Association Between Calcium or Vitamin D Supplementation and Fracture Incidence in Community-Dwelling Older Adults: A Systematic Review and Meta-analysis.

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IMPORTANCE: The increased social and economic burdens for osteoporosis-related fractures worldwide make the prevention of such injuries a major public health goal. Previous studies have reached mixed conclusions regarding the association between calcium, vitamin D, or combined calcium and vitamin D supplements and fracture incidence in older adults.

OBJECTIVE: To investigate whether calcium, vitamin D, or combined calcium and vitamin D supplements are associated with a lower fracture incidence in community-dwelling older adults.

DATA SOURCES: The PubMed, Cochrane library, and EMBASE databases were systematically searched from the inception dates to December 24, 2016, using the keywords calcium, vitamin D, and fracture to identify systematic reviews or meta-analyses. The primary randomized clinical trials included in systematic reviews or meta-analyses were identified, and an additional search for recently published randomized trials was performed from July 16, 2012, to July 16, 2017.

STUDY SELECTION: Randomized clinical trials comparing calcium, vitamin D, or combined calcium and vitamin D supplements with a placebo or no treatment for fracture incidence in community-dwelling adults older than 50 years.

DATA EXTRACTION AND SYNTHESIS: Two independent reviewers performed the data extraction and assessed study quality. A meta-analysis was performed to calculate risk ratios (RRs), absolute risk differences (ARDs), and 95% CIs using random-effects models.

MAIN OUTCOMES AND MEASURES: Hip fracture was defined as the primary outcome. Secondary outcomes were nonvertebral fracture, vertebral fracture, and total fracture.

RESULTS: A total of 33 randomized trials involving 51,145 participants fulfilled the inclusion criteria. There was no significant association of calcium or vitamin D with risk of hip fracture compared with placebo or no treatment (calcium: RR, 1.53 [95% CI, 0.97 to 2.42]; ARD, 0.01 [95% CI, 0.00 to 0.01]; vitamin D: RR, 1.21 [95% CI, 0.99 to 1.47]; ARD, 0.00 [95% CI, -0.00 to 0.01]). There was no significant association of combined calcium and vitamin D with hip fracture compared with placebo or no treatment (RR, 1.09 [95% CI, 0.85 to 1.39]; ARD, 0.00 [95% CI, -0.00 to 0.00]). No significant associations were found between calcium, vitamin D, or combined calcium and vitamin D supplements and the incidence of nonvertebral, vertebral, or total fractures. Subgroup analyses showed that these results were generally consistent regardless of the calcium or vitamin D dose, sex, fracture history, dietary calcium intake, and baseline serum 25-hydroxyvitamin D concentration.

CONCLUSIONS AND RELEVANCE: In this meta-analysis of randomized clinical trials, the use of supplements that included calcium, vitamin D, or both compared with placebo or no treatment was not associated with a lower risk of fractures among community-dwelling older adults. These findings do not support the routine use of these supplements in community-dwelling older people.

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