Denosumab, raloxifene, romosozumab and teriparatide to prevent osteoporotic fragility fractures: a systematic review and economic evaluation

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Plain English summary

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Background

Fragility fractures are fractures that result from mechanical forces that would not ordinarily result in fracture, known as low-level (or ‘low-energy’) trauma. Some people are at particularly high risk of fragility fractures. The first treatment used is often a bisphosphonate, but non-bisphosphonate treatments are alternatives.

Aims

We aimed to determine how effective non-bisphosphonates [denosumab [Prolia®; Amgen Inc., Thousand Oaks, CA, USA], raloxifene [Evista®; Daiichi Sankyo Company, Ltd, Tokyo, Japan], romosozumab [Evenity®; Union Chimique Belge (UCB) S.A. (Brussels, Belgium) and Amgen Inc.] and teriparatide [Forsteo®; Eli Lilly and Company, Indianapolis, IN, USA]] are at preventing fractures, whether or not treatment has any risks for patients and whether or not the clinical benefits are achieved at a reasonable cost.

Methods

We have systematically identified and examined trials that assessed the clinical effects of non-bisphosphonates. For each clinical outcome, we have combined data from multiple trials to estimate the clinical effectiveness of each non-bisphosphonate treatment.

We combined data from published sources in an economic model to estimate lifetime costs and clinical benefits for each non-bisphosphonate and compared these with the estimated costs and clinical outcomes for untreated patients and patients treated with bisphosphonates.

Results

All non-bisphosphonates reduced the risk of vertebral fractures compared with no treatment. For fractures at the hip or at any non-vertebral site, all of the non-bisphosphonates reduced the average number of fractures, but, for some non-bisphosphonates, we could not exclude the possibility that this was a chance finding.

The chance of patients experiencing serious side effects was generally similar regardless of whether patients took non-bisphosphonates, bisphosphonates or placebo (a dummy pill). Blood clots were more common in patients taking raloxifene than in those taking placebo, but these were still a rare outcome (fewer than 1 in 100).

The benefits of denosumab, teriparatide and romosozumab are few compared with their costs. For raloxifene, the risks generally outweigh the benefits. Treatment with bisphosphonates is likely to represent better value for money than treatment with non-bisphosphonates.
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This report

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