Angiotensin 1-7: A Novel Strategy in COVID-19 Treatment

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Dear Editor,

Coronavirus disease 2019 (COVID-19) is an emerging infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The mortality rate of COVID-19 is high and there is no effective treatment for these patients to reduce the high hospitalization and mortality rates.

The renin-angiotensin-aldosterone system plays a critical role in COVID-19 pathogenesis.1 The sex difference in the mortality rate and complications of COVID-19, and also the more favorable prognosis of children leads to new hypotheses regarding the protective and harmful factors in the treatment of these patients.2,3

Angiotensin-converting enzyme (ACE) plays a role in innate and adaptive immune responses as well as converting angiotensin and affecting different physiological functions.4 Understanding the expression of ACE on myeloid cells can be helpful in the treatment of infections. In comparison to adults, children have a higher level of ACE.4 Although SARS-CoV-2 binds to ACE2 for entering the host cells, children are more immune against this virus; this is possibly due to a high level of ACE in children and its effects on immune responses.4 Moreover, although children have a higher level of renin, angiotensin, and aldosterone compared with adults and also a higher amount of fluid in their bodies, they have lower blood pressures; one of the reasons behind this is the high level of angiotensin 1-7 that acts as a vasodilator and anti-inflammatory agent against angiotensin 2. This is probably another reason for children's enhanced immunity against COVID-19.6 Despite the low level of ACE2 in females in comparison to males, which protects the host against virus penetration, given the regulatory effect of estrogen on angiotensin type 2 receptor its effect on angiotensin 1-7 is more dominant. This is possibly the relative cause of women's increased immunity against COVID-19 infection.7 Angiotensin receptor blockers (ARBs) are one of the main drugs that can provide high levels of ACE and angiotensin 1-7 at the same time. However, ARBs may also elevate the ACE2 level as the virus entry location, which should be considered in the prescription of ARBs.8,9

The administration of angiotensin 1-7 in adults may provide immunity against COVID-19 as in children. By injecting angiotensin 1-7, the renin-angiotensin-aldosterone axis will become active to prevent a further drop in blood pressure, the ACE level will rise, and the ACE2 level will reduce owing to the accumulation of angiotensin 1-7.8 This means that providing high levels of angiotensin 1-7 and ACE while reducing inflammatory bradykinin will be protective against ACE2, the entry site of the virus into the host cells.8 Finally, the controlled injection of angiotensin 1-7 as a modulator of the renin-angiotensin-aldosterone system and the compensation of a possible drop in blood pressure by infusion of intravenous fluids and alpha agonists may be able to reduce the severity of COVID-19 infection since the host is given an opportunity to induce specific immunity.

Ethical Issues

Not applicable.

Conflict of Interest

We declare no competing interests.

References


