

# COVID-19 pandemic: a glimpse into newly diagnosed hypertensive patients

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The coronavirus disease 2019 (COVID-19) pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has emerged as an immediate and global problem just within a few months after its first description in Wuhan-China. Beyond its alarming mortality rate and easily transmissible nature through air droplets, it has also resulted in significant challenges in the cardiovascular area not only due to its higher mortality rates in cardiovascular disease and certain associated conditions, including diabetes mellitus and hypertension, but also due to the theoretically facilitated inoculation of lung tissue by the culprit agent, SARS-CoV-2 in these conditions [1,2]. This worrisome concern has been largely attributed to the potential upregulation of angiotensin enzyme 2 (ACE2) in hypertensive and diabetic patients, and more interestingly; in those receiving angiotensin-converting enzyme inhibitors (ACEIs) and angiotensin receptor blockers (ARBs) [3].

Fortunately, this clinical confusion has been resolved by successive recommendations of cardiovascular societies [4]. Consistently, all guidelines have advised against

discontinuation of ACEIs/ARBs in the context of avoiding or treating COVID-19 infection. More interestingly, use of ACEIs and ARBs has been reported to be protective against lung injury caused by COVID-19 particularly in more severe clinical scenarios [5]. Additionally, these agents might also exert anti-inflammatory and antioxidative effects through a significant reduction in angiotensin II levels (with well known oxidative and inflammatory characteristics) along with potentiation of ACE2 (potentially mediating the synthesis of anti-inflammatory and antioxidative byproducts including angiotensin-1–9) that all prevent or mitigate the course of acute respiratory distress syndrome [6]. Clinical trials evaluating the effects of ACEIs, ARBs, and angiotensins themselves in patients with COVID-19 in outpatient and in-patient settings might help to provide important data on this issue. Several studies are currently being conducted to assess role of ACEIs, ARBs, and angiotensins on the clinical course and pathophysiology of COVID-19 (ClinicalTrials.gov identifiers, NCT04364893, NCT04340557, NCT04322786, and NCT04332666). The clinical impact of continuation

**Table 1 Studies evaluating the role of renin angiotensin systems on the clinical course of coronavirus disease 2019**

Study title	Interventions	ClinicalTrials.gov identifier (NCT number)
Angiotensin receptor blockers and angiotensin-converting enzyme inhibitors and adverse outcomes in patients with COVID-19	ARBs and ACEIs	NCT04364893
Do angiotensin receptor blockers mitigate progression to acute respiratory distress syndrome with SARS-CoV-2 infection	Losartan	NCT04340557
Elimination or prolongation of ACE inhibitors and ARB in coronavirus disease 2019	Discontinuation of ARB/ACEI Continuation of ARB/ACEI	NCT04338009
Angiotensin-(1,7) treatment in COVID-19: the ATCO trial	Angiotensin 1-7	NCT04332666
The use of angiotensin converting enzyme inhibitors and incident respiratory infections, are they harmful or protective?	ACEIs	NCT04322786
Prognosis of coronavirus disease 2019 (COVID-19) patients receiving antihypertensives	ACEIs ARBs	NCT04357535
Efficacy and safety of angiotensin II use in coronavirus disease(COVID)-19 patients with acute respiratory distress syndrome	Angiotensin II	NCT04408326
Valsartan for prevention of acute respiratory distress syndrome in hospitalized patients with SARS-COV-2 (COVID-19) infection disease	Valsartan	NCT04335786
Losartan for patients with COVID-19 requiring hospitalization	Losartan	NCT04312009
Losartan for patients with COVID-19 not requiring hospitalization	Losartan	NCT04311177
Evaluation of clinical parameters on admission and medications in Covid-19 pneumonia (coronavirus disease 2019)	ACEIs and calcium channel blockers	NCT04379310
Efficacy of captopril in Covid-19 patients with severe acute respiratory syndrome (SARS) CoV-2 pneumonia (CAPTOCOVID)	Kaptopril	NCT04355429
Treatments to decrease the risk of hospitalization or death in elderly outpatients with symptomatic SARS-CoV-2 infection (COVID-19)	Vitamins Imatinib Telmisartan	NCT04356495

ARBs, angiotensin receptor blockers; ACEIs, angiotensin-converting enzyme inhibitors; COVID-19, coronavirus disease 2019; SARS, severe acute respiratory syndrome.

versus discontinuation of ACEIs and ARBs on outcomes in patients hospitalized with COVID-19 will also be assessed by a randomized clinical study (NCT04338009) (Table 1).

Clinicians also need strong recommendations regarding the prescription of these agents for newly diagnosed hypertension cases with or without concomitant conditions, including heart failure (HF), diabetes mellitus, and ischemic heart disease, during the ongoing outbreak of COVID-19. Considering the obscure and multifaceted effects of ACEIs and ARBs in various clinical conditions, it seems plausible to prescribe these agents exclusively for compelling indications (for which these agents are known to be indisputably beneficial), including concomitant heart failure and ischemic heart disease, etc, in the setting of newly diagnosed hypertension. On the other hand, withholding ACEIs or ARBs as the first choice with particular preference of other antihypertensive classes, including calcium antagonist,  $\beta$ -blockers, diuretics, and  $\alpha$ -blockers in the absence of compelling indications may eliminate the concerns on the patient's side and thereby may increase the drug compliance in the setting of newly

diagnosed hypertension during the spreading outbreak of COVID-19.

## Acknowledgements

### Conflicts of interest

There are no conflicts of interest.

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