Pharmaco-economic aspects of osteoporosis: communication of treatment effects and economic evaluation of interventions

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ABSTRACT

This PhD dissertation, which is based on three published papers and a working paper, is the result of my employment as a research fellow at the Research Unit of Clinical Pharmacology, University of Southern Denmark, and Department of Public Health, Sydney University.

The aim was to estimate effects of osteoporosis interventions in terms of postponing of hip fractures; to test whether lay persons have different perception of the benefits of an osteoporosis intervention when presented in terms of number needed to treat (NNT) compared to postponement of hip fractures. Besides, the aim was to estimate cost and health effects in a cost-effectiveness analysis of the use of alendronate in elderly Danish women with increased risk of fracture.

Using Markov simulations it was estimated that a one-year treatment would on average postpone hip fracture by twelve days if therapy was begun at the age of 50 years, and 23, 55, 90, or 74 days if the treatment was started at the age of 60, 70, 80, or 90 years, respectively. For ten years of treatment, postponement of hip fracture was 146, 260, 369, 373, and 167 days, respectively.

Based on face-to-face interviews in cross-sectional, randomised trial of a representative sample of the Danish population it was found that when laypersons were presented with information about the benefit of an osteoporosis intervention based on NNT of 10, 50, 100, and 400, the proportions consenting to an intervention were 65%, 61%, 63%, and 57%, respectively (χ^2_{trend}=0.75, p=0.39, DF=1). Almost half of the respondents indicated that the concept of NNT was difficult to understand. When the benefit was presented in terms of postponement of hip fracture by one month, six months, one year, and four years, the proportions that consented with the intervention were 25%, 40%, 39%, and 53%, respectively (χ^2_{trend}= 20.09, p<0.001, DF=1).

The cost-effectiveness analysis indicated that when using alendronate for three years in 71-year-old Danish women with increased risk of fracture, the incremental cost per QALY gained was DKK 125,000 while the cost per life year gained was DKK 374,000.

The implications of our studies are that: 1) NNT should be used cautiously when communicating effects of interventions for chronic conditions, 2) the postponement perspective needs further testing before being implemented and 3) an intervention with a relative risk reduction of fracture by 50%, with a yearly cost of around DKK 5000 seems to provide good value for money.