

## Prognostic value of brain natriuretic peptide in COVID-19 with or without acute heart failure

M. Bergami<sup>1</sup>, O. Manfrini<sup>1</sup>, E. Cenko<sup>1</sup>, M. Dorobantu<sup>2</sup>, I. Demiri<sup>3</sup>, O. Fronea<sup>2</sup>, S. Kedev<sup>4</sup>, P. Mjehovic<sup>5</sup>, M. Pasalic<sup>5</sup>, L. Poposka<sup>4</sup>, M. Stefanovic<sup>3</sup>, M. Vavlukis<sup>4</sup>, D. Milicic<sup>5</sup>, M. Zdravkovic<sup>6</sup>, R. Bugiardini<sup>1</sup>

<sup>1</sup>University of Bologna, DIMES, Bologna, Italy; <sup>2</sup>University of Medicine and Pharmacy Carol Davila, Emergency Clinical Hospital of Bucharest, Bucharest, Romania; <sup>3</sup>University "Ss. Cyril and Methodius", University Clinic of Infectious Diseases, Skopje, North Macedonia; <sup>4</sup>University Clinic of Cardiology, Skopje, North Macedonia; <sup>5</sup>University Hospital Centre Zagreb, Department for Cardiovascular Diseases, Zagreb, Croatia; <sup>6</sup>University Hospital Medical Center Bezanijska Kosa, Belgrade, Serbia

**Funding Acknowledgement:** Type of funding sources: None.

**Background:** Although Brain Natriuretic Peptide (BNP) provides strong prognostic information of an unfavorable outcome in patients with acute heart failure (AHF), there is little information of its relevance as a biomarker for outcomes in COVID-19 and its complications

**Purpose:** To evaluate the association of increased BNP levels with complications and in-hospital mortality in a cohort of hospitalized COVID-19 patients.

**Methods:** The study included COVID-19 patients with data on BNP levels included in the ISACS COVID-19 registry. The population was categorized according to the presence of peak BNP levels  $\geq 100$  pg/mL during hospitalization. Primary outcomes included in-hospital mortality, AHF or acute respiratory failure (ARF, defined as  $\text{PiO}_2/\text{FiO}_2 < 300$  mmHg or need for mechanical ventilation). Calculations were conducted using age and sex-adjusted multivariable logistic regression analyses. Results were also stratified according to presence or absence of cardiovascular disease (CVD) history. Differences between subgroups were verified for statistical significance using test for interaction.

**Results:** Of the 1152 patients included in the study, 615 (53.4%) had elevated BNP levels. These subjects were older ( $69.9 \pm 13.8$  vs  $59.1 \pm 16.8$ ,  $p < 0.001$ ), had higher rates of cardiovascular risk factors (82.9% vs

57.7%,  $p < 0.001$ ) and presented more frequently with a prior history of CVD (either ischemic heart disease, cerebrovascular disease, venous thromboembolism, atrial fibrillation or a history of revascularization) (50.1% vs 27.5%,  $p < 0.001$ ). No sex differences were observed. When considering outcomes, BNP levels  $\geq 100$  pg/mL were associated with increased rates of in-hospital mortality (32.9% vs 4.9%,  $p < 0.001$ ), even after adjustment for demographic characteristics (OR: 7.35; 95% CI: 4.75–11.40;  $p < 0.001$ ). High BNP levels were also strongly associated with an increased risk of AHF (OR 19.9; 95% CI 8.6–45.9;  $p < 0.001$ ), a correlation that persisted both in patients with and without a prior CVD history ( $p$  for interaction=0.29). Of note, patients with elevated BNP also had a higher likelihood of developing ARF (OR 2.7; 95% CI 2.1–3.6;  $p < 0.001$ ), even in absence of AHF (OR 3.00; 95% CI 2.20–4.1;  $p < 0.001$ ).

**Conclusions:** In COVID-19, blood BNP level not only appears to be predictor of in-hospital mortality and AHF but was also independently associated with an increased risk of ARF. This finding supports the routine use of BNP in all patients admitted to hospital for COVID-19, regardless of a prior history of CVD.