Cost effectiveness of adalimumab for the treatment of ankylosing spondylitis in the United Kingdom

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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.

CRD summary
This study examined the cost-effectiveness of adalimumab versus conventional therapy for the treatment of ankylosing spondylitis. The authors concluded that adalimumab was cost-effective from the perspective of the UK National Health Service, especially if the British Society of Rheumatology treatment guidelines were followed. Despite some limitations, the methodology was valid and the authors’ conclusions appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to compare the cost-effectiveness of two treatments for ankylosing spondylitis.

Interventions
The interventions were a tumour necrosis factor antagonist, which was adalimumab (HUMIRA, Abbott Laboratories), and conventional treatment, which consisted of non-steroidal anti-inflammatory drugs. The treatment pathways followed the guidelines of the UK British Society of Rheumatology (BSR).

Location/setting
UK/primary care.

Methods
Analytical approach:
A decision analytic model with a 30-year time horizon was used. The authors reported that the perspective of the UK National Health Service (NHS) was adopted.

Effectiveness data:
The effectiveness data were combined from two Phase III clinical trials; the Adalimumab Trial Evaluating Long-Term Efficacy and Safety in Ankylosing Spondylitis (ATLAS) and the M03-606 trial (see ‘Other Publications of Related Interest’ below for bibliographic details). Some assumptions were necessary and were fully reported. From a total of 397 patients, 315 met the inclusion criteria and were analysed. These patients were comparable with those who were not included at baseline in their demographic characteristics, but the included patients had higher average baseline visual analogue scale, Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and Bath Ankylosing Spondylitis Functional Index (BASFI) scores.

Monetary benefit and utility valuations:
The utilities were from the two clinical trials and were evaluated using the Health Utilities Index 3 (HUI-3) at baseline and at the 24th week. Regression analysis was also used to estimate the association between the utilities and the BASDAI and BASFI scores.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the measure of benefit and they were discounted at an annual rate of 3.5%.

Cost data:
The economic analysis included those costs associated with ankylosing spondylitis based on different BASDAI scores. The costs and resource use data were derived from a published study with 208 patients. The costs of adalimumab, specialist visits, routine safety monitoring, X-rays, and tuberculosis skin tests were included as were the costs of nursing and physician time spent on tests, treatment for tuberculosis, and adverse events, including physician visits, liver function tests, urea and electrolytes, full blood counts, and antibiotics. The unit costs and resource quantities were derived from national sources and the literature and were reported separately, except for the costs of treating tuberculosis and the cost of ankylosing spondylitis by BADSAI score, which were reported as macro-categories. All costs were reported in UK pounds sterling (£) and discounted at an annual rate of 3.5%. The price year was not explicitly reported.

Analysis of uncertainty:
Several one-way sensitivity analyses were carried out on the key model inputs, using ranges defined by the authors. Probabilistic sensitivity analyses using a bootstrap technique were also conducted. Alternative scenarios were tested and these scenarios were briefly described.

Results
The results were reported per patient for one-year, five-year, and 30-year time horizons. Over 30 years, the expected QALYs were 8.1891 with conventional therapy and 9.2220 with adalimumab. The total per patient costs were £92,080 with conventional therapy and £115,937 with adalimumab. When adalimumab was compared with conventional therapy it resulted in an incremental cost effectiveness ratio (ICER) of £23,097 per QALY. The ICER over a one-year time horizon was £47,083 and over a five-year horizon was £26,332.

One-way sensitivity analysis, with a 30-year horizon, demonstrated that these results were robust. In all cases, the ICER was less than £30,000 per QALY.

The probabilistic sensitivity analysis indicated that, when adalimumab was compared with conventional therapy, the probability that the ICER was below £30,000 was 69.7% and the probability that it was below £40,000 was 85.6%.

The scenario analyses demonstrated that, when the indirect costs were included, the ICER reduced to £5,093 per QALY and when all patients remained on therapy regardless of their treatment response, the ICER increased to £62,679 per QALY.

Authors’ conclusions
The authors concluded that adalimumab was cost-effective compared with conventional therapy for the treatment of ankylosing spondylitis, based on UK BSR treatment guidelines.

CRD commentary
Interventions:
The interventions were presented, but the doses were not reported. The authors used the usual care in their setting as the comparator.

Effectiveness/benefits:
The use of RCTs to derive the effectiveness data was appropriate as the RCT design is usually associated with high internal validity. Some of the features of the trials were reported, but the full details were published elsewhere.

Costs:
The analysis of costs included all those categories relevant to the health service perspective. The details of the unit costs and resource quantities were provided which enhances the transparency of the economic analysis. The use of discounting was appropriate. The price year was not reported, which will prevent future reflation exercises.

Analysis and results:
The incremental analysis used to synthesise the costs and benefits was appropriate. The issue of uncertainty was appropriately addressed using both deterministic and probabilistic methods. The authors compared their results with those from previous studies and highlighted the reasons for some differences. They also briefly discussed some
limitations to their study, which mainly related to the sources for the cost and resource use data.

**Concluding remarks:**
Despite some limitations, the methodology was generally valid and the authors’ conclusions appear to be appropriate.

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