

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/360032812>

Post-COVID-19 postural orthostatic tachycardia syndrome

Article in *Cardiology Journal* · April 2022

DOI: 10.5603/CJ.a2022.0021

CITATIONS

2

READS

126

5 authors, including:



Michał Pruc

Polish Society of Disaster Medicine

102 PUBLICATIONS 399 CITATIONS

[SEE PROFILE](#)



Marek Malysz

Lazarski University

20 PUBLICATIONS 110 CITATIONS

[SEE PROFILE](#)



Anatoliy Maslyukov

International European University (School of Medicine)

10 PUBLICATIONS 54 CITATIONS

[SEE PROFILE](#)



Łukasz Szarpak

Maria Skłodowska-Curie Medical Academy

627 PUBLICATIONS 3,790 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:







Postresuscitation care [View project](#)



Medicine against COVID-19 [View project](#)

Post-COVID-19 postural orthostatic tachycardia syndrome

Ivan Volodymyrovych Savytskyi¹, Michal Pruc², Marek Malysz²,
Anatoliy Maslyukov^{1,3}, Lukasz Szarpak⁴

¹School of Medicine, International European University, Kyiv, Ukraine

²Research Unit, Polish Society of Disaster Medicine, Warsaw, Poland

³Department of Biomedical Sciences, Odessa International Medical University, Odessa, Ukraine

⁴Henry JN Taub Department of Emergency Medicine, Baylor College of Medicine, Houston, TX, United States

Since the beginning of the pandemic, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has faced a significant threat healthcare systems and medical professionals [1]. Despite the current pandemic and recent considerable increases in the incidence and hospitalizations linked with the Omicron BA.2, patients with a history of coronavirus disease 2019 (COVID-19) who suffer post-COVID-19 complications should be given additional attention. It is known that as a result of post-COVID-19 syndrome, patients struggle with a number of cardiac complications, such as myocarditis and progressive damage to the heart muscle [2]. People recovering from the COVID-19 sometimes show symptoms of a condition called postural orthostatic tachycardia syndrome (POTS). Typical arrhythmias occur in COVID-19 and long-term COVID-19 has been linked to tachycardia, with 25–50% of patients at a tertiary post-COVID-19 multidisciplinary team clinic experiencing persistent tachycardia or palpitations [3, 4]. It is unknown how many people worldwide suffer with long-COVID-19. However, according to one research roughly 43% of patients who tested positive for COVID-19, and more than half of those who got inpatient care for this condition, developed long-COVID-19 [5]. However, POTS is not a direct cardiac condition, but a neurological disorder that affects a component of the nervous system that controls heart rate and blood flow. POTS can cause the heart to beat rapidly

when standing from a reclining position, causing symptoms such as brain fog, fatigue, palpitations, dizziness, shortness of breath and other issues. A range of diseases, including viral or bacterial infections, can cause POTS. Because an increasing number of patients who recovered from COVID-19 are now reporting POTS-like symptoms including brain fog, tachycardia and severe chronic fatigue, some experts believe coronavirus may be a trigger for POTS. More and more studies provide us with information on POTS patients with long-COVID-19 [6]. According to studies, the prevalence of orthostatic hypotension with long-COVID-19 might range from 10% to 41% [7, 8]. The mechanism of POTS is unknown, although research is continuing to find the most likely reasons. People with POTS have platelet storage pool shortage, according to Gunning et al. [9], which is connected to symptoms including nosebleeds, dysmenorrhea, easy bruising, and anemia. It was also shown that persons with POTS have higher inflammatory biomarkers, all of which might indicate a chronic inflammatory condition. The presented conditions, especially inflammatory markers, could be associated with a cytokine storm during COVID-19 [9]. POTS affected an estimated 1–3 million persons in the United States, well before the pandemic, according to data published by the group Dysautonomia International. Although it is unknown how many more patients are seeking care as a result of COVID-19 than they were before the pandemic,

Address for correspondence: Lukasz Szarpak, PhD, DPH, DBA, MBA, LLM, Henry JN Taub Department of Emergency Medicine, Baylor College of Medicine, One Baylor Plaza, Houston, Texas 77030, United States, tel: +48 500186225, e-mail: lukasz.szarpak@bcm.edu

Received: 27.03.2022

Accepted: 31.03.2022

Early publication date: 19.04.2022

This article is available in open access under Creative Commons Attribution-Non-Commercial-No Derivatives 4.0 International (CC BY-NC-ND 4.0) license, allowing to download articles and share them with others as long as they credit the authors and the publisher, but without permission to change them in any way or use them commercially.

American Autonomic Society statement reports suggest a sharp rise in instances, the majority of which are linked to long-COVID-19 [10]. These data suggest that POTS may be significantly related to COVID-19. POTS is an incurable condition, thus understanding its link with COVID-19 is critical if we are to protect people against it. At the moment, the sole treatment for POTS is conservative treatment, which includes exercise programs, avoiding triggers, high fluid and salt intake, wearing compression stockings, and engaging in cognitive behavioral therapy. At present, the only goal of pharmacological interventions is to correct physiological parameters. Further research is needed on the pathomechanism of POTS and the relationship between POTS and COVID-19 and long-COVID-19 in order to protect patients against the disease. In clinical practice, special attention should also be paid to post-COVID-19 patients in order to detect possible POTS, which, as reported during the COVID-19 pandemic, is becoming more frequent.

Acknowledgments

The study was supported by the Polish Society of Disaster Medicine.

Conflict of interest: None declared

References

1. Dzieciatkowski T, Szarpak L, Filipiak KJ, et al. COVID-19 challenge for modern medicine. *Cardiol J.* 2020; 27(2): 175–183, doi: [10.5603/CJ.a2020.0055](https://doi.org/10.5603/CJ.a2020.0055), indexed in Pubmed: [32286679](https://pubmed.ncbi.nlm.nih.gov/32286679/).
2. Szarpak L, Pruc M, Filipiak KJ, et al. Myocarditis: a complication of COVID-19 and long-COVID-19 syndrome as a serious threat in modern cardiology. *Cardiol J.* 2022; 29(1): 178–179, doi: [10.5603/CJ.a2021.0155](https://doi.org/10.5603/CJ.a2021.0155), indexed in Pubmed: [34811716](https://pubmed.ncbi.nlm.nih.gov/34811716/).
3. Szarpak L, Filipiak KJ, Skwarek A, et al. Outcomes and mortality associated with atrial arrhythmias among patients hospitalized with COVID-19: a systematic review and meta-analysis. *Cardiol J.* 2022; 29(1): 33–43, doi: [10.5603/CJ.a2021.0167](https://doi.org/10.5603/CJ.a2021.0167), indexed in Pubmed: [34897631](https://pubmed.ncbi.nlm.nih.gov/34897631/).
4. Ståhlberg M, Reistam U, Fedorowski A, et al. Post-COVID-19 tachycardia syndrome: a distinct phenotype of post-acute COVID-19 syndrome. *Am J Med.* 2021; 134(12): 1451–1456, doi: [10.1016/j.amjmed.2021.07.004](https://doi.org/10.1016/j.amjmed.2021.07.004), indexed in Pubmed: [34390682](https://pubmed.ncbi.nlm.nih.gov/34390682/).
5. Chen C, Hauptert S, Zimmermann L, et al. Global prevalence of post-acute sequelae of COVID-19 (PASC) or long COVID: a meta-analysis and systematic review. *medRxiv.* 2021, doi: [10.1101/2021.11.15.21266377](https://doi.org/10.1101/2021.11.15.21266377).
6. Dani M, Dirksen A, Taraborrelli P, et al. Autonomic dysfunction in 'long COVID': rationale, physiology and management strategies. *Clin Med (Lond).* 2021; 21(1): e63–e67, doi: [10.7861/clinmed.2020-0896](https://doi.org/10.7861/clinmed.2020-0896), indexed in Pubmed: [33243837](https://pubmed.ncbi.nlm.nih.gov/33243837/).
7. Buote Stella A, Furlanis G, Frezza NA, et al. Autonomic dysfunction in post-COVID patients with and without neurological symptoms: a prospective multidomain observational study. *J Neurol.* 2022; 269(2): 587–596, doi: [10.1007/s00415-021-10735-y](https://doi.org/10.1007/s00415-021-10735-y), indexed in Pubmed: [34386903](https://pubmed.ncbi.nlm.nih.gov/34386903/).
8. Shah B, Kunal S, Bansal A, et al. Heart rate variability as a marker of cardiovascular dysautonomia in post-COVID-19 syndrome using artificial intelligence. *Indian Pacing Electrophysiol J.* 2022; 22(2): 70–76, doi: [10.1016/j.ipej.2022.01.004](https://doi.org/10.1016/j.ipej.2022.01.004), indexed in Pubmed: [35101582](https://pubmed.ncbi.nlm.nih.gov/35101582/).
9. Gunning WT, Kramer PM, Cichocki JA, et al. Platelet storage pool deficiency and elevated inflammatory biomarkers are prevalent in postural orthostatic tachycardia syndrome. *Cells.* 2022; 11(5), doi: [10.3390/cells11050774](https://doi.org/10.3390/cells11050774), indexed in Pubmed: [35269395](https://pubmed.ncbi.nlm.nih.gov/35269395/).
10. Raj SR, Arnold AC, Barboi A, et al. Long-COVID postural tachycardia syndrome: an American Autonomic Society statement. *Clin Auton Res.* 2021; 31(3): 365–368, doi: [10.1007/s10286-021-00798-2](https://doi.org/10.1007/s10286-021-00798-2), indexed in Pubmed: [33740207](https://pubmed.ncbi.nlm.nih.gov/33740207/).