

Evidence has been reported on the influence that diet has on the immune system and susceptibility to disease. It has been shown that a deficit in specific nutrients affects the immune system through cell activation, changes in the production of signaling molecules, and gene expression. Nutritional deficiencies in energy, protein, and micronutrients have been associated with depressed immune function and increased susceptibility to infection.<sup>4</sup> In addition, dietary components are significant determinants of gut microbiota composition and, consequently, can shape the characteristics of immune responses in the body. Nutritional support therapies form part of the care for patients with a high degree of comorbidity and advanced age, factors related to a higher probability of presenting with poor progress (Fig. 1).

Just a few small studies have reported on the nutritional status of patients with COVID-19, and, in those works, it was clear that patients with nutritional deficiencies had poor progress.<sup>5</sup> We have not found any recommendations regarding treatment and prevention strategies in this regard, only opinion articles. If the nutritional status is a decisive factor in the progress of patients with infectious diseases, it leads us to ask ourselves, Is nutrition the forgotten risk factor in COVID-19 infection?

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## COVID-19 myopericarditis: A case report<sup>☆</sup>



### Miopericarditis por COVID-19: A propósito de un caso

Dear Director:

SARS-CoV-2 fundamentally causes a severe respiratory infection characterised by diffuse interstitial infiltrates. Some cases of myocarditis have been reported as causing arrhythmia, heart failure, cardiogenic shock, and even death in some patients.<sup>1,2</sup> The most likely pathophysiological mechanism is multifactorial: from the direct damage of the virus to the cardiomyocytes, the immune response generated by the body against the viral infection, or the hypoxia-induced injury.<sup>3</sup>

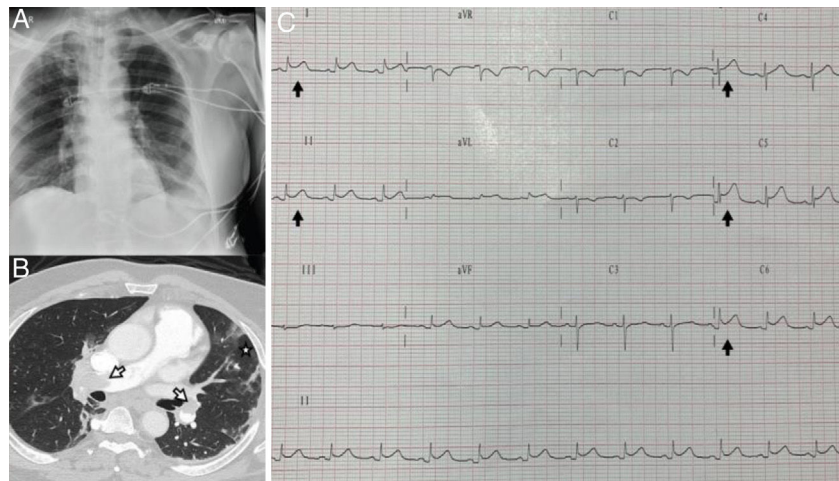
We present the case of a 61-year-old male with a history of obesity who self-referred for symptoms of progressive dyspnoea of five days since onset and was admitted with severe hypoxemic respiratory failure.

The chest radiography showed bilateral interstitial infiltrate (Fig. 1A). Severe pneumonia due to Covid-19 was suspected and confirmed via PCR. Due to hemodynamic and respiratory instability, orotracheal intubation and mechanical ventilation was required; a transthoracic echocardiogram (TTE) was performed which showed severe dysfunction of the right ventricle with paradoxical septal motion due to overload of the right cavities, in addition to severe tricuspid regurgitation.

With suspected pulmonary thromboembolism, computed tomography angiography (CT angiogram) of the chest was performed, confirming the presence of thrombi in both main pulmonary arteries (Fig. 1B). This clinical situation required high dose catecholamines and elevated oxygen requirements, so systemic fibrinolysis was administered. During admission, a progressive trend towards stabilisation of the clinical picture was observed with improved right ventricular function and normalisation of the cardiac damage markers.

On the seventh day of admission, under sedation and analgesia and connected to invasive mechanical ventilation, the patient presented electrocardiographic changes (ECG) with generalised concave ST elevation (Fig. 1C), confirming elevation of the cardiac damage markers. A new TTE was performed, showing adequate left ventricular ejection fraction (LVEF), with mild to moderate pericardial effusion, suggestive of acute myopericarditis.

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**Figure 1** A) Chest radiography. B) CT showing thrombi in both main pulmonary arteries (arrows), in addition to interstitial infiltrates (star). C) ECG with generalised concave ST elevation.

The patient showed satisfactory evolution and was moved to the ward 14 days after his initial admission.

In conclusion, SARS-CoV-2 infection can cause systemic involvement beyond respiratory failure, with cardiac complications common during the clinical progress of this disease,<sup>4</sup> with elevated morbidity and mortality. Therefore, it is vitally important to be highly aware when preventing and diagnosing these cardiac complications in order to properly manage these types of patients in intensive care units.

Serial ECG analysis, cardiac markers, and echocardiograms are recommended in patients with SARS-CoV-2 infection. Nevertheless, it can be hard to clinically differentiate between cardiac involvement due to sepsis or stress cardiomyopathy or due to a coronary syndrome.<sup>5</sup>

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### Conflicts of interest

The authors declare that they do not have any conflicts of interest.

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