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Honchar, Oleksii; Ashcheulova, Tetiana  
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### IMPROVED ACCURACY OF LONG COVID-19 PREDICTION IN HOSPITALIZED HYPERTENSIVE PATIENTS COMPARED TO THE GENERAL COHORT

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### THE ROLE OF RIGHT VENTRICLE FUNCTIONALITY IN THE CARDIOPULMONARY STATUS OF HYPERTENSIVE PATIENTS HOSPITALIZED FOR SARS-COV-2 INFECTION

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**Objective:** There is little data concerning the impact of SARS-Cov-2 infection on the cardiopulmonary status and right ventricle (RV) function of patients with arterial hypertension (HTN). The purpose of our study was to investigate whether hospitalization for COVID-19 affects the functional status of hypertensive patients, using cardiopulmonary exercise test and echocardiographic parameters, 3 months after the infection onset.

**Design and method:** All subjects underwent cardiorespiratory exercise using Bruce or modified Bruce protocol where all cardiorespiratory parameters were evaluated. Echocardiographic parameters including right ventricle longitudinal strain were analyzed using an offline program. Subjects with a history of HTN were divided into two groups according to hospitalization for Covid-19 infection. Group I included 28 subjects who were hospitalized for Sars-Cov-2 infection and Group II included 34 subjects without the need for hospitalization.

**Results:** Out of a total population of 198 patients with COVID-19 infection, 62 subjects had a hypertension history (mean age: 61±10 years, 58.1% males, history of coronary artery disease: 16.1%) and they were evaluated 3 months after the symptoms' onset. Hospitalized patients were older (63±8 vs. 52±11 years, p<0.001). Analysis of cardiopulmonary test parameters, oxygen consumption both maximum (21±4 vs. 23.5±4, p: 0.01) and during the 1st minute of recovery (15.5±2 vs. 21±25, p: 0.02), VO<sub>2</sub>\_AT (17±4 vs. 27.5±32) and PETCO<sub>2</sub> (39±4 vs. 38±19 mmHg, p: 0.03) were impaired comparing to non-hospitalized subjects. Out of echocardiographic parameters, the diameter of the left atrium (mm), differed significantly between the two groups (41±6 vs. 38±5 p: 0.02). Furthermore, in hospitalized patients, the absolute mean value of right ventricle strain (RVLS, (%): 13±8 vs. 23±3, p:0.04) was impaired despite a similar left ventricle ejection fraction between the two groups. Finally, using linear regression analysis adjusted for age, gender, hypertension history, and hospitalization, hospitalization proved to be an independent predictive factor for RVLS in hypertensive patients.

**Conclusions:** To conclude our study highlighted the negative impact of hospitalization for Sars-Cov-2 infection in the capacity for exercise and in right ventricle functionality, implying the severity of the disease as a negative independent predictive factor in hypertensive patients.

### IMPACT OF SARS-COV-2 INFECTION IN NEUROCOGNITIVE AND CARDIOPULMONARY FUNCTIONALITY OF HYPERTENSIVE PATIENTS

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**Objective:** Few data have been published regarding the holistic approach of post-Covid patients with a history of hypertension, examining both physical and mental health. The purpose of our prospective study was to follow up cardiorespiratory status, and mental and psychological health of hypertensive patients 3 months after the first day of infection.

**Design and method:** All patients with a history of Sars-Cov-2 infection and good functional status were assessed using cardiorespiratory test, transthoracic echocardiogram, and standardized questionnaires by a comprehensive team of experts (cardiologists, psychiatrists, and psychologists). The population was divided into two groups according to hypertension status.

**Results:** Out of total population of 198 patients (51±15 years, 44.4% males, 6.6% history of coronary heart disease) with COVID-19 infection were assessed. Hypertensives had higher BMI (p<0.001) and BSA (p<0.001) and they were hospitalized in higher percentage (p<0.01). Out of echocardiographic parameters, diastolic dysfunction parameters including left atrial diameter (p<0.001) and E/A ratio (p<0.001) differed significantly between the two groups. LVEF (%) was significantly impaired (56±10% vs. 58±9%, p:0.04) in hypertensives that was depicted in lower values of oxygen consumption (VO<sub>2</sub> (ml/kg/min)) both maximum (p<0.001) and during the 1st minute of recovery (p<0.006), metabolic equivalents

(METS) at peak, (p<0.001) and HR1st minute recovery (p< 0.001) comparing to normotensives. Systolic blood pressure (mmHg) at rest (p: 0.002), at peak (p: 0.01), and during the 1st minute of recovery (p: 0.001) as well as Borg scale score for dyspnea (p:0.02) were higher while the exercise duration was significantly lower (p<0.001) in hypertensives comparing to normotensives. Similarly, their psychometric tests (DASI METS (p:0.008), Functionality (p:0.036)) were also affected. Finally, using linear regression analysis adjusted for age, gender, hypertension status, and hospitalization, age (p: 0.001) proved to be an independent predictive factor for VO<sub>2</sub>, VO<sub>2</sub>\_AT, and VO<sub>2</sub>1st minute of recovery in hypertensive patients.

**Conclusions:** To conclude, the current study highlighted the reduced ability to exercise and fragility of patients with a history of hypertension. Age proved to be an independent negative predictor of functionality. Therefore, the need for a more comprehensive approach to the rehabilitation of post-covid patients is mandatory.

### COMPREHENSIVE PRE-DISCHARGE SYMPTOMS ASSESSMENT IN HYPERTENSIVE PATIENTS HOSPITALIZED FOR COVID-19 ALLOWS TO PREDICT PERSISTENCE OF SYMPTOMS AT 3 MONTHS

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**Objective:** To study the prognostic value of survey-based respiratory, physical, emotional, and cognitive symptoms assessment in hypertensive patients hospitalized for COVID-19 in prediction of symptoms persistence at 3 months after discharge.

**Design and method:** 88 hospitalized patients with COVID-19 and a history of hypertension (mean age 57.8±11.8 years, 53% female) underwent a comprehensive survey-based symptoms assessment 1-2 days prior to discharge that included MRC Dyspnea scale, CAT and CCQ questionnaires, HADS, the physical symptoms subscale of the EFTER-COVID questionnaire, and the Memory, Thinking, and Communication subscale of the SBQ-LC questionnaire. Marginal effects in logistic regression analysis were used to gauge the predictive value of resulting scores and separate symptoms. 500 SANN-based classification models were subsequently trained for various combinations of significant predictors, with an automatic ranging of obtained models by their predictive accuracy.

**Results:** 77% of participants have reported an incomplete recovery at 3 month after hospital discharge. In the order of decreasing predictive value for persistence of symptoms, significant (p < 0,05) risk factors included EFTER-COVID physical symptoms score (Somers' D-statistic = 0,63), HADS depression subscale (D = 0,58), SBQ-LC Memory, Thinking, and Communication score (D = 0,52), MRC dyspnea class (D = 0,45), and CAT score (D = 0,30); among the specific symptoms, significant predictors included dyspnea (D = 0,42), dizziness (D = 0,38), muscles and joints pain (D = 0,38), and difficulties in remembering things (D = 0,40).

Out of the derived machine-learning based classification models, the optimal performance was observed for the one using gender, pre-discharge MRC dyspnea class, and summary scores on EFTER-COVID physical symptoms and SBQ-LC Memory, Thinking, and Communication subscales. The model exhibited a 100% predictive accuracy in classifying the pre-specified test/validation subset of the study group into those who would subsequently report persistence of symptoms or complete recovery.

**Conclusions:** Survey-based pre-discharge assessment of symptoms in hypertensive patients hospitalized for acute COVID-19 yields a high prognostic value. The combination of gender and survey-based measures of dyspnea, physical and cognitive symptoms may be used in this setting to predict the persistence of symptoms at 3 months after hospital discharge.

### IMPROVED ACCURACY OF LONG COVID-19 PREDICTION IN HOSPITALIZED HYPERTENSIVE PATIENTS COMPARED TO THE GENERAL COHORT

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**Objective:** The accuracy of prediction of Long COVID-19 development is currently suboptimal. Phenotyping a general post-COVID-19 population based on simple clinical and anamnestic criteria may be used to address this problem.

The purpose of this study was to identify the early predictors of Long COVID-19 syndrome at 3 months after discharge in hospitalized patients with a history of hypertension (HT).

**Design and method:** 221 hospitalized patients with COVID-19 (mean age 53.4±13.6 years, 53% female, 40% with a history of hypertension) underwent compre-