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Opinion
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Phytosterols: a really safe remedy?

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Background

Globally, about 17 million people die from cardiovascular disease (CVD) every year, accounting for 31% of all deaths worldwide [1]. A worldwide study demonstrated that among all modifiable risk factors of CV disease, abnormal serum levels of cholesterol were associated with the highest attributable risk for the occurrence of CVD, especially ischemic heart disease [2]. High serum total cholesterol (TC) is regarded by many as the main cause of coronary atherosclerosis, and it has been well established that elevated TC is associated with an increased risk of CVD [3]. Low-density lipoprotein cholesterol (LDL-C) has been identified as the main risk factor for CVD by many epidemiological and interventional studies because LDL-C plays a major role in the pathogenesis of atherosclerosis [4].

Cholesterol-lowering supplements

Treatment of dyslipidemia consists of lifestyle modification and drug treatment [5]. Although there is positive research and clinical trial data supporting the efficacy of cholesterol-lowering medications, patient compliance can be challenging because of the potential side effects or personal preference [6]. One of these supplements are phytosterols (PSs). Both cholesterol and PSs belong to the family of triterpenes. They have a tetracyclic ring and carbon-linked side chain. Plant sterols differ from cholesterol by structural modification within the side chain in position C24. Plant stanols are saturated sterols with a double-bind at the C5-atom in the B-ring.

Indications for the use of phytosterols

The first study to evaluate the LDL-C lowering effects of PSs was published in the 1950s [7]. One review found that up to 3.3 grams of PSs a day gradually lowered low-density lipoprotein (LDL) cholesterol by 6 to 12 per cent after around four weeks [8]. PSs are effective by inhibiting intestinal cholesterol absorption [9]. Most guidelines and consensus on the treatment of dyslipidemia and/or prevention of CVD recommend the intake of PSs in the amount of approximately 2 g/day with the goal of reducing LDL-cholesterol by approximately 10%, in association with lifestyle changes [10-14].

Supplement market

Using data from the National Health and Nutrition Examination Survey, the sale of dietary supplements accounts for an estimated 50 billion dollars in the United States in 2020 with more than 50% of adults reporting any supplement use [15]. Furthermore, between 2007–2008 and 2017–2018 dietary supplement use increased from 48.6% to 56.1% [16]. Possible explanations for this increasing popularity include that supplement use is thought to be more "natural" and allays concerns regarding adverse reactions of pharmaceutical drugs, is perceived to align more closely with the ideologies of patients, satisfies a desire for more personalized and self-administered healthcare and is sold without the need for a drug prescription.

Suspicious data

LURIC, a prospective cohort study with a total of 3,316 participants, demonstrated that plasma phytosterol levels were predictors of all-cause and cardiovascular mortality [17]. Another cohort study, MONIKA/KORA, demonstrated that in healthy men 35-64 years of age, higher phytosterol levels correlated with occurrence of myocardial infarction during 10-year follow-up [18]. In patients admitted for coronary angiography for suspected coronary artery disease, 7α-hydroxycampesterol and their ratios to cholesterol were associated with cardiovascular events during a 5-year follow-up period [19]. All the above-mentioned studies are prospective cohort studies. Unfortunately, there is no prospective, placebo-controlled, randomized trial to address the impact of phytosterol diet supplementation on cardiovascular outcomes.

Conclusion

The patient can take PSs by self-administration or encouraged by their doctor or pharmacist who are in turn reassured by the indications of various scientific societies as well as the market of

supplements. But are we only interested in lowering cholesterol levels or reducing heart attacks and strokes? There is a need for clarity and in the absence of doubt and proper follow-up, use of PSs as a remedy for hypercholesterolemia should be discouraged.

References

1. (2015) Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013. Lancet 385: 117-171.
2. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, et al. (2004) Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): Case-control study. Lancet 364(9438): 937-952.
3. Stamler J, M L Daviglus, D B Garside, A R Dyer, P Greenland, et al. (2000) Relationship of baseline serum cholesterol levels in 3 large cohorts of younger men to long-term coronary, cardiovascular, and all-cause mortality and to longevity. JAMA 284(3): 311-318.
4. Wilson PW, RB D'Agostino, D Levy, AM Belanger, H Silbershatz, et al. (1998) Prediction of coronary heart disease using risk factor categories. Circulation 97(18): 1837-1847.
5. Donna K, Blumenthal SR, Albert MA, Buroker AB, Goldberger ZD, et al. (2019) 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Circulation140(11): e596-e646.
6. Ward NC, Watts GF, Eckel RH (2019) 'Statin toxicity', Circulation Research 124(2): 328-350.
7. O. Pollak (1953) Reduction of blood cholesterol in man. Circulation 7(5): 702-706.
8. Ras RT, Geleijnse JM, Trautwein EA. (2014) LDL-cholesterol-lowering effect of plant sterols and stanols across different dose ranges: a meta-analysis of randomised controlled studies. British Journal of Nutrition 112(2): 214-219.
9. EA Trautwein, GSMJE Duchateau, Yuguang Lin, Ntanios FY, Molhuizen HOF, et al. (2003)Proposed mechanisms of cholesterol-lowering action of plant sterols. Eur. J. Lipid Sci. Technology. 105(3-4): 171-185.
10. Piepoli MF, Hoes AW, Stefan Agewall, Christian Albus, Carlos Brotons, et al. (2016)2016 European Guidelines on cardiovascular disease prevention in clinical practice: The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice. Developed with the special contribution of the European Association for Cardiovascular Prevention & Rehabilitation (EACPR) Eur Heart J 37(29): 2315-2381.
11. Jellinger PS, DA Smith, AE Mehta, Om Ganda, Yehuda Handelsman, et al. (2017) American Association of Clinical Endocrinologists and American College of Endocrionology guidelines for management of dyslipidemia and a prevention of atherosclerosis. Endocr Pract 23(2): 1-87.
12. (2014) Expert Dyslipidemia Panel of the International Atherosclerosis Society Panel Members an International Atherosclerosis Society Position Paper: Global recommendations for the management of dyslipidemia - Full report. J Clin Lipidol 8(1): 29-60.
13. Catapano AL, Ian Graham, GD Backer, Olov Wiklund, MJ Chapman, et al. (2016) 2016 ESC/EAS Guidelines for the management of dyslipidaemias. Eur Heart J 37(39): 2999-3058.
14. Gylling H, Jogchum Plat , Stephen Turley , HN Ginsberg , Lars Ellegård, et al. (2014) Plant sterols and plant stanols in the management of dyslipidaemia and prevention of cardiovascular disease. Atherosclerosis232(2): 346-360.
15. North america dietary supplements market size, share & trends analysis report by ingredient, by form, by application, By end-user, by distribution channel, by region, and segment forecasts, 2021 - 2028 Grand View Res. 2023.
16. S. Mishra, B. Stierman, J.J. Gahche, N Potischman (2021) Dietary supplement uses among adults: United States, 2017–2018 NCHS Data Brief 399: 1-8.
17. Silbernagel G, Guenter Fauler, MM Hoffmann, Dieter Lütjohann, BR Winkelmann, BO Boehm, et al. (2010). The associations of cholesterol metabolism and plasma plant sterols with all-cause and cardiovascular mortality. J Lipid Res 51: 2384-2393.
18. Thiery J, et al. (2006). Abstract 4099: elevated campesterol serum levels—a significant predictor of incident myocardial infarction: results of the population-based MONICA/KORA follow-up study 1994 to 2005. Circulation114: II_884.
19. Fuhrmann A, Oliver Weingärtner , Sven Meyer , Bodo Cremers , Sarah Seiler-Mußler, et al. (2018) Plasma levels of the oxyphytosterol 7α-hydroxycampesterol are associated with cardiovascular events. Atherosclerosis 279: 17-22.

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