EPOSTER'S SECTION

COVID-19 AND HYPERTENSION

CARDIOPULMONARY STATUS AND RIGHT VENTRICLE FUNCTIONALITY IN HYPERTENSIVE PATIENTS HOSPITALIZED OR NOT 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 COVID19 affects the functional status of hypertensive patients, using cardiopulmonary 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 history of HTN were divided into two groups according to hospitalization for Covid-19 infection. Group I included 34 subjects who were hospitalized for Sars-Cov-2 infection and Group II included 28 subjects without need for hospitalization.

Results: Out of total population of 198 patients with COVID19 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 (ml/kg/min) 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), VO2_AT (17±4 vs. 27.5±32) and PETCO2 (39±4 vs. 38±19 mmHg, p: 0.03) were impaired comparing to non-hospitalized subjects. Out of echocardiographic parameters, diameter of left atrium (mm), differed significantly between two groups (41±6 vs.38±5 p: 0.02). The absolute mean value of right ventricle strain (RVLS, (%): 13±8 vs. 23±3, p:0.04) was impaired to hospitalized despite a similar left ventricle ejection fraction between two groups. Using linear regression analysis adjusted for age, gender and hospitalization, hospitalization (p: 0.001) proved to be independent predictive factor for RVLS in hypertensive patients.

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

EFFECTS OF SARS-COV-2 INFECTION ON THE CARDIORESPIRATORY PERFORMANCE BY HYPERTENSION STATUS

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Objective: Few data have been published regarding the holistic approach of patients with history of arterial hypertension after Sars-Cov-2 infection. The purpose of our study was to examine the impact of Covid-19 in the cardiopulmonary status of hypertensive patients 3 months after the first day of infection.

Design and method: All participants who recovered Covid-19 infection underwent cardiorespiratory exercise test using either Bruce or modified Bruce protocol and transthoracic echocardiogram where all parameters were evaluated. The population was separated into two groups based on history of hypertension. Group I included 62hypertensives and Group II included 134normotensive subjects.

Results: A total of 198 patients (51±15 years, 44.4% males, 6.6% history of coronary heart disease) were assessed. Hypertensives had higher BMI (30.47±4.68 vs. 26.20 ±5.36 kg/m2, p<0.001) and BSA (2.03±0.24 vs. 1.91±0.45, p<0.001). They were hospitalized in higher percentage comparing to normotensives(54.8% vs. 35.8%, p<0.01). Out of echocardiographic parameters, diastolic dysfunction parameters including left atrial diameter(40 ±6 vs. 35±5mm, p<0.001) and E/A ratio (0.95±0.34 vs. 1.22±0.43, p<0.001) differed significantly between two groups. LVEF(%) was also significantly impaired (56±10% vs. 58±9%, p:0.04) in hypertensives. This finding was depicted in lower oxygen consumption (VO2 (ml/kg/min)) both maximum (22±4 vs.28±7, p<0.001) and during the 1st minute of recovery (19±18 vs.21±23, p<0.006), metabolic equivalents (METS) at peak, 10±13 vs. 10±3, p<0.001) and HR1st minute recovery (124±23 vs. 138±21 bpm, p< 0.001) comparing to normotensives. Systolic blood pressure(mmHg) at rest (132±13 vs. 125±16, p: 0.002), maximum (189±28 vs. 177±26, p: 0.01) and during the 1st minute of recovery (179±29 vs. 162±25, p: 0.001) was higher while the exercise duration was significantly lower (8±3 vs. 9±3 min, p<0.001) in patients with hypertension. Finally, hypertensive subjects reported higher scores in Borg scale for dyspnea (7±2 vs. 6±2, p:0.02) comparing to normotensives.

Conclusions: Current study highlighted the negative impact of Sars-Cov-2 infection in the ability of patients with hypertension to exercise. Therefore, the need for a more comprehensive approach for rehabilitation including the modification of risk factors like hypertension and obesity in post-covid patients is mandatory

PROTECTIVE EFFECTS OF CALCIUM CHANNEL BLOCKERS IN HYPERTENSIVE NON-VACCINATED PATIENTS WITH COVID-19

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Objective: Analysis of the effects of antihypertensive therapy on the prognosis and outcome of hypertensive non-vaccinated patients with COVID-19.

Design and method: The study included 90 hypertensive non-vaccinated patients who underwent cardiovascular assessment in 2019 and suffered from COVID-19 in 2020. The cardiovascular evaluation included laboratory, heart ultrasound, exercise stress test, and 24h Holter ECG. The aim of our study was to analyze the effects of clinical and demographic characteristics and antihypertensive therapy on the prognosis and outcome of hypertensive non-vaccinated patients with COVID-19. Data were obtained by completing a telephone-based questionnaire. All pts were divided into three groups according to the way of treatment – pts who were treated ambulatory (A group, 56 pts), pts who were hospitalized and required oxygen therapy (H group, 25 pts), and patients who died due to COVID-19 (D group, 9 pts).

Results: Groups didn't differ in the presence of dyslipidemia. Obesity was the most prevalent in the A group (A 30.4%, H 20%, and D 11.1%), and smoking status in the H group (H 48%, A 33.9%, and D 33.3%). Diabetes was highly present in the D group (D 44.4%, H 25%, and A 32%), coronary artery disease in the H group (H 52%, A 41%, and D 33.3%), as well as atrial fibrillation (H 32%, A 28.57%, D 22.22%). Complex heart arrhythmias on 24h Holter ECG were the most prevalent in the H group (H 50%, A 20%. D 19.44%), and pts from the H group had the worst strain tolerance on exercise stress test (H 5.62 ± 2.37min, A 5.86 ± 2.77, and D 6.84 ± 3.39). Groups didn't differ in using beta-blockers, diuretics, angiotensin II receptor antagonists, or angiotensin-converting enzyme inhibitors. On the other hand, only 28.57% of pts from the D group were taking calcium channel blockers (CCBs), while this percentage was significantly higher in the H (75%) and in the A group (52%).

Conclusions: Our study showed that CCBs had a protective effect on the prognosis and outcome in hypertensive non-vaccinated pts with COVID-19.

UNCONTROLLED BLOOD PRESSURE BEFORE COVID-19 IS ASSOCIATED WITH ELEVATED SERUM IL-17 AND LONG-COVID SEQUELAE IN HEMODIALYSIS PATIENTS

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Objective: Hypertension, a nearly ubiquitous complication in hemodialysis (HD) patients, has been identified as a risk factor for COVID -19 and its associated adverse outcomes. In turn, both hypertensive and COVID-19-infected patients with long- COVID sequelae have been reported to have elevated serum interleukin-17 (IL-17) levels. Although HD patients belong to the high-risk group for long COVID sequelae, the association between pre-infection blood pressure (BP) control, serum IL-17 levels, and long COVID sequelae has never been investigated in this cohort.

Design and method: A total of 80 HD patients aged 56 (44-63.2) years with a dialysis vintage of 40 (23-74) months who had experienced COVID-19 before enrollment were included in this cross-sectional cohort study. Controlled BP was defined as a 3-month average pre-dialysis BP < 140/90 mmHg and post-dialysis < 130/80 mmHg. IL-17 was measured at least 5 months after acute COVID-19 by ELISA assay. Data were expressed as proportion or median (Me) and interquartile ranges (Q25-Q75) and compared with the Chi-squared test or the Mann-Whitney test as appropriate.

Results: Of the 80 patients included, 46 (57.5%) had uncontrolled BP and 34 (42.5%) had controlled BP before infection with COVID -19. Long-term COVID sequelae were observed in 26/46 (56.5%) patients with uncontrolled BP and 11/34 (32.4%) of the BP -controlled group (χ^2 = 4.6, p = 0.03). Serum levels of IL-17 ranged from 0.01 to 15.14 pg/ml and were significantly higher in patients with uncontrolled BP than in the controlled BP group [0.34 (0.08-0.98) vs 0.06 (0.03-0.14) pg/mL, p = 0.001]. In addition, IL-17 was also higher in patients with long-COVID sequelae than in fully recovered patients [0.43 (0.07-1.58) vs 0.08 (0.02-0.16) pg/mL, p = 0.0003], while those with long-COVID sequelae and pre-infection uncontrolled BP had the highest value IL-17 (p = 0.04) (Fig. 1).
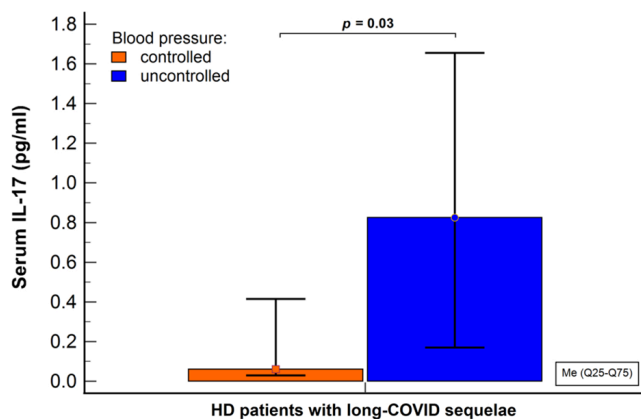

Fig. 1. Serum IL-17 concentration in HD patients with long-COVID sequelae stratified by preinfection BP.

Conclusions: Uncontrolled BP before COVID-19 is associated with increased serum IL-17 levels and long-COVID sequelae in HD patients. Further studies are needed to understand the role of IL-17 in BP control and long-term COVID sequelae in HD patients.

PECULIARITIES OF THE COURSE OF ATRIAL FIBRILLATION IN PATIENTS WITH ARTERIAL HYPERTENSION AFTER A CORONAVIRUS INFECTION

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Objective: Arterial hypertension is one of the most common comorbid pathologies in patients with atrial fibrillation (AF). The aim of our study was to evaluate blood pressure indicators as a predictor of the development of AF after experiencing a coronavirus infection (CI).

Design and method: 187 patients (pts) aged 62,5±0,9 years (47% men, 53% women) were included in the study. The vast majority of pts (89%) had arterial hypertension (stage2 – 80%, stage3 – 9%). The first three groups formed 116 pts who had AF and underwent CI. The first group (G1) consisted of 36 pts who did not have AF before CI. The second group (G2) was represented by 25 pts in whom the transition of the paroxysmal form of AF into persistent, or persistent AF into its permanent form occurred. The third group (G3) consisted of 55 pts in whom the form of AF did not change. Two control groups were formed: K1 - 49 pts with

AF who did not have a history of CI, and K2 - 22 pts with extrasystole who experienced CI, but who did not develop AF.

Results: Arterial hypertension affected the possibility of developing and worsening the course of AF after CI in G2 pts compared with K1 pts (88,0% vs. 80,0%, p< 0,05), G1 compared with K2 patients. Concomitant hypertension was associated with an increase in the frequency and duration of AF paroxysms after COVID-19. Thus, G2, compared to G3, was characterized by more frequent detection of both 2nd degree hypertension (72% versus 65,5%; p<0,05) and 3rd degree hypertension (12% versus 3,6%, p<0.05).

Conclusions: Arterial hypertension are predictors of the development of AF in patients after CI. The presence of AH significantly worsens the course of AF after CI, increasing the frequency of paroxysms of this arrhythmia and their duration.

IMPACT OF POST-COVID MENTAL STRESS DISORDERS ON BLOOD PRESSURE RESPONSE TO EXERCISE

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Objective: Patients recovered from COVID-19 are at high risk of developing mental stress disorders over the long-term. Post-traumatical stress disorders (PTSD) are associated with increased BP and hypertension incidence. We tested the hypothesis that PTSD, occurring in patients after hospital discharge for severe COVID-19, is associated with an impaired BP response to exercise.

Design and method: 108 patients previously hospitalized for severe COVID-19 were evaluated after 5 months from hospital discharge. A Revised Impact of Event Scale (IES-r) score>33 indicated probable COVID-related PTSDs All subjects underwent maximal cardio-pulmonary exercise test on a cycle ergometer with incremental ramp protocol. Submaximal BP was recorded after 4 minutes, at a workload threshold of 75W.

Results: 95 subjects (mean age 58±10 years, 71% men) had complete data. Mean baseline BP was 128/82±12/11 mmHg. 51% were hypertensive. 32% had a IES-r score>33 (PTSD group). These patients were more frequently women (45% vs 20%, p = 0.01), whereas no differences in terms of age, BMI, hypertension history, other CV risk factors or diseases were found compared to non-PTSD group. Baseline BP did not differ between PTSD and non-PTSD groups (127/82±10/8 mmHg vs 129/82±15/9 mmHg, p = 0.43/0.88). By contrast, submaximal exercise SBP (eSBP) was increased in PTSD vs non-PTSD group (155±16 mmHg vs 146±14 mmHg, p<0.05). A strong sex-specific effect was found, being eSBP higher in PTSD vs non-PTSD women, but not in PTSD vs non-PTSD men (p for sex interaction = 0.01). Intrusion symptoms, such as unwanted and upsetting memories, nightmares and flashbacks, were more markedly associated with increased BP response to exercise.

Conclusions: In people with mental stress disorders related to previous COVID-19 hospitalization, we showed increased submaximal BP during exercise. This finding showed a sex-specific association, being observed in women but not in men. Mental stress disorders could negatively impact on future CV risk in post-COVID-19 women through an exaggerated BP response to physical stressors.

IMPACT OF THE COVID-19 PANDEMIC ON THE TREATMENT AND ADHERENCE OF HYPERTENSIVE PATIENTS: CHALLENGES AND OUTCOMES

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Objective: The COVID19 pandemic has seen an important decrease in outpatient clinic visits across all medical specialties as well as a raise in emergency presentations often more severe than previously. Although Sweden has not undergone a strict lockdown, patients' behaviour was similar to the rest of the European countries. The aim of our study was to evaluate the impact of the pandemic on hypertensive patients follow-up and adherence to medical treatment at a Primary Health Care Center (PHCC) in Sweden.

Design and method: We conducted a prospective, single centre study which included patients diagnosed with arterial hypertension undergoing regular follow-ups at the PHCC. Inclusion criteria were no record of blood pressure (BP) measurement within the last two years from start date (March 2022) and ongoing prescribed medication from the PHCC. A letter with recommendation to book a