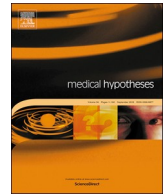




Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



## Olfactory dysfunction may predict myocardial injury in COVID-19 patients



As a hypothesis, in the coronavirus disease 2019 (COVID-19) pandemic, growing evidence suggests a possible correlation between increased cytokine levels, olfactory dysfunction and myocardial injury. Puntmann et al. studied the cardiovascular magnetic resonance imaging of patients who survived COVID-19 and showed that 78% of the patients had cardiac involvement, and even if the disease had healed, 60% continued to have myocardial inflammation [1]. Haehner et al. showed that 64.7% of COVID-19 patients had 'sudden smell loss' [2]. In their autopsy study, Solomon et al. reported that there was no damage to olfactory bulbs or tracts of COVID-19 patients [3] whereas Torabi et al. reported significant increase in local tumour necrosis factor alpha (TNF- $\alpha$ ) levels of the olfactory epithelium in COVID-19 patients [4]. Based on this, it has been observed that covid-19 disease has more frequent occurrence of sudden olfactory dysfunction than other flu diseases, cardiac involvement and thrombotic events are more frequent, and it is a 'cytokine storm' since the first symptom phase. In addition we showed a direct relationship between the severity of heart failure and that of olfactory dysfunction. An important hypothesis explaining this clinical relationship is that TNF- $\alpha$  and interleukin-1 (IL-1) levels increase in heart failure patients and in those with olfactory dysfunction [5]. Considering this literature and two important recent studies, the similarity between the frequency of cardiac involvement (78%) and that of sudden smell loss (64.7%) in COVID-19 patients suggests that olfactory dysfunction in COVID-19 patients can be a predictor of myocardial injury. When olfactory dysfunction is detected in COVID-19 patients, providing optimal primary and secondary cardiovascular prevention can positively contribute to the disease course.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### References

- [1] Puntmann VO, Carerj ML, Wieters I, et al. Outcomes of cardiovascular magnetic resonance imaging in patients recently recovered from coronavirus disease (COVID-19). *JAMA* 2019. <https://doi.org/10.1001/jamacardio.2020.3557>.
- [2] Haehner A, Draf J, Dräger S, de With K, Hummel T. Predictive value of sudden olfactory loss in the diagnosis of COVID-19. *ORL* 2020;82(4):175–80.
- [3] Solomon IH, Normandin E, Bhattacharyya S, et al. Neuropathological features of Covid-19. *N Engl J Med* 2020. <https://doi.org/10.1056/NEJMc2019373>.
- [4] Torabi A, Mohammadbagheri E, Dilmaghani NA, et al. Proinflammatory cytokines in the olfactory mucosa result in COVID-19 induced anosmia. *ACS Chem Neurosci* 2020. <https://doi.org/10.1021/acscchemneuro.0c00249>.
- [5] Akşit E, Çil ÖÇ. Olfactory dysfunction in patients with ischemic heart failure. *Acta Cardiol Sin* 2020;36(2):133–9.

Ercan Akşit<sup>a,\*</sup>, Özge Çağlar Çil<sup>b</sup>, Hakkı Kaya<sup>a</sup>

<sup>a</sup> Canakkale Onsekiz Mart University Faculty of Medicine, Department of Cardiology, Canakkale, Turkey

<sup>b</sup> Canakkale Onsekiz Mart University, Faculty of Medicine, Department of Otorhinolaryngology, Canakkale, Turkey

E-mail address: [ercanaksit@comu.edu.tr](mailto:ercanaksit@comu.edu.tr) (E. Akşit).

\* Corresponding author at: Barbaros Street Terzioğlu Campus B Block No: 4, Onsekiz Mart University, Faculty of Medicine, Department of Cardiology, Canakkale, Turkey.

<https://doi.org/10.1016/j.mehy.2020.110232>

Received 9 August 2020; Accepted 28 August 2020

Available online 02 September 2020

0306-9877/ © 2020 Elsevier Ltd. All rights reserved.