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CLINICAL GUIDELINE

Lack of Evidence Linking Calcium With or Without Vitamin D Supplementation to Cardiovascular Disease in Generally Healthy Adults: A Clinical Guideline From the National Osteoporosis Foundation and the American Society for Preventive Cardiology

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Description: Calcium is the dominant mineral present in bone and a shortfall nutrient in the American diet. Supplements have been recommended for persons who do not consume adequate calcium from their diet as a standard strategy for the prevention of osteoporosis and related fractures. Whether calcium with or without vitamin D supplementation is beneficial or detrimental to vascular health is not known.

Methods: The National Osteoporosis Foundation and American Society for Preventive Cardiology convened an expert panel to evaluate the effects of dietary and supplemental calcium on cardiovascular disease based on the existing peer-reviewed scientific literature. The panel considered the findings of the accompanying updated evidence report provided by an independent evidence review team at Tufts University.

Recommendation: The National Osteoporosis Foundation and American Society for Preventive Cardiology adopt the position that there is moderate-quality evidence (B level) that calcium with or without vitamin D intake from food or supplements has no relationship (beneficial or harmful) to the risk for cardiovascular and cerebrovascular disease, mortality, or all-cause mortality in generally healthy adults at this time. In light of the evidence available to date, calcium intake from food and supplements that does not exceed the tolerable upper level of intake (defined by the National Academy of Medicine as 2000 to 2500 mg/d) should be considered safe from a cardiovascular standpoint.

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Calcium is a component of the dominant mineral (hydroxyapatite) present in bone and a shortfall nutrient in the American diet (1). Supplements have been recommended for persons who do not consume adequate calcium from their diet as a standard strategy for the prevention of osteoporosis and related fractures. The U.S. Agency for Healthcare Research and Quality (AHRQ) Evidence-based Practice Center at Tufts University published an evidence report in 2009 (2) reviewing the existing data on the effect of both vitamin D and calcium on health outcomes, including cardiovascular disease. Since then, conflicting reports have suggested that calcium intake, particularly from supplements, may have either beneficial or harmful effects on cardiovascular outcomes. The National Osteoporosis Foundation (NOF) contracted an independent evidence review team at Tufts University to update the 2009 AHRQ evidence report on cardiovascular disease outcomes and end points (2). The expert panel, informed by the updated report (3), was assembled by the NOF and American Society for Preventive Cardiology (ASPC) and was ultimately responsible for writing this clinical guideline.

Guideline Focus

The focus of this guideline is to provide clinicians and health professionals with an evidence-based recommendation about the health risks and benefits of calcium intake from food or supplements on cardiovascular and cerebrovascular disease incidence, mortality, and all-cause mortality in generally healthy adults.

Guideline Development Process

To develop this guideline, the NOF and ASPC adhered to the methods previously published by the NOF (4). The authors served as the expert panel tasked with evaluating and grading the strength of evidence based on an externally developed evidence report (3). The evidence report was developed by the evidence review team at Tufts University and reflects the peer-reviewed scientific literature as of 1 July 2016. All members of the panel and evidence review team have disclosed their relationships in the prior 2 years (available at www.nof.org/news/nof-and-aspc-position-statement-on-calcium-and-cardiovascular-disease), and disclosures were verbally affirmed during the project. The guideline is based largely on the findings of the evidence report. The evidence review team presented their findings to the expert panel via Webcast. Expert panel members were able to ask questions specific to the evidence report but were not permitted to influence the final study design or outcomes. An animal and mechanistic study (5), and comments submitted by scientists and other scientific bodies during a 14-day public comment period ending on 21 June 2016, were considered during

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the development of the final guideline. The expert panel and authors of the evidence report were blinded to the funding source for the evidence report (no corporate funds were accepted for development of the guideline) until both manuscripts were approved by both societies' boards and submitted for publication.

RECOMMENDATION

Recommendation: The NOF and ASPC adopt the position that there is moderate-quality evidence (B level) that calcium with or without vitamin D intake from food or supplements has no relationship (beneficial or harmful) with the risk for cardiovascular and cerebrovascular disease, mortality, or all-cause mortality in generally healthy adults at this time. In light of the evidence available to date, calcium intake from food and supplements that does not exceed the tolerable upper level of intake (defined by the National Academy of Medicine as 2000 to 2500 mg/d [6]) should be considered safe from a cardiovascular standpoint.

Obtaining calcium from food sources is preferred. Supplemental calcium can be safely used to correct any shortfalls in intake. Discontinuation of supplemental calcium for safety reasons is not necessary and may be harmful to bone health when intake from food is suboptimal. This guideline is based on the peer-reviewed scientific literature as of 1 July 2016 and supports the findings of the accompanying evidence report (2). In addition to the evidence report, the panel considered a recent animal and mechanistic study, which found no detectable effect of high-calcium diets (for example, dairy or calcium carbonate) on coronary artery calcium phosphate deposition in swine with diet-induced metabolic syndrome (5). Currently, no established biological mechanism supports an association between calcium and cardiovascular disease. This official guideline was adopted by the boards of directors of both societies on 22 July 2016.

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