

# COVID-19 Infection Presenting as Myalgia, Abnormal Liver Function Tests and the Guillain-Barre Syndrome

Senyo Tagboto<sup>1,2</sup> 

<sup>1</sup>Department of Medicine, University of Health and Allied Sciences, Ho, Ghana

<sup>2</sup>Department of Medicine, Yarmouth Regional Hospital, Yarmouth, Canada

Email: senyo2@hotmail.com

**How to cite this paper:** Tagboto, S. (2022) COVID-19 Infection Presenting as Myalgia, Abnormal Liver Function Tests and the Guillain-Barre Syndrome. *Advances in Infectious Diseases*, 12, 128-136.  
<https://doi.org/10.4236/aid.2022.121011>

**Received:** February 25, 2022

**Accepted:** March 8, 2022

**Published:** March 11, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

---

## Abstract

The severe acute respiratory syndrome coronavirus 2 infection typically presents with respiratory symptoms. Additionally, there are a number of less frequent neurological manifestations of infection with the coronavirus disease 2019 (COVID-19) with case reports suggesting an association with the Guillain-Barre syndrome. Most patients present with the typical upper respiratory symptoms in association with these neurological symptoms. We present a case of an unvaccinated gentleman with none of the typical respiratory symptoms of COVID-19 who presented with the Guillain Barre syndrome and myalgia. His symptoms settled following treatment with intravenous immunoglobulins. This case highlights the importance of testing for COVID-19 in patients without typical symptoms but who present with neurological illness and supports the use of intravenous immunoglobulin therapy.

## Keywords

Guillain-Barre Syndrome, COVID-19, Myalgia

---

## 1. Introduction

Following an outbreak of a contagious lower respiratory tract infection in Wuhan, China at the end of 2019, The World Health Organization (WHO) subsequently declared this a Public Health Emergency of International Concern [1]. This virus was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and was a novel form of coronavirus belonging to the genus Betacoronavirus and subgenus Sarbecovirus [2]. This disease has resulted in a worldwide increase in hospitalizations for pneumonia with multiorgan disease

[3].

The average time from exposure to symptom onset is 5 days, and 97.5% of people who develop symptoms do so within 11.5 days. SARS-CoV-2 transmission is primarily by direct person-to-person transmission, mainly through close-range contact via respiratory particles which cause infection if these particles are inhaled or make direct contact with the mucous membranes. Infection can be spread by asymptomatic, presymptomatic, and symptomatic carriers. The diagnosis is made by detection of SARS-CoV-2 via reverse transcription polymerase chain reaction testing. The infectivity is the greatest in the early stages of infection, starting just prior to the development of symptoms. Transmission after 7 to 10 days of illness is unlikely, although prolonged viral shedding after symptom resolution may continue. Since the original outbreak, several variants of SARS-CoV-2 have emerged. The Omicron variant is associated with a higher risk of reinfection in previously infected individuals and infection despite prior vaccination. However, this variant is also associated with less severe disease [3] [4].

By the 1<sup>st</sup> of February 2022, there have been 379,822,966 cases reported worldwide and 5,694,569 deaths [5]. The rapid spread of disease prompted public health official and government bodies to enforce measures such as major travel restrictions, large-scale curfews, social isolation and quarantine of infected individuals, and voluntary or mandatory vaccination which have had some impact but the disease remains a menace [2].

Common symptoms in hospitalized patients include fever (70% - 90%), dry cough (60% - 86%), shortness of breath (53% - 80%), fatigue (38%), myalgias (15% - 44%), nausea/vomiting or diarrhea (15% - 39%), headache, weakness (25%), and rhinorrhea (7%). Anosmia or ageusia may be the sole presenting symptom in approximately 3% of individuals with COVID-19 [4]. The virus mainly causes pneumonia and acute respiratory distress syndrome, but may cause multi-organ disease affecting the kidneys, brain, heart, liver, and other organs. It leads to serious complications such as a cytokine storm, septic shock, blood clots, and immune-mediated injuries [4]. However, many patients with COVID-19 are asymptomatic or have only mild symptoms, but are nevertheless able to transmit the virus [6].

## 2. Case Report

A 71-year-old gentleman who had not been vaccinated against COVID-19, presented at the emergency department on the 26<sup>th</sup> of January 2022 with a 4-day history progressive leg weakness, and muscle pain in his back, anterior and lateral thighs. The pain in his thighs meant it was uncomfortable for him to sleep lying on either side and as such he was sleeping only on his back. He was still able to walk at the time. The patient then went home because he was concerned about looking after his pets. He came back to the hospital on the 29<sup>th</sup> of January because he was unable to pass urine, and had not opened his bowels for 4 days.

Additionally, his weakness had continued to progress and he now needed a Zimmer frame to mobilize and that with difficulty. He agreed to be admitted on that day.

An incidental COVID-19 test taken at his initial presentation, was reported as being positive.

He denied a cough, or sputum production, with no nasal stuffiness, dyspnea, orthopnea or paroxysmal nocturnal dyspnea. Additionally, did not report a temperature or chills. He had no chest pain or palpitations. He has had no diarrhea, and had not lost his sense of taste or smell, with no other ear, nose and throat symptoms. Additionally, he had no skin rash or joint pains and denied abdominal pain, chest pain, palpitations or edema.

On examination, his temperature was 36.4 degrees Celsius. He was a thin man who weighed 57 kg. He was not pale, jaundiced or cyanosed with no pedal edema or clubbing. His pulse was regular at 80 per minute. His blood pressure 149/88, heart sounds 1 and 2 were audible with no murmurs. His respiratory rate was 20 per minute. His oxygen saturation was 98% on room air. His chest was clinically clear. His liver, spleen and kidneys were not palpable. Bowel sounds were present and normal.

His muscle tone and bulk were normal and neurological examination disclosed symmetric weakness (Medical Research Council grade 4/5) and areflexia in both legs and feet. Sensation to light touch, vibration, pinprick and proprioception were normal.

He worked as a clam digger and admitted to drinking 1 - 2 alcoholic beverages most days and did not smoke cigarettes. He was divorced and had a son and a daughter. His past medical history included a bilateral inguinal herniorrhaphy a left hydrocelectomy and hemorrhoids.

### 3. Laboratory Results

His laboratory results were reported as follows:

Haemoglobin 134 g/l, white cell count  $6.4 \times 10^9/l$ , with a low lymphocyte count at  $0.9 \times 10^9/l$  and a platelet count of  $231 \times 10^9/l$ . Renal function tests were unremarkable as were liver function tests except for raised transaminases (see **Table 1**). Sodium, potassium, calcium, phosphate and magnesium levels were normal and reported as 139 mmol/l, 4.2 mmol/l, 2.36 mmol/l, 1.04 mmol/l, 0.86 mmol/l respectively. B12 levels were 717 pmol/l (145 - 569), folate levels 13.58 nmol/l (>8.8). Ferritin levels were elevated at 2321 ug/l, as were lactate dehydrogenase (LDH) levels at 241 U/L (100 - 225). D-dimer levels were reported at 498 ng/ml (normal range < 500 ng/ml). INR, aPTT, Troponin levels were all within normal limits. Serial creatinine kinase levels remained normal and were 42 U/L on the day of initial presentation. C-reactive protein (CRP) and erythrocyte sedimentation rates (ESR) were both elevated and reached a peak of 65.91 mg/l and 108 mm/hr respectively. Uric acid levels were low at 196  $\mu\text{mol/l}$ . Arterial blood gases showed a normal PH,  $\text{PCO}_2$ ,  $\text{PO}_2$  and Oxygen saturation were normal at

**Table 1.** Serial changes in CRP, ESR, ALT, AST, LDH, CK levels & lymphocyte count following admission.

	29/1/22	30/1/22	31/1/22	01/2/22	03/2/22	04/2/22	18/2/22
CRP-mg/l	35.21	65.91	56.46	34.06	17.62		10.1
ESR-mm/Hr	30		108		73		
ALT-U/L	96	175	209	194	149		25
AST-U/L	73	160	145	121	105		25
LDH	241				746		226
CK-U/L	42		33		64		135
Lymphocyte count $\times 10^9/l$	1.2	0.9	1.4	1.6	2.5	2.6	

7.43, 44 mmHg, 92.1 mmHg, and 98.2% respectively. His bicarbonate levels were marginally raised at 29.3 mmol/l and Base excess was reported at 5 (range -2 to 3 mmol/l). His cerebrospinal fluid (CSF) demonstrated elevated protein levels at 2.98 g/l (0.15 - 0.45), and glucose levels at 5 mmol/l (2.2 - 4.1 mmol/l). CSF reported a red cell count of  $0.3 \times 10^6/l$  and a white cell count of  $8 \times 10^6/l$  (normal:  $0 - 8 \times 10^6/L$ ). ANA, ANCA, rheumatoid factor, serum protein electrophoresis, Hepatitis A, B, and C screens, serum ACE levels and immunoglobulin IgG, IgA and IgM levels were unremarkable. Complement C3 and C4 levels were normal at 1.34 g/l and 0.26 g/l respectively. Urinalysis was negative for protein and blood. A chest X ray was reported as being entirely normal. An MRI scan of his entire spine was carried out and reported as demonstrating no abnormal signals in the cord to suggest a transverse myelitis and no nerve roots compression or mass lesions in the cord. Stool cultures were negative for *Campylobacter* and other bacterial pathogens. CMV and Lyme disease serology were negative. Bloodwork indicated the presence of immunoglobulin G but not Immunoglobulin M against the Epstein Barr virus, indicating old infection, as such this virus was not responsible for his symptoms.

Creatinine Kinase, CRP, ESR, LDH, ALT and AST levels were monitored serially and the results reported in **Table 1**.

This patient received treatment with a total of 2 g/kg of intravenous immunoglobulin spread over the next 3 days.

Five days after his initial admission, he reported that his thigh pain had resolved. He did not develop any sensory deficits during his admission. He initially required the help of two nurses to stand on admission but by day 6 he was standing independently but mobilizing with the help of a Zimmer frame for support. His urinary catheter was removed on day 7 of his admission and he passed urine normally and he was discharged home. As per current local guidelines, a repeat COVID-19 pcr study was not carried out at discharge. Furthermore, the COVID-19 genotype was not determined in this patient.

He was seen for a review appointment 2 weeks after discharge and by that

time his muscle strength had returned to normal and he was walking independently without aids. His lower limb reflexes had returned and were normal.

#### 4. Discussion

SARS-CoV-2 infection appears to be associated with neurological and neuropsychiatric illness. Five major categories of illness have been identified including: 1) encephalopathies with delirium/psychosis and no distinct MRI or CSF abnormalities, 2) inflammatory CNS syndromes including encephalitis, acute disseminated encephalomyelitis 3) ischemic strokes associated with a pro-thrombotic state, 4) peripheral neurological disorders including the Guillain-Barré syndrome, and 5) miscellaneous central disorders who did not fit these categories. Some cases, respond to immunotherapies including steroids or intravenous immunoglobulins [7].

COVID-19 mRNA was not typically found in the cerebrospinal fluid when tested but one study from the Sudan, reported the CSF being positive for COVID-19 [8].

A systematic review of all published cases until July 20th 2020, included 73 patients with the Guillain Barre syndrome reported in 52 publications. This complication was reported in patients aged from 11 to 94 years (mean 55) with a male predominance (68.5%). Most reports had the classic sensorimotor form of the syndrome and the acute inflammatory demyelinating polyneuropathy, although rare variants like Miller Fisher syndrome were also reported. Cerebrospinal fluid (CSF) albuminocytological dissociation was present in around 71% cases, and CSF SARS-CoV-2 RNA was absent in all tested cases. More than 70% of patients showed a good prognosis, mostly after treatment with intravenous immunoglobulin [9].

There has been a case report of delayed onset, acute demyelinating neuropathy in a 46-year-old man 53 days after COVID-19 pneumonitis. He presented with bilateral leg pain and loss of sensation in his feet followed by a rapidly progressive lower motor neuron weakness involving all limbs, face and respiratory muscles, needing ventilatory support. The cerebrospinal fluid examination showed albuminocytologic dissociation and nerve conduction studies supported the diagnosis of an acute inflammatory demyelinating polyradiculoneuropathy. The authors conclude that this case might indicate that the Gullain Barre syndrome may be part of the “long COVID-19 syndrome” [10].

A study in the United Kingdom (UK) compared GBS cases reported to the UK National Immunoglobulin Database from 2016 to 2019 with cases reported during the COVID-19 pandemic. This study found that the incidence of GBS treated in UK hospitals from 2016 to 2019 was 1.65 - 1.88 per 100,000 individuals per year and fell between March and May 2020 compared to the same months of 2016-19. GBS and COVID-19 incidences during the pandemic also did not correlate with one another in regions of the UK with different COVID-19 incidence rates ( $r = 0.06$ , 95% confidence interval:  $-0.56$  to  $0.63$ ,  $P =$

0.86). The study concluded that although it was not possible to entirely rule out the possibility of a link, there was no epidemiological data to prove this. The overall reduction in GBS incidence during the pandemic, was thought to be due to the influence of lockdown measures reducing transmission of known GBS inducing pathogens such as *Campylobacter jejuni* and respiratory viruses [11].

Guillain Barre syndrome has been reported after COVID-19 vaccination, including the Astra-Zeneca [12], Pfizer [13] and Moderna [14] vaccines. However, compared to a worldwide typical incidence of 1.1/100,000, an analysis of a cohort of 3,890,250 Hispanic/Latinx recipients of the BNT162b2 mRNA vaccine (613,780 of whom had already received both doses) for incident GBS occurring within 30 days from vaccine administration found seven cases of GBS were detected among first-dose recipients (incidence of 0.18/100,000 within 30 days of vaccination). No cases were reported after second-dose administration. The authors conclude this data is consistent with GBS at the expected community-based rate; however, the incidence of GBS among the unvaccinated population in the same timeframe was not determined for a direct comparison [15]. Furthermore, safety surveillance data from Vaccine Safety Datalink reported that out of a total of 11,845,128 doses of mRNA vaccines [BNT162b2 (Pfizer-BioNTech) or mRNA-1273 (Moderna)] administered to 6.2 million individuals, the incidence of serious outcomes including the GBS was not significantly higher 1 to 21 days postvaccination compared with 22 to 42 days postvaccination [16]. Nevertheless, there needs to be a comparison of GBS in patients with COVID-19 and the general population and with matched vaccinated and unvaccinated populations to draw firm conclusions. The overall expected reduction in GBS from the reduction in the transmission of other known GBS inducing pathogens such as *Campylobacter*, Influenza virus, Epstein Barr virus, HIV or the Zika virus as a result of COVID-19 preventative measures is not known [17].

The first case report of a possible association between COVID-19 infection and GBS was from the Jingzhou Central Hospital, in Jingzhou, China. A 61-year-old woman admitted on the 23<sup>rd</sup> of January 2020 [18], having been in Wuhan, the city where the outbreak originated from, a few days prior. On presentation, this patient did not have a febrile illness or a pyrexial illness. However, she developed a pyrexial illness and mild respiratory symptoms on day 8. On presentation the patient did have muscle weakness with progressed until day 3 where maximal weakness was graded 4/5 in both arms and hands and 3/5 in both legs and feet. Sensation to light touch and pinprick was decreased distally. Nerve conduction studies (day 5) showed delayed distal latencies and absent F waves in early course, supporting demyelinating neuropathy. She received treatment with intravenous immunoglobulin and the antiviral drugs arbidol, lopinavir, and ritonavir and at discharge on day 30, had normal muscle strength in both arms and legs and return of tendon reflexes in both legs and feet.

The SARS-CoV-2 virus has been isolated from the CSF raising the possibility that it may have neuroinvasive potential [17]. Typically, antiganglioside antibo-

dy tests were negative supporting the view that non-immune abnormalities such as hyperinflammation following cytokine storms and microvascular disorders due to vascular endothelial damage may lead to neurological symptoms in patients with SARS-CoV-2 infection [19].

Myalgia myositis and rhabdomyolysis have been described in association with COVID-19 infection. Few patients had muscle weakness and elevated creatine kinase levels along with elevated levels of acute-phase reactants. Typically, patients with myositis/rhabdomyolysis had severe respiratory complications. A handful of patients with myasthenia gravis had an exacerbation of their disease after acquiring COVID-19 disease. Most of these patients recovered with either intravenous immunoglobulins or steroids [20].

## 5. Conclusions

There is increasing evidence of neurological manifestations of COVID-19 infection. The Guillain Barre Syndrome is increasingly being recognized as a presenting feature of infection, and may occur during otherwise asymptomatic infection. However, the individual risk for GBS remains small.

The association between COVID-19 and GBS is still uncertain, but a high index of suspicion of possible infection should be assumed during this pandemic. Thorough and well-designed GBS detection studies with accurate case definition and confirmation are needed to complement the increasing case reports of an association between COVID-19 and GBS. This case adds support to the potential value of the use of intravenous immunoglobulins in the treatment of GBS associated with COVID-19.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

## References

- [1] World Health Organization (2021) Coronavirus Disease (COVID-19) Situation Reports. World Health Organization, Geneva. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>
- [2] Khan, M., Adil, S.F., Alkhatlan, H.Z., Tahir, M.N., Saif, S., Khan, M. and Khan, S.T. (2021) COVID-19: A Global Challenge with Old History, Epidemiology and Progress So Far. *Molecules*, **26**, Article No. 39. <https://doi.org/10.3390/molecules26010039>
- [3] Wiersinga, W.J., Rhodes, A., Cheng, A.C., Peacock, S.J. and Prescott, H.C. (2020) Pathophysiology, Transmission, Diagnosis, and Treatment of Coronavirus Disease 2019 (COVID-19): A Review. *JAMA*, **324**, 782-793. <https://doi.org/10.1001/jama.2020.12839>
- [4] Planas, D., Saunders, N., Maes, P., Guivel-Benhassine, F., Planchais, C., Buchrieser, J., et al. (2022) Considerable Escape of SARS-CoV-2 Omicron to antibody neutralization. *Nature*, **602**, 671-675. <https://doi.org/10.1038/s41586-021-04389-z>



- [5] <https://www.worldometers.info/coronavirus/>
- [6] Gao, Z., Xu, Y., Sun, C., Wang, X., Guo, Y., Qiu, S. and Ma, K. (2021) A Systematic Review of Asymptomatic Infections with COVID-19. *Journal of Microbiology, Immunology and Infection*, **54**, 12-16. <https://doi.org/10.1016/j.jmii.2020.05.001>
- [7] Paterson, R.W., Brown, R.L., Benjamin, L., Nortley, R., Wiethoff, S., Bharucha, T., *et al.* (2020) The Emerging Spectrum of COVID-19 Neurology: Clinical, Radiological and Laboratory Findings. *Brain*, **143**, 3104-3120. <https://doi.org/10.1093/brain/awaa240>
- [8] Ibrahim, E.A.A., Mohamed Ahmed, K.A.H., Salah, E.T. and Omer, M.E.A. (2021) COVID-19 Was Found in a Patient's Cerebrospinal Fluid Who Presented with a Severe Form of Guillain-Barre Syndrome: A Successful Sudanese Story: Case Report. *Clinical Case Reports*, **9**, Article No. e04597. <https://doi.org/10.1002/ccr3.4597>
- [9] Abu-Rumeileh, S., Abdelhak, A., Foschi, M., Tumani, H. and Otto, M. (2021) Guillain-Barré Syndrome Spectrum Associated with COVID-19: An Up-to-Date Systematic Review of 73 Cases. *Journal of Neurology*, **268**, 1133-1170. <https://doi.org/10.1007/s00415-020-10124-x>
- [10] Raahimi, M.M., Kane, A., Moore, C.E. and Alareed, A.W. (2021) Late Onset of Guillain-Barré Syndrome Following SARS-CoV-2 Infection: Part of 'Long COVID-19 Syndrome'? *BMJ Case Reports*, **14**, Article ID: e240178. <https://doi.org/10.1136/bcr-2020-240178>
- [11] Keddie, S., Pakpoor, J., Mousele, C., Pipis, M., Machado, P.M., Foster, M., *et al.* (2021) Epidemiological and Cohort Study Finds No Association between COVID-19 and Guillain-Barré Syndrome. *Brain*, **144**, 682-693. <https://doi.org/10.1093/brain/awaa433>
- [12] Hasan, T., Khan, M., Khan, F., Hamza, G. (2021) Case of Guillain-Barré Syndrome Following COVID-19 Vaccine. *BMJ Case Reports*, **14**, Article ID: e243629. <https://doi.org/10.1136/bcr-2021-243629>
- [13] Waheed, S., Bayas, A., Hindi, F., Rizvi, Z., Espinosa, P.S. (2021) Neurological Complications of COVID-19: Guillain-Barre Syndrome Following Pfizer COVID-19 Vaccine. *Cureus*, **13**, Article ID: e13426. <https://doi.org/10.7759/cureus.13426>
- [14] Dalwadi, V., Hancock, D., Ballout, A.A., Geraci, A. (2021) Axonal-Variant Guillain-Barre Syndrome Temporally Associated with mRNA-Based Moderna SARS-CoV-2 Vaccine. *Cureus*, **13**, Article ID: e18291. <https://doi.org/10.7759/cureus.18291>
- [15] García-Grimshaw, M., Michel-Chávez, A., Vera-Zertuche, J.M., Galnares-Olalde, J.A., Hernández-Vanegas, L.E., *et al.* (2021) Guillain-Barré Syndrome Is Infrequent among Recipients of the BNT162b2 mRNA COVID-19 Vaccine. *Clinical Immunology*, **230**, Article ID: 108818. <https://doi.org/10.1016/j.clim.2021.108818>
- [16] Klein, N.P., Lewis, N., Goddard, K., Fireman, B., Zerbo, O., Hanson, K.E., *et al.* (2021) Surveillance for Adverse Events after COVID-19 mRNA Vaccination. *JAMA*, **326**, 1390-1399. <https://doi.org/10.1001/jama.2021.15072>
- [17] Khan, F., Sharma, P., Pandey, S., Sharma, D., Vijayarman, V., Kumar, N., Shukla, S., Dandu, H., Jain, A., Garg, R.K. and Malhotra, H.S. (2021) COVID-19-Associated Guillain-Barre Syndrome: Postinfectious alone or Neuroinvasive Too? *Journal of Medical Virology*, **93**, 6045-6049. <https://doi.org/10.1002/jmv.27159>
- [18] Zhao, H., Shen, D., Zhou, H., Liu, J. and Chen, S. (2020) Guillain-Barré Syndrome Associated with SARS-CoV-2 Infection: Causality or Coincidence? *The Lancet Neurology*, **19**, 383-384. [https://doi.org/10.1016/S1474-4422\(20\)30109-5](https://doi.org/10.1016/S1474-4422(20)30109-5)
- [19] Hirayama, T., Hongo, Y., Kaida, K. and Kano, O. (2020) Guillain-Barré Syndrome after COVID-19 in Japan. *BMJ Case Reports*, **13**, Article ID: e239218.



<https://doi.org/10.1136/bcr-2020-239218>

- [20] Paliwal, V.K., Garg, R.K., Gupta, A. and Tejan, N. (2020) Neuromuscular Presentations in Patients with COVID-19. *Neurological Sciences*, **1**, 3039-3056.

<https://doi.org/10.1007/s10072-020-04708-8>