The Cost To Breathe: A Case of Pan-Brachial Plexopathy Following COVID-19 Treatment

Jacob Kastner, DO; David Del Toro, MD; Christopher White, MD
Department of Physical Medicine and Rehabilitation, Medical College of Wisconsin, Milwaukee WI

Case Description

A 61-year-old previously healthy gentleman acquired severe acute respiratory syndrome coronavirus 2 (SARS- CoV-2) or COVID-19 and was placed on a mechanical ventilator in the ICU for 22 days. His care included frequent proning, which included both the standard prone positioning and the "swimmer's position." Upon regaining consciousness, he was unable to activate any muscles in his right arm. Brachial plexus injury was suspected due to a lack of other findings to support an acute infarct. EMG/NCS 3 months later revealed acute denervation changes and no motor unit activation in any tested muscles of the right upper extremity. The right sternocleidomastoid showed decreased recruitment with no abnormal spontaneous activity, and the right cervical paraspinals were normal. There was no motor or sensory response to electrical stimulation of the right median, ulnar, or radial nerves. **Electrodiagnostic findings were consistent with an electrically complete right-sided pan-brachial plexopathy.**

Case Diagnosis

Pan-Brachial Plexopathy

AANEM Accredited Laboratory *Exemplary Status

Motor NCS

Nerve / Sites	Rec. Site	Lat ms	Amp mV	Dist cm	Vel m/s
R Median - APB					
Wrist	APB	NR	NR	8	
Elbow	APB	NR	NR		
R Ulnar - ADM					
Wrist	ADM	NR	NR	8	
B.Elbow	ADM	NR	NR		
L Ulnar - ADM					
Wrist	ADM	3.2	9.6	8	
B.Elbow	ADM	8.0	9.0	24	50.6

F Wave

Nerve	Fmin ms
L Ulnar	32.81

Sensory NCS

Nerve / Sites	Rec. Site	Onset ms	Peak ms	NP Amp µV	Dist cm	Vel m/s
R Median - Dig III						
Wrist	III	NR	NR	NR	14	NR
R Ulnar - Dig V						
Wrist	Dig V	NR	NR	NR	14	NR
R Radial - Snuff						
Forearm	Snuff	NR	NR	NR	10	NR
L Radial - Snuff						
Forearm	Snuff	2.0	2.6	16	10	50.5

Needle EMG

EMG Summary Table										
	INSERTIONAL, SPONTANEOUS					VOL MOTOR UNIT POTENTIAL				
Muscle	IA	PSW	Fib	Fasc	Other	Eff	Recrt	Amp	Dur	Poly
R. Deltoid C5,6	Incr	2+, 200 uV	2+, 200 uV	0	0	N	No MUPs	-	-	-
R. Biceps C5,6	N	3+, 300 uV	3+, 200 uV	0	0	N	No MUPs	-	-	-
R. Triceps C6,7,8	N	3+, 300 uV	3+, 200 uV		0	N	No MUPs	-	-	-
R. PronTeres C6,7	N	3+, 200 uV	3+, 200 uV	0	0	N	No MUPs	-	-	-
R. First Dors Int C8,T1	N	2+, 300 uV	2+, 300 uV	0	0	N	No MUPs	-	-	-
R. Infraspinatus C5,6	N	3+, 200 uV	3+, 200 uV	0	0	N	No MUPs	-	-	-
R. Cervical PSP C5,6,7,8,T1	N	0	0	0	0	N	N	N	N	N
R. SternCMast C2,3	N	0	0	0	0	N	1-	N	1+	2+

Discussion

There have been reports of both upper trunk and lower trunk brachial plexopathies caused by prone positioning of ventilated patients, some of which have been due to COVID-19. However, to the best of our knowledge, this is the first case of an electrically complete pan-brachial plexopathy caused by prolonged malpositioning during a proning protocol in a ventilated patient undergoing treatment for COVID-19. It was discovered that our patient spent most of his time on the ventilator in the "swimmer's position," with at least one interval >48 hours before returning to the supine position.

Conclusions

- Proning is an important tool to use in the fight against COVID-19 and should be continued for patients on prolonged ventilator treatment.
- Without compromising the patient's cardiopulmonary status, care should be taken when using the "swimmer's position" to safely rotate the patient's head, neck, and abducted arm at least every 2 hours to limit stress injuries to the brachial plexus.