

Original Article

Hip bone loss is attenuated with 1000 IU but not 400 IU daily vitamin D3: a 1 year double-blind RCT in postmenopausal women[†]

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Trial Registration Vitamin D effects on Cardiovascular disease Risk (VICtORy) study at controlled-trials.com as ISRCTN20328039 (<http://controlled-trials.com/ISRCTN20328039/>).

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Abstract

Few year-long vitamin D supplementation trials exist that match seasonal changes. The aim of this study was to determine whether daily oral vitamin D₃ at 400 IU or 1000 IU compared with placebo affects annual BMD change in postmenopausal women in a 1-year double blind placebo controlled trial in Scotland. Caucasian women aged 60-70 y (n=305) were randomized to one of two doses of vitamin D or placebo. All participants started simultaneously in January/ February 2009, attending visits at bi-monthly intervals with 265 (87%) women attending the final visit; and an additional visit 1 month after treatment cessation. BMD (Lunar iDXA) and 1,25-dihydroxyvitamin D[1,25(OH)₂D], N-terminal propeptide of type 1 collagen [P1NP], C-terminal telopeptide of type I collagen [CTX] and fibroblast growth factor-23 [FGF23] were measured by immunoassay at the start and end of treatment. Circulating PTH, serum Ca and total 25-hydroxyvitamin D [25(OH)D] (latter by tandem mass spectrometry) were measured at each visit. Mean BMD loss at the hip was significantly less for the 1000 IU vitamin D group (0.05±1.46%), compared to the 400 IU vitamin D or placebo groups (0.57±1.33% and 0.60±1.67%, respectively) (p<0.05). Mean(±SD) baseline 25(OH)D was 33.8±14.6 nmol/L; comparative 25(OH)D change for the placebo, 400 IU and 1000 IU vitamin D groups was: -4.1±11.5 nmol/L, +31.6±19.8 nmol/L and +42.6±18.9 nmol/L respectively. Treatment did not change markers of bone metabolism, except for small reductions in PTH and serum calcium (latter with 1000 IU dose only). The discordance between the incremental increase in 25(OH)D between the 400IU and 1000 IU vitamin D and effect on BMD suggests that 25(OH)D may not accurately reflect clinical outcome, nor how much vitamin D is being stored.

KEY WORDS: vitamin D, randomised controlled trial, bone loss, bone turnover markers, postmenopausal women.