The cost-effectiveness of strontium ranelate in the UK for the management of osteoporosis

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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 strontium ranelate for osteoporosis treatment in post-menopausal women, with clinical risk factors, identified by the World Health Organization's fracture risk assessment tool; FRAX. Strontium ranelate was cost-effective for the treatment of established osteoporosis in women over the age of 65 years, as well as in younger women with additional clinical risk factors. The methods were valid and the results were clearly reported for various subgroups of patients. The authors' conclusions appear to be robust.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of strontium ranelate compared with no intervention for the prevention and treatment of osteoporosis, in post-menopausal women with clinical risk factors, identified by the World Health Organization's fracture risk assessment tool; FRAX.

Interventions
Five years of strontium ranelate was compared with no treatment, for cohorts of women with different risk factors, which were smoking, drinking over three units of alcohol each day, rheumatoid arthritis, taking glucocorticoids, a family history of osteoporotic fracture, and a prior fracture.

Location/setting
UK/primary care.

Methods
Analytical approach:
The analysis was based on a published decision analytic model, with a Markov cohort and a lifetime horizon. Two scenarios were considered, one with self-identified patients (identified by a previous fracture) and the other with opportunistic assessment, which included women with a parental history of hip fracture. The authors stated that the analysis was carried out from the perspective of the health care system.

Effectiveness data:
The efficacy of strontium on fracture risk was the key input and was based on the results of two phase III trials, which were the Spinal Osteoporosis Therapeutic Intervention (SOTT) trial and the Treatment of Peripheral Osteoporosis Study (TROPOS). The clinical risk factors were identified through several meta-analyses, which were reported elsewhere, with the FRAX model (Kanis, et al. 2008, see ‘Other Publications of Related Interest’ below for bibliographic details). Some details of the other sources were reported and a number of assumptions were required. The FRAX tool was clearly described.

Monetary benefit and utility valuations:
The utility values were derived from published sources and expert opinion; UK tariffs were used.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure and they were discounted at an annual rate of 3.5%.
Cost data:
The economic analysis included the costs of strontium ranelate and of fractures. The drug cost was from the British National Formulary, while the cost of fractures was from a published cost analysis, which included in- and out-patient costs as well as admissions to nursing homes, but excluded the costs for home help. The costs of case finding were also analysed, including the general practitioner time to administer the questionnaire on risk factors and to start treatment, as well as a bone mineral density (BMD) test. All costs were in UK pounds sterling (£) and were discounted at an annual rate of 3.5%. The price year was 2006.

Analysis of uncertainty:
A probabilistic sensitivity analysis was undertaken to create cost-effectiveness acceptability curves. Changes in the key model inputs were investigated in a deterministic analysis.

Results
The incremental cost per QALY gained was below the threshold of £30,000 in all women with a low T-score (under -2.5) and no previous fracture and no family history, only at 70 years old; in self-identified women (with a previous fracture), with a low T-score, from 65 to 75 years old; in self-identified women, without a BMD test, from 65 years old; and in opportunistically assessed women (with a parental history of fracture), with a low T-score or without a BMD test, from 65 years old.

Treatment was generally cost-effective from 65 years old and this was also true in alternative scenarios for the treatment efficacy. In women at the threshold of osteopenia, treatment with strontium ranelate was cost-effective in the presence of a prior fracture or a family history of fracture.

In women with osteoporosis (low T-score), strontium ranelate was cost-effective in the presence of any single clinical risk factor, such as taking glucocorticoids or rheumatoid arthritis, except for smoking status. The most influential model inputs were assumptions on the side effects and the time horizon. Shorter time horizons led to unfavourable cost-utility ratios that were almost doubled.

Authors' conclusions
The authors concluded that strontium ranelate was cost-effective for the treatment of established osteoporosis, in women over the age of 65 years, as well as in younger women with additional clinical risk factors.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear as the proposed treatment with strontium ranelate was compared with the usual care, which was no intervention, but other therapies were available for post-menopausal women. The authors stated that comparators, such as alendronate, were not considered due to a lack of head-to-head clinical trials. Alendronate is often considered as the first-line treatment for women with osteoporosis.

Effectiveness/benefits:
The sources were selected from those known to the authors. Generally, randomised controlled trials are valid sources of data for treatment efficacy, due to their methods, but more details of the other sources of data would have been useful for judging the clinical inputs. Most of the clinical inputs were from the FRAX model. Limited information was provided on the derivation of the utility values, but QALYs capture the impact of the disease on quality of life and allow cross-disease comparisons.

Costs:
The cost analysis was consistent with the perspective, but the unit costs and resource quantities were not explicitly reported, with the costs being presented as total categories. This approach is common in the assessment of fracture costs, but reduces the transparency of the analysis. Limited information was provided on the study used to derive the fracture costs, but it appears that typical UK sources were used and most of the data were from a Health Technology Assessment submitted to the National Institute for Health and Clinical Excellence (NICE). The cost estimates were treated deterministically.
Analysis and results:
The results were not fully presented as the expected costs and benefits were not reported, but the incremental cost-utility ratios were extensively reported by age and clinical subgroups. The sensitivity analyses addressed the issue of uncertainty, using both probabilistic and deterministic methods. The main strengths of the analysis were the model that allowed the identification of several risk factors for fractures and the analysis of several subgroups of patients. The authors stated that their results differed from those of a previous NICE appraisal, which was less favourable to strontium ranelate. The main reasons for the differences appear to have been the use of a lifetime horizon instead of a 10-year time frame and the estimation of risk based on clinical factors.

Concluding remarks:
The methods were valid and study results were clearly reported for various subgroups of patients. The authors’ conclusions appear to be robust.

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