Cost-effectiveness of bazedoxifene compared with raloxifene in the treatment of postmenopausal osteoporotic women

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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 assessed the cost-effectiveness of bazedoxifene, compared with raloxifene, for postmenopausal women with osteoporosis. The authors concluded that bazedoxifene and raloxifene had similar cost-effectiveness for these women in general, but for women at a higher risk of fracture, bazedoxifene was more cost-effective. The methods seem to have been appropriate, but the data sources were not well reported and some relevant comparators were not included, which limits the usefulness of the authors’ conclusions.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of bazedoxifene, compared with raloxifene, in postmenopausal women with osteoporosis.

Interventions
Bazedoxifene 20mg was compared with raloxifene 60mg. Both drugs were selective oestrogen-receptor modulators.

Location/setting
Belgium/secondary care.

Methods
Analytical approach:
An update of a published Markov micro-simulation (see Other Publications of Related Interest) was used to combine data from hospital databases and a clinical trial. The authors stated that a health care payer perspective was taken.

Effectiveness data:
The main clinical effectiveness estimate was the fracture risk. The effects of bazedoxifene and raloxifene on this risk were derived from the results of a three-year randomised, double-blind, placebo- and active-controlled trial. The main analysis assessed women aged 70 years, who had not had a fracture and had a bone mineral density (BMD) at or below -2.5. The treatment effects were assessed for the total population and for a subgroup of women who were at a higher risk of fracture due to a femoral neck T-score of -3.0 or less, one or more moderate or severe vertebral fracture, multiple mild vertebral fractures, or a combination of these. Adjustments were made for the fracture risk in women with a low BMD. Adherence to treatment was excluded from the model as no major differences between the two drugs were expected.

Monetary benefit and utility valuations:
The utility values for the general female population and the reductions, due to fractures, during the year following the fracture, and in subsequent years, were from a systematic review. When a second fracture occurred at the same site, the disutility for this fracture was halved.

Measure of benefit:
The benefit measure was quality-adjusted life-years (QALYs), which were discounted at an annual rate of 1.5%.
Cost data:
The cost categories were hospitalisation, the year following hip fracture, hip fracture long-term, non-hip fracture, drugs, physician visits, BMD measurement, and venous thromboembolism (VTE). Hospitalisation costs were estimated using the Belgian national database of hospital bills. The additional costs of hip fractures were estimated using published literature. Drug costs were estimated using the official listings of the Belgian Centre for Pharmacotherapeutic Information. The resource estimates for VTE were estimated by a panel of experts. The costs were discounted at an annual rate of 3% and presented in 2010 Euros (EUR), adjusted using the health care product price index.

Analysis of uncertainty:
Ninety-five percent confidence intervals were presented for the relative risk of fracture with bazedoxifene and raloxifene, compared with placebo, for both vertebral and non-vertebral fractures. Univariate sensitivity analyses were performed on key parameters, including the discount rates, fracture disutility, fracture cost, and fracture risk. Probabilistic sensitivity analysis was undertaken for 100,000 women and 200 Monte Carlo simulations. The results were presented in cost-effectiveness acceptability curves and cost-effectiveness planes. Analyses were conducted for women with prevalent vertebral fractures, and at varying starting ages of treatment. The effect of reducing the cost of raloxifene and incorporating the effects of raloxifene on breast cancer were investigated. Another analysis assessed the impact of bazedoxifene and raloxifene on breast cancer; the annual incidence of breast cancer in Belgian women was from the Belgian Cancer Registry for the year 2009 and the direct cost of breast cancer in Belgium was estimated using published literature.

Results
The main analysis indicated that bazedoxifene and raloxifene were equally cost-effective. They were each dominant over the other (more effective and cheaper) in around 40% of simulations.

In the analysis of the subgroup of women at a higher risk of fracture, bazedoxifene was dominant in 84% of simulations. The cost-effectiveness acceptability curves indicated that it was cost-effective, at willingness-to-pay thresholds of EUR 20,000 or higher, in around 90% of simulations.

Bazedoxifene remained dominant or more cost-effective in most simulations for each of the other sensitivity analyses.

Authors' conclusions
The authors concluded that bazedoxifene and raloxifene had similar cost-effectiveness for postmenopausal women with osteoporosis, in general, but for women at a higher risk of fracture, bazedoxifene was more cost-effective.

CRD commentary
Interventions:
The interventions were briefly described and were appropriate comparators, but they were not the only treatments available, as discussed. Comparators, such as bisphosphonates, denosumab and strontium ranelate, should have been included for a full analysis for the benefit of decision-makers.

Effectiveness/benefits:
The effectiveness data were from a trial which should have had high internal validity, but very little detail was provided. The original publication was referenced. Very little information was provided on the utility values, but the source, a published systematic review, was referenced. The quality of this review could not be assessed. The second fracture disutility rate assumption was that used in the published model, but as before, it is not clear if this was appropriate.

Costs:
The study perspective was clearly stated and all the relevant cost categories were included. The costs were from appropriate sources. It was unclear if the social security cost and the patient's out-of-pocket contribution for nursing and residential fees were included in the direct hospitalisation cost of hip fracture. If these costs were included, it was inappropriate for the study perspective. The source for the resource estimates was unclear, which hinders the reproducibility of the study. The costs were appropriately discounted and adjusted for inflation.

Analysis and results:
The analytic approach appears to have been appropriate, but only the two drugs with direct comparison data were
analysed. No indirect comparisons were used, which omitted appropriate comparators. No main analysis cost and effectiveness results were presented, only the results of the probabilistic sensitivity analysis were given. The uncertainty in the model was adequately explored in deterministic and probabilistic sensitivity analyses. The authors noted that a limitation of their study was that full adherence to the drugs was assumed, and this might not be the case in the real world.

Concluding remarks:
The methods seem to have been appropriate, but the data sources were not well reported and some relevant comparators were not included. This limits the usefulness of the authors' conclusions.

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Other publications of related interest

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