

# Cerebral Microvascular and Macrovascular Disease Risk Factors and COVID-19 Progression

Nevio Cimolai

Children's and Women's Health Centre of British Columbia, Faculty of Medicine, The University of British Columbia, Vancouver, BC, Canada

Dear Editor,

Nia et al. [1] proposed that past cerebrovascular disease history is an independent risk factor for enhanced COVID-19-related morbidity and mortality. The specific categorization of clinical entities that comprise cerebrovascular diseases in their research predominantly emphasizes preexisting macrovascular disease. In its greater breadth, cerebrovascular disease spans a more plenary spectrum of microvascular and/or macrovascular pathology [2, 3]. Is there any reason to believe that microvascular cerebral diseases are also risk factors for severity?

Chronic hypertension and its associated microvascular disease is lesser understood as among the spectrum of cerebrovascular diseases [4, 5]. Such pathology is initiated early in the course of chronic hypertension and may have a variable progressive pattern thereafter [6]. Given the latter, it would be tempting to hypothesize that such disease and its associated endotheliopathy may provide the right preconditions to complicate the thrombotic tendencies of active SARS-CoV-2 infection [7]. Both univariate and multivariate analyses have associated the precondition of hypertension with increased risk for more severe COVID-19 [8–10]. Systematic reviews also provide further corroboration for the latter [11, 12]. Also in pregnancy, hypertension associates with severity of infection [13].

In this light, it would be of interest to determine if the data from Nia et al. [1] gives rise to similar findings for the association of hypertension and worse outcome. Moreover, it would be of value to determine if hypertension and the clinical macrovascular cerebrovascular diseases independently associate with worse COVID-19 or simply associate as co-variates. Such analyses have the potential to broaden our understanding of COVID-19-related endothelial disease for active infection, thrombosis, and potentially vaccine-related complications.

## Conflict of Interest Statement

The author has no conflicts of interest to declare.

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## Author Contributions

Nevio Cimolai is the sole author.

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