

Impaired heart rate variability one and six months post acute COVID-19

S. Lampsas¹, E. Oikonomou¹, N. Souvaliotis¹, A. Goliopoulou¹, G.A. Papamikroulis¹, A. Anastasiou¹, P. Theofilis², G. Zakynthinos¹, I. Gialamas¹, P. Pantelidis¹, M.A. Gounaridi¹, A. Tsatsaragkou¹, G. Siasos¹, D. Tousoulis², M. Vavuranakis¹

¹National & Kapodistrian University of Athens Medical School, 3rd Department of Cardiology, Sotiria Chest Disease Hospital, Athens, Greece;

²National & Kapodistrian University of Athens Medical School, 1st Department of Cardiology, Hippokraton General Hospital, Athens, Greece

Funding Acknowledgement: Type of funding sources: None.

Background: Long COVID-19 syndrome is an increasingly recognized problem. Post-infectious cardiac autonomic dysfunction is commonly reported. This study aims to evaluate autonomic dysfunction by means of Heart rate variability (HRV) on post-COVID-19 patients.

Methods: Hospitalized patients for COVID-19 (either at the medical ward or Intensive Care Unit (ICU)) were followed up at 1 and 6 months after hospital discharge. Medical history and clinical information were collected. HRV was assessed by 24-hour ambulatory electrocardiography Holter, with the measure of the standard deviation of normal RR intervals in 24 h, ms (SDNN). The comparison was conducted with age and sex-matched non-COVID-19 controls.

Results: Thirty-four patients hospitalized with COVID-19 (20.6% admitted in ICU) were examined 1-month and 6-months post-hospital discharge. SDNN was significantly ($p < 0.001$) reduced in the COVID-19 group (111 ± 23 ms) compared to the control subjects (152 ± 24 ms) 1-month after discharge. Subgroup analysis between COVID-19 group revealed that ICU

subjects presented significantly ($p < 0.001$) reduced SDNN compared to the medical ward, respectively (83 ± 20 ms vs. 118 ± 17 ms). At 6-months, an improvement was noted at SDNN 24h (6-month: 133 ± 24 vs. control: 151 ± 24 ms, $p = 0.004$; 1-month: 111 ± 23 ms vs. 6-month: 133 ± 24 ms, $p < 0.001$). Also at 6-months, ICU subjects noted significantly ($p = 0.003$) reduced SDNN 24h compared to medical ward subjects (107 ± 17 ms vs. 140 ± 20 ms). On the 6-months follow-up, 32% of the subjects had “long-COVID-19” symptoms. Subjects with long COVID-19 symptoms had low SDNN values (“long-COVID-19”: 112 ± 17 ms vs. non-“long-COVID-19”: 142 ± 20 ms, $p = 0.001$)

Conclusion: Patients hospitalized for COVID-19 have reduced SDNN, at one month post-hospital discharge which is improved at the six months follow-up. These findings emphasize the increased sympathetic drive activity in the post-acute COVID-19 phase and imply a link between autonomic dysfunction and long COVID-19.

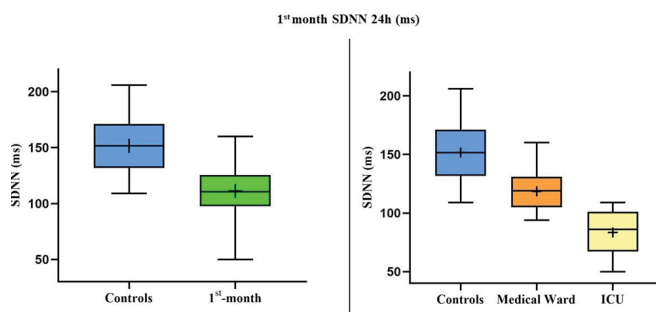


Figure 1. SDNN (ms) at one month

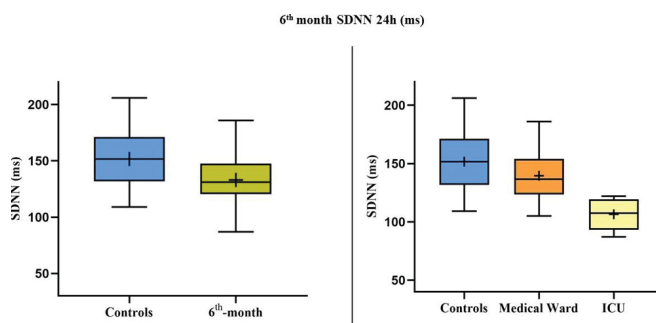


Figure 2. SDNN (ms) at six months