



Unusual Presentation of Critical Illness Myopathy in a Severe Acute Respiratory Syndrome Coronavirus 2 Patient: A Case Report

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Introduction:

- The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) causes symptoms that are classified as coronavirus disease 2019 (COVID-19)¹.
- SARS-CoV-2 infection commonly causes respiratory conditions, with acute respiratory distress syndrome (ARDS) being a hallmark feature of critical COVID cases¹.
- COVID-19 reached pandemic-level diffusion in March 2020, when many patients required intensive care unit (ICU) stays².
- Critically ill patients are at risk for developing muscular complications such as critical illness myopathy (CIM), which adversely affects short and long-term outcomes².
- CIM typically present as flaccid and symmetric weakness, with proximal muscles being more affected than distal, and normal sensation³.
- Here we report an unusual case of a patient who developed severe asymmetric muscular weakness after prolonged hospitalization in the ICU for COVID-19.

Case Description:

- This is a 40-year-old male with a history of diabetes mellitus admitted with fever, myalgia, and shortness of breath.
- Workup was significant for SARS-CoV-2 infection. He was intubated on hospital day 1 due to respiratory failure secondary to COVID-19 pneumonia.
- He had a prolonged ICU stay which was further complicated by disproportionate weakness with sensory preservation.
- On examination, he had flaccid limbs with atrophy. Manual muscle testing was 2/5 proximally and 3/5 distally in the right upper limb, 4/5 proximally and 4+/5 distally in the left upper limb, 2/5 proximally and 5/5 distally in the right lower limb, and 4/5 proximally and 5/5 distally in the left lower limb.
- Magnetic resonance imaging of the brain and the cervical spine were negative for stroke and spinal cord lesions.
- Electromyography was not done due to COVID-19 social distancing recommendations.
- Neurology had decided that the cause of weakness was due to CIM.
- He was transferred to acute inpatient rehabilitation, and his muscle weakness improved with physical and occupational therapies.

Suggested diagnostic research criteria for critical illness myopathy

Major diagnostic features

1. Sensory nerve amplitudes >80 percent of the lower limit of normal in 2 or more nerves
2. Needle EMG with short-duration, low-amplitude MUPs with early or normal full recruitment, with or without fibrillation potentials
3. Absence of a decremental response on repetitive nerve stimulation
4. Muscle histopathologic findings of myopathy with myosin loss

Supportive features

1. Motor amplitudes <80 percent lower limit of normal in 2 or more nerves without conduction block
2. Elevated serum CK (best assessed in the first week of illness)
3. Demonstration of muscle inexcitability
4. Prolonged compound muscle action potential durations (>8 milliseconds for all nerves except >15 milliseconds for the fibular motor response to the tibialis anterior)

By definition, patients are or were critically ill, and weakness should have started after onset of critical illness. For a *definite diagnosis of critical illness myopathy*, patients should have all 4 major features and 1 or more supportive features. For *probable critical illness myopathy*, patients should have any 3 major features and 1 or more supportive feature. For *possible critical illness myopathy*, patients should have either major features 1 and 3, or 2 and 3, and 1 or more supportive feature.

Discussion:

- Our case presents a young patient who had asymmetric myopathy following ICU inpatient admission for COVID-19.
- SARS-CoV-2 has been shown to be associated with multiple neurological manifestations including meningitis, encephalitis, myelitis, Guillain-Barre syndrome and stroke.
- Critically ill patients have additional risk factors for neuromuscular damage from deep sedation, muscle paralysis and prolonged immobilization.
- CIM presents as diffuse, mostly symmetric muscle weakness that are typically bilateral, affects more proximal than distal muscles, and occurs in critically ill patients.
- Our patient was unusual in the presence of asymmetric yet bilateral weakness and negative diagnostic tests for other causes of weakness.
- COVID-19 patients with CIM present further challenges due to requirement of distancing restrictions and absence of accepted guidelines.
- Our patient was discharged home with home-therapy and telemedicine follow up. 7 months later, his motor deficits recovered back to full strength except for subtle weakness of the right upper limb.

Conclusion:

- Critically ill COVID-19 patients may be associated with severe myopathy due to lengthy ICU stays.
- Rehabilitation plan for such patients should be instituted early during recovery.
- Their prolonged course could benefit from possible early mobilization and using telemedicine in rehabilitation programs to reverse muscle weakness and prevent complications.

References

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