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Clinical Image

Covid-19-Associated Myopericardial Injury: A Macro and Microscopic Description

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Abstract: Authors describe autoptic findings of two cases whose COVID-19 diagnosis was supported by laboratory data. Both patients were Caucasian individuals of middle age (one male, 47 years old; the other a female aging 36 years) that were considered as previously healthy. Clinically they died from cardiorespiratory insufficiency while being treated in intensive care units. None of them was intubated and blood oxygen levels (SpO2) decreased below 90% only during the agonal phase. Myopericardial changes were visible from a macroscopic point of view, with hemorrhagic and necrotic areas involving pericardium. Fresh hemorrhage and severe hyperemia were both signs of vascular damage and extravasation leading to acute myocardial injuries. Lymphocytic presence was disparate and not constant.

Keywords: Covid-19; Myocarditis; Pericarditis; Endothelial Injury

1. Introduction

Covid-19-related myopericardial injuries are documented from several sources, during the acute phase and the convalescence [1]. Doubts have been raised even with regard to a still unproven link between vaccines and myocarditis among other, as with other vaccinations' potential adverse effects.

We describe two lethal cases following Covid-19 infection that were both positive in two consecutive SARS-CoV-2 PCR (nucleic acid amplification) tests for each case.

The **first patient** was a Caucasian male of 46 years old, previously healthy, that complained of general malaise, fever, sweating and profuse muscular pain. His oxygen levels (SpO2) remained within norm until two days prior his death, when he suddenly accused chest pain, shortness of breath and fainting.

His heart showed stringent signs of myopericardial necrosis and hyperemia in the macroscopic view (Figure 1), with no visible enlargement of cardiac chambers. Histological findings were compatible with a viral myocarditis, but pericardial sac was in some areas inundated with extravasation elements (*Figures 2A and 2B*).

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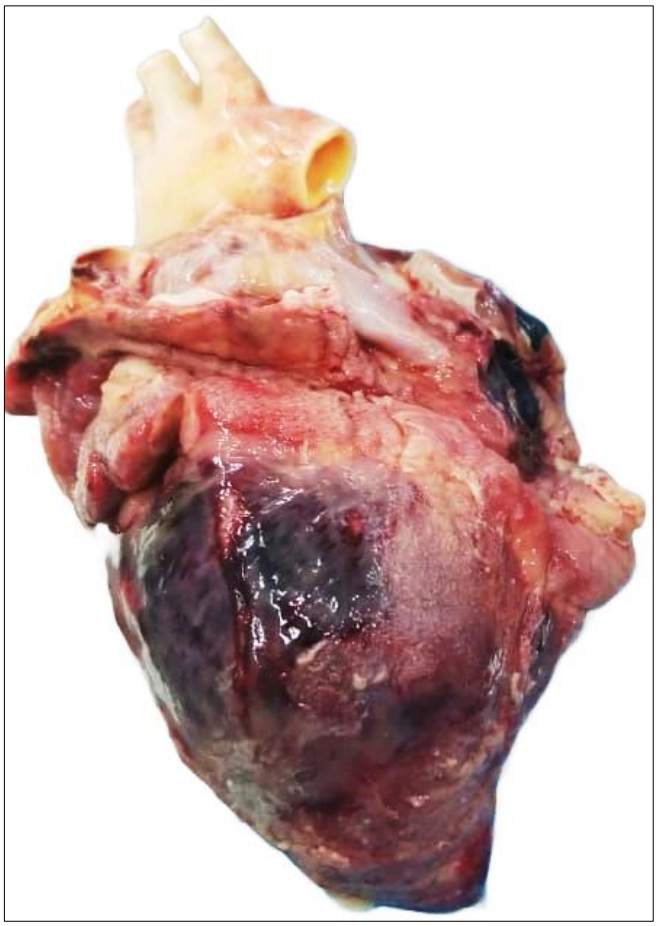

Figure 1. Large, hyperemic and necrotic areas in the anterior cardiac regions.

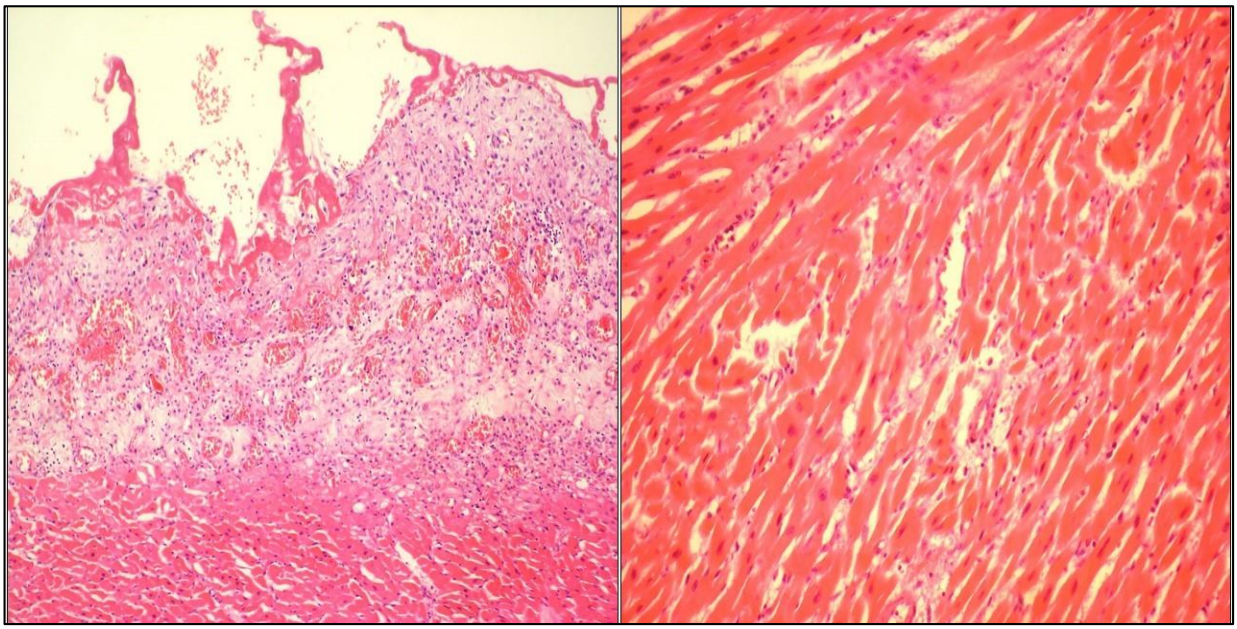

Figure 2. 2***A-Left inset,*** edema and hyperemia in the epicardial region, with lymphocytic infiltration. Fibrin strands in the pericardial space compatible with severe fibrinous, nonspecific inflammation. ***2B-Right inset,*** widening of intercellular space between the myocytes, with moderate presence of lymphocytic cells. (H-E; X20).

The **second case** was a female patient aged 37 years, slightly obese but otherwise healthy, emergently hospitalized due to severe dyspnea, during the period of pandemics. Her SpO2 upon admission was 90%, and she accused profuse sweating, cough and hypotension with episodes of vomiting. The next day she had an episode of ventricular fibrillation, unresponsive to cardiopulmonary resuscitation measures.

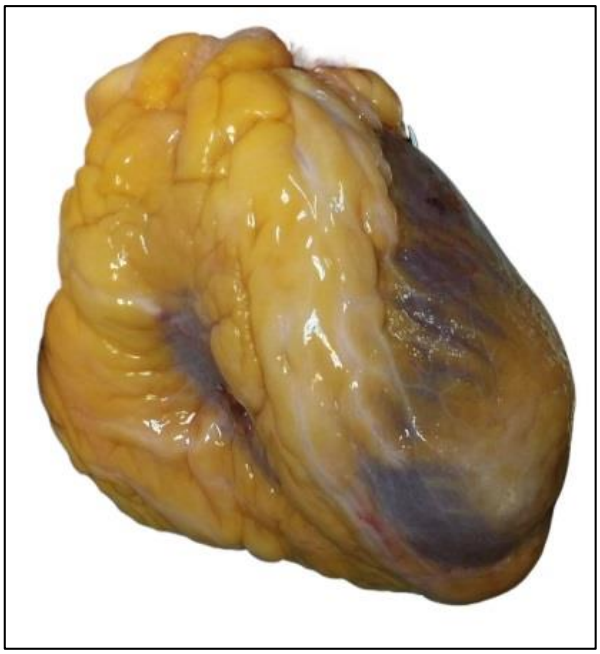

Figure 3. Macroscopic view of the heart, with fatty changes and necrotic areas.

Autoptic findings suggested fatty changes of the heart, and necrotic apical areas in the left ventricle (Figure 3). Histological changes are described below (*Figures 4A and 4B*).

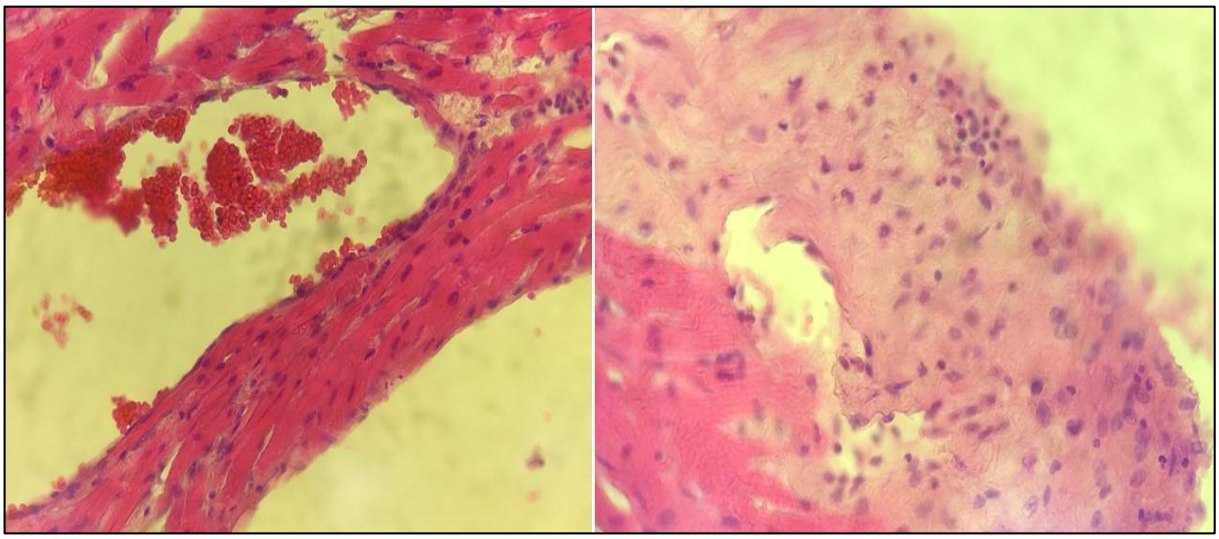

Figure 4. ***4A-Left inset,*** freshly extravasation of red blood cells in the background of interstitial edematous myocardium. ***4B-Right inset,*** inflammatory cellular elements embedded inside fragmented myofibrils of the left ventricle myocardial tissue. (H-E; X100).

In a series of 21 autopsies of Covid-19 patients, myocarditis was the main pathological finding. Other forms of acute myocyte injury, here including coronary artery and pericardium involvement, have been reported [2].

Respiratory tract involvement and complications are the most common reported events. However, SARS-CoV-2 infection clearly leads also to a diversity of cardiac events, here including acute coronary syndromes, myocardial infarct and heart failure, with an increased probability of lethal outcome. Different hypotheses are raised with regard to vascular and endothelial injuries during and following Covid-19, with sources denoting in particular the importance of macrophages-mediated cardiac inflammation [3].

Acknowledgments

None

Conflict Of Interest

Nothing to declare

References

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