Cost-effectiveness evaluation of etoricoxib versus celecoxib and nonselective NSAIDs in the treatment of ankylosing spondylitis in Norway

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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
The objective was to estimate the cost-effectiveness of etoricoxib in the initial treatment of ankylosing spondylitis, in Norway. The authors concluded that etoricoxib was the most cost-effective intervention, from a health care perspective. Overall, the study was good with adequate reporting of the methods, sources of data, and results. Given the scope of the study, the authors’ conclusions appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to estimate the cost-effectiveness of etoricoxib, relative to celecoxib and non-selective non-steroidal anti-inflammatory drugs (NSAIDs), in the initial treatment of ankylosing spondylitis, in Norway.

Interventions
The interventions were etoricoxib 90mg, celecoxib 200mg or 400mg, and the non-selective NSAIDs naproxen 1g, and diclofenac 150mg.

Location/setting
Norway/out-patient secondary care.

Methods
Analytical approach:
A published Markov model (Jansen, et al. 2010, see 'Other Publications of Related Interest' below for bibliographic details), with a one-year cycle length, was used to evaluate the cost-effectiveness of the interventions. The model had eight health states and the patients’ average age was 45 years. The time horizon was 30 years. The authors stated that a health care perspective was used.

Effectiveness data:
The clinical and effectiveness data were from published studies. The main parameters were the effects of etoricoxib, celecoxib, diclofenac, and naproxen on the Bath Ankylosing Spondylitis Functional Index (BASFI) and the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI). These estimates were from a systematic review and Bayesian mixed-treatment comparison of randomised controlled trials (RCTs). Other clinical parameters, such as adverse events, mortality, and treatment discontinuation, came from published literature.

Monetary benefit and utility valuations:
The utility values were mainly from a published study of the relationship between responses to the European Quality of life (EQ-5D) questionnaire and BASFI and BASDAI scores, for UK patients with ankylosing spondylitis. For adverse events, the estimates were from published literature.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary measure of benefit and they were discounted at an annual rate of 4%.
Cost data:
The direct costs included those of the drugs; the treatment of gastrointestinal (adverse) events, such as perforation, ulcer, or bleeding, which included drugs, general practitioner (GP) visits, investigations, hospitalisation, and surgery; and the treatment of other adverse events, such as chronic heart failure and cardiovascular events. The costs for adverse events were limited to the first year, and the resources were from published sources. The annual drug costs were from the Norwegian Medicines Agency. In-patient costs were from Norwegian diagnosis-related group price lists. All costs were in Norwegian kroner (NOK) and the price year was 2007. Future costs were discounted at an annual rate of 4%.

Analysis of uncertainty:
The authors undertook a probabilistic sensitivity analysis, with 10,000 iterations, using probability distributions fitted to each model parameter. The results were presented in cost-effectiveness acceptability curves. Scenario analyses were undertaken. The time horizon was varied to five years and one year.

Results
Over 30 years, the average QALYs were 11.16 (95% CrI 9.85 to 12.42) with etoricoxib, 10.66 (95% CrI 9.24 to 12.04) with celecoxib, 10.71 (95% CrI 9.30 to 12.08) with diclofenac, and 10.80 (95% CrI 9.41 to 12.15) with naproxen.

The average cost per patient was NOK 640,900 (95% CrI 476,900 to 835,600) with etoricoxib, NOK 750,300 (95% CrI 554,500 to 980,800) with celecoxib, NOK 721,000 (95% CrI 528,800 to 947,700) with diclofenac, and 717,800 (95% CrI 526,000 to 944,700) with naproxen.

Etoricoxib was dominant over celecoxib, diclofenac, and naproxen, as it was more effective and less costly.

Variations in the sensitivity analysis had little impact on these findings. At a cost-effectiveness threshold of NOK 500,000, etoricoxib was cost-effective in over 99% of simulations.

Authors' conclusions
The authors concluded that etoricoxib was the most cost-effective initial treatment for ankylosing spondylitis, in Norway, from a health care perspective.

CRD commentary
Interventions:
The interventions were well reported and relevant to the authors' setting. The first-line treatment for ankylosing spondylitis was NSAIDs, which included etoricoxib, celecoxib, diclofenac, and naproxen. It was not clear whether there were other relevant NSAIDs that could have been analysed.

Effectiveness/benefits:
The clinical and effectiveness data were from published studies and these sources were fully reported. The main measures of effectiveness were from a systematic review and mixed-treatment comparison of RCTs. As a result, the main measure of effectiveness is likely to have been internally valid. No systematic review was reported to identify the data sources and it is not clear if all the relevant information was analysed. QALYs were the best benefit measure for capturing the impact of the disease on quality of life and survival. The utilities were primarily from a UK published study, which may have included patients with more severe disease. These issues might limit the generalisability of the results.

Costs:
The authors reported that a health care perspective was adopted, and it appears that all the major relevant cost categories were included. The costs of ankylosing spondylitis, such as GP visits, specialist visits, paramedic visits, hospitalisation, technical examinations, and adaptations and aids, were not included due to a lack of data. The authors reported that this was likely to have underestimated the cost savings with etoricoxib. The sources for the resource use and unit costs were reported, as were the price year, discount rate, time horizon, and currency.

Analysis and results:
The cost and outcome information was synthesised in a published Markov model. Details of the model structure and assumptions were provided, with a diagram. The incremental analysis was appropriate for comparing the costs and
outcomes of the four drugs. The methods appear to have been robust, but some were not well reported, possibly due to the complicated analyses and limited reporting space. The results were reported clearly and in full. The sensitivity analyses were exhaustive and included probabilistic sensitivity analysis. The authors reported that the main limitation of their study was that non-Norwegian data had to be used for some of the model parameters, such as the resource use for gastrointestinal events.

Concluding remarks:
Overall, the study was good with adequate reporting of the methods, sources of data, and results. Given the scope of the study, the authors’ conclusions appear to be appropriate.

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Other publications of related interest
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Indexing Status
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MeSH
Humans; Cost-Benefit Analysis; Pyridines; Sulfones; Cyclooxygenase 2 Inhibitors; Pyrazoles; Sulfonamides; Anti-Inflammatory Agents, Non-Steroidal; Spondylitis, Ankylosing; Norway; Naproxen; Diclofenac; Markov Chains; Quality-Adjusted Life Years

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