Osteoporosis Canada
Ostéoporose Canada

High-dose oral vitamin D and falls and fractures

May 2010

A recent study, *Annual High-Dose Oral Vitamin D and Falls and Fractures in Older Women*, published in the Journal of the American Medical Association (JAMA), showed that a single large dose of vitamin D, given once yearly to a group of elderly patients, actually increased their risk of falls and fractures. The study recruited 2258 women, average age of 76 years, who were at increased risk of falling, and randomly assigned them to receive either a single dose of 500,000 International Units (IU) of vitamin D (ten 50,000 IU tablets taken in a single day) or placebo, once a year for 3 to 5 years. There are no obvious serious flaws or biases in the study. There has been one other large dose, once-yearly, study of vitamin D (300,000 IU of vitamin D2, given by injection) that has shown an increased risk of fracture. In contrast, studies using small, more frequent doses of vitamin D (averaging 700-800 IU/day with adequate calcium intake) have tended to show fracture and fall prevention.

There is no good explanation for the apparent danger of large dose vitamin D replacement. The editorial accompanying the paper suggests two possible mechanisms whereby a single dose providing a year's supply might not be effective in protecting against falls and fractures:

1. Our body normally converts vitamin D to a very potent active form that provides the bone and muscle benefits of vitamin D that would be expected to protect against falls and fractures. However, a huge dose of vitamin D might cause the body to over-produce the enzyme that allows the body to degrade this active form of vitamin D (which was not measured in this study).

2. Half the patients had vitamin D levels below the normal range before the first dose of vitamin D was given and it is possible the patients receiving vitamin D improved their muscle strength, felt better, and were more active than the placebo group. Activity levels and general health were not measured in this study, but when people are more active, they are also at higher risk of falling.

Vitamin D deficiency or insufficiency is common in Canada. This study does not provide any evidence to change our standard recommendation of a modest daily intake of vitamin D (800-2000 IU/day for most adults), or equivalent doses on a once-weekly basis. However, it is now reasonably clear that a single huge dose of vitamin D, given once yearly, is not advisable. We need more studies to determine optimal dosing of vitamin D supplements.

Prepared by: David Hanley, William D Leslie, Sophie Jamal, Jonathan Adachi, Alexandra Papaioannou, Suzanne Morin, members, Osteoporosis Canada Scientific Advisory Council