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IMPACTS OF IMMUNOSUPPRESSION ON THE GRAVITY OF COVID-19 IN INDIVIDUALS CO-INFECTED WITH THE HUMAN IMMUNODEFICIENCY VIRUS (HIV)

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ABSTRACT

Objective: To identify the levels of severity of COVID-19 in individuals co-infected with the Human Immunodeficiency Virus (HIV). **Methods:** Expanded summary of the literature review type. The searches were carried out in the main databases of the BVS and CAPES. The above authors declare that they do not have conflict of interest in this study. **Results:** Most individuals were being treated with antiretrovirals (83-100%) and, therefore, most had a TCD4 lymphocyte count above 200 cells/ μ L and a viral load ranging between 67-100%. Comorbidities ranged from 33-70% and deaths from 0-14%. The severity picture was mostly mild, at a minimum proportion of 63%, not significantly differing from the population with COVID-19 in general, which on average remains in a mild symptomatic picture, around 80%. Therefore, the percentage of deaths and more severe levels of the disease were lower than expected due to the immune deficiency of HIV positive people. **Conclusion:** It is rash to make generalizations about the topic or to safely close the hypothesis that the immunosuppression of individuals with HIV, co-infected with SARS-CoV-2 has an increased risk to acquire the most severe form of COVID-19. This is because the studies found in the literature did not have a sample of participants significant enough.

Keywords: Coronavirus infections. Coinfection. HIV. Immunosuppression.

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INTRODUCTION:

Currently the world faces two major active pandemics: an older one, the HIV / AIDS pandemic, where no cure has yet been found, and a more recent one, the COVID-19 pandemic.

The COVID-19, caused by SARS-CoV-2, was discovered in December 2019 in China^{1,2} and in a few months it spread around the world, being considered by WHO as a Public Health Emergency of International Importance (ESPII) and shortly thereafter was declared a pandemic, which has already infected and killed thousands of people³. So far, there is no specific pharmacological therapy for this disease^{4,5} and individuals who evolve to cure - under the action of their own immune system - usually present themselves in the group of asymptomatic or with mild symptoms, which represent 81% of those infected, with clinical manifestations such as anosmia, myalgia, cough, fever and diarrhea. However, about 14% progress to the most severe form of the disease and 5% require admission to the Intensive Care Unit (ICU), which may develop respiratory failure due to the Acute Respiratory Discomfort Syndrome (ARDS), responsible for the largest number of deaths by new coronavirus⁵.

The Risk factors are determinant for the severity and mortality of the disease, among them are multimorbidities and immunosuppression^{4,6}. In this context, a group of individuals deserves attention: the carriers of the Human Immunodeficiency Virus (HIV), which causes the Acquired Immunodeficiency Syndrome (AIDS), which depresses the immune system by the progressive reduction of the defense TCD4+ lymphocytes, leaving the individual more susceptible to infections¹, especially when dealing with a virus with high levels of transmissibility, such as the new coronavirus. However, antiretroviral therapy can alter this risk, and appears to be a protective factor⁷, even in patients without adequate immune recovery.

In this way, considering the tendency towards immunosuppression in HIV patients and the current pandemic scenario of a highly transmissible virus, which can worsen in the face of risk factors and lead to death, this study aims to identify the impact of immunosuppression, caused by HIV, in the severity of COVID-19, in individuals co-infected with SARS-CoV-2.

METHODOLOGY:

It is an expanded summary of the literature review type. The present work was carried out through research in the main databases offered by the Virtual Health Library (BVS) and the Portal of Periodicals of the Coordination for the Improvement of Higher Education Personnel (CAPES). For search purposes, the descriptors were used: "COVID-19", "SARS-CoV-2", "co-infection" and "HIV", for which 38 articles were found in the BVS (34 from MEDLINE, three from medRxiv and one from LILACS) and 105 in the CAPES Periodical from different databases, totaling 143 documents.

The exclusion criteria applied were articles whose themes deviated from the focus of this research, those that were not available in full and in full and duplicates. The total number of excluded articles was 111, and the rest (32) were selected for reading in full.

After reading, the exclusion criteria were applied once again, excluding studies with preliminary results, any type of review (so that only original articles would remain) and case studies with a sample size of less than two. After applying all the criteria, 25 studies were excluded, and, therefore, seven studies were used to compose the references of this work.

The above authors declare that they do not have conflict of interest in this study.

RESULTS AND DISCUSSION:

The results of the literature found were divided into: sample size, antiretroviral therapy (ART), TCD4 lymphocyte count, HIV viral load, comorbidities, deaths, severity and signs/symptoms, organized according to the chart below:

	Vizcarra, et al., 2020 ²	Stoeckle, et al., 2020 ⁸	Byrd, et al., 2020 ¹	Guo, et al., 2020 ⁹	Marimuthu, et al., 2020 ¹⁰	Molina, et al., 2020 ⁷	Hu, et al., 2020 ¹¹
Sample size	51	30	27	14	6	8	12
ART	100%	97%	100%	97%	97%	100%	83%
TCD4 (cells/μL)							
< 200	47%	23%	4%	36%	17%	12%	17%
200 – 499	41%	-	37%	21%	17%	38%	-
= ou > 500	12%	-	59%	43%	66%	50%	-
Undetectable HIV viral load (<20copies/mL)	-	100%	100%	86%	-	75%	67%
Comorbidities	63%	-	70%	70%	50%	-	33%
Deaths	4%	7%	4%	14%	0%	13%	8%
General severity							
Mild	75%	-	-	64%	100%	63%	75%
Severe	25%	-	-	36%	0%	37%	25%
Signs and symptoms							
Asymptomatic	-	-	4%	21%	17%	-	-
Cough	71%	70%	23%	50%	33%	-	-
Fever	71%	57%	35%	71%	83%	-	58%
Dyspnoea	55%	67%	27%	50%	-	-	-
Fatigue	53%	-	-	79%	-	-	-
Myalgia	33%	13%	31%	-	-	-	-
Headache	25%	10%	12%	-	-	-	-
Diarrhea	22%	33%	-	-	-	-	58%
Sore throat	20%	-	8%	-	17%	-	-
Anosmia/ageusia	14%	10%	19%	-	-	-	-
Nausea/vomiting	10%	17%	-	-	-	-	33%
Abdominal pain	-	10%	-	-	-	-	50%
Chest pain	-	10%	4%	-	-	-	-
Backache	-	-	12%	-	-	-	-
Nasal congestion	-	3%	8%	-	-	-	-
Hiccups	-		8%	-	-	-	-
Chills	-	-	8%	-	-	-	-
Reduced appetite	-	-	4%	-	-	-	-
Skin rashes	-	-	-	-	-	-	17%

In Vizcarr et al., The most severe cases (it is noteworthy that the proportion of comorbidities was greater than half of the sample) had a lower TCD4 lymphocyte count than individuals with mild symptoms, which may demonstrate the role of immunosuppression as a risk factor for increasing the severity of COVID-19. In the case series published by Byrd et al., 96% of the sample had a TCD4 count greater than 200 cells / μ L and there were no deaths related to COVID-19, suggesting that individuals with good TCD4 counts do not have an increased risk of death

from this disease. This line of thought differs from Marimuthu et al., Who in their sample does not hear serious cases or deaths and did not find an association with TCD4 in the prognostic function in COVID-19.

This point of view corroborates the case series presented by Guo et al., As two individuals had an extreme immune deficiency, with CD4 of 29 cells / μ L and Kaposi sarcoma and the other had CD4 of 34 cells / μ L, viral load of 35,000 copies / mL HIV and pneumonia, but they did not die.

Two other participants in the sample had a CD4 of 695 and 350 cells / μL and died, with oxygen saturation of 76 and 82% and comorbidities of COPD and hypertension. In Molina et al., 38% of the sample with the worst course of the disease had a CD4 count greater than 500 cells / μL , especially the only individual who died had a CD4 count of 888 cells / μL and an undetectable HIV viral load, but risk factors such as high age (70 years), which could have led to the cytokine storm. This scenario may suggest that low CD4 counts may act as a possible protective factor against the exacerbation of the immune response that commonly occurs in individuals who develop the cytokine storm caused by COVID-19.

It is noteworthy that individuals with HIV, even being treated with antiretrovirals, still have a certain degree of immunosuppression¹¹ and despite this, the proportions of deaths and more severe levels of the disease were lower than expected due to the immunological deficiency of HIV positive people.

CONCLUSIONS:

To date, there are many controversies in the literature to support the hypothesis that the immunosuppression of individuals with the Human Immunodeficiency Virus, co-infected with SARS-CoV-2 has a real increased risk to acquire the most severe form of COVID-19. However, there is a very large deficit of studies with significant samples.

Therefore, at the moment, it is rash to make generalizations about the topic or to safely close that hypothesis. Of the 32 surveys read in full, most were case studies with a very small sample, preprints and experiences of health institutions. In addition, most of the carriers of the Human Immunodeficiency Virus who participated in the research were using antiretrovirals, which makes it difficult to comprehend the effects of COVID-19 in HIV patients in a reliable way, and studies in co-infected individuals who are not found are necessary. in the use of these drugs.

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