CARDIAC AUTONOMIC FUNCTION AND FUNCTIONAL CAPACITY IN POST-COVID-19 INDIVIDUALS WITH SYSTEMIC ARTERIAL HYPERTENSION

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Background: The COVID-19 is a recent and highly contagious disease. Individuals diagnosed with systemic arterial hypertension (SAH) are considered risk groups and may have a stronger association with higher level of COVID-19 severity and increased mortality. Furthermore, individuals infected with COVID-19 may also have cardiac autonomic dysfunction (CAD), as well as reduced functional capacity (FC) in the recovery period of disease. However, it is unclear whether individuals infected with COVID-19 have impaired CAD, as well as a greater reduction in FC compared to individuals with SAH not infected to COVID-19.

Objectives: We assessed if cardiac autonomic function and FC differ in SAH patients with post-COVID-19 compared to SAH individuals without COVID-19 infection.

Methods: We evaluated 40 individuals (31 to 80 years old, both sexes) diagnosed with SAH who had or did not have COVID-19. Volunteers were divided into 2 groups: Group 1 (G1), individuals with SAH and COVID-19 and Group 2 (G2), individuals with SAH. Cardiac autonomic function was assessed with heart rate variability (HRV) method. R-R intervals from ECG were recorded at rest in the supine position for 10 minutes. Stable sequences of 256 R-R intervals were chosen and was analyzed using symbolic analysis (SA) as follows: 0% (patterns with no variation - sympathetic modulation), 1% (patterns with one variation, - sympathetic and parasympathetic modulation), 2L% (patterns with two like variations - parasympathetic modulation) and 2UV% (patterns with two unlike variations - parasympathetic modulation) indices. The FC assessment was performed by 6-minute walk test (6MWT). Student t-test or Mann-Whitney test was performed to compare groups. Furthermore, the correlation between SA indices and the 6MWT was tested by Pearson or Spearman correlation test.

Results: The G1 was composed of 21 individuals (53±13 years; 57% female) and G2 was composed of 19 individuals (53±11 years; 32% female). The groups were similar in terms of age, anthropometric data, clinical status and medication. The SA did not show significant differences between groups. Regarding the distance covered in meters in 6MWT, G2 showed higher values when compared to G1 (G1: 464.70±59.41 vs. G2: 522.21 ±77.6, p<0.05). There was a positive and moderate correlation between the 6MWT and the 2L% index only in G2 (r=0.58; p<0.05). The other variables did not show any significant correlations for both groups.

Conclusion: Individuals with SAH who had COVID-19 walked a shorter distance demonstrating that there was a greater impact on the functional capacity of this population. The SAH together with COVID-19 did not show a worsening in cardiac autonomic function when compared to the SAH group without infection to COVID-19.

Implications: The results of our study can contribute to the clinical applicability of several health professionals, with the aim of guiding rehabilitation programs for these individuals and thus improving their physical capacity.

Keywords: COVID-19, Arterial hypertension, Functional capacity

Conflict of interest: The authors declare no conflict of interest.

Acknowledgment: To Federal University of Ceará.

Ethics committee approval: Not applicable.

https://doi.org/10.1016/j.bjpt.2024.101011
Acknowledgment: The authors declare no conflict of interest. 

Conflict of interest: The authors declare no conflict of interest.

Acknowledgment: This study was approved by the Ethics Committee of Brasilia, project 028/15. The group control consists of animals that were not submitted to partial injury of the Achilles tendon (TC) and four other groups that were submitted to partial injury of the TC and subdivided by the time of tissue collection, namely: 3.1428 and 55 days after the injury. The muscle gastrocnemius was collected and used for the analysis of gene expression, zymography, and morphology. The CT was collected only to prove the presence of the lesion.

Results: The tendon injury generated a decrease in the expression of genes Vegf, Smad3, Egr and Akt 3 days in skeletal muscle. As well as increased gene expression, Col3a1, Ctgf, Timp-2 and Bgn. All when compared to the control group. In the period of 14 days after partial injury of the Achilles tendon, a decrease in the Mstn and Smad3 gene content was verified. On the other hand, there was an increase in the expression levels of the Akt and Vegf genes. In the period of 28 days after the injury, there was an increase in the levels of expression of the genes Tgf-b, Vegf, Mstn, Pax7 and Myod1. With the decrease of Smad3 expression, Akt. Finally, 55 days after partial Achilles tendon injury, the Akt, P70s6k, Pax7, Mstn and Atrogin-1 genes showed an increase in their expression. While the levels of Smad3, Timp-2 showed a decrease. As for the zymography analysis of MMP-2 activity in the gastrocnemius muscle, it was demonstrated that MMP-2 pro increased in the 28D and 55D groups when compared to the control group. For morphological analyses, only the 55D group showed an increase in cross-sectional area and diameter.

Conclusion: The project is in the phase of discussing the results, but a partial injury of the Achilles tendon in rats probably affected the homeostasis of the skeletal muscle, disturbing signaling/degradation pathways, in addition to impacting the remodeling process through the communication of the muscular extracellular matrix with the tendon.

Implications: The findings of this study have the potential to improve the understanding of the underlying effects of the muscle-tendon relationship and may provide valuable information for the development of targeted therapies aimed at improving the recovery and rehabilitation of muscle and tendon injuries. Furthermore, the results of this study may help to identify new therapeutic targets and biomarkers for the diagnosis and monitoring of muscle and tendon injuries, allowing for a more personalized and effective treatment.

Keywords: Injury, Muscle-tendon interaction, Remodeling

Conflict of Interest: The authors declare no conflict of interest.

Acknowledgment: We thank Prof. Octávio Franco and Prof. Rosangela Andrade, for the reception and availability in her laboratories, since without this help, the present project would have several limitations. Our sincere thanks.

Ethics committee approval: Catholic University of Brasilia, project 028/15

Background: The COVID-19 pandemic has actively impacted the lifestyle of older adults, interrupting their participation in exercise programs (EP) and consequently increasing sedentary behavior (SB) and decreasing physical activity (PA). However, the flexibilization of the pandemic’s restrictive measures is expect that the older adults will return to adopting an active lifestyle.

Objectives: To compare the SB and PA level of older adults during and after the restrictive measures of the COVID-19 pandemic.

Methods: This is an observational and longitudinal study. Older adults (≥60 years old), with preserved ambulation and participants in the multicomponent EP (3x50min during the week) before the COVID-19 pandemic were included. The participants were evaluated 18 months (T1= during the restrictive measures of the pandemic) and 24 months (T2= after the restrictive measures of the pandemic) after the interruption of the EP. SB and PA level were evaluated by the ActiPalm3 micro accelerometer. SB variables were daily SB time, % of SB time during the day, daily sitting time, number of sedentary bouts > 30min and time spent in sedentary bouts > 30min. The PA level was described by the number of steps per day. To evaluate the effect of time in the SB variables and the PA level, a generalized linear mixed model analysis was used. Time was considered a fixed effect and participants a random factor. Results are presented in estimated marginal means and standard error. Statistical analysis was performed using the JAMOVI software (version 2.3.18) and a significance level of p < 0.05 was adopted.

Results: Seventeen older adults were included (75.8 ± 7.47 years, 76.5% female). No statistically significant differences were observed in the time spent in SB (T1= 8.49 h and T2= 8.85 h, X²= 1.99, Dif= -0.356, p= 0.158), % of time in SB (T1= 55.9 % and T2= 56.3%, X²= 0.06, Dif= -0.382, p= 0.793), sitting time (T1= 8.06 h and T2= 7.87 h, X²= 0.324, Dif= -0.191, p= 0.569), number of sedentary bouts > 30min (T1= 3.85 and T2= 4.14, X²= 0.941, Dif= 0.293, p= 0.332), time spent in sedentary bouts > 30min (T1= 4.23 h and T2= 3.90 h, X²= 0.998, Dif= -0.332, p= 0.318) and in the PA level (T1= 9521 steps and T2= 9862 steps, X²= 0.653, Dif= 341, p= 0.419) of older adults after the flexibilization of the restrictive measures of the COVID-19 pandemic.

Conclusion: No significant changes were observed in the SB and PA level of older adults who participated in an EP after the flexibilization of restrictive measures of the COVID-19 pandemic.

Implications: The findings of this study demonstrate that despite the flexibilization of restrictive measures of the COVID-19 pandemic, the older adults continue to have high rates of SB, demonstrating the need to implement public policies that reduce SB and encourage the practice of PA.

Keywords: Aged, Sedentary Behavior, COVID-19

Conflict of Interest: The authors declare no conflict of interest.

Acknowledgment: This study was funded by FAPESP (2020/05471-5), CAPES (001) e CNPq (304479/2021-7).

Ethics committee approval: This study was approved by the Ethics Committee for Research on Human Beings of UFSCar (Ethical approval n°4.126.247/2020).

https://doi.org/10.1016/j.bjpt.2024.101013

SEDENTARY BEHAVIOR AND PHYSICAL ACTIVITY LEVEL OF OLDER ADULTS DURING AND AFTER THE RESTRICTIVE MEASURES OF THE COVID-19 PANDEMIC

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Background: The COVID-19 pandemic has active...