

## SPECIAL COMMUNICATION

## POTENTIAL INTERACTIONS BETWEEN CARDIOVASCULAR AND COVID-19 MEDICATION REGIMENS AMONG PATIENTS WITH HEART FAILURE

Mohammad Javad Ghazanfari<sup>1</sup>, Samad Karkhah<sup>2</sup>, Mohsen Taghadosi<sup>1</sup>

<sup>1</sup>Kashan University of Medical Sciences, Kashan, Iran, <sup>2</sup>Guilan University of Medical Sciences, Rasht, Iran,

Since December 2019, the COVID-19 pandemic has led to significant mortality in the world. Based on epidemiological data from China, 20% or more of COVID-19 patients had cardiovascular comorbidities. Life-threatening complications due to COVID-19 can develop in these patients. Meanwhile, the risk of complications may be higher in patients with heart failure (HF), who usually have older people and more comorbidities. COVID-19 can lead to myocardial injury and disease exacerbation in HF patients due to a cytokine storm-related hyper-inflammation syndrome.<sup>1</sup> Hence, most studies only addressed the prevalence of the cardiovascular disease among COVID-19 patients and less specifically the prevalence of HF. A study in China found that 23% of COVID-19 patients had HF, of which 52% died.<sup>2</sup> On the other hand, it has been suggested that COVID-19 may cause heart damage due to the specific condition of HF patients and the characteristics of this syndrome.<sup>3</sup> Therefore, it is important to pay attention to the cardiovascular consequences of COVID-19. Despite, the effect of different drug therapies on the outcomes of COVID-19 patients with HF, management of potential interactions between cardiovascular and COVID-19 medication regimens among patients with HF remains an important and challenging clinical issue.

In the early pandemic, antiviral drugs such as hydroxychloroquine were widely used to manage COVID-19 infection. Chloroquine and hydroxychloroquine are potassium channel blockers that can prolong QTc and play a role in sudden cardiac death. This process becomes especially dangerous when combined with other treatments, including the QTc prolonging azithromycin and lopinavir/ritonavir. Therefore, HF patients may be at particular risk for sudden cardiac death. In addition, in advanced treatments of HF patients, interactions may occur between COVID-19 and the cardiovascular medication regimen. For example, patients with left ventricular assist devices (LVAD) are usually treated with anticoagulation drugs such as warfarin. Warfarin is a vitamin K antagonist that can interact with some antiviral drugs in the treatment of COVID-19.<sup>4</sup> Previous evidences have shown that chloroquine and hydroxychloroquine interactions with cardiovascular drugs such as digoxin and antiarrhythmic drugs are

associated with the possibility of HF, QT prolongation, and cardiac arrhythmias.<sup>5,6</sup> On the other hand, Remdesivir, which is made to treat Ebola, has shown little potential effect against SARS-CoV-2. Despite the lack of interaction of Remdesivir with HF drugs, it has been suggested that patients receiving Remdesivir be closely monitored due to the risk of QT prolongation and electrolyte disturbances.<sup>1</sup>

In sum, previous evidence regarding the potential interactions between cardiovascular and COVID-19 medication regimens among patients with HF are limited and no strong evidence is available. Therefore, further studies are needed to identify these interactions. Given the increasing incidence of COVID-19 in HF patients, it is essential to better understand the interactions between this disease and SARS-CoV-2 in order to manage these patients. Also, a multidisciplinary approach including members of the HF team may lead to better management of HF patients in this pandemic.

### REFERENCES

1. Zhang Y, Coats AJ, Zheng Z, Adamo M, Ambrosio G, Anker SD, et al. Management of heart failure patients with COVID-19: a joint position paper of the Chinese Heart Failure Association & National Heart Failure Committee and the Heart Failure Association of the European Society of Cardiology. *Eur J Heart Fail.* 2020;22(6):941-56.
2. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet.* 2020;395(10229):1054-62.
3. Madjid M, Safavi-Naeini P, Solomon SD, Vardeny O. Potential effects of coronaviruses on the cardiovascular system: a review. *JAMA Cardiol.* 2020;5(7):831-40.
4. Bader F, Manla Y, Atallah B, Starling RC. Heart failure and COVID-19. *Heart Fail Rev.* 2021;26(1):1-10.
5. Chorin E, Wadhwani L, Magnani S, Dai M, Shulman E, Nadeau-Routhier C, et al. QT interval prolongation and torsade de pointes in patients with COVID-19 treated with

hydroxychloroquine/azithromycin. Heart Rhythm. 2020;17(9):1425-33.

6. Mercurio NJ, Yen CF, Shim DJ, Maher TR, McCoy CM, Zimetbaum PJ, et al. Risk of QT interval prolongation associated with use of hydroxychloroquine with or without concomitant azithromycin among hospitalized patients testing positive for coronavirus disease 2019 (COVID-19). JAMA Cardiol. 2020;5(9):1036-41.

**Address for Correspondence:**

**Dr. Mohsen Taghadosi**, Trauma Nursing Research Center, Kashan University of Medical Sciences, Kashan, Iran

**Email:** [taghadosi\\_m@kaums.ac.ir](mailto:taghadosi_m@kaums.ac.ir)

**Citation:** Ghazanfari MJ, Karkhah S, Taghadosi M. Potential Interactions between Cardiovascular and COVID-19 Medication Regimens among Patients with Heart Failure. Pak Heart J. 2022;55(01):92-93. <https://doi.org/10.47144/phj.v55i1.2216>