Neurographic Evidence of Inflammatory Polyneuropathies in Peri-COVID-19 Circumstances and Their Relationship With Acute Disease Severity and Inflammatory Storm

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INTRODUCTION

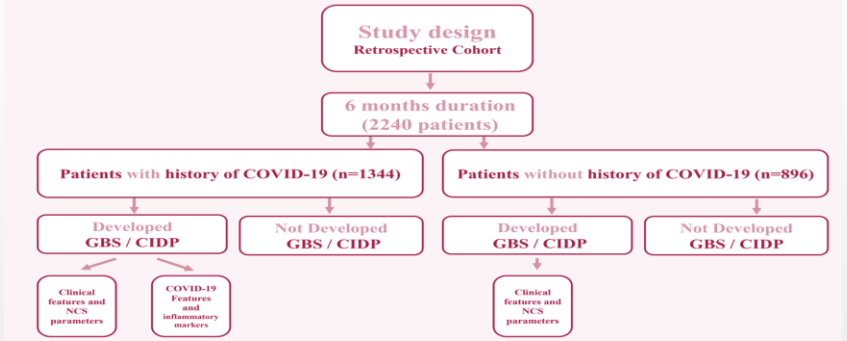
Recently, there has been increasing evidence among people infected with coronavirus disease 2019 (COVID-19) of being diagnosed with the typical acute post-infectious inflammatory polyneuroradiculopathy that was formerly known as Guillain-Barré syndrome (GBS), and it is not uncommon that some of them develop chronic inflammatory demyelinating polyneuroradiculopathy (CIDP). However, there is still a large debate and controversy about the link between COVID-19 and polyneuropathy.

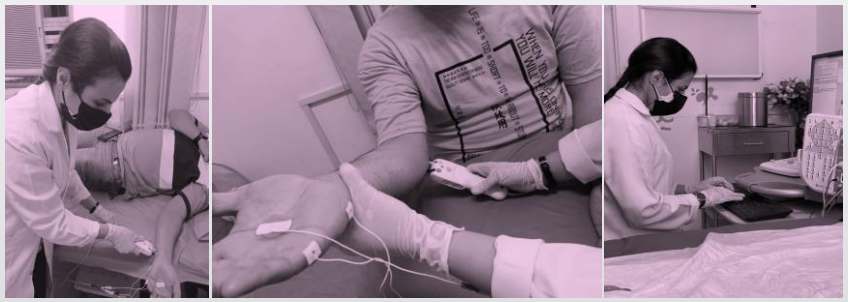
OBJECTIVES

The goal of this study was to show the burden of inflammatory polyneuropathy in patients who have had a preceding COVID-19 infection and examine the NCS and EMG abnormalities in these instances and their association with the respiratory illness severity and inflammatory cytokine release syndrome.

METHODS

A multicentric retrospective cohort study was conducted in Basrah Governorate in the south of Iraq on 2240 patients who attended the neurology unit in Basrah University Teaching Hospital and neurophysiology outpatient clinic in both Al-Sadr Teaching Hospital and Basrah Specialized Children's Hospital; it included the whole number of patients attending these three units for six months from July 1, 2021, to January 1, 2022.





RESULTS AND CONCLUSIONS

Among the 1344 patients who had a history of COVID-19 in the previous year, (1.14%) of them developed inflammatory polyneuropathy, while only 0.29% of those with no history of COVID-19 (896 patients) had developed inflammatory polyneuropathy. This difference is highly significant, with a relative risk of equal to six.

COVID-19 VS. Inflammatory neuropathy	Developed GBS/CIDP	Not Developed GBS/CIDP	Total
History of COVID-19	18	1326	1344
	1.14 %	98.86 %	
No History of COVID-19	2	894	896
	0.29 %	99.71 %	
Total	20	2220	2240
Statistical number	Fisher Exact test P value = 0.005		Relative risk ratio = 6

The demographics are different from the non-COVID-19 population as the mean age is higher (53.3 Vs. 33.5 years), and the male gender predominates over females. However, the clinical presentations are roughly similar, and the demyelinating GBS with classic motor sensory involvement remains the most common type.

Classification of Neuropathy		COVID-19 Group	Non COVID-19 Group	P value
Diagnosis	GBS	13 (72.2%)	1 (50%)	0.52
	CIDP	5 (27.8%)	1 (50%)	
Function	Mixed motor and sensory	14 (77.8%)	2 (100%)	0.90
	Pure Motor	4 (22.2%)	Zero	
Pathology	Demyelination	17 (94.4%)	2 (100%)	0.90
	Axonopathy	1 (5.6%)	Zero	
Total		18	2	20

Most of the inflammatory polyneuropathy (44.4%) was diagnosed 4 to 12 weeks after the COVID-19 infection but the mean time of onset of neurological symptoms is 16.3 days after COVID-19 infection.

The nerve conduction velocity (NCV), the distal latency, and the amplitude of the most studied nerves were slower, more prolonged, and lower, respectively, among the COVID-19 groups compared with the non- COVID-19 group. There is an inverse correlation between the NCV in the majority of studied nerves and certain inflammatory biomarkers such as serum ferritin, interleukin-6, and C-reactive protein. The occurrence of inflammatory polyneuropathy is more common among the less severe groups of COVID-19 (Mild to moderate severity). But if it occurs in the severe groups, it shows a more aggressive presentations and neurophysiological findings.

RECOMMENDATIONS

We recommend active surveying and maybe screening programs for those who recovered from COVID-19 and developed neurological symptoms, as well as increasing doctors' and patients' awareness about these disorders and not referring to the fatigue and walking difficulties as trivial post-COVID-19 manifestations