

Cardiovascular disease and the impact of COVID-19

Anusha Yoganathan¹, Menahel Sajjad¹, and Amer Harky²

¹University of Liverpool

²Liverpool Heart and Chest Hospital NHS Foundation Trust

May 18, 2020

Cardiovascular disease and the impact of COVID-19

Running Head: COVID-19 and cardiovascular

Anusha Yoganathan¹, Menahel Sajjad¹, Amer Harky^{1,2}

1. **University of Liverpool, Liverpool, UK**

2. **Department of Cardiothoracic Surgery, Liverpool Heart and Chest, Liverpool, UK**

Corresponding author

Amer Harky

MRCS, MSc

Department of Cardiothoracic Surgery

Liverpool Heart and Chest

Liverpool, UK

e-mail: aaharky@gmail.com

tel: +44-151-600-1616

Funding: none obtained

Conflict of Interest: None obtained

Key words: COVID-19, Cardiovascular, Heart

Dear Editor,

Khan and colleagues reported on cardiovascular outcomes of COVID-19[1]. The study has concluded that appropriate risk stratification and triage is essential in patients with cardiovascular diseases and COVID-19 as their outcomes could be severely affected.

It is, by now, well established that patients with pre-existing cardiovascular diseases, such as hypertension or ischaemic heart disease, are more vulnerable and at risk from severe complications due to COVID-19. One of the most important pathophysiology of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is lying in its affinity to renin-angiotensin-aldosterone system (RAAS) through angiotensin converting enzyme inhibitor (ACEi) or utilization of angiotensin receptor blockers (ARBs). Several studies have reported equivocal outcomes in using ACEi and ARBs in patients with COVID-19, whether they were using ACEi/ARBs prior to contracting COVID-19 or they were initiated/suspended during the course of the infection; yet there is lack of robust evidence supporting the use or discontinuation of RAAS medications[2,3]. Although, there

is a theory that ACEi/ARBs antagonise RAAS which might reduce inflammation in COVID-19 pneumonia, thus reducing mortality[2,4].

The study by Zhang et al.[4] reports the conclusion of a lower risk of all-cause mortality in the ACEi/ARBs group compared with the non-users for hypertension [4]. Yet, this study is associated with significant confounding variables, foremost being the hypertensive patients unclassified by staging, signs/symptoms or complications. As well as there was no differentiation between ACEi/ARBs in the cohort or whether the patients in the cohort were novice or chronic users.

Future research and observational studies should eliminate the existing confounding variables in the current studies which are accounted for the controversial outcomes of ACEi/ARBs in SARS-CoV-2 in the presence of cardiovascular diseases, which may have significant impact on outcomes in COVID-19 patients using ACEi/ARBs.

References:

1. Khan IH, Zahra SA, Zaim S, Harky A. At the heart of COVID-19. *J Card Surg.* 2020;10.1111/jocs.14596. doi:10.1111/jocs.14596
2. Mancia G, Rea F, Ludergnani M, Apolone G, Corrao G. Renin-Angiotensin-Aldosterone System Blockers and the Risk of Covid-19. *N Engl J Med.* 2020;NEJMoa2006923. doi:10.1056/NEJMoa2006923
3. Lopes RD, Macedo AVS, de Barros E Silva PGM, et al. Continuing versus suspending angiotensin-converting enzyme inhibitors and angiotensin receptor blockers: Impact on adverse outcomes in hospitalized patients with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [published online ahead of print, 2020 May 13]. *Am Heart J.* 2020;10.1016/j.ahj.2020.05.002. doi:10.1016/j.ahj.2020.05.002
4. Zhang, P., Zhu, L., Cai, J., et al. 2020. Association of Inpatient Use of Angiotensin Converting Enzyme Inhibitors and Angiotensin II Receptor Blockers with Mortality Among Patients With Hypertension Hospitalized With COVID-19. *Circulation Research.*