


# Guillain-Barré Syndrome with Rapid Onset and Autonomic Dysfunction Following First Dose of Pfizer-BioNTech COVID-19 Vaccine: A Case Report

The Neurohospitalist  
2022, Vol. 12(2) 388–390  
© The Author(s) 2022  
Article reuse guidelines:  
[sagepub.com/journals-permissions](https://sagepub.com/journals-permissions)  
DOI: 10.1177/19418744211065242  
[journals.sagepub.com/home/nho](https://journals.sagepub.com/home/nho)  


Tyler Ashford Lanman, MD<sup>1,2,\*</sup> , Connie Wu, MD<sup>1,\*</sup> , Helen Cheung, MD<sup>2</sup>,  
Neelam Goyal, MD<sup>2</sup>, and Maxwell Greene, MD<sup>2</sup>

## Abstract

Guillain-Barre syndrome (GBS) is an immune-mediated, often post-infectious illness manifesting as an acute, characteristically monophasic, polyradiculoneuropathy. We present a case of GBS with autonomic involvement following an mRNA-based vaccine against SARS-COV2 (Pfizer/BioNTech mRNA-BNT162b2). A 58-year-old woman presented with fatigue, distal extremity paresthesias, and severe back pain within 3 days after receiving her first vaccine dose. She developed worsening back pain and paresthesias in distal extremities which prompted her initial presentation to the hospital. By the third week post-vaccine, she developed increasing gait unsteadiness, progression of paresthesias, and new autonomic symptoms including presyncopal episodes and constipation. Neurological exam showed bilateral distal predominant lower extremity weakness, decreased sensation in a length-dependent pattern, and areflexia. EMG/NCS showed a diffuse sensorimotor polyneuropathy with mixed demyelinating and axonal features consistent with GBS. She was treated with 2 g/kg of IVIG over 3 days and also received prednisone 60 mg daily for 3 days for severe back pain, with improvement of symptoms. This possible association with mRNA-based vaccination expands the potential triggers for an autoimmune-based attack on the peripheral nervous system.

## Keywords

Guillain-Barre syndrome, autoimmune diseases of the nervous system, autonomic nervous system diseases

## Introduction

Guillain-Barre syndrome (GBS) is an immune-mediated, often post-infectious illness manifesting as an acute, characteristically monophasic polyradiculoneuropathy. There is particular public health interest in GBS given its association with other viral infections including influenza and Zika virus.<sup>1</sup> Several studies have demonstrated possible influenza vaccine-related GBS in the United States due to a small increase in incidence of GBS following the vaccine though without evidence of a causal relationship.<sup>2</sup>

The Pfizer/BioNTech mRNA-BNT162b2 vaccine is a vaccine against SARS-COV2 and is given in 2 doses ideally separated by 21–42 days. This vaccine uses mRNA technology to develop an immunogenic response and is highly effective.<sup>3</sup> As of July 2, 2021, a total of 328,809,470 COVID-19 vaccine doses have been administered in the United States. Based on the Centers for Disease Control (CDC) Vaccine Adverse Event Reporting System, there have been 346 263

adverse reactions reported with 309 cases of GBS, accounting for .09% of the events reported and .00009% of total vaccines given.

We report a case of a woman who developed GBS with atypical rapid onset of symptoms and autonomic dysfunction following the first dose of the Pfizer-BioNTech COVID-19 vaccine. To our knowledge, at the time of writing this paper, this is the third report of an mRNA-based vaccine temporally associated with the development of GBS and the first to report the development of associated autonomic features.<sup>4-6</sup>

<sup>1</sup>Neurology Department, Stanford Medicine, Stanford, CA, USA

<sup>2</sup>Neuromuscular Department, Stanford Medicine, Stanford, CA, USA

\*Equal Author Contributions: Tyler Lanman and Connie Wu are co-first authors

## Corresponding Author:

Tyler Ashford Lanman, Neurology Department, Stanford Medicine, 300 Pasteur Dr., Stanford, CA 93305, USA.

Email: [tlanman@stanford.edu](mailto:tlanman@stanford.edu)

## Case Report

A 58-year-old woman with a history of childhood absence seizures presented with fatigue, distal extremity paresthesias, and severe back pain 3 days after receiving her first dose of the Pfizer-BioNTech COVID-19 vaccine. She developed new severe back pain with radiation to the chest, and progression of paresthesias in bilateral hands and feet which prompted her to present to the hospital.

Her initial exam was notable for a subjective change in sensation to light touch in the second–fifth fingers of bilateral hands, bilateral feet just distal to ankles, and diminished patellar reflexes bilaterally. Screening myelopathy and neuropathy workup including complete metabolic panel, blood counts, MRI cervical and thoracic spine, hemoglobin A1c, thyroid-stimulating hormone, serum protein electrophoresis, vitamin B12, erythrocyte sedimentation rate, and demyelinating neuropathy panel<sup>7</sup> were normal. By the third week following her vaccine, she developed gait unsteadiness and progression of paresthesias extending up to her wrists and knees bilaterally. An interval exam revealed bilateral distal predominant lower extremity weakness, decreased sensation in a length-dependent pattern, and absent patellar and Achilles reflexes. She also developed new autonomic symptoms including presyncopal episodes while soaking in a bath, persistent orthostatic hypotension, episodes of sinus tachycardia, and constipation. Electrocardiogram (EKG) demonstrated first degree atrioventricular block with PR intervals between 319–345 ms which were more prolonged than prior. Repeat MRI of cervical and thoracic spine was unremarkable. EMG/NCS (electromyogram and nerve conduction studies) showed a diffuse sensorimotor polyneuropathy with mixed demyelinating and axonal features consistent with a diagnosis of GBS. A lumbar puncture was not performed as the diagnosis was made based on clinical presentation and electrodiagnostic testing.

She was treated with a course of 2 g/kg of IVIG (intravenous immune globulin) over 3 days. Given her severe back pain, she also received prednisone 60 mg daily for 3 days. While steroids in this setting are controversial, we opted to give steroids based on anecdotal evidence<sup>8</sup>, with a significant improvement in her pain. Her course was further complicated by a subsegmental pulmonary embolism which was attributed to hypercoagulability in the setting of IVIG, for which she was treated with anticoagulation. At 2 months after symptom onset, she reported resolution of her back pain, improvement in lower extremity strength, but had persistent numbness and tingling in her hands and feet and continued PR prolongation at 381 ms. Repeat EMG/NCS studies showed interval overall improvement of demyelinating features.

## Discussion

Here, we present a case of GBS with autonomic involvement following vaccination with an mRNA-based vaccine. Although

no definitive causal link has been demonstrated, certain vaccines have been temporally associated with the development of GBS.<sup>2</sup> This possible association with mRNA-based vaccination expands the potential triggers for an autoimmune-based attack on the peripheral nervous system. The response to IVIG suggests that IgG4 is not a significant contributor to the pathogenesis of this response.<sup>9</sup> As prior reports have highlighted, a causal link between the vaccine and GBS is by no means implied and a coincidental temporal association cannot be ruled out.<sup>4-6</sup> This article should not dissuade the average person from obtaining vaccination for COVID-19, especially as others have reported increased risk of GBS after contracting the virus itself compared to getting the vaccine.<sup>10</sup> Nonetheless, we believe that post-vaccine presentations of unique neurological occurrences are important to add to the small but growing literature to help guide future scientists and providers.


## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID iDs

Tyler Ashford Lanman  <https://orcid.org/0000-0001-8746-282X>  
 Connie Wu  <https://orcid.org/0000-0002-2890-5528>

## References

1. Brito Ferreira ML, Militão de Albuquerque Md. FP, de Brito CAA, et al. Neurological disease in adults with Zika and chikungunya virus infection in Northeast Brazil: A prospective observational study. *Lancet Neurol.* 2020;19(10):826-839.
2. Perez-Vilar S, Hu M, Weintraub E, et al. Guillain-Barré syndrome after high-dose influenza vaccine administration in the United States, 2018-2019 season. *J Infect Dis.* 2021;223(3):416-425.
3. Polack FP, Thomas SJ, Kitchin N, et al. Safety and efficacy of the BNT162b2 mRNA Covid-19 vaccine. *N Engl J Med.* 2020;385(19):1761-1773.
4. Ogbonor O, Seth H, Min Z, Bhanot N. Guillain-Barré syndrome following the first dose of SARS-CoV-2 vaccine: A temporal occurrence, not a causal association. *IDCases.* 2021;24:e01143.
5. Waheed S, Bayas A, Hindi F, Rizvi Z, Espinosa PS. Neurological complications of COVID-19: Guillain-Barre syndrome following Pfizer COVID-19 vaccine. *Cureus.* 2021;13(2):e13426.
6. Allen CM, Ramsamy S, Tarr AW, et al. Guillain-Barré syndrome variant occurring after SARS-CoV-2 vaccination. *Ann Neurol.* 2021;90:315-318.
7. Neuromuscular Disease Center at Washington University School of Medicine, Department of Neurology. *Neuromuscular Clinical Laboratory Antibody Tests. Requisitions.* Published June 29,

2021. <https://neuromuscular.wustl.edu/lab/reqs.htm>. Accessed November 1, 2021.
8. Kabore R, Magy L, Boukhris S, Mabrouk T, Lacoste M, Vallat JM. Contribution of corticosteroid to the treatment of pain in the acute phase of Guillain-Barré syndrome. *Rev Neurol*. 2004; 160(8-9):821-823.
  9. Querol L, Nogales-Gadea G, Rojas-Garcia R, et al. Neurofascin IgG4 antibodies in CIDP associate with disabling tremor and poor response to IVIg. *Neurology*. 2014;82(10):879-886.
  10. Patone M, Handunnetthi L, Saatci D, et al. *Neurological complications after first dose of COVID-19 vaccines and SARS-CoV-2 infection*. London: Nature Medicine; 2021.