Cost-effectiveness of abatacept in patients with moderately to severely active rheumatoid arthritis and inadequate response to methotrexate


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 examined the cost-effectiveness of abatacept added to methotrexate (MTX), compared with MTX alone, in women aged 55 to 64 years with moderately to severely active rheumatoid arthritis and inadequate response to MTX. The authors concluded that abatacept added to MTX was a cost-effective strategy from the perspective of the US third-party payer. The study methodology was appropriate and the extensive sensitivity analyses enhance the robustness of the authors’ conclusions.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to examine the cost-effectiveness of abatacept added to methotrexate (MTX), compared with MTX alone, in women aged 55 to 64 years with moderately to severely active rheumatoid arthritis (RA) and inadequate response to MTX.

Interventions
The study examined MTX alone (15 mg once weekly) versus MTX plus abatacept (on days 1, 14 and 29, and every 4 weeks thereafter). Abatacept was administered initially as a 500- to 1,000-mg (based on body weight) intravenous infusion over 30 minutes on day 1, with additional infusions on days 14 and 29, then every 4 weeks thereafter.

Location/setting
USA/secondary care.

Methods
Analytical approach:
A decision model was developed to depict the progression of functional disability and the impact of the two strategies on future costs and health benefits. Both a lifetime horizon and a 10-year timeframe were used. The authors stated that the perspective of the third-party payer was adopted in the study.

Effectiveness data:
Sources of clinical data appear to have been identified from a selection of known relevant studies. The short-term effect of abatacept plus MTX versus MTX alone and patient characteristics were taken from a double-blind, randomised clinical trial (RCT), the Abatacept in Inadequate Responders to Methotrexate trial. Mortality risk (which depends on age, gender and disease progression) was taken from the National Data Bank for Rheumatic Diseases (NDB), a research organisation with longitudinal data on patients with various rheumatic disorders recruited from US rheumatology practices. Disease progression for patients receiving MTX was obtained from a cohort of patients with early RA. Some assumptions about the sustained effect of treatment were also made in order to extrapolate clinical trial data beyond the trial follow-up period. The key clinical outcome was drug effect in reducing disease progression, as measured by the Health Assessment Questionnaire Disability Index (HAQ-DI).

Monetary benefit and utility valuations:
Utility valuations were derived from the sample of approximately 19,000 RA patients included in the NDB on the basis of the relationship between the EQ-5D Weighted Health Index and the HAQ-DI.
Measure of benefit:
The summary benefit measure was the quality-adjusted life-years (QALYs). These were calculated using the decision model and discounted at an annual rate of 3%.1

Cost data:
The health services included in the analysis were drugs (acquisition and administration), monitoring, inpatient stay and outpatient services. Much of the data on abatacept administration and acquisition were derived from the manufacturer. The costs for other health care services were based on Medicare reimbursement rates. Resource use was related to the HAQ-DI score on the basis of patient-level data from the NDB. The costs were in US dollars ($). The price year was 2006. An annual discount rate of 3% was applied to costs accrued after the first year.

Analysis of uncertainty:
Both first- and second-order Monte Carlo simulations were performed in order to generate means and confidence intervals (CIs) for selected model outputs. Cost-effectiveness acceptability curves were generated. A deterministic sensitivity analysis was also carried out by varying selected assumptions and parameter estimates. Other scenarios were based upon patient age, discontinuation policy and mortality rates.

Results
Over a 10-year horizon, the additional costs of abatacept over MTX treatment were $51,426, the gain in QALYs was 1.2, and the mean incremental cost per QALY gained was $47,910 (95% CI: 44,641 to 52,136). Over lifetime, the additional costs were $67,757, the gain in QALYs was 2.0, and the mean incremental cost was $43,041 per QALY (95% CI: 39,070 to 46,725).

The sensitivity analysis confirmed the robustness of the base-case findings. The probabilistic sensitivity analysis showed that, at a threshold of $50,000 per QALY, the probability that abatacept would be cost-effective was 0.80 over 10 years and 0.99 over the patients' lifetime.

The deterministic sensitivity analysis showed that the cost-utility ratio ranged from $40,190 to $70,209 with a 10-year time horizon and from $37,551 to $60,106 over the patients' lifetime. As expected, the results of the analysis were mostly sensitive to the impact of drug therapies on disease progression.

Authors' conclusions
The authors concluded that abatacept added to MTX was a cost-effective strategy in women aged 55 to 64 years with moderately to severely active RA and inadequate response to MTX.

CRD commentary
Interventions:
The selection of MTX as the background treatment was appropriate since disease-modifying antirheumatic drugs represent the standard of care against which new drugs for RA are usually evaluated. A comparison between abatacept and other biological agents was beyond the objective of this study.

Effectiveness/benefits:
The clinical data were obtained from sources identified directly by the authors for the purpose of the analysis, rather than through a review of the literature. The use of an RCT was appropriate in that it should ensure the validity of the clinical estimates on treatment effectiveness, owing to the strengths of its design. Other studies used, such as the longitudinal databases or manufacturers' file, were generally appropriate to the model parameter investigated. The issue of heterogeneity among these sources of data was not addressed, but the sensitivity analysis investigated the impact of these estimates on the study results. The authors reported the sources used to derive utility valuations, which were obtained from the limited literature available, as the authors pointed out. QALYs were an appropriate benefit measure and are also comparable with the benefits of other health care interventions.

Costs:
The analysis of the costs was consistent with the perspective of the study. A breakdown of the cost items was not given, most of the costs being presented as macro-categories. This was a peculiarity of the analysis that was related to the
disease under examination. In effect, RA costs were associated with the severity of disease. Although commonly used in RA studies, such an approach partially reduces the transparency of the whole economic analysis. The sources used were reported but details of the specific accounting system were not given, except for Medicare reimbursement rates. The price year and the use of discounting were reported. Probabilistic distributions were assigned to economic inputs in the simulation analysis.

Analysis and results:
The synthesis of the costs and benefits was appropriately performed and clearly presented. The sensitivity analysis was conducted satisfactorily to cover both the general issue of uncertainty and also specific areas. The authors stated that their findings were likely to be conservative because of the assumptions made in the analysis. The selection of two time horizons was appropriately justified.

Concluding remarks:
The study methodology was satisfactory, although more details on the economic side of the analysis would have been useful. The extensive sensitivity analysis and the clear presentation of study findings enhance the validity of the authors’ conclusions.

Funding
Bristol-Myers Squibb.

Bibliographic details

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Adult; Antirheumatic Agents /economics /therapeutic use; Arthritis, Rheumatoid /drug therapy /economics; Cost-Benefit Analysis; Disability Evaluation; Disease Progression; Drug Costs /statistics & numerical data; Female; Health Care Costs /statistics & numerical data; Humans; Immunoconjugates /economics /therapeutic use; Male; Methotrexate /therapeutic use; Middle Aged; Models, Econometric; Quality-Adjusted Life Years; Sensitivity and Specificity; Severity of Illness Index; Treatment Outcome; Tumor Necrosis Factor-alpha /antagonists & inhibitors

AccessionNumber
22008100901
Date bibliographic record published
01/09/2008

Date abstract record published
01/12/2008