



Editorial

COVID-19 and Chagas disease in Latin America

COVID-19 y Enfermedad de Chagas en América Latina

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The Coronavirus Disease 2019 (COVID-19), caused by severe acute respiratory syndrome type 2 coronavirus (SARS-CoV-2), have compromised multiple implications in regional epidemiological problems^[1-4]. For example, in Latin America, COVID-19 was first reported in a 61-year-old man from Italy in Brazil on February 26, 2020^[5,6]. As a result, more than 68.294.000 documented infections and 1.682.000 deaths are reported in Latin America and the Caribbean^[7].

Fifteen per cent of patients with COVID-19 develop severe clinical symptoms requiring oxygen support, and 5% develop a critical condition accompanied by respiratory failure, acute respiratory distress syndrome, septic shock and sepsis, thromboembolism, and multiorgan failure, including acute renal and cardiac injury^[8]. Some risk factors for presenting the severe form of COVID-19 described in the literature are advanced age, smoking, hypertension, diabetes, heart disease, chronic lung disease, and cancer^[9,10].

Chagas disease, first described in Latin America (Brazil) in 1909 by Carlos Chagas, is a parasitic infection caused by *Trypanosoma cruzi*, transmitted mainly by the *Triatoma*, a hematophagous arthropod of the Reduviidae family^[11-15].

Chagas Disease has a high morbimortality rate and a substantial social impact, emerging as an essential threat to public health, affecting millions of people worldwide, causing approximately 50,000 deaths^[16,17].

Chagas Disease is endemic in much of Latin America, causing mainly cardiac and gastrointestinal complications, which could increase susceptibility to COVID-19 in infected patients^[18,19].

Chagas Disease presents two distinct clinical phases: an acute phase, associated with a strong type 1 immune response, and a chronic phase, which can last for the rest of the patient's life. The chronic phase can progress to varying degrees of severity in 30% of cases, leading to dilated cardiomyopathy, arrhythmia, cardioembolism, heart failure, and death^[11].

Cardiac manifestations of Chagas Disease include generalized hypertrophy and dilatation and mural thrombus commonly seen in the right atrium and apex of the left ventricle. In addition, microscopically, it will show chronic fibrosis, focal area of necrosis and granular degeneration, and interfibrillar oedema^[20].

The cardiac damage produced by Chagas Disease has a similar presentation to SARS-CoV-2 infection, causing myocardial dysfunction and damage, endothelial dysfunction, microvascular dysfunction, plaque instability, and myocardial infarction^[21,22]. The cardiac damage produced by COVID-19 is a combination of direct viral injury and cardiac damage due to the host immune response^[23].

Further depression of ventricular function by COVID-19 caused by myocardial infarction and microvascular dysfunction is also found in *T. cruzi* infection^[21]. In

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CONFLICTOS DE INTERÉS

Los autores, niegan conflictos de interés

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addition, COVID-19 may predispose patients to thrombotic disease^[24]. Increased procoagulant activity has been reported in the plasma of patients with chronic Chagas Disease^[25].

During the chronic phase of Chagas Disease, immunosuppression due to treatment and the disease itself leads to a high risk of Chagas Disease reactivation^[26,27]. For example, during COVID-19 presentation, cytokine storm, treatment with steroids and immunomodulators, and SARS-CoV-2 can trigger Chagas Disease reactivation, directly influencing the parasite and the host^[28-30].

Given the above, the spread of the COVID-19 pandemic in Latin America is of concern due to several reasons: the population infected with *T. cruzi* in our region, the burden of comorbidities, the socioeconomic vulnerability affecting Latin America, and the presence of saturated and weakened health systems due to the pandemic^[31].

Cases of Chagas Disease and COVID-19 co-infection have begun to be reported in Latin America. Most of these are in Brazil. The reports report cases of patients with chronic Chagas Disease infection with rapid disease progression to death from COVID-19^[5,11,32]. That could be due to both diseases' myocardial involvement, as previously explained. Therefore, it should be considered a risk factor for complications and unfavourable prognosis in patients with co-infection, especially in Chagas Disease patients with cardiomyopathy.

A study conducted in Brazil that compared the progression of COVID-19 between patients with chronic Chagas Disease and those without the disease reported a significantly superior difference in patients with chronic Chagas Disease concerning the prevalence of chronic heart failure (8 [25.8%] vs 12 [9.7%]; $p = 0.031$) and atrial fibrillation (9 [29.0%] vs 7 [5.6%]; $p < 0.001$). He also reported that patients with Chagas Disease more frequently presented pleural effusion on follow-up computed tomography^[32].

CHD affects many socially vulnerable populations, including population groups with a high burden of CHD among their inhabitants, presenting particular challenges in access to health services^[33]. In addition, low-income people are especially vulnerable to the economic impact of the pandemic, worsening access to health care.

The pandemic has led many people to generate feelings against going to hospitals, which could be detrimental to people vulnerable to *T. cruzi* infection and people living in Chagas Disease endemic areas^[34]. Likewise, Chagas Disease could generate a higher level of concern in patients, more accentuated in patients with co-infection, and could generate high levels of worry and stress^[18].

Although the indications for screening and diagnosis of Chagas Disease have not changed during the pandemic, actions for prevention, control, and care of neglected diseases, including Chagas Disease, were interrupted in many regional countries for various periods, mainly routine vector control actions^[35,36]. The number of studies regarding Chagas Disease and COVID-19 is limited in Latin America, deserving more research^[37,38]. With the expansion from rural to urban areas, this is also relevant^[39]. It is also important to

remember that patients with the indeterminate chronic form of Chagas Disease had a significant annual risk of developing cardiomyopathy. The annual risk was more than double among patients in the acute phase of *T. cruzi* infection^[40].

Finally, the COVID-19 pandemic is far from over in the region; there is still much to be understood not only at the epidemiological and clinical level but also in its pathophysiology and immune response, which includes the interaction with the *T. cruzi* virus and other pathogens, with which there may be co-infections and aggravate the patient's disease^[36]. Certainly, also would be important to assess the impact of cardiovascular long-COVID-19 and their implications among patients with Chagas Disease.

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