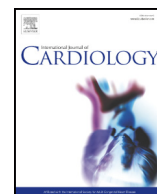




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Letter to the editor

An anti-oxidative therapy for ameliorating cardiac injuries of critically ill COVID-19-infected patients



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To the Editor,

The 2019 novel coronavirus (2019-nCoV, COVID-19) has spread in nearly 100 countries, infected 217,645 patients, and resulted in 8942 deaths worldwide. The major clinical feature is Respiratory Distress Syndrome and one key complication is Acute Cardiac Injury [1]. Interestingly, a recent article of *IJC* may provide a clue to heart protection for COVID-19-infected individuals, based on the oxidative stress theory [2].

According to recent clinical reports, the therapeutic time for COVID-19 infection is much longer than 14 days, but long-time viral stimulation is prone to suddenly elicit intensive immunological reactions, cytokine storm and immune-cell infiltration *in vivo*; however, some immunocytes especially macrophages and neutrophils can produce numerous reactive oxygen species (ROS) including H_2O_2 , $(\cdot O_2^-)$, $(\cdot OH)$, etc. [2–4].

Generally, a certain level of ROS is important for regulating immunological responses and for clearing viruses, but excessive ROS will oxidize cellular proteins and membrane lipids and quickly destroy not only

virus-infected cells but also normal cells in lung and even heart, resulting in multiple organ failure.

Thus, a potential anti-oxidative therapy could be proposed to alleviate cardiogenic casualties caused by COVID-19. Inexpensive medicinal antioxidants include Vitamin C (ascorbic acid) and Vitamin E, because their reductive hydrogen atoms can react with ROS and then produce nontoxic water [5]. Plant-derived molecules (similar to ancient Chinese medicine), such as Curcumin and Baicalin, may have potential anti-oxidative efficacy, too.

Predictably, a proper dose of antioxidants may ameliorate cardiac injuries of critically ill COVID-19-infected patients (but possibly not including mild-symptom patients).

Statement of authorship

The authors take responsibility for all aspects of the reliability and freedom from bias of the data presented and their discussed interpretation.

Declaration of competing interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijcard.2020.04.009>.

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Abbreviations: COVID-19 (or 2019-nCoV), the 2019 novel coronavirus; ROS, reactive oxygen species.

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