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Case report

COVID-19: Our story – the beginning

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Abstract **Background.** Cardiovascular diseases are common in patients with coronavirus disease 2019 (COVID-19) and carry the risk of developing a severe clinical presentation varies from a syndrome similar to acute coronary syndrome and acute fulminant myocarditis to cardiogenic shock.
Case reports. This paper presents a patient with a history of cardiovascular and pulmonary diseases admitted to the hospital with COVID-19 and LV dysfunction. Our main findings are that cardiac involvement can occur with COVID-19 with signs of the respiratory tract and symptoms of infection. We diagnosed COVID-19, which triggered the emergency on our department. We have never experienced anything like this before.
Conclusion. Myocardial injury has a significant association with fatal outcomes of COVID-19, while the prognosis of patients with underlying CVD but without myocardial injury appears relatively favorable.

Kew words COVID-19, myocardial injury

"Open your mind for new diagnostic/ therapeutic approach: we are the students again…" Dr Aleksandar Veljkovic, Head of Interventional Pulmonology - San Luigi University Hospital Gonzaga of Orbassano

Introduction

Cardiovascular diseases are common in patients with coronavirus disease 2019 (COVID-19) and carry the risk of developing a severe clinical presentation varies from a syndrome similar to acute coronary syndrome and acute fulminant myocarditis to cardiogenic shock. The first cases of (COVID-19) were reported in the end of December 2019, originating in Wuhan, China, with rapid spread worldwide[1]. The emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes COVID-19, has rapidly grown into a pandemic, and a large proportion of affected patients have been reported to have underlying cardiovascular diseases (CVD).[2,3]

Do COVID-19 patients have a significantly increased incidence of myocarditis, arrhythmias or acute heart failure? COVID-19 is associated with a high inflammatory burden that can induce vascular inflammation, myocarditis, and cardiac arrhythmias. SARS CoV-2 appears to affect the myocardium and cause myocarditis. Biopsy–proven myocarditis is more common in the young, may occur in the middle age, but is rare in the elderly Cardiac biomarker studies suggest a high prevalence of myocardial injury in hospitalized patients. Myocardial injury defined as increased troponin (Tn) and natriuretic peptides, and it is likely associated with infection-related myocarditis and/or ischemia and is an important prognostic factor in COVID-19. COVID-19 can cause a viral pneumonia with additional extra-pulmonary complications. A many of patients have underlying CVD and/or cardiac risk factors. Negative predictors for death in COVID-19 include older age (>60-70 years), male sex, and comorbidities such as hypertension, diabetes mellitus, CVD and chronic obstructive pulmonary disease (COPD). Acute cardiac injury (elevated high-sensitivity troponin levels) is observed in severe cases and is strongly associated with mortality. Acute respiratory infections are well-recognized triggers for CVD and the underlying CVD is usually associated with comorbidities, which may increase the incidence and severity of infectious diseases[4].

Case presentation

We present an obese 77 years-old woman with previous history of cardiovascular and pulmonary diseases. She arrived at the emergency room 22nd March with shortness of breath, severe dyspnea without fever and cough. On admission to the emergency department, physical examination revealed blood pressure of 140/80 mmHg, heart rate of 100 beats per minute, oxygen saturation of 91 % while breathing ambient air, and body temperature of 36,4°C. The patient was admitted to the intensive care unit with a diagnosis of pulmonary edema?! Capillary gas analysis showed a pH of 7,38 oxygen partial pressure of 8,93mmHg, carbon dioxide partial pressure of 7,52 mmHg. A 12-lead electrocardiogram (ECG) showed the minimal transient ST-segment elevation in the inferior lead and the minimal ST-segment depression in lateral lead, as well as ECG changes during hospitalization and the occurrence of atrial fibrillation with a rapid ventricular response (Figure 1, 2, and 3).

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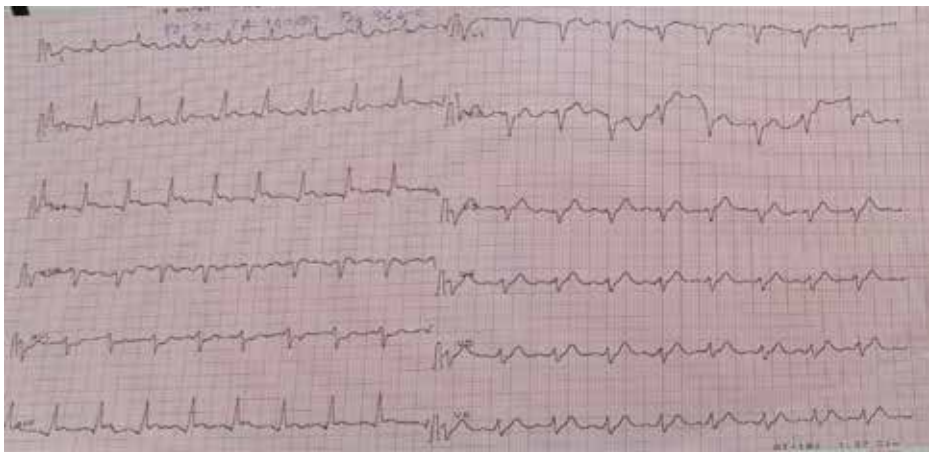

Figure 1. A 12- lead electrocardiogram on admission

Figure 2. ECG changes during hospitalization

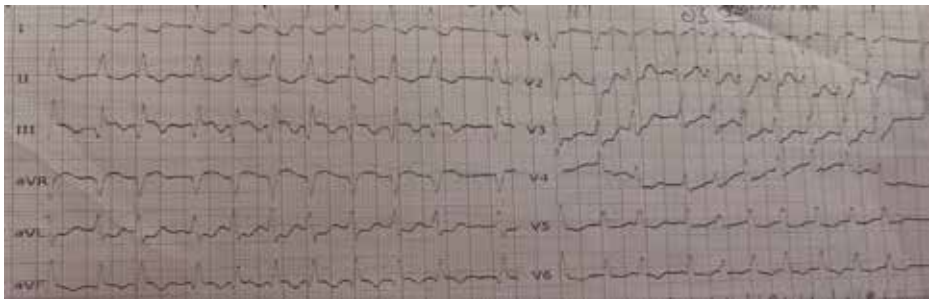

Figure 3. Atrial fibrilation with a rapid ventricular response on 26th March

23.03.dry cough occurs, fever up to 38,5 o C. Blood tests revealed elevated levels of markers of myocyte necrosis TnI 157,0 NG/ML and creatine kinase–MB level of 110 IU/L elevated LDI level of 728 IU/L, increase in C-reactive protein levels of 42,64 mg/L and blood cells WBC 19,8 x 10^9/L Ly 2,45 x 10^9/L, ferritin 167 ng/ml Blood sample tests also revealed hypokalemia, hypochloremia and hyperglycemia. Transthoracic echocardiography revealed normal left ventricular (LV) dimensions with an estimated LV ejection fraction (LVEF) of 50%. There was no evidence of severe heart valve disease. Left ventricular diastolic function was mildly impaired with mitral inflow patterns. Given the echocardiography changes, regional wall motion abnormalities (hypo-kinesis posterior, lateral wall, akinesias to hypo-kinesis inferior wall) and elevated markers of myocardial necrosis, urgent coronary angiography was indicated, but was not performed. Findings on chest radiography:23.03. pronounced hypostasis changes, hilus trimmed. On 24.03. pulmonary changes in the lungs In the lower lung field, blotchy shading that corresponds to pulmonary consolidation.

Based on the clinical history and the COVID-19 outbreak, COVID-19 was deemed as likely. Lung ultrasound – Comet sing and highly suspected interstitial pneumonia. MSCT thorax in the lungs mutually discrete changes in the form of ground glass (Figure 4). We suspected (courtesy Dr G. Grujic) a coronavirus infection and immediately called to request a nasopharyngeal swab. The patient did not meet the national criteria for coronavirus testing, but we decided to do it anyway. Even before we received the test result, our decision was to isolate the patient because the risk of not doing so was too high.

A nasopharyngeal swab was performed with a positive result for SARS-CoV. Further treatment was continued in a tertiary institution.

Here in, we describe a patient with a history of cardiovascular and pulmonary diseases admitted to the hospital with COVID-19 and LV dysfunction. Our main findings are that cardiac involvement can occur with COVID-19 with signs of the respiratory tract and symptoms of infection. We diagnosed COVID-19, which triggered the emergency on our department. We have never experienced anything like this before.

Discussion

COVID-19 is the clinical manifestation of infection with SARS-CoV2 and most frequently presents with respiratory symptoms that can progress to pneumonia and, in severe cases, acute respiratory distress syndrome (ARDS) and shock. We are dealing with a severe emergency. There is increasing awareness of the cardiovascular manifestations of COVID-19 disease and the adverse impact that cardiovascular involvement has on prognosis[5]. Some parameters of poorer disease outcome: high values of D dimer (microthrombosis), lymphopenia, increased values of LDH, ferritin, cardio-tropic enzymes, IL 6.[6]

Putative mechanisms of myocardial injury in COVID-19 patients are ACE2 mediated direct damage, hypoxia-induced myocardial injury, cardiac microvascular damage and systemic inflammatory response syndrome. Myocardial injury has a significant association with fatal outcomes of COVID-19, while the prognosis of patients with underlying CVD but without myocardial injury appears relatively favorable.

Myocardial injury is associated with impairment of cardiac function and ventricular tachy-arrhythmias. Arrhythmia is not common feature of COVID-19. Inflammation may be associated with myocardial injury. Aggressive treatment may be considered for the patients with myocardial injury.[7]

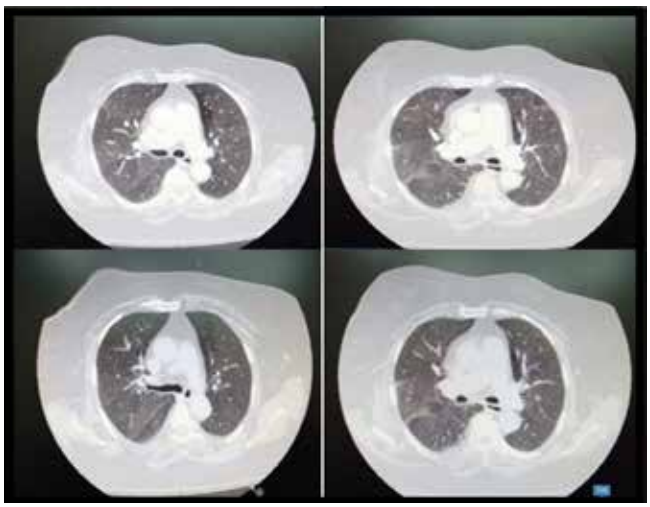

Figure 4. MSCT thorax "Ground glass"

Clinical information about COVID-19 symptoms: Fever 83-88%, Cough 68-82%, Dyspnea 22-31% 2. Severity: Mild-Moderate 60-80% Severe 15-25% Critical 5-15% 3.Mortality risk : older age, comorbidities, respiratory failure 4.Laboratory : Lymphopenia 50%, CRP elevation, IL-6 high. PCT low. (8,9) Diagnosis of COVID 19 is based among other things on RT-PCR (sensitivity ≈ 60-95%).
Up to approximately 50% of patients with COVID-19 infection may have normal CT scans 0–2 days after onset of flu-like symptoms from COVID-19. COVID-19 RT-PCR sensitivity may be as low as 60-70%; therefore, patients with pneumonia due to COVID-19 may have lung abnormalities on chest CT but an initially negative RT-PCR Lung abnormalities during the early course of COVID-19 infection usually are peripheral focal or multifocal ground-glass opacities affecting both lungs in approximately 50%–75% of patients. As the disease progresses, paving and consolidation become the dominant CT findings, peaking around 9–13 days followed by slow clearing at approximately 1 month and beyond (10).

Conclusion

The global pandemic caused by COVID-19 has affected **4 088 848** worldwide, in Serbia **10 438**, mortality **2,16%***
Discriminating between a cardiac or respiratory etiology of symptoms can be challenging since each may present predominantly with dyspnea. It is also critical to recognize when cardiac and pulmonary involvement coexist.
A 2020 report by the China Medical Treatment Expert Group for COVID-19 showed the spectrum of clinical and diagnostic features associated with SARS-CoV-2 infection among. (11) This case provides records of cardiac involvement as a possible early onset of the viral respiratory infection and the simultaneous presence of coronary disease. The predominant presenting symptoms of this patient were cardiac in nature without symptoms suggestive of infection.

* data taken from covid.rs source Institute of Public Health of Serbia updated for the world on 12.05. and for Serbia 15.05.2020)

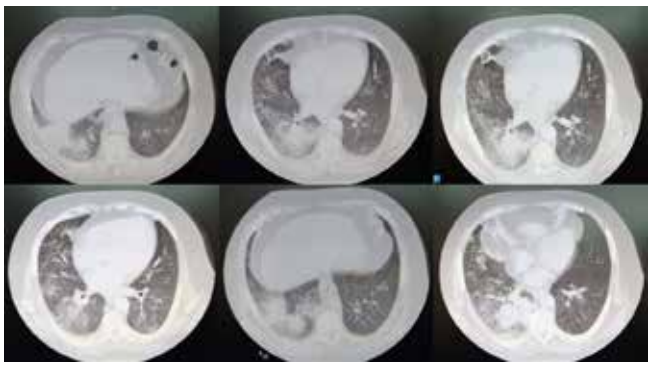

Figure 5. MSCT thorax bilateral pulmonary infiltration

"Before I came to this lecture, I was confused. After hearing it I am still confused, but on a higher level"
Enrico Fermi

Dilemma: this patient was COVID 19 negative?

The swab is the best we have. Even without test results, if a patient has a fever, cough, shortness of breath, and an X-ray showing lung infiltrates, it should be considered positive.

This case presentation is dedicated to all health professionals who managed Covid 19 patients during pandemia, with some of them get sick and even died during the course of the infection

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