysis.

Study population
Hypothetical cohort of 1 million HIV-infected patients at various CD4 levels.

Setting
Hospital setting. The economic study was carried out in the USA.

Dates to which data relate
Effectiveness data were collected from studies previously published between 1990 and 1996. Cost data were derived from a 1993 and a 1995 source. The price year was 1995.

Source of effectiveness data
Effectiveness data were derived from a review of previously published studies.

Modelling
A Monte Carlo simulation was set up to assess the development of opportunistic infections, survival time, quality-adjusted survival time, and costs of care under the various scenarios for the timing and type of prophylaxis. In all sixteen possible policies were analysed.

Outcomes assessed in the review
The following outcomes were assessed in the review: primary acute infection rate, death rate, CD4 decline, acute relapse infection rate, toxicity rate, acute infection survival rate and prophylaxis efficacy.

Study designs and other criteria for inclusion in the review
Some of the effectiveness data were derived from randomised controlled trials.
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
Approximately 14 studies were included.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not stated.

Results of the review
Primary acute infection rates ranged between 0.022 for MAC (CD4, 201-300/mm3) and 3.94 for other opportunistic infections (CD4, 0-50/mm3). Death rates varied from 0.071 for HIV-infected patients without AIDS to 9.682 for patients with chronic AIDS and opportunistic infection history (CD4, 0-50/mm3). The CD4 decline ranged between 4.6163 (CD4, 101-200/mm3) and 7.248 (CD4, 51-100/mm3). Acute relapse infection rates varied from 0.4265 for systemic fungal infections to 5 for cytomegalovirus. Minor toxicity ranged between 0 and 40, whereas major toxicity ranged between 0.21 and 23.2. Acute infection survival rates varied from 82.14 for toxoplasmosis to 94.34 for systemic fungal infections. Prophylaxis efficacy varied from 51.46 for rifabutin to 95.96 for trimethoprim-sulfamethoxazole.

Measure of benefits used in the economic analysis
Life expectancy and quality-adjusted-life years (QALYs) were used as the measures of benefits. The MOS-HIV questionnaire was used to derive quality of life estimates. This instrument was presented to patients enrolled in AIDS Clinical Trial Group Protocol 204. Life expectancies were discounted at an annual rate of 3%.

Direct costs
Direct costs were discounted at an annual rate of 3%. Quantities and costs were reported separately. Direct costs included costs related to routine medical care, acute infection care, death, prophylaxis medication, and care after recovery from an opportunistic infection. The quantity/cost boundary adopted was that of the health service. The estimation of quantities and costs was based on actual data. Charge data were derived from the 1995 Red Book and the 1991-1992 AIDS Cost and Services Utilization Survey. A cost-to-charge ratio was calculated to derive costs from charges. The cost of a CD4 test was derived from the Boston Medical Center Cost Accounting System. Medication costs were based on average wholesale prices. All costs were converted into 1995 dollars by means of the Medical Care Component of the Consumer Price Index.

Statistical analysis of costs
Not reported.
Indirect Costs
Not included.

Currency
US dollars ($)

Sensitivity analysis
A sensitivity analysis was conducted on the following parameters: quality of life, risk of infection, prophylaxis costs, drug adherence, and resistance.

Estimated benefits used in the economic analysis
The azithromycin/rifabutin combination therapy for HIV-infected patients with CD4 count below 200/mm³ generated a life expectancy of 50.77 months and 43.34 QALYs.

Cost results
Costs of the azithromycin therapy for HIV-infected patients with CD4 count below 50/mm³ amounted to $44,040.

Synthesis of costs and benefits
All rifabutin alone and clarithromycin/rifabutin policies, as well as azithromycin/rifabutin < 50/mm³ are dominated. Initiating azithromycin prophylaxis after the CD4 count has fallen to 50 has an incremental cost-effectiveness ratio of $21,000 per year of life saved and $25,000/QALY, relative to PCP prophylaxis only. Sensitivity analysis revealed that azithromycin remains the most cost-effective prophylaxis option.

Authors’ conclusions
Results suggested that the strategy beginning with azithromycin and changing to clarithromycin, and then rifabutin, if required, after major toxicity is the most cost-effective of the five options.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparators was clear. You, as a user of this database, should verify whether these health technologies are relevant to your own setting.

Validity of estimate of measure of benefit
The measure of benefit seems to be valid given that a review of recent trials was undertaken to determine baseline data within the normal limitations of a modelled solution. The data do not seem to have been used selectively. The model did not reflect the fact that current combination antiretroviral therapies are associated with a lower risk of CD4 decline.

Validity of estimate of costs
Productivity and patient time costs were not considered due to the perspective adopted. Costs were derived from a national survey and a number of assumptions were made in order to derive cost estimates for the model.

Other issues
The authors adopted a sound methodological strategy in their approach to the incremental cost-effectiveness analysis (removing strongly dominated strategies etc) and provided clarity in their reporting. The robustness of the results was also tested using sensitivity analyses. If the model had included the beneficial effects of azithromycin, however, on the incidence of sinusitis and pneumonia, azithromycin would have appeared even more cost-effective. The generalisability of the results to other settings or countries was not specifically addressed, but appropriate comparisons with other relevant studies were made.
Implications of the study
The modelled solution presented by the authors is a first step in the development of a list of medications that is prioritised to offer the greatest impact on quality-adjusted survival for a given budget. Natural history data on the risk of MAC in patients receiving combination antiretroviral therapy should also be incorporated in the analysis as they become available.

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Other publications of related interest


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