



Research Article

Correlation between Neck Circumference and Pulse Wave Velocity: A Population-based Study

Larissa Ribeiro Bessa[§], Luís Antônio Bahiana Cruz[§], Rodrigo Lins Sant'Ana de Lima,
Maria Cristina Lima Fontenele Presta, Antonio de Assis Oliveira Alves Filho, Roberta de Castro Araújo Cunha,
Alana dos Reis Silva, Juan Jailson Oliveira Almeida Costa, Cecília Freitas da Silva Araújo, Diordene Oliveira da Silva,
Lucélia Batista Neves Cunha Magalhães*

Preventive Cardiology Department, Faculdade de Tecnologia e Ciências (FTC), Salvador, Brazil

ARTICLE INFO

Article History

Received 27 November 2019

Accepted 24 February 2020

Keywords

Pulse wave velocity
neck circumference
cardiovascular diseases

ABSTRACT

Background: Cardiovascular diseases are the main cause of death worldwide. In this setting, Neck Circumference (NC) and Pulse Wave Velocity (PWV) are simple and valuable tools for an early evaluation of cardiovascular risk through the assessment of upper body obesity and arterial stiffness. However, the associations between both measurements have not been systematically explored.

Methods: A population-based cross-sectional study representative of a neighborhood of Salvador-BA, Brazil. Data were collected between December 2016 and May 2019, and comprise 130 individuals for the present study. Variables such as age, sex, education levels and NC were analyzed to verify their associations with PWV status. Correlations between PWV and NC were performed to further depict their association.

Results: There was a predominance of patients with elevated PWV. The subgroup of patients aged 60 years or older presented the largest proportion of PWV alterations over normal results. There was a majority of women in the study population and sex could not determine PWV status. There was a predominance of concomitant elevation of NC and PWV in the studied population. NC measurements could distinguish PWV status from women and the study population. NC and PWV had a positive and statistically significant correlation for women and for the general population.

Conclusion: These findings suggest a possible association between upper body obesity and vascular homeostasis impairment. Therefore, screening patients with both measurements could prove relevant to better identify subclinical vascular perturbations and further delimitate prognosis related to cardiovascular events potentially associated with them.

HIGHLIGHTS

- Elevation of pulse wave velocity (PWV) was associated with the increase of age.
- Frequency of patients with elevated PWV and neck circumference was predominant.
- Neck circumference and pulse wave velocity were positively correlated.

© 2020 Association for Research into Arterial Structure and Physiology. Publishing services by Atlantis Press International B.V. This is an open access article distributed under the CC BY-NC 4.0 license (<http://creativecommons.org/licenses/by-nc/4.0/>).

1. INTRODUCTION

Cardiovascular Diseases (CVD) remain as a major public health problem, as well as the leading cause of death worldwide [1,2]. According to the Pan American Health Organization and the World Health Organization (WHO), around 31% of deaths worldwide were related to CVD in 2015 [1,2]. In this setting, millions of dollars are invested annually in studies and strategies which aim to expand knowledge with regard to risk factors and preventive approaches to CVD [2–4].

*Corresponding author. Email: luceliamagalhaes@terra.com.br

[§]Both authors contributed equally.

Peer review under responsibility of the Association for Research into Arterial Structure and Physiology

Data availability statement: The data that support the findings of this study are available from the corresponding author, Lucélia Batista Neves Cunha Magalhães, upon reasonable request.

The relationship between CVD and the majority of its risk factors, such as dyslipidemia, smoking, overweight and obesity, is well defined [1,5]. Furthermore, the success of preventive strategies to CVD is strongly associated with proper management of these risk factors [5]. Some biomarkers have already been proposed for the evaluation of cardiovascular-related impairments associated with these deleterious conditions [6,7]. Such biomarkers range from exams that have been widely used in medical practice for years, such as the assessment of serum cholesterol or Body Mass Index (BMI) calculations, to some novel and promising applications, like the measurement and analysis of Pulse Wave Velocity (PWV) [6].

In recent years, PWV measurement has been presented as a relevant exam in the detection of vascular damage and, consequently, in the early identification of cardiovascular risk [6,8–10]. Some key characteristics of the PWV measurement highlight its importance as a tool