MYOCARDITIS SECONDARY TO COVID 19 INFECTION: ABOUT A CASE AT THE CARDIOLOGY DEPARTMENT OF CHNU DE FANN

Abstract

Introduction

Coronavirus disease 2019 (COVID 19) is an emerging viral infection caused by the strain of coronavirus SARS-CoV-2, primarily affecting the respiratory system. However, it can be responsible for heart damage.

The aim of this work was to report a case of symptomatic myocarditis in a 53-year-old patient.

Patient and observation

We report the case of a 53-year-old patient with no particular history or cardiovascular risk factor found who had consulted in June 2020 in a hospital for dyspnea, dizziness and palpitations in whom the electrocardiogram had demonstrated ventricular tachycardia. The echocardiography was normal and coronary artery disease was ruled out on coronary angiography and antiarrhythmic treatment allowed it to regress. Two months later, after a break in therapy, this tachycardia recurred despite several electrical and chemical cardioversions. Subsequently, myocarditis was suspected. This motivated the
realization of a cardiac magnetic resonance imaging (MRI) which came back in favor of myocarditis. As part of the etiological research, RT-PCR and COVID 19 serology were requested and the serology returned positive for IgG.

Conclusion

COVID 19 disease is known for its respiratory manifestations. However, several cases of cardiac involvement, in particular myocardial damage, have been described and among these, a considerable proportion of arrhythmias. They can be multifactorial in origin, due to the virus itself, or the prolongation of the QT interval from various drug therapies. These arrhythmias are the source of sudden death, hence the interest of RT-PCR and COVID 19 serology, but also the need for early and appropriate management, as well as long-term monitoring of patients. cured patients.

Introduction

Coronavirus disease 2019 (COVID 19) is an emerging viral zoonosis-like infectious disease caused by the strain of coronavirus SARS-CoV-2 primarily affecting the respiratory system. However, in some cases it can be responsible for cardiac damage, namely myocarditis.

The aim of this work was to report a case of symptomatic myocarditis in a 53-year-old patient.

Case presentation

C. G. is a 53-year-old patient with no history who had consulted in June 2020 in a hospital for exertional dyspnea, dizziness, and palpitations. Hemodynamic constants were stable apart from regular tachycardia at 180 beats/minute.
(bpm) and physical examination was normal. The emergency electrocardiogram (ECG) showed monomorphic ventricular tachycardia (VT) (Figure 1a).

**Figure 1a:** Percritical ECG showing ventricular tachycardia

The patient had undergone electrical cardioversion allowing resinusalisation with negative and hollow T waves in the lower territory.

**Figure 1b:** ECG after electrical cardioversion with sinus rhythm

The transthoracic echocardiography (TTE) was normal, however the ultrasensitive troponinemia was positive, suggesting an ischemic etiology related to this tachycardia.
As part of the etiological assessment, a diagnostic coronary angiography performed revealed discreetly atheromatous coronaries without significant stenosis.

Discharge treatment was low dose beta blocker and amiodarone.

Two months later, after a break in therapy, the patient again felt the same symptoms, prompting his consultation in our department.

The examination noted regular tachycardia at 190 bpm, polypnea and arterial hypotension at 90/60 mmHg.

The ECG at entry again recorded this ventricular tachycardia with a rate of 180 cpm and was subsequently hospitalized.

The biology found a non-specific inflammatory syndrome with a hyperleukocytosis predominantly neutrophilic (13,920 / mm3) and a high C-Reactive Protein (131.4 mg / l).

The transthoracic cardiac Doppler ultrasound (TTE) this time noted an undilated cardiomyopathy with a mean alteration of the LVEF to 42% and disturbances of the segmental kinetics.

The evolution during hospitalization was marked by several recurrences of this ventricular tachycardia despite several electrical and chemical cardioversions, sometimes with cardiovascular collapsing episodes, as well as a persistence of the inflammatory syndrome. Faced with this picture of recurrent ventricular tachycardia and the elimination of an ischemic etiology, myocarditis was suspected.

Cardiac MRI was requested and was compatible with myocarditis with severe left ventricular dysfunction with early and late enhancement of the lateral and
lower basal and mid-ventricular segments (Figures 2a and 2b).

![Cardiac MRI after gadolinium injection showing subepicardial hypersignal in T1](image)

**Figures 2a et 2b:** Cardiac MRI after gadolinium injection showing subepicardial hypersignal in T1

Faced with this picture of myocarditis complicated by recurrent ventricular tachycardia, the HIV, hepatitis B and C serologies were negative. RT-PCR and COVID 19 serology were performed and PCR was negative, however serology was positive for IgG.

A regression of the tachycardia was noted at the 3rd week of hospitalization after optimization of the doses of B-blockers.

**Discussion**

COVID 19 presents a broad spectrum of cardiovascular complications, including acute heart failure, arrhythmias, myocarditis\(^1\).

A retrospective analysis of the causes of death in Chinese patients infected with COVID-19 found that 40% of patients died at least in part from myocardial injury and circulatory collapse.
Due to the relative novelty of COVID 19, data surrounding the association between COVID-19 and myocarditis is still being released.

However, we know that the ACE-2 receptor, the cellular gateway for SARS-CoV-2, which is very present in the upper airways and the lungs, is also in the heart. We can therefore think that the coronavirus infects cardiomyocytes by binding to the ACE2 receptor, which induces cell necrosis.

The exact pathophysiology of COVID-19 disease is still elusive. However, a consistent observation is the presence of a pro-inflammatory surge, the so-called “cytokine storm”.

ECGs are usually abnormal in patients with myocarditis, often showing arrhythmias. Nonetheless, dynamic changes could herald clinical deterioration and should be documented in all hospitalized patients with COVID-19.\textsuperscript{9}

Transthoracic echocardiography (TTE) for most reported cases of myocarditis in patients with COVID-19 has revealed altered LVEF.\textsuperscript{2,9}

Cardiac MRI is one of the first line diagnostic tools in the analysis of myocarditis associated with COVID-19.\textsuperscript{10,11} This is documented because several authors have used cardiac MRI to meet the criteria of Lake Louise to diagnose patients with myocarditis associated with COVID-19.\textsuperscript{5,7}

BEM is recommended in certain clinical situations to aid in the diagnosis of myocarditis.\textsuperscript{8} Histologic analysis usually reveals inflammatory infiltrates with myocyte degeneration and non-ischemic necrosis.\textsuperscript{13}
There are some data from randomized trials which conclude that the routine use of corticosteroids and other immunosuppressive strategies in patients with myocarditis is not recommended\textsuperscript{12}.

**Conclusion**

COVID 19 is a multi-faceted disease of which several cases of cardiac attack including myocardial described and among these, a considerable proportion of arrhythmias which can be of multifactorial origin either due to the virus itself, or the prolongation of the QT interval of various pharmacotherapies. Through this clinical case, we wanted to highlight the capital place occupied by additional investigations, in particular cardiac MRI, RT-PCR but also COVID 19 serology for the diagnosis which can be retrospective.

Myocarditis requires an adequate therapeutic attitude because it can lead to serious complications such as arrhythmias which can be life-threatening through sudden death, but also long-term monitoring of cured patients.

**Keywords:** myocarditis, COVID 19, ventricular tachycardia

**References**

1 Steve Stiles

Myocarditis by CMR May Be Rare After COVID-19 in Elite Athletes


3 S. Shi, M. Qin, B. Shen, et al.

Association of cardiac injury with mortality in hospitalized patients with COVID-19 in Wuhan, China [e-pub ahead of print]. JAMA Cardiol
4 J.H. Zeng, Y.X. Liu, J. Yuan, et al.
First case of COVID-19 complicated with fulminant myocarditis: a case report and insights
Infection (2020), pp. 1-5

5 Q. Ruan, K. Yang, W. Wang, L. Jiang, J. Song
Clinical predictors of mortality due to COVID-19 based on an analysis of data of 150 patients from Wuhan

6 G. Tavazzi, C. Pellegrini, M. Maurelli, et al.
Myocardial localization of coronavirus in COVID-19 cardiogenic shock
Eur J Heart Fail, 22 (2020), pp. 911-915

Cardiac involvement in a patient with coronavirus disease 2019 (COVID-19) [e-pub ahead of print]. JAMA Cardiol

8 D. Fairweather, L.T.J. Cooper, L.A. Blauwet
Sex and gender differences in myocarditis and dilated cardiomyopathy Curr Probl Cardiol, 38 (2013), pp. 7-46

9 J. He, B. Wu, Y. Chen, et al.
Characteristic electrocardiographic manifestations in patients With COVID-19 J Cardiol, 36 (2020), pp. 966.e1-966.e4

10 Y. Han, T. Chen, J. Bryant, et al.

Cardiovascular magnetic resonance in myocarditis: a JACC white paper J Am Coll Cardiol, 53 (2009), pp. 1475-1487

12 J. Coyle, E. Igbominwanhia, A. Sanchez-Nadales, et al.
A recovered case of COVID-19 myocarditis and ARDS treated with corticosteroids, tocilizumab, and experimental AT-001 [e-pub ahead of print]. JACC Case Rep
Current state of knowledge on etiology, diagnosis, management, and therapy of myocarditis: a position statement of the European Society of Cardiology Working Group on Myocardial and Pericardial Diseases  
Eur Heart J, 34 (2013), pp. 2636-2648, 2648a-d