



Title	Treatment of Established Osteoporosis: A Systematic Review and Cost-Utility Analysis
Agency	NCCHTA, National Coordinating Centre for Health Technology Assessment Mailpoint 728, Boldrewood, University of Southampton, Southampton SO16 7PX, United Kingdom; Tel: +44 2380 595586, Fax: +44 2380 595639
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Aim

To assess the effectiveness of treatments for established osteoporosis.

Conclusions and results

A systematic review indicated that bisphosphonates, calcitonin, calcium, fluoride salts, and raloxifene reduced the incidence of vertebral fracture. The bisphosphonate, alendronate, also decreased non-vertebral fracture, including hip fracture.

For several agents, failure to demonstrate efficacy was due to the lack of RCTs. Epidemiological evidence suggested that treatment with calcium, calcitonin, hormone replacement therapy (HRT), thiazide diuretics, etidronate, and anabolic steroids reduced hip fracture risk. RCT evidence showed that calcium plus vitamin D reduced fracture risk in patients with unknown bone mineral density. It was not cost effective to treat established osteoporosis with raloxifene in the model used. HRT was not cost effective except below the age of 60 years. However, treatment became cost effective from the age of 50 years if the effects on appendicular fractures were included. Calcium alone was cost effective compared with no intervention from age 60 years, assuming an effect only on vertebral fracture risk, but cost effective at all ages if effects on appendicular fractures were included. Calcitonin was not cost effective at any age because of its high costs, whereas alendronate was only cost effective from age 70 years. Fluoride was not cost effective until over 60 years. Compared with no treatment, it was not cost effective to treat osteoporosis with alfacalcidol except over 70 years. The conclusions are conservative, mainly due to insufficient data.

Recommendations

Cost-effectiveness ratios decrease with age. At age 50 years, only HRT and calcium plus vitamin D were cost effective (assuming that the agent would decrease the risk of appendicular fractures at this age). At age 80 years, HRT, calcium with or without vitamin D, alfacalcidol, alendronate and bisphosphonate were all cost effective.

Methods

All relevant RCTs were systematically reviewed. The annual risk of osteoporotic fracture was characterized for women from the UK. Published meta-analyses were used to determine the risk of osteoporotic fractures in women at the threshold for osteoporosis and the risk for such fractures after prior osteoporotic fracture. The consequences of fracture on mortality were assessed for each fracture type. Annual breast cancer, coronary heart disease, and mortality risks were reviewed. Costs and utilities were determined for osteoporosis in the UK by systematic review of the literature. A model was developed to simulate cohorts at fixed ages with osteoporosis..

Further research/reviews required

Health economic assessment based on probability of fracture is an important area for further research. Other areas arise from gaps in empirical knowledge on utilities and side effects that are amenable to primary research. Further secondary research should be undertaken to more closely evaluate the impact of vertebral deformities on cost effectiveness.

Written by Professor John Kanis, Centre for Metabolic Bone Disease, University of Sheffield, UK