TREATMENT

Review: prophylactic use of vitamin D reduces falls in older people

Q Is prophylactic use of vitamin D effective for preventing falls in older people?

METHODS

Data sources: MEDLINE and the Cochrane Controlled Trials Register (1960 to February 2004), EMBASE/Excerpta Medica (1991 to February 2004), and the American Society for Bone and Mineral Research conference abstracts (1995–2002); bibliographies of relevant studies; and experts in the field.

Study selection and assessment: randomised controlled trials (RCTs) that compared prophylactic use of any type of vitamin D with a control condition in community-dwelling or institutionalised older people (mean age of study participants had to be ≥60 y) and included a methods section that stated how falls (the outcome) were defined and ascertained. Individual study quality was assessed using specified criteria that included allocation concealment, blinding, and withdrawals.

Outcomes: low trauma falls defined as unintentionally coming to rest on the ground, floor, or other lower level.

MAIN RESULTS

5 RCTs (n = 1237) (mean age 70 y, 81% women) met the selection criteria. Comparisons included cholecalciferol (800 IU/d) plus calcium (1200 mg/d) with calcium (1200 mg/d) (2 RCTs); cholecalciferol (400 IU/d) plus calcium (800–1000 mg/d) from dairy products with placebo (1 RCT); calcitriol (0.5 μg/d) with placebo (1 RCT); and 1α-calcidiol (1 μg/d) with placebo (1 RCT). Meta-analyses using fixed and random effects models showed that fewer participants in the vitamin D group than in the control group had >1 fall (table). Furthermore, a sensitivity meta-analysis of the 10 “potentially appropriate for inclusion RCTs” (n = 10 001) showed that fewer participants in the vitamin D group than in the control group had >1 fall (relative risk reduction 13%, 95% CI 4 to 20).

CONCLUSION

Prophylactic use of vitamin D is effective for reducing falls in older people.

A modified version of this abstract appears in ACP Journal Club.

Commentary

Research on the beneficial effects of vitamin D for reducing falls is based on the hypothesis that human muscle tissue has specific vitamin D receptors that interact with sufficient concentrations of the vitamin to improve muscle strength. The meta-analysis by Bischoff-Ferrari et al concluded that in older people, prophylactic use of vitamin D is effective for reducing the rate of falls.

Strengths of the review include an extensive literature search, rigorous examination of several high quality studies, and a thorough sensitivity analysis. Inclusion of data from a larger number of participants included in “weaker” studies in the meta-analysis did not change the conclusion but led to a lower estimate of treatment effect, which remained clinically important.

The review does not answer several questions including the optimum dose, route and frequency of administration, and whether it should be given concurrently with calcium to maximise its effect. Bischoff-Ferrari et al suggest that a dose of 700–800 IU/d may be required and that concurrent calcium may be important. However, no firm conclusions can be made from the available evidence.

The use of vitamin D for fall reduction needs to be considered in addition to many other fall prevention techniques.1 People at high risk of falling are often elderly and have multiple pathologies and risks (not fully considered in the studies selected for the meta-analysis). This observation, however, does not discount the need to consider the potential deficiency of vitamin D when assessing older people. The assessment should include establishing the patient’s dietary intake of vitamin D, calcium, and other nutrients, especially among those who are housebound and have little exposure to sunlight. If intake is found to be inadequate through history taking and screening, and risk of falling is high, supplementation could be considered part of an overall strategy to reduce the risk of falls and potential injury.2

Heather Monaghan, RN, MHS;
Independent Nursing Consultant and Staff Nurse
Harrogate, North Yorkshire, UK

For correspondence: Dr H A Bischoff-Ferrari, Division of Aging, Brigham and Women’s Hospital, Boston, MA, USA. hbischof@hsph.harvard.edu
Sources of funding: Harvard/Harvard Foundation; Charles A King Trust Fellowship Award; Irene and Fredrick Stare Nutrition Education Fund; Swiss Foundation for Nutrition Research; International Foundation for the Promotion of Nutrition Research and Nutrition Education.

Vitamin D prophylaxis v a control condition (eg, calcium or placebo) in older people*

<table>
<thead>
<tr>
<th>Outcome (3 mo to 3 y)</th>
<th>Number of RCTs (n)</th>
<th>Vitamin D</th>
<th>Control</th>
<th>RRR (95% CI)</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants who had &gt;1 fall</td>
<td>5 (1237)</td>
<td>30%</td>
<td>37%</td>
<td>19% (6 to 31)</td>
<td>15 (9 to 52)</td>
</tr>
</tbody>
</table>

*RCTs = randomised controlled trials. Other abbreviations defined in glossary; weighted event rates, RRR, NNT, and CI calculated from data in article using a random-effects model.