



# COVID-19 Auto-Immune Encephalitis Presenting as First-Break Psychosis: A Case Report and Literature Review

Erin Davidowicz, MD & Shannon Mazur, DO, MA

Yale University School of Medicine, Psychiatry, Department of Psychological Medicine



## BACKGROUND

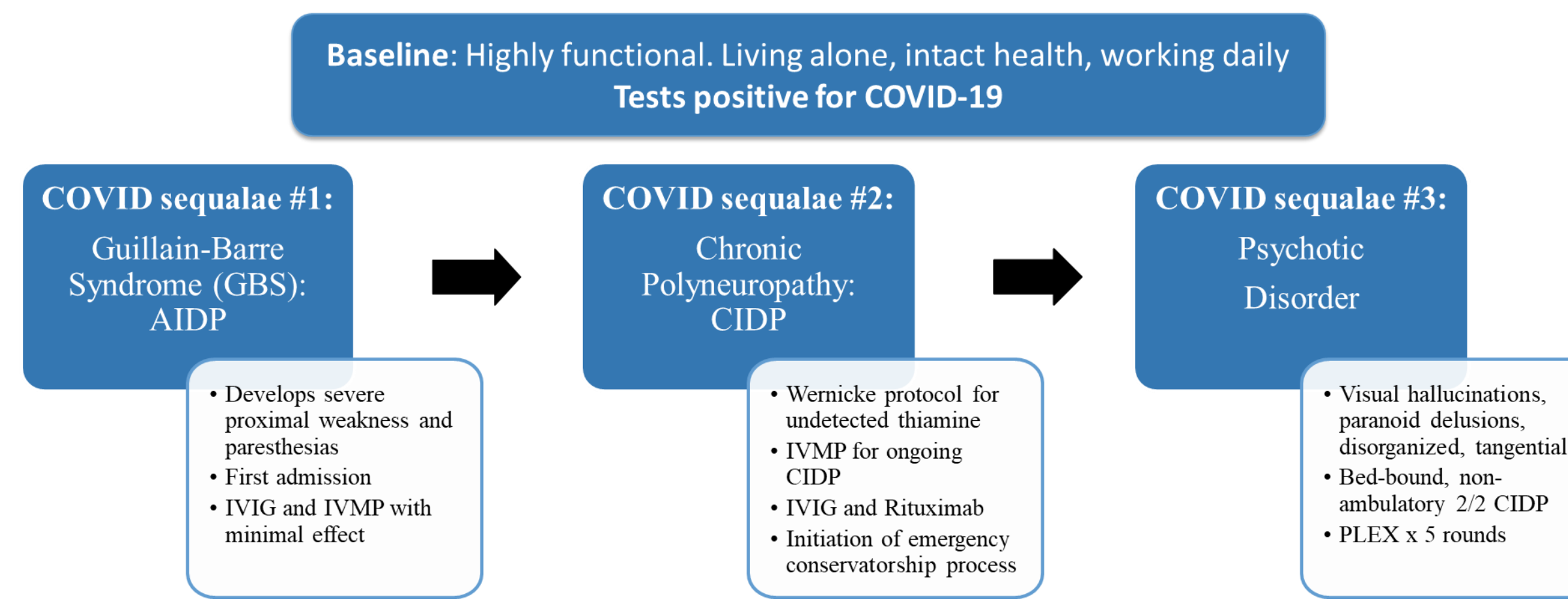
- Numbers of COVID-induced neurological complications are increasing; few cases report a progression to encephalitis
- COVID-induced encephalitis has significant associated morbidity with a **mortality rate of 13.4%**
- **Significant morbidity and poor outcomes** underscores need for understanding of COVID-induced auto-immune encephalitis and the unique ways it can present
- < 1% of COVID-19 patients develop encephalitis, but **6.7% of severely ill COVID+ population** develop encephalitis

**GBS:** Guillain-Barre Syndrome  
**AIDP:** Acute Inflammatory Demyelinating Polyradiculoneuropathy (GBS)  
**CIDP:** Chronic Inflammatory Demyelinating Polyradiculoneuropathy  
**PLEX:** Plasma exchange/plasmapheresis

## CASE SUMMARY

- 53-year-old female with history of anxiety and AUD
- **COVID-19 viral prodrome:** Fever, N/V/D, chills
- Develops **severe proximal weakness and paresthesias**; admitted for GBS
- IVIG and IVMP with limited effect
- Readmitted 3 times over next 30 days for ongoing **conversion of AIDP to CIDP**
- IV Thiamine for possible Wernicke's
- Acute psychosis noted 7 weeks after initial presentation
- **MSE: paranoid/persecutory delusions, confabulation, tangential thought process, visual hallucinations**
- Risperidone and Haldol initiated; Haldol transitioned to Olanzapine due to dystonic reaction
- LP concerning for autoimmune encephalitis
- **PLEX initiated for 5 rounds**
- Psychosis improves → titrated off Olanzapine
- **Return to cognitive baseline** and transferred to rehabilitation center for ongoing CIDP symptoms

## CLINICAL TIMELINE AND TREATMENT COURSE



## DIAGNOSTIC TESTS

ANA: **Positive**  
ANA titer: **1:80**, dense fine speckled  
ANCA: negative  
ESR: **43** CRP: **5.7**  
Anti-GAD65 Antibody: **Positive, 0.38**  
CSF: **1+ WBC's, 12 nucleated cells (99% lymphocytes), Protein elevated (44), RBC 122**

MRI/CT Head: Unremarkable  
L Sural Nerve Biopsy: **marked axonal loss and demyelination**  
Muscle Biopsy: **moderate neurogenic atrophy, chronic inflammation**

**Unremarkable Work-Up:**  
-B12, TSH, hepatitis, ceruloplasmin, HIV, copper, Treponema, lupus, porphyria, CNS vasculitis  
-Paraneoplastic panel, heavy metal screening, immunoglobulin testing, sensory neuropathy panel WNL

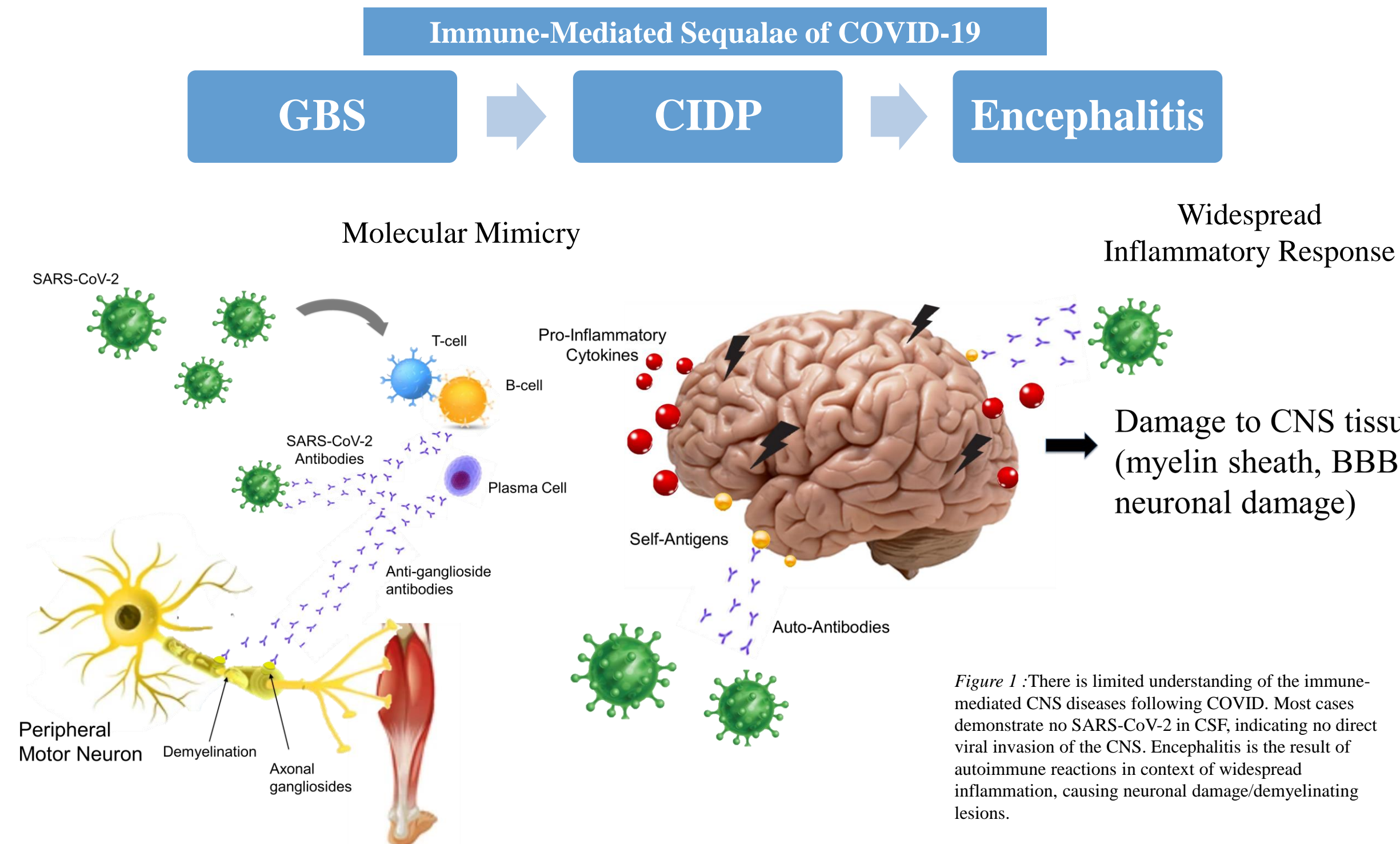
## DISCUSSION

- This case highlights several areas of complexity regarding COVID-19 encephalitis: progression from GBS/CIDP, varying etiologies, unusual presentations, significant associated morbidity and mortality
- A broad differential diagnosis is required when a patient presents with first-break psychosis
- Detailed history-taking of clinical timeline is imperative to accurately diagnose and provide timely treatment
- Further characterization is needed of the diagnosis of COVID-19-induced encephalitis within a rapidly progressive CIDP context
- Rapidity/severity of condition may lead to ethical concerns of emergency conservatorship, changed code status, decision capacity
- Potential for rapid decline underscores need to understand this condition for efficient diagnosis, treatment, and prevention to optimize patient outcomes

## REFERENCES

1. Gagarkin, D.A., Dombrowski, K.E., Thakar, K.B. *et al.* Acute inflammatory demyelinating polyneuropathy or Guillain-Barré syndrome associated with COVID-19: a case report. *J Med Case Reports.* 2021; 15, 219.
2. Salle V. Coronavirus-induced autoimmunity. *Clin Immunol.* 2021 May; 226:108694. Epub 2021 Feb 19.
3. Siow, I, Lee, KS, Zhang, JJY, Saffari, SE, Ng, A. Encephalitis as a neurological complication of COVID-19: A systematic review and meta-analysis of incidence, outcomes, and predictors. *Eur J Neurol.* 2021; 28: 3491.
4. Stoian A, Stoian M, Bajko Z, Maier S, Andone S, Cioflin RA, Motataianu A, Barcutean L, Balasa R. Autoimmune Encephalitis in COVID-19 Infection: Our Experience and Systematic Review of the Literature. *Biomedicine.* 2022 Mar 25;10(4):774.
5. Vakili K, Fathi M, Hajiesmaeili M, Salari M, Saluja D, Tafakhori A, Sayehmiri F, Rezaei-Tavirani M: Neurological Symptoms, Comorbidities, & Complications of COVID-19: A Literature Review & Meta-Analysis. *Eur Neurol* 2021;84:307-324.

## NEUROPHYSIOLOGY



*Figure 1:* There is limited understanding of the immune-mediated CNS diseases following COVID. Most cases demonstrate no SARS-CoV-2 in CSF, indicating no direct viral invasion of the CNS. Encephalitis is the result of autoimmune reactions in context of widespread inflammation, causing neuronal damage/demyelinating lesions.