Multifocal Injury of Nerves in Immobility Syndrome (MINIS): a Potential Sequela of Prolonged Intensive Care Unit Stay for a Patient with Coronavirus Disease (COVID-19) A Case Report

Ya-Ting Chen, M.D., Raymond Chou, M.D.[1], David Crandell, M.D.[1]

1. Department of Physical Medicine and Rehabilitation, Harvard Medical School, Boston MA

SPAULDING REHABILITATION NETWORK
MASSACHUSETTS GENERAL HOSPITAL
BRIGHAM AND WOMEN'S HOSPITAL
HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

Case Diagnosis

Multifocal injury of nerves in immobility syndrome (MINIS)

Case Description

- 60-year-old overweight male presented with three days of shortness of breath and was found to be COVID-19 positive.
- Intubated for acute respiratory distress syndrome (ARDS) in prone-positioning for three days followed by supine-positioning for two weeks.
- On hospital day (HD) 21, patient was found to have asymmetric weakness in upper extremities (right weaker than left) and lower extremities (left weaker than right) with a complete left foot drop.
- Past medical history was significant for type-2 diabetes mellitus and alcohol use disorder.

Physical Examination at Admission to Rehabilitation Facility (4 weeks after initial hospital presentation)

- Diffuse muscle atrophy with asymmetric weakness requiring maximum assistance for all ADLs (Table 1).
- Paresthesia at and distal to the ankle and over bilateral fourth and fifth fingers.
- No signs of low back or radicular pain.

Laboratory Findings

- Initial creatine kinase was attributed to COVID-19 infection: 541 U/L (HD 1) → 4,206 U/L (HD 6) → 198 U/L (HD 14).

Case Description (continued)

Intervention at Rehabilitation Facility

- Received inpatient rehabilitation with occupational and physical therapy.
- A custom ankle foot orthosis (AFO) was made for his left foot drop to help improve gait efficiency.
- Achieved supervision level for bathing, lower body dressing, toileting, and ambulation with rolling walker.
- Reached complete independent level for upper body dressing, self-feeding, and wheelchair mobility, while he could climb stairs with contact guard.
- He was discharged to home after six weeks.

SIDE	SAB	EF	WE	FF	FAB	HF	KE	DF	EHL	PF
RIGHT	2/5	3+/5	4/5	4/5	4/5	3/5	3-/5	3/5	3/5	3/5
LEFT	2+/5	3+/5	4/5	4/5	4/5	3-/5	3/5	0/5	0/5	0/5

Table 1. Strength exam findings at 4 weeks after initial presentation on admission to acute inpatient rehabilitation.

SIDE	SAB	EF	WE	FF	FAB	HF	KE	DF	EHL	PF
RIGHT	5/5	5/5	5/5	5/5*	5/5*	5/5	5/5	5/5	4-/5	5/5
LEFT	4+/5	4+/5	4+/5	5/5*	5/5*	5/5	5/5	0/5	0/5	0/5

Table 2. Strength exam findings at 4 months after initial presentation. *5/5 throughout except for 4-/5 strength at the fifth finger abduction and at the fourth and fifth finger flexion. *SAB = shoulder abduction. EF = elbow flexion. WE = wrist extension. FF = finger flexion. FAB = finger abduction. HF = hip flexion. KE = knee extension. DF = dorsiflexion. EHL = extensor hallucis longus (big toe extension). PF = plantar flexion.*

Follow Up (4 months after initial hospital presentation)

- Completed 2.5 months of home physical and occupational therapy.
- His right proximal arm strength has improved to 5/5 but the complete left foot drop remained (Table 2).
- Continued to have reduced sensation along the bilateral fourth and fifth fingers and distal to the left ankle.

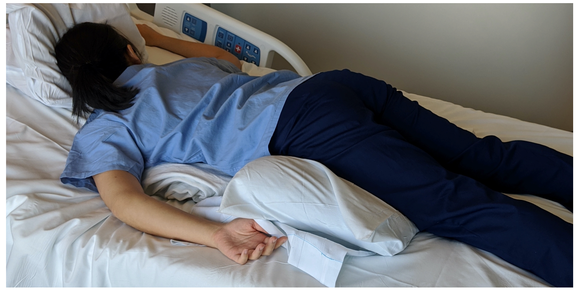

Figure. Brachial plexus may be vulnerable to stretch injury due to excessive shoulder depression with contralateral neck flexion in the prone position.

Discussion

- Many COVID-19 patients required prolonged ventilation.[1, 2]
- Few reports have described multifocal nerve injuries after prone-positioning ventilation with prolonged immobility.[3,4,5]
- This patient's presentation was suggestive of injuries to brachial plexus, ulnar nerve, and common peroneal nerve.[3,4,5]
- Etiology is likely multifactorial, including nerve ischemia, hyperinflammatory state, type-2 diabetes, and obesity.[3,4,5]
- The brachial plexus is vulnerable to stretch injury in the setting of poor positioning (Figure).[4]
- The ulnar and common peroneal nerves are prone to compressive injuries secondary to poor positioning in the state of immobility.[3,4,5]
- Recovering from peripheral nerve injuries generally could take up to 24 months.[3,4]

Conclusions

- This unique presentation of MINIS may become more common during the COVID-19 pandemic.
- Early mobilization interventions and proper positioning strategies should be implemented in the acute setting.[4]

References

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