BBA Clinical 2 (2014) 1–6

Contents lists available at ScienceDirect

BBA Clinical

journal homepage: http://www.journals.elsevier.com/bba-clinical/

Low zinc levels is associated with increased inflammatory activity but not with atherosclerosis, arteriosclerosis or endothelial dysfunction among the very elderly

Rafaela C.S. De Paula [b], Ehimen C. Aneni [e], Ana Paula R. Costa [b], Valeria N. Figueiredo [a], Filipe A. Moura [a], Wladimir M. Freitas [a], Luiz A. Quaglia [a], Simone N. Santos [b], Alexandre A. Soares [a], Wilson Nadruz Jr. [a], Michael Blaha [c], Roger Blumenthal [c], Arthur Agatston [d], Khurram Nasir [e], Andrei C. Sposito [a,*], on behalf of the Brazilian Study on Healthy Aging Group

[a] State University of Campinas Medical School (UNICAMP), Campinas, SP, Brazil
[b] University of Brasilia Medical School (UnB), Brasilia, Brazil
[c] Johns Hopkins Ciccarone Center for the Prevention of Heart Disease, Baltimore, MD, USA
[d] University of Miami Miller School of Medicine, Miami, FL, USA
[e] Center for Prevention and Wellness, Baptist Health South Florida, Miami, FL, USA

ARTICLE INFO

Article history:
Received 11 June 2014
Received in revised form 3 July 2014
Accepted 13 July 2014
Available online 25 July 2014

Keywords:
Zinc
Inflammation
Atherosclerosis
Arteriosclerosis
Endothelial dysfunction

ABSTRACT

Background: Reduced zinc intake has been related to atherogenesis and arteriosclerosis. We verified this assumption in very old individuals, which are particularly prone to both zinc deficiency and structural and functional changes in the arterial wall.
Methods: Subjects (n = 201, 80–102 years) with uneventful cardiovascular history and who were not in use of anti-inflammatory treatments in the last 30-days were enrolled. Daily intake of zinc, lipid profile, plasma C-reactive protein (CRP), plasma zinc, flow-mediated dilation (FMD), carotid ultrasonography and cardiac computed tomography were obtained. Young's Elastic Modulus, Stiffness Index and Artery Compliance were calculated.
Results: There was no significant difference in clinical or laboratorial data between subjects grouped according to plasma zinc tertile, except for CRP (p = 0.01) and blood leukocytes (p = 0.002), of which levels were higher in the upper tertiles. The average daily intake of zinc was not significantly correlated with zinc or CRP plasma levels. The plasma zinc/zinc intake ratio was inversely correlated with plasma CRP levels (−0.18; p = 0.01). There was no significant difference between the plasma zinc tertiles and FMD, carotid intima–media thickness, coronary calcium score, carotid plaque presence, remodeled noncalcified coronary plaques, or low-attenuation noncalcified coronary plaques.
Conclusion: Although plasma zinc level is inversely related to systemic inflammatory activity, its plasma levels of daily intake are not associated to alterations in structure or function of the arterial wall.
General significance: In the very elderly plasma concentrations or daily intake of zinc is not related to endothelial dysfunction, arteriosclerosis or atherosclerotic burden at coronary or carotid arteries.
© 2014 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/3.0/).

1. Introduction

In the very elderly, i.e. those aged 80 or more years, cardiovascular morbidity and mortality intensify due to a combination of prolonged exposure to traditional risk factors and rising of novel pro-atherogenic mechanisms [1]. At the core of this atherogenic process lies a persistent increase in systemic inflammation that is mainly attributed to immunosenescence, a reciprocal activation of the innate immune system due to an aging-dependent decline of the adaptive immune system. Recent data, however, have raised the possibility of reversible components that may contribute to this inflammatory upregulation in the elder.

Among potential candidates, zinc is a micronutrient that is essential for the immune system and its insufficiency may exacerbate immunosenescence. Indeed, individuals with inborn errors in zinc malabsorption present a reduced adaptive immunity that is compensated by the upregulation of innate immunity [2]. In the intracellular environment, zinc interacts with signal transducers implicated in immune response and influences both the structural stability and function

* Corresponding author at: Laboratory of Atherosclerosis and Vascular Biology (AteroLab), Cardiology Division, State University of Campinas Medicine School (Unicamp), 13084-971, Campinas, SP, Brazil. Tel.: +55 191 3521 7098; fax: +55 19 3289 4107.
E-mail address: andreisposito@gmail.com (A.C. Sposito).

http://dx.doi.org/10.1016/j.bbacli.2014.07.002
2214-6474/© 2014 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/3.0/).

of immunologically relevant transcription factors [3]. In the bloodstream, zinc insufficiency may also contribute to cardiovascular risk via its association with reduced anti-oxidant capacity [4], endothelial dysfunction [5], arterial wall stiffness and increased systolic blood pressure [6,7].

The abovementioned arguments motivated the hypothesis that a higher zinc intake could help to mitigate a host of mechanisms that favor the decline of functional and structural properties of the arterial wall as well as the generation of atherosclerotic plaques. Since there is a particularly rapid decline in all these arterial properties among the very elderly, should zinc intake show to be beneficial, we expect its effect to be even more apparent in these individuals. So far, there is no information to confirm or refuse this hypothesis. Thus, the present study was designed to investigate the association pf zinc intake and plasma levels with arterial wall properties in a carefully selected cohort of very elderly individuals.

2. Subjects and methods

2.1. Participants

The studied population consisted of men and women who were consecutively recruited in the Brazilian Study on Healthy Aging from December 2008 to August 2011, as described elsewhere [8]. Briefly, after medical screening of 1204 individuals aged 80 years or more who spontaneously sought Biocardios Institute of Cardiology in Brasilia, Brazil, for assessment of cardiovascular risk, 214 (18.6%) were considered eligible, 12 (1%) chose not to participate, and 1 (0.08%) withdrew the informed consent due to impossibility to attend the exams and appointments. Thus, for the present investigation, 201 (16.7%) subjects were actually enrolled (Fig. 1). The main inclusion criterion was the absence of atherosclerotic coronary, cerebrovascular, and peripheral

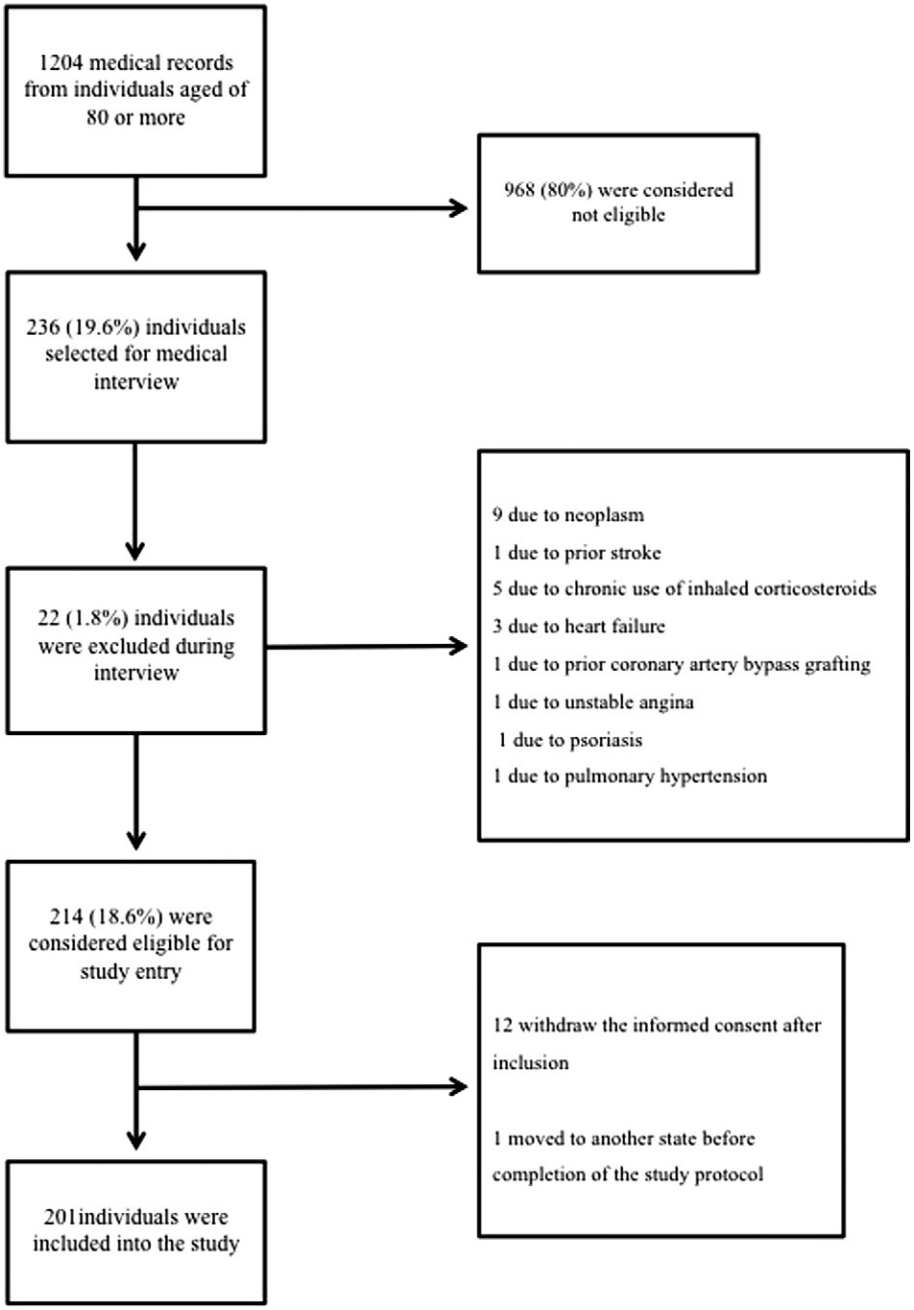

Fig. 1. Flow diagram depicting the study design.

Download English Version:

https://daneshyari.com/en/article/2773211

Download Persian Version:

https://daneshyari.com/article/2773211

Daneshyari.com