The Comparative Effects of Different Types of Oral Vitamin Supplements on Arterial Stiffness: A Network Meta-Analysis

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Abstract

Arterial stiffness, a significant prognostic factor of cardiovascular disease, may be affected by dietary factors. Research on the effects of oral vitamin supplements on arterial stiffness and/or endothelial function has produced controversial results. Therefore, the aim of this network meta-analysis was to comparatively assess the effect of different types of oral vitamin supplements on arterial stiffness in the adult population. We searched the PubMed, Embase, Cochrane Library, and Web of Science databases for randomized controlled trials from their inception to 30 September 2021. A network meta-analysis using a frequentist perspective was conducted to assess the effects of different types of oral vitamin supplements on arterial stiffness, as determined by pulse wave velocity. In total, 22 studies were included, with a total of 1318 participants in the intervention group and 1115 participants in the placebo group. The included studies were listed in an ad hoc table describing direct and indirect comparisons of the different types of vitamins. Our findings showed that, in both pairwise comparison and frequentist network meta-analysis, the different types of oral vitamin supplements did not show statistically significant effects on arterial stiffness. However, when oral vitamin supplementation was longer than 12 weeks, vitamin D3 showed a significant reduction in arterial stiffness, compared with the placebo (ES: −0.15; 95% CI: −0.30, −0.00; −60.0% m/s) and vitamin D2 (ES: −0.25; 95% CI: −0.48, −0.02, −52.0% m/s). In summary, our study confirms that oral vitamin D3 supplementation for more than 12 weeks could be an effective approach to reduce arterial stiffness and could be considered a useful approach to improve vascular health in patients at high risk of cardiovascular disease.

Author keywords

Adults; Arterial stiffness; Network meta-analysis; Oral vitamin supplementation; Pulse wave velocity