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Case Report

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COVID-19 & Refractory Cardiogenic Shock

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Introduction

Coronavirus disease 2019 (COVID-19) is the clinical manifestation of infection by severe acute respiratory syndrome related coronavirus 2 (SARS-CoV-2), cardiac manifestations are poorly understood, but early data suggest that individuals infected with the novel pathogen are susceptible to develop myocarditis [1].

In the study conducted in Spain, between the 1st of march till the 15th of April 2020, urgent cardiac catheterization was carried out in 23 patients with a suspected ST-elevation acute coronary syndrome or cardiorespiratory arrest. Seven of them (30%) tested positive for COVID-19 by polymerase chain reaction (PCR) in nasopharyngeal exudate. Of the 7 testing positive for COVID-19, 4 developed cardiogenic shock immediately after arrival at the hospital. Three of these 4 patients died, yielding a mortality rate of 75% in the context of cardiogenic shock [2].

Case description

78-year-old woman, with diabetes mellitus type 2, hypertension and ischemic cardiomyopathy as cardiovascular risk factors, and neglected hernia, presented dyspnea, mild confusion and disorientation, 2 days after, she was transferred to the intensive care unit. Her presenting vital signs were a Glasgow score of 13/15, 100/80 mmHg with 78 beats per minute, oxygen saturation of 80% on room air, respiratory rate 32 breaths per minute, body temperature was 37.2°C and glycemia was 5g/l.

Within minutes she developed a severe hypotension (systolic blood pressure, diastolic blood pressure with tachycardia and arrythmia, she also experienced an aggravation of her dyspnea with severe oxygen desaturation (<80%) she required orotracheal intubation as well as mechanical ventilation, intravenous dobutamine was started with a dose of 5mcg/kg/min. The electrocardiogram was showing a depression of ST segment in inferior and lateral, ventricular bigeminy and numerous ventricular extrasystoles, Echocardiography was remarkable for a ventricular hypertrophy and hypokinesia at its lateral-anterior and anterior segments, severe mitral valve regurgitation, a left ventricular fraction of ejection of 35%, right ventricle of limited function with a pulmonary hypertension of 60mmhg and a dilated vena cava (22mm) with low compliance.

The patient received a loading dose of amiodarone (150mg), norepinephrine (0.5 mg/hour) and furosemide, she also received antibiotics: azithromycin 500mg and 2g of ceftriaxone (we could not administer hydroxychloroquine in presence of repolarization abnormalities).

Initial laboratory test was remarkable for elevated white blood cells (23560), elevated neutrophils (21675), elevated lymphocytes (942), normal blood platelets count (297000), elevated CRP (430), hyponatremia (127) and normokalaemia (4.05), urea: 0.94 and creatinine at 13.5 as well as elevated cardiac markers with troponin: 17666 (ref <100).

Computed tomography (CT) of the head was negative for intracranial hemorrhage, CT chest showed ground glass opacities compatible with SARS-COV-19 infection which was confirmed with nasopharyngeal secretions PCR.

She was transferred to the cardiac catheterization unit for which revealed a stenosis of the ostial circumflex artery, a calcified proximal and medium portion of the anterior interventricular artery stenosis and a tight stenosis of the posterior interventricular artery. At completion of the

procedure an angioplasty with a double stent placement in the proximal and the medium portion of the anterior interventricular artery but the patient died within hours due to refractory cardiogenic shock.

Discussion

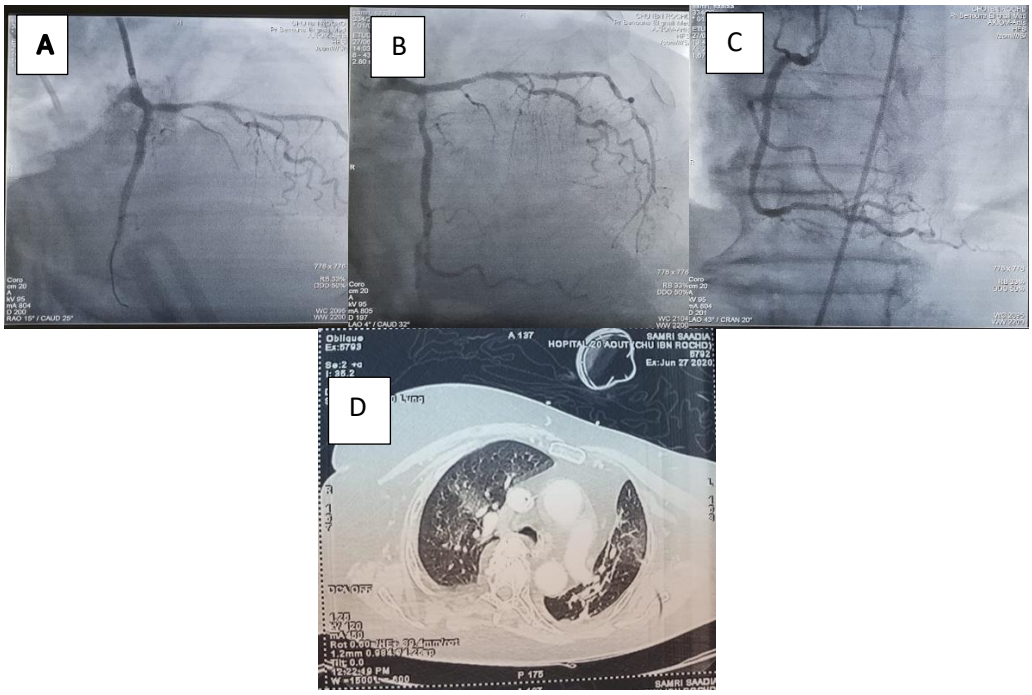
Although the principal manifestation of SARS-COV-2 infection have been documented as respiratory, myocardial injury was reported in 5 out of the first 41 cases diagnosed in Wuhan, china (1) other early reports from the region indicate that patients admitted to intensive care with SARS-COV-2 had high sensitivity cardiac troponin and creatine kinase myocardial band fraction pointing to a higher severity of disease associated with cardiac injury [3].

Cardiogenic shock can develop suddenly in COVID-19 patients and can have different causes, it is essential to perform a differential diagnosis with a view toward etiological treatment.

Myocardial inflammation underlies the acute myocarditis and SARS-COV-2 particles have recently been demonstrated in the myocardium of these patients [4]. Myocardial injury was equal between men and women, cardiovascular risk factors were presents as dyslipidemia, hypertension and morbid obesity [2,5]. Symptoms were generally dyspnea and chest pain with hypotension complicating the clinical course defining the cardiogenic shock [2].

Inotropes and vasopressors were used to improve cardiovascular function, hydroxychloroquine and azithromycin were used despite the presence of arrythmias and repolarization abnormalities that was not the case in our study, extrasystoles and ventricular bigeminy contraindicated the use of the latter drugs.

This case was treated with double percutaneous stent placement, as is recommended in the related clinical practice guidelines. The cause of death remains refractory cardiogenic shock in the majority of the cases.



A: Successful stenting of the culprit lesion (rCx) with a 3 TIMI flow. B: A caudal view with a significant stenosis in the ostium of the rCx artery and a calcified left descending artery. C: Oblique left anterior 30° view with a very distal stenosis in the right coronary artery. D: chest CT scan showing ground glass opacities consistent with SARS-COV infection.

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