Pheochromocytoma presenting as fulminant myocarditis mimicking COVID-19 pneumonia

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Abstract

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Title page

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Keywords: Pheochromocytoma- Adrenergic myocarditis- Fulminant myocarditis- COVID-19

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None.

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Ethical statement

Written informed consent was obtained from the patient.

Data availability statement

The data of this case are available from the corresponding author upon reasonable request.

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Abstract

Adrenergic myocarditis is a very rare manifestation of pheochromocytoma. On the other hand, due to the pandemic situation, COVID-19 pneumonia is now considered a differential diagnosis of patients with dyspnea. This case illustrates diagnostic difficulties of such uncommon disease during this pandemic situation.

Keywords: Pheochromocytoma- Adrenergic myocarditis- Fulminant myocarditis- COVID-19

Key clinical message:

Adrenergic cardiomyopathy is uncommon but can be fulminant and life-threatening. Nowadays, the need to exclude the possibility of COVID-19 pneumonia in patients with acute dyspnea in previously healthy adult may cause a delay in the diagnosis.

1. Introduction:

Pheochromocytomas are rare catecholamine-producing neuroendocrine tumors. Unusual presentations, including cardiovascular manifestations, have been reported but fulminant myocarditis as first manifestation of pheochromocytoma is extremely rare[1, 2].

On the other hand, due to the pandemic situation, COVID-19 pneumonia is now considered a differential diagnosis of patients with dyspnea. So that, other diseases having the same symptoms may be misdiagnosed[3].

Here, we report a case of adrenergic cardiomyopathy mimicking COVID-19.

2. Case report:

A 40-year-old woman was admitted to the emergency department for an acute shortness of breath.

Three days before her admission she presented epigastralgia, vomiting and myalgia.

On physical examination: temperature= 38°C, BP= 100/60 mmHg, HR= 100 bpm, SpO_2 100% with oxygen therapy at 15 l/min.

These findings led to the suspicion of a Sars-Cov2 infection.

Blood examinations showed the following results: white blood cells: 27,000 /µL (normal 4000-10000); lymphopenia: 700/µl (1000-4000); C-reactive protein 35 mg/L (normal <5); troponin: 8.84 ng/mL (normal <0.05); BNP 270 pg/ml (normal <74); CK : 532 UI/l (normal<171).

The chest CT revealed asymmetric and diffuse ground glass opacities associated with septal thickening, consolidations and confluent nodules (Fig.1) compatible with Covid-19 pneumonia.

Three COVID-19 PCR tests were negative.

The day following his admission, the patient presented an acute chest pain with tachycardia, hypotension, confusion and cardiac arrest. The patient was successfully resuscitated, intubated, and mechanically ventilated.

The ECG showed a sinus tachycardia at 110 bpm with ST segment depression in the inferolateral leads.

Transthoracic echocardiography (TTE) revealed left ventricular septico apical hypokinesis with ejection fraction (LVEF) of 20%.

Blood examinations gave the following values: troponin : 9 ng/mL; BNP 1558 pg/ml ; white blood cells, 27.000/µL.

Anti-nuclear antibodies and serological tests for the most common cardiotropic viruses were negative. Multiple blood, urine and bronchial aspirate cultures were sterile. Coronary angiography was normal.

Thus, the diagnosis of myocarditis complicated with pulmonary edema and cardiac arrest was made based on: hypoxemia, localized depolarization disorder, echocardiographic findings and abnormal cardiac biomarkers.

Cardiac magnetic resonance imaging (MRI) wasn't done because of tachycardia and dyspnea.

A second chest scan (9 days later the first) showed the disappearance of the opacities (Fig.2).

The Sars-Cov2 pneumonia was eliminated because of a negative PCR, serologies and the quick disappearance of the ground-glass opacities.

CT slices exploring the upper abdominal floor showed a heterogeneous mass on the left adrenal gland, measuring 52×46 mm with hyperdense component suggesting hemorrhagic content (Fig.3). MRI examination showed a heterogenous adrenal mass with hypersignal areas on T1 weighted images related to hemorrhage (Fig.4).

After stabilization, the patient was referred to the Endocrinology Department for further exploration.

Laboratory tests of 72-hour urine catecholamines metabolites revealed mildly increased normetanephrine, but normal metanephrine as shown in table 1. The diagnosis of pheohromocytoma was suspected.

	Day 1	Day 2	Day3	Normal values
normetanephrine nmol/creat	303	370	284	40 - 280
metanephrine nmol/creat	88	86	59	15-120

Table 1: 72-hour urine catecholamines metabolites

TTE and cardiac MRI, performed 16 days later, were normal.

Left adrenalectomy was performed after pharmacological preparation. Histopathological evaluations confirmed the diagnosis of pheochromocytoma.

The evolution was good at 8 months follow-up. No symptoms, including cardiovascular, were noted.

3. Discussion:

This case demonstrates an unusual presentation of pheochromocytoma as acute myocarditis complicated by pulmonary edema, cardiogenic shock and cardiac arrest.

Pheochromocytoma is a rare catecholamine-secreting tumor associated with several catecholamine-induced cardiovascular complications. Adrenergic myocarditis is a rare serious complication of pheochromocytoma[4-7].

Myocarditis is caused by the chronic exposure and the sudden excessive release of catecholamine. Actually, the long-term elevation of adrenaline and noradrenaline leads to downregulation of β-adrenoreceptors leading to suboptimal function of myofibers and decreased number of contracting units.

Therefore, heart failure symptoms are the common presentation of adrenergic myocarditis, which makes it difficult to render a definite diagnosis[6].

It has been suggested that an acute hemorrhagic necrosis of the tumor may cause an abnormally high catecholamine release which lead to cardiogenic shock[7] . This finding concord with our case in which the adrenal mass has a frankly hemorrhagic CT density and MRI signal.

On the other hand, there has been a concern regarding the failure to diagnose covid-19 cases since the outbreak of the pandemic mostly due to the absence of any specific signs. This applies to viral myocarditis which has been reported in the literature as an initial cardiac complication of covid-19. Many patients experienced tachycardia and acute-onset heart failure with cardiogenic shock. Yet, no specific echocardiographic features of myocarditis exist[8].

Diagnostic gold standards for myocarditis are endomyocardial biopsy or cMRI (during the acute phase). Nevertheless, according to a position statement of the ESC diagnosis can be made from clinical and biochemical findings[9]. In our case, the diagnosis of adrenergic myocarditis was based on clinical, laboratory and echocardiography findings. Unfortunately, endomyocardial biopsy is not performed in our country.

The presence of fever on admission could be explained by the cytokine release from pheochromocytoma cells[10].

The prognosis of patients with pheochromocytoma-associated adrenergic cardiomyopathy depends greatly on its early diagnosis[1]. The later, despite being crucial to avoid life-threatening complications, is often challenging. The present pandemic makes it even worse since it mandates the exclusion of Covid-19 pneumonia in patients with acute dyspnea[3]. Myocardial injuries are also common in covid-19 patients, accounting for 7 to 23 % of the reported cases in Wuha[11].

In conclusion, adrenergic cardiomyopathy is a rare entity with a variable clinical presentation. It can be fulminant and life-threatening. Nowadays, the need to exclude the possibility of COVID-19 pneumonia in patients with acute dyspnea in previously healthy adults may cause a delay in the diagnosis and treatment, which increases the risks of morbidity and mortality.

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Ethical statement

Written informed consent was obtained from the patient.

Consent statement

The authors have confirmed during submission that patient consent has been signed and collected in accordance with the journal's patient consent policy.

Author contributions:

Meriem Adel: involved in conception and design of study, literature search, and drafting of article. Imen Rojbi, Meriem Affes, and Ibtissem Ben Nacef: involved in design of manuscript, literature search, and drafting of article. Meriem Affes, Saoussen Hantous and Myriam Jrad: involved in radiographic image acquisition and interpretation. Karima Khiari: involved in design of manuscript, drafting of article, and final approval. All authors read and approved the final version of the manuscript.

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