Case report

Rhabdomyolysis as an initial presentation in a patient diagnosed with COVID-19

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SUMMARY

The presence of rhabdomyolysis secondary to multiple infections has been reported, predominantly viral, but also bacterial and fungal. It is well known that COVID-19 can present a wide variety of complications during the course of infection; however, the presence of rhabdomyolysis as an initial condition has not been reported so far. We report a case of rhabdomyolysis as an initial presentation in a patient diagnosed with SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) infection.

BACKGROUND

Rhabdomyolysis is defined as a dissolution of skeletal muscle, with acute kidney injury (AKI) as the most important and comorbid complication, especially in severe cases. Patients with SARS-CoV-2 infection can have a wide variety of complications during the course of infection. Pulmonary, cardiovascular and thrombotic complications have been widely reported. The present case reports a patient diagnosed with SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) infection presenting with rhabdomyolysis.

CASE PRESENTATION

A 71-year-old man, who had a history of benign prostatic hyperplasia and of smoking 20 cigarettes a day for the past 30 years, presented to the emergency department with a 1-week history of dry coughing, mild dyspnoea and a fever of 38°C that did not resolve with paracetamol. Two weeks previously, he had returned to Mexico City from Miami. On the day of his admission, he felt greater dyspnoea and was suffering from severe myalgia and arthralgia, predominantly in his legs.

At his initial evaluation, the patient reported generalised weakness and malaise. He did not report any nausea, vomiting, diarrhoea, urinary or neurological symptoms. He had not taken any medication except paracetamol (750 mg) every 8 hours to control the fever. He had no known allergies.

A physical examination revealed a blood pressure of 120/68 mmHg, a pulse of 90 beats/min and a respiratory rate of 22 breaths/min. His temperature was 36.5°C and his oxygen saturation was 84% while breathing ambient air. He was alert and oriented, but his speech was slow and pausing. A cardiopulmonary examination revealed rales in both lung bases, but without signs of respiratory distress. Otherwise, his physical examination was unremarkable.

INVESTIGATIONS

Blood tests showed a normal leucocyte count with lymphopaenia (0.85 $\times 10^9$/L), haemoglobin level (161 g/L) and mild thrombocytopaenia (118 000$\times 10^9$/L). His creatinine level was increased, at 1.68 mg/dL, and his C-reactive protein (CRP) and procalcitonin (PCT) were elevated, at 2.9 mg/dL and 2.89 ng/mL, respectively. His interleukin (IL)-6 was also increased (233 pg/mL). His muscle enzymes were markedly elevated (creatine phosphokinase at 8720 U/L and myoglobin at 2079 ng/mL). His ferritin and lactic dehydrogenase levels were high as well (at 2603 ng/mL and 541 U/L, respectively). A urinalysis showed haemoglobin without erythrocytes in the sediment microscopy (table 1). A nasopharyngeal swab for SARS-CoV2 was positive. Multiplex PCR for respiratory viruses and HIV test were negative. A lung CT scan showed bilateral infiltrates with areas of consolidation and extensive ground-glass opacities.

TREATMENT

The patient was admitted to the COVID-19 ward and administered oxygen by nasal cannula. We started aggressive fluid and bicarbonate therapy as well as enoxaparin, azithromycin and ceftriaxone. The patient agreed to the use of compassionate drug therapy, so we started him on hydroxychloroquine and lopinavir/ritonavir. His condition deteriorated on the third day of hospitalisation and he required invasive mechanical ventilation. Over the next 2 days, his condition continued to deteriorate, with fever, hypotension and high ventilatory requirements. His CRP and IL-6 levels also increased (to 26.9 mg/dL and 275 pg/mL, respectively). His family agreed to the use of tocilizumab on a compassionate use scheme. Consequently, we gave him two doses of tocilizumab 400 mg intravenous on the fifth and sixth day after admission.

OUTCOME AND FOLLOW-UP

On the seventh day after admission, his condition started to improve and he showed a decrease in lactic dehydrogenase, ferritin, CRP and PCT levels. It was possible to extubate him on the 12th day after admission. His clinical condition continued to improve and after a negative SARS-CoV2 test, we

Table 1 Laboratory data

Variable	On admission	5th day	8th day	16th day	Reference range
Haemoglobin (g/L)	161	126	105	115	145–185
White cell count (×10^9/L)	7.1	6.2	4.5	4.2	1.8–10.0
Lymphocites	0.85	1.4	0.6	2.43	1.00–3.50
Platelet count (×10^9/L)	118 000	137 000	218 000	280 000	1 50 000–45 000
Creatinine (mg/dL)	1.68	0.99	0.70	0.84	0.74–1.35
Electrolytes					
Sodium (mmol/L)	137	137	147	141	135–145
Potassium (mmol/L)	4	3.9	4.9	4.2	3.5–5.1
Carbon dioxide (mmol/L)	19.9	22.2	32	23.1	22–29
D-dimer (ng/mL)	983	945	656		40–500
Lactic dehydrogenase (U/L)	541	672	294		122–22
Creatin kinase (U/L)	8720	3876	460	71	39–308
Myoglobin (ng/mL)	2079	208			28–72
C-reactive protein (mg/dL)	2.99	26.9	4.2	0.39	0.00–0.50
Procalcitonin (ng/mL)	2.89	4.7	1.45	0.17	0.00–0.50
Ferritin (ng/mL)	2603	4073	1938	1544	30–400
IL-6 (pg/mL)	233	275			0.0–7.0

IL, interleukin.

were able to finally discharge him to his home on the 16th day after admission.

DISCUSSION

This case illustrates that rhabdomyolysis could be related to SARS-CoV2 infection and could be a presenting problem in patients with COVID-19 severe pneumonia, rather than being only a late complication, as was previously reported.[1] In a large series of COVID-19 patients, Guan *et al* reported two cases of rhabdomyolysis in non-severe cases. However, the study does not clarify specificities about the patients.[2] Likewise, Suwanwongse *et al* described a case of a patient with non-severe COVID-19 pneumonia with rhabdomyolysis as a presenting feature and Gefen *et al* described the first paediatric patient with rhabdomyolysis and non-severe COVID-19 infection.[3 4]

Rhabdomyolysis has been associated with viral infections and especially influenza.[5] It has also been reported in association with SARS.[6] Our patient presented with clinical and biochemical evidence of rhabdomyolysis before he was started on any drug or had been placed on paralytic therapy for mechanical ventilation, which are known causes of muscular injury.[7]

A recent report of renal histopathological features in post-mortem COVID-19 patients found pigmented cast in three cases; the authors stated that drug-relevant or hyperventilation-relevant rhabdomyolysis contributed, although they did not rule out a possible direct viral injury on muscle.[8] However, SARS-CoV-2 has been isolated in multiple tissues as kidneys, liver, brain and heart, which could suggest that the virus could also infect striated muscle tissue.[9] In our case, the patient also presented with AKI possibly associated with rhabdomyolysis because the urinalysis had haemoglobin without red blood cells in the sediment.

Although high PCT is associated with severe bacterial infections,[10] it has also been related to other conditions as pancreatitis, burn injury, mechanical trauma and rhabdomyolysis.[11] Our patient presented with a high serum PCT without a proven bacterial infection. It is possible that the PCT level was associated with the COVID-19 infection severity and the rhabdomyolysis.[12] Luckily, our patient responded well, and although tocilizumab use is anecdotic, the patient's temporal sequence could suggest a possible positive role.

Learning points

- Rhabdomyolysis can be the initial presentation of COVID-19.
- High creatine kinase level could be related to rhabdomyolysis and acute kidney injury, which requires an aggressive treatment to prevent further complications.
- Rhabdomyolysis and COVID-19 infection can be associated with an increased procalcitonin level without a bacterial infection.

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