

# Anti-NMDA Receptor Encephalitis Associated with COVID-19: A Case Report

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## Introduction

- Encephalitis is a rare complication of COVID-19 but is associated with increased morbidity and mortality (Siow et al., 2021).
- Anti-N-methyl-D-aspartate (NMDA) receptor encephalitis associated with COVID-19 infection has been reported, although there continues to be a paucity of data in the literature (Vasilevska et al., 2021).
- We describe a case of acute-onset mania with psychotic features found to be secondary to anti-NMDA receptor encephalitis in the context of a recent COVID-19 infection.

## Case Description

- Patient is a 45 year old female who was brought to the emergency department by her partner for erratic behavior and mood lability for several weeks.
- Patient was diagnosed with COVID-19 several weeks ago, and her symptoms and unusual behavior appeared to develop around the time of her diagnosis.
- Patient had been increasing anxious, grandiose, and paranoid with insomnia and auditory hallucinations.

Past Medical History
Rheumatoid Arthritis
GERD
Hypothyroidism

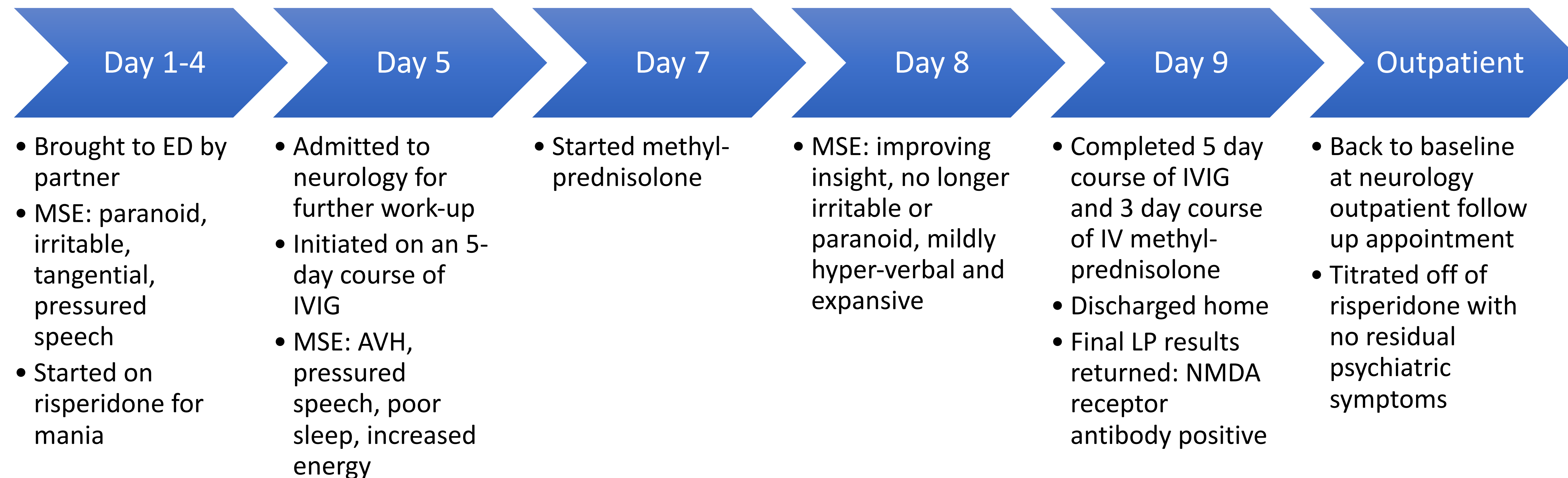
## Case Description

- Patient was initiated on risperidone for mood but remained floridly manic. Due to concern for an underlying organic etiology, a course of IVIG and methyl-prednisolone was initiated.
- Patient's mental status significantly improved. She was discharged on day 9 and titrated off risperidone as an outpatient. On the day of discharge, LP results returned and were positive for NMDA receptor antibodies.

PPhx, FH, Substance Use History
No prior psychiatric history
No family psychiatric history
Rare EtOH use, No drug use

Labs and Imaging	
CBC, BMP, LFTs, TSH, HgA1c, B12, Thiamine, Ammonia	WNL
Utox, HIV, RPR	Negative
ESR	32 (elevated)
CRP	7.3 (elevated)
Rheumatoid Factor	139.8 (elevated)
TPO Antibodies	2515 (very high)
EEG	unremarkable
CSF	NMDA Receptor Antibody Positive
Brain MRI w/ and w/o contrast	Leptomeningeal enhancement in the bilateral frontal convexities

## Timeline



## Discussion

- COVID-19 associated encephalitis is an inflammatory condition of the brain.
- Average incidence of 0.215% in patients with COVID-19 (Siow et al., 2021).
- Unknown pathophysiology but several proposed mechanisms.
  - Most likely cause is molecular mimicry (Vasilevska et al., 2021).
- This patient was likely at increased risk of an autoimmune encephalitis given her history of prior autoimmune conditions.

## Conclusion

- Individuals with acute-onset neuropsychiatric symptoms, particularly in the setting of recent infection with COVID-19, should be evaluated for possible autoimmune etiologies and considered for initiation of immunotherapy for empiric treatment.

## References

- Siow, I., Lee, K. S., Zhang, J. J. Y., Saffari, S. E., & Ng, A. (2021, Oct). Encephalitis as a neurological complication of COVID-19: A systematic review and meta-analysis of incidence, outcomes, and predictors. *Eur J Neurol*, 28(10), 3491-3502. <https://doi.org/10.1111/ene.14913>
- Vasilevska, V., Guest, P. C., Bernstein, H. G., Schroeter, M. L., Geis, C., & Steiner, J. (2021, Oct 28). Molecular mimicry of NMDA receptors may contribute to neuropsychiatric symptoms in severe COVID-19 cases. *J Neuroinflammation*, 18(1), 245. <https://doi.org/10.1186/s12974-021-02293-x>

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