

ANALYSIS OF THE PREVALENCE OF SYSTEMIC ARTERIAL HYPERTENSION IN PATIENTS ADMITTED FOR SUSPECTED COVID-19 IN A TERTIARY HOSPITAL

Carlos Eduardo Gasparetto

Universidade Luterana do Brasil (ULBRA),
Medicine course
Canoas - RS
<http://lattes.cnpq.br/8181398744474363>

Conrado Brenner Luvizon

Universidade Luterana do Brasil (ULBRA),
Medicine course
Canoas - RS
<http://lattes.cnpq.br/1995960928075398>

Gabriela Uberti

Universidade Luterana do Brasil (ULBRA),
Medicine course
Canoas - RS
<https://lattes.cnpq.br/3333510868364719>

Gabriela Fleck Santos

Universidade Luterana do Brasil (ULBRA),
Medicine course
Canoas - RS
<http://lattes.cnpq.br/2447706747343134>

Thainara Villani

Universidade Luterana do Brasil (ULBRA),
Medicine course
Canoas - RS
<http://lattes.cnpq.br/9217553949985125>

All content in this magazine is licensed under a Creative Commons Attribution License. Attribution-Non-Commercial-Non-Derivatives 4.0 International (CC BY-NC-ND 4.0).



João Fajer Millman

Universidade Luterana do Brasil (ULBRA),
Medicine course
Canoas - RS
<http://lattes.cnpq.br/8374255752801520>

Luiza Costa Gomes

Universidade Luterana do Brasil (ULBRA),
Medicine course
Canoas - RS
<https://lattes.cnpq.br/2737067329930976>

Eduarda Morbach

Universidade Luterana do Brasil (ULBRA),
Medicine course
Canoas- RS
<https://lattes.cnpq.br/8849148843477164>

Mariana Dall'Agnol Deconto

Universidade Luterana do Brasil (ULBRA),
Medicine course
Canoas- RS
<http://lattes.cnpq.br/6203958239332355>

Eduardo Walker Zettler

Universidade Luterana do Brasil (ULBRA),
Medicine course
Canoas - RS
<http://lattes.cnpq.br/0491252411504242>

Abstract: The presence of multiple comorbidities is associated with more severe manifestations of COVID-19. Although severe illness can affect anyone, most severe cases have at least one risk factor. Systemic arterial hypertension (SAH) is particularly relevant due to its high prevalence globally and in Brazil. This retrospective study analyzed suspected COVID-19 hospitalizations in a tertiary hospital, with the aim of determining the prevalence of SAH in different age groups. 956 hospitalizations due to suspected COVID-19 were recorded during the period from March 2020 to January 2021 at ``Hospital Universitário de Canoas``. Among patients over 60 years old (n = 542), 70.7% had SAH. In the age group of 50 to 59 years (n = 168), 54.2% were hypertensive. For patients aged 40 to 49 years (n = 135), the prevalence of hypertension was 36.3%. In the age group of 30 to 39 years (n = 81), 19.8% had SAH. For those aged 20 to 29 years (n = 30), only 3.3% had this comorbidity. The results indicate that the prevalence of SAH increases with the age of patients and that the most severe cases of COVID-19, resulting in hospital admission, are more associated with older patients with SAH. This suggests that chronic changes in end organs caused by SAH may play a role in the less favorable outcomes of COVID-19. In summary, this study highlights the importance of hypertension as a risk factor, especially in older patients, for worsening COVID-19 and the need for prevention and management strategies aimed at this population.

Keywords: Systemic arterial hypertension; COVID-19; risk factor.

INTRODUCTION

Based on scientific discoveries related to the SARS-CoV-2 virus, responsible for the emergence of COVID-19, which was initially identified in Wuhan, China, in December 2019, and its impact on the human body,

today we know that several comorbidities and underlying conditions are correlated with the most severe forms of the disease (GUAN et al., 2020). Within this context, although it is recognized that severe COVID-19 can affect any individual, the majority of patients who require hospitalization, with greater pulmonary involvement and risk of mortality, present at least one risk factor, being Systemic Arterial Hypertension. (HAS) notably the most common, as indicated in several studies (BARROSO et al., 2020; ERNESTO et al., 2020). SAH is a complex clinical condition, characterized by high and sustained blood pressure (BP) levels above the normal value for the age. Its pathophysiology is intrinsically related to the action of the renin-angiotensin-aldosterone system (RAAS) and the type 2 angiotensin-converting enzyme (ACE-2), which is used by SARS-CoV-2 as a cell entry receptor. This enzyme is abundantly present on the surface of cells in the endothelium, kidneys, lungs and other organs. When we examine the literature, it is evident that SAH stands out due to its high prevalence in Brazil, ranging from 21.4% to 32.3% in the adult population, although this variation is related to differences in the definition of the condition (MALTA et al, 2017). Furthermore, observational studies have demonstrated that hypertension is often associated with other cardiovascular risk factors and advanced age, as these conditions tend to coexist in populations around the world (GALLO et al., 2022).

OBJECTIVE

To analyze hospitalizations due to suspected COVID-19 in a tertiary hospital, determining the prevalence of SAH in this population according to the patients' age groups.

METHODOLOGY

This is a retrospective observational study. The population in question comprises suspected cases of COVID-19 who were hospitalized. The source for identifying cases was the database containing electronic medical records from ``Hospital Universitário de Canoas``, Rio Grande do Sul. The data was obtained in person, with an individual transfer process to an electronic spreadsheet belonging to the research group., using Excel® software. Information such as current and previous clinical history, as well as age, was collected. During the process, due precautions were taken with the handling of sensitive data, and the study was approved by the Research Ethics Committee of the Universidade Luterana do Brasil (ULBRA), under CAAE number 37926920.3.0000.5349, and conducted in accordance with the current standards. The records studied covered the period from March 2020 to January 2021, with the cases being correlated with the existence or not of SAH, stratified by age group. For data analysis, the final file was imported into the SPSS® software (25.0 version, Chicago, IL Statistical Package for the Social Sciences), where frequency analyzes were performed.

RESULTS

The total number of hospitalizations due to suspected COVID-19 in the period analyzed was 956 patients, after excluding medical records with incomplete data. The average age of the patients analyzed was 61.5 years, with a predominance of males, representing 52.5% of cases. Of the 542 patients aged over 60 years, 383 (70.7%) had SAH. Between 50 and 59 years old, there were a total of 168 hospitalizations, with 91 (54.2%) patients presenting this disease. In the age group of 40 to 49 years, there were 135 admissions due to COVID-19, of which 49 (36.3%) were hypertensive patients. In the group aged 30

Figure 1: Prevalence of SAH among patients hospitalized with COVID 19, according to age

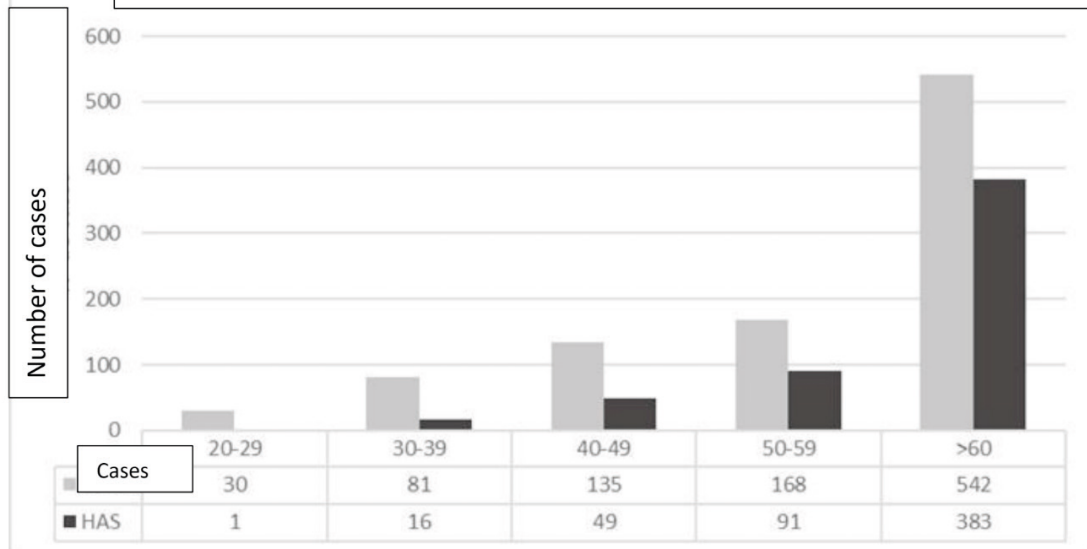


FIGURE 1 Prevalence of SAH among patients hospitalized with COVID-19 according to age group.

to 39 years, there were 81 hospitalizations, with 19.8% having hypertension. Finally, in the 20 to 29 age group, there were a total of 30 hospitalizations due to COVID-19, only one (3.3%) related to the comorbidity under analysis (FIGURE 1).

DISCUSSION

Understanding the pathophysiological mechanisms underlying the interaction between the SARS-CoV-2 virus and the cardiovascular system is of paramount importance for the analysis of clinical outcomes in patients with COVID-19. In this context, the role of the angiotensin II-converting enzyme (ACE II) emerges as a critical component of this relationship (MALTA et al., 2017). ACE II is abundantly expressed on the surface of cells of the vascular endothelium, kidneys, lungs and other organs, playing a fundamental role in the regulation of the renin-angiotensin-aldosterone system (RAAS). This enzyme is known to inactivate angiotensin II, functioning as a negative

regulator of the RAAS. Notably, elevated ACE II levels have been observed in patients with SAH. In addition to its involvement in blood pressure control, the elevation of ACE II is associated with significant clinical implications (FERREIRA et al., 2023). Studies indicate that this elevation can negatively affect respiratory capacity, the functioning of the renal tubule, the health of cardiomyocytes, the integrity of the small intestinal epithelium and the function of bile duct epithelial cells, as well as Leydig cells. Therefore, it is not surprising that patients with COVID-19 frequently present with extrapulmonary manifestations and possible complications due to the interaction of the virus with ACE II.

For our research, it became crucial to control the age variable, as this is a potential source of confusion in analyzes involving chronic degenerative diseases, such as SAH. Stratification of groups by age group revealed results consistent with other published studies, highlighting the dependence of age on the impact of SAH. It was observed that in the

younger age groups, there was a gradual reduction in the presence of SAH among hospitalized cases. In line with these findings, a multicenter, observational study conducted in 26 hospitals and health centers in Italy suggests that hypertension alone is not an independent risk factor for severe forms of COVID-19, but when combined with age, assumes a significant role. This can be explained by the nature of SAH, which generally develops as part of the systemic vascular aging process. Vascular aging involves the fragmentation and degeneration of elastin, the progressive increase in collagen and the deposition of calcium in the arterial media layer, leading to an increase in arterial stiffness (BARROSO et al., 2021). As a result, in younger populations, other factors may mask the role of hypertension in disease processes. Furthermore, it is important to recognize the close relationship between SAH and chronic kidney disease, where SAH can not only cause, but also worsen this condition. Therefore, adequate control and attention to SAH are critical, as its lack of control can trigger or exacerbate a condition that is notoriously associated with higher mortality in patients with COVID-19 (HENRY et al., 2020). In the clinical context, studies in China observed that individuals with at least one comorbidity were, on average, older and that the presence of comorbidities was more associated with severe cases of COVID-19. Furthermore, individuals with multiple comorbidities had a considerably higher risk of experiencing negative outcomes, such as ICU admission, invasive ventilation, or death, compared to those with a single comorbidity or no comorbidities (DENG et al. 2021). According to the work of Mascarello and collaborators, as age advances, the probability of negative outcomes increases significantly, with the probability of being hospitalized being 11.3 times higher among individuals aged 60 or

over compared to those aged 18 to 29., while being 60 years old or older was associated with a 10.7-fold increase in the probability of being admitted to the ICU, compared to the youngest stratum (MASCARELLO et al. 2021).

In summary, this discussion highlights the complex interaction between hypertension, age and other comorbidities in the progression of COVID-19. She emphasizes the need to consider these interconnected factors when assessing the risk and severity of the disease. This highlights the importance of specific prevention and management strategies, adapted to different patient groups, taking into consideration, the complexity of comorbidities and individual characteristics.

CONCLUSIONS

In short, the data analyzed in this research reveal important implications in the relationship between SAH and COVID-19, highlighting the complexity of this interaction. The elevation of ACE II, frequently associated with hypertension, plays a relevant role in the extrapulmonary manifestations of the disease, affecting different organs. Stratification by age group showed that the impact of SAH varies according to the age of the patients, being more prominent in older populations. Furthermore, the combination of hypertension and age emerges as a significant risk factor for severe cases of COVID-19. These findings highlight the importance of a personalized approach in the management of patients with COVID-19, considering not only the presence of SAH, but also its interaction with other risk factors and individual characteristics. Adequate control of hypertension and attention to renal health may be crucial to mitigate adverse outcomes in patients with COVID-19, particularly in the older population.

REFERENCES

- BARROSO, W. K. S. et al. Diretrizes Brasileiras de Hipertensão Arterial – 2020. Arquivos Brasileiros de Cardiologia, v. 116, n. 3, 2021.
- DENG, Y. et al. Associação da Hipertensão com a Gravidade e a Mortalidade de Pacientes Hospitalizados com COVID-19 em Wuhan, China: Estudo Unicêntrico e Retrospectivo. Arq. Bras. Cardiol., v. 117, n. 5, p. 911-921, jul. 2021.
- ERNESTO, L. S. et al. Hypertension and COVID-19. American Journal of Hypertension, v. 33, n. 5, p. 373–374, 2020.
- FERREIRA, M. D. et al. O impacto da COVID-19 em pacientes hipertensos e atuação multiprofissional: uma revisão integrativa. Research, Society and Development, v. 12, n. 4, 2023.
- GALLO, G. et al. Hypertension and COVID-19: Current Evidence and Perspectives. High Blood Pressure & Cardiovascular Prevention, v. 29, n. 2, p. 115-123, 2022.
- GUAN, W. J. et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020; 382(18):1708-20.
- HENRY, B. M. et al. Chronic kidney disease is associated with severe coronavirus disease 2019 (COVID-19) infection, International Urology and Nephrology, 52(6), p. 1193–1194, 2020.
- MALTA, D. C. et al. Prevalência e fatores associados com hipertensão arterial autorreferida em adultos brasileiros. Rev Saúde Pública. 2017;51 Supl 1:11s.
- MASCARELLO, K. C. et al. Hospitalização e morte por COVID-19 e sua relação com determinantes sociais da saúde e morbidades no Espírito Santo: um estudo transversal. Epidemiologia e Serviços de Saúde, Brasília, v. 30, n. 3, 2021.