Save Children from Mortal Shock of COVID-19

Satoru Matsuda¹*, Yuka Ikeda¹, Mutsumi Murakami¹ and Ai Tsuji¹

¹Department of Food Science and Nutrition, Nara Women's University, Kita-Uoya Nishimachi, Nara 630-8506, Japan.

Authors’ contributions

This work was carried out in collaboration among all authors. Authors SM, YI, MM and AT have contributed to the conception and design of the study. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JAMMR/2020/v32i830462
Editors:
(1) Chan-Min Liu, Xuzhou Normal University, China.
Reviewers:
(1) Emmanuel Ejembi Anyebe, University of Ilorin, Nigeria.
(2) Katarzyna Potyrala, University of Cracow, Poland.
Complete Peer review History: http://www.sdiarticle4.com/review-history/57600

Received 13 May 2020
Accepted 30 May 2020
Published 05 June 2020

Keywords: COVID-19; children; respiratory system; mortal shock.

Dear Editor,

This is a hypothetical but very important story. COVID-19 had been declared a pandemic in March 2020. Most children with COVID-19 exhibit mild symptoms and/or are asymptomatic. However, an infrequent number of children developed a more serious inflammatory disorder, a Kawasaki disease like-symptom with cardiac and/or renal failures, in which the ordinary COVID-19 test may not be positive. Reverse transcriptase-polymerase chain reaction (RT-PCR) test measures the amount of the virus’s RNA in the patient sample which usually would be a nasal and throat swab. When COVID-19 causes the severe symptoms in children similar to the Kawasaki Disease, the patients may exhibit viremia instead of throat-pathogens. So, we ask for relevant pediatric staffs in charge who should examine blood samples in addition to the throat swabs by means of the RT-PCR.

Although quick treatment is important to prevent the substantial heart problems, limited data are available on prevalence of COVID-19 in pediatric population. Anyway, it remains unclear why children are less severely affected than elder people [1]. Initially, COVID-19 infects cells in the respiratory system and initiates cell death. Surface spike glycoprotein of COVID-19 binds to the angiotensin converting enzyme-2 (ACE2), which is expressed on pneumocytes in the respiratory system. Then, the virus spreads out other tissues creating pathological changes...

*Corresponding author: E-mail: smatsuda@cc.nara-wu.ac.jp;
containing cardiovascular complications. ACE2 is a monokarboxypeptidase generating Ang1-7, which acting through its receptor Mas exerts vasodilatory actions and so on. The ACE2/ Ang(1–7)/Mas activates PI3K/AKT signaling [2], and the signaling is thought to correlate with tissue-protection by improving oxidative stress and inflammation. Accordingly, a host-protective role of the ACE2 pathway has been shown. Particularly, the ACE2 plays a pivotal role in the regulation of cardiovascular cell function. For example, the ACE2 is a negative regulator of myocardial hypertrophy and diastolic dysfunction and suppresses heart-failure [3]. On the contrary, loss of ACE2 may enhance the pathological remodeling susceptibility to heart failure [3].

The virus attaches to the ACE2 at low pH values. So, acidic fluids such as gastric juice and/or sour fruits juice might happen to exacerbate the infection, when those fluids would exist with the virus in the respiratory system. A protease may play an important role in SARS-CoV viral replication. In particular, the SARS-CoV papain-like protease is essential for virus replication and is conserved among human coronaviruses [4]. So, several protease containing fruits juice and/or vegetables juice such as papain in papaya, zingipain in ginger, bromelain in pineapple, and actinidin in kiwifruit might also happen to exacerbate the COVID-19 infection, if those fluids would co-exist in the respiratory system by chance of choking and/or snore.

As the efficacy of pharmacological treatments has been still limited at present, dietary choices could indicate a certain role via the PI3K/AKT signaling-activation for fear that COVID-19 virus abolishes the ACE2/Ang(1–7)/Mas/PI3K/AKT protection-pathway [5]. Besides, a lot of studies have shown that the protection-pathway is working everywhere in the body of pediatric population.

Fig. 1. Schematic illustration implying that COVID-19 may induce the suppression of ACE2 /Ang(1-7)/Mas/PI3K/AKT pathway that is protecting from toxic shock including cardiac failure. Sour (low PH) fruits juice or Ginger ale (containing zingipain-protease) might happen to exacerbate the COVID-19 infection by chance of choking. When COVID-19 infection abolishes the ACE2 protection-axis, certain diet could substitute the activation of PI3K/AKT signaling.
CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES


© 2020 Matsuda et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/57600