



Fatal rhabdomyolysis caused by COVID-19 infection: a case report

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Introduction and importance: COVID-19 is a systemic viral disease complicated with medical conditions. Severe rhabdomyolysis during the COVID-19 course is not until now well known.

Case presentation: The authors presented a 48-year-old female with fatal rhabdomyolysis caused by COVID-19 infection. She was referred to us with cough, generalized myalgia and arthralgia, and fever during the last week. Laboratory results showed an elevated erythrocyte sedimentation rate, elevated C-reactive protein level, and elevated creatine kinase. The nasopharyngeal swab confirmed the diagnosis of coronavirus 2 RNA infection. She was managed initially in the COVID-19 isolation department. Three days later, she was transferred to the intensive care unit and mechanically ventilated. Laboratory results were consistent with rhabdomyolysis. She died because of cardiac arrest due to continuous hemodynamic deterioration.

Clinical discussion: Rhabdomyolysis is a serious condition that can be fatal or cause disability. Rhabdomyolysis cases have been reported in COVID-19 patients.

Conclusion: Rhabdomyolysis cases have been reported in COVID-19 patients. Further studies are needed to understand the mechanism and to optimize the treatment.

Keywords: COVID-19, creatine kinase, myoglobinuria, rhabdomyolysis

Introduction

Coronavirus (SARS-CoV-2) infection is responsible since 2019 for a respiratory illness with varying severity worldwide^[1]. Extra-respiratory manifestations of this disease, which have been described and widespread concerned as public health, included the musculoskeletal involvements (MSK) such as fatigue, myalgia and myositis, arthralgia, symmetrical or poly-articular arthritis, reactive arthritis, new-onset backache, osteoporosis, aseptic osteonecrosis^[2-4]. The prevalence of MSK manifestations is 30%, according to studies^[4,5]. MSK manifestations of COVID-19 infection are fatigue, arthralgia and arthritis, myalgia and myositis, new-onset backache, osteoporosis, and aseptic necrosis^[4]. Rhabdomyolysis is a serious condition that can be fatal or cause disability^[6]. It occurs when the death muscle tissue releases its proteins and electrolytes into the blood stream, complicated by acute renal failure, metabolic acidosis, disseminated intravenous coagulation, and cardiac arrest^[7,8]. The etiologies

HIGHLIGHTS

- Covid-19 is a systemic viral disease complicated with medical conditions that surprise healthcare professionals.
- Rhabdomyolysis is a serious condition that can be fatal or cause disability.
- Rhabdomyolysis cases have been reported in COVID-19 patients.
- Early diagnosis of this complication is essential to avoid serious complications or death by initiating the management.

are multiple, including muscle compression, alcohol, medications, malignant hyperthermia, infections, and others. Infections that can cause rhabdomyolysis are variables that include bacterial, viral, and other infections. Viruses include respiratory viruses such as influenza and para influenza viruses^[9,10]. COVID-19 is mainly a respiratory virus. Patients who present classic clinical manifestations and laboratorial diagnostic tests are estimated at less than 10%^[9]. Severe rhabdomyolysis during the COVID-19 course is not until now well known^[11]. For that, we present a case of rhabdomyolysis during COVID-19 infection.

All our cases has been reported in line with THE CARE 2017 guidelines^[12] and THE SCARE 2020 criteria^[13].

Case presentation

A 48-year-old non-alcoholic, non-smoker female patient presented to our out-hospital clinic in Al-Sham Medical Complex Hospital, Damascus, Syria, with a cough, generalized myalgia and arthralgia, and fever during the last week. Her physical examination revealed: a temperature; of 36.9°C, pulse of 76/m, blood pressure = 132/78 mmHg, and oxygen saturation of 96%

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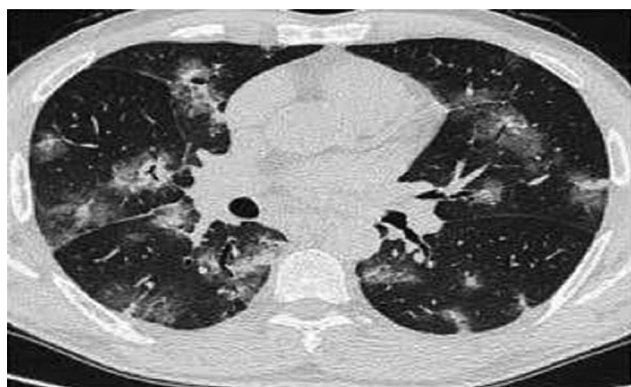


Figure 1. Computed tomography revealed mild pulmonary infiltrations.

in room air. The body mass index was 26. The clinical examination only revealed diffuse arthralgia and myalgia. She had no previous medical history. She had had no chronic diseases, or previous treatment with any medication. She had no previous medical family history, such as genetic disease, cancer, blood hypertension, or diabetes mellitus. Laboratory results revealed: an elevated erythrocyte sedimentation rate of 42 m/h ($N=0-20$), elevated C-reactive protein level of 16 mg/dl ($N=0-6$), and elevated creatine kinase levels at 12 700 IU/l ($N=200$). The remain tests were unremarkable. The nasopharyngeal swab confirmed the diagnosis of coronavirus 2 RNA infection. Gene Finder COVID-19 and real amp Kit has been used through reverse Transcription and real-time reverse transcription-polymerase chain reaction from RNA extracted from nasopharyngeal swab (ELITe InGenius, France). The viral stain is not known. The patient had mild disease, according to the WHO classification^[14]. Computed tomography showed mild pulmonary infiltrations (Fig. 1).

She was hospitalized in the COVID-19 isolation department. Three days later, she was admitted to the intensive care unit for confusion, high fever (39.8 °C), tachycardia (125/m), hypotension (75/40 mmHg), and a Glasgow score of 10/15. Laboratory test results were: White blood cells 10 000, with normal differentiation, erythrocyte sedimentation rate 61 m/h, C-reactive protein level 36 mg/dl, Creatine phosphokinase (CPK) 542310 IU, myoglobin more than 15 000 g/l, Aspartate aminotransferase 1246U/L, Alanine aminotransferase 986U/l, urea 154, and creatinine 2.8. The rest of the laboratory tests were normal, including troponin level, and D-dimer. She was treated with 12 l/min oxygen, intravenous normal saline, with 1.4% bicarbonate and epinephrine, azithromycin, methyl prednisone 250 mg/IV/ day for 3 days, and enoxaparine 4000 IU/SC/day. She was intubated and mechanically ventilated, and had dialysis therapy due to anuria, metabolic acidosis, and hyperkalemia. The next day, our patient died because of cardiac arrest due to continuous hemodynamic deterioration.

Discussion

Rhabdomyolysis is characterized by different symptoms and signs such as muscle pain, abdominal pain, fever, confusion or lack of consciousness, tachycardia, dark red or brown urine, or decreased urination^[7-10]. Our patient had presented with

generalized myalgia, confusion, high fever (39.8 °C), tachycardia, and anuria. Blood tests revealed elevated creatine kinase and myoglobinuria. CPK is the most sensitive laboratory test, as muscle damage occurs from a level of CPK greater than 5000 U/l, but; there is no correlation between its elevation and the muscle injury severity or renal failure. Very high levels of potassium, elevated liver enzymes, and elevated creatinine are predictors of severity^[8,9,15]. Our patient had very elevated levels of CPK, myoglobin, liver enzymes, and creatinine. Treatment with intravenous fluids to prevent kidney failure, management of electrolyte abnormalities like potassium, calcium, and phosphorus, and rarely dialysis^[15,16], like in our case. In some cases, the intensive care unit is needed for close monitoring. Most causes of rhabdomyolysis are reversible, but the rest may end with death^[9,10], like our patient. The most common reported musculoskeletal manifestations of COVID-19 infection include fatigue, myalgia and myositis, arthralgia, symmetrical or poly-articular arthritis, reactive arthritis, new-onset backache, osteoporosis, aseptic osteonecrosis^[1-5]. Severe rhabdomyolysis during the COVID-19 infection course is not well known^[11]. The exact mechanism of this manifestation is not yet known but may be due to some possible causes, such as the direct viral invasion of myocytes, leading to muscles necrosis, the effect of inflammatory mediators, such as cytokines and the tissue hypoxia^[17,18]. Early diagnosis of this complication is essential to avoid serious complications or death by initiating the management^[9,10]. So, myoglobin measurement in patients with severe forms of COVID-19 might change therapeutic options.

Conclusion

Rhabdomyolysis cases have been reported in COVID-19 patients. Further studies are needed to understand the mechanism and to optimize the treatment.

Ethical approval

Institutional review board approval is not required for deidentified single case reports or histories based on institutional policies.

Consent

Written informed consent was obtained from the patient's mother for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author contribution

All authors contributed to the development of the manuscript and the care of the patient presented. All authors approved the final manuscript.

Conflicts of interest disclosure

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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