

# Brain Responsive Neurostimulation Device Safety and Effectiveness in Patients

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## Description

Epileptic seizures are frequently seen as a hallmark symptom of autoimmune encephalitis. Seizures are thought to be a symptomatic, acute brain inflammation that responds to immunotherapy in this setting. Sadly, autoimmune epilepsy is more appropriate for cases in which seizures persist and are resistant to immunotherapy and antiseizure medications. After antibodies to GluR3 were discovered in severe epilepsies, including Rasmussen's encephalitis, the term autoimmune epilepsy was first coined in 2002. The International League against Epilepsy defined it as epilepsy with evidence of autoimmune-mediated CNS inflammation in its most recent position paper on the classification of epilepsy. The growing evidence for epilepsy with an autoimmune etiology has been bolstered by advances in autoimmune encephalitis research over the past ten years. In 2020, the ILAE Autoimmunity and Neuroinflammation Taskforce proposed conceptual definitions of acute symptomatic seizures secondary to autoimmune encephalitis and autoimmune-associated epilepsy in order to provide the foundation for the distinction between seizures in the context of autoimmune encephalitis.

## Acute Symptomatic Seizures

A probable autoimmune cause has been implicated in a significant number of new-onset cryptogenic epilepsies, particularly in adults and adolescents. Early suspicion and prompt identification are crucial in clinical practice due to the fact that these patients rarely respond to conventional antiseizure medication and timely immunotherapy can dramatically improve seizure control. Contrary to adults, definite autoimmune encephalitis, in which neural-specific autoantibodies are positive in high titers in plasma or cerebrospinal fluid, is numerically less prominent in the pediatric population. However, timely immunotherapy is beneficial for both seropositive and seronegative autoimmune encephalitis patients. Immunotherapy frequently proves clinically beneficial, particularly in pediatric patients, with the assistance of criteria for establishing a probable autoimmune encephalitis diagnosis. However, there are clinical entities such as Rasmussen encephalitis and new-onset refractory status epilepticus, which may not always meet the criteria for probable autoimmune encephalitis but respond to immunotherapy.

While an altered mental status, cognitive dysfunction, movement disorder, and neuropsychiatric features in a patient with epilepsy are clues, an objective weighted score for individual criteria will assist the clinician in deciding whether to administer immunotherapy, taking into consideration the cost and potential side effects. Based on clinical features and the initial neurologic assessment of adults with epilepsy, the Antibody Prevalence in Epilepsy and Response to Immunotherapy in Epilepsy scores have already been developed and validated. Children often present with autoimmune encephalitis in different ways than adults do. Additionally, a validated scoring system with high sensitivity and specificity would eliminate the need for extensive autoimmune serologic testing in low-middle-income countries and may assist in redirecting resources toward the evaluation of alternative etiologies. As a result, we decided to evaluate the performances of the two scores above by adapting them to the pediatric population. Clinically, patients with autoimmune limbic encephalitis-caused temporal lobe epilepsy are similar to those with non-autoimmune etiologies-caused temporal lobe epilepsy, but they have a different prognosis and require customized treatments. The purpose of this study was to see if neuropsychological testing could distinguish patients with these types of TLE. Autoimmune limbic encephalitis is a severe brain inflammation characterized by morphological and metabolic changes primarily affecting mesio-temporal structures and the presence of heterogeneous autoantibodies directed against neuronal cell-surface or intracellular proteins.

## Mesio-Temporal Structures

ALE frequently causes autoimmune-associated temporal lobe epilepsy, changes in emotional well-being and behavior, and dynamic or permanent impairments of cognitive functions due to its predominant effects on the limbic system. Neuropsychological evaluations play a crucial role not only in the diagnostic process for patients who are suspected of having ALE, but also in the monitoring of the progression of the condition and the evaluation of therapeutic interventions. Subacute onset of neurological symptoms, such as cognitive dysfunction, neuropsychiatric symptoms, and seizures, are characteristic of the autoimmune encephalitis group of neuroinflammatory disorders. A significant portion of patients with AIE have poor long-term clinical outcomes, including

functional disability, cognitive impairment, and drug-resistant epilepsy, despite the fact that the disease is typically monophasic and responds to immunosuppressive treatment. DRE has been linked to significant morbidity and mortality, with a prevalence of between 10% and 30%. We don't know everything about the factors that lead to DRE. Clinical epilepticus and abnormalities in the mesial temporal lobe or cortical region on imaging have been identified as risk factors for the development of DRE in AIE. Electroencephalography may be able to provide biomarkers that can be used to predict DRE in AIE. It is easy to get, doesn't hurt, and usually happens as part of regular clinical care.

A small number of studies have looked into how EEG and clinical characteristics can predict DRE as an outcome. We examine the value of early EEG patterns and patient clinical

parameters for DRE prediction and present the findings of a large retrospective multicenter study that characterized DRE in a group of AIE patients. An uncommon condition is autoimmune-related epilepsy, also known as acute symptomatic seizures that are the result of autoimmune encephalitis. Antineuronal and onconeuronal antibodies are the only diagnostic clues, with the exception of a few specific seizure types and EEG patterns. Immunotherapy may have a very sensitive but not specific response. More than a third of patients with autoimmune encephalitis who have acute symptomatic seizures eventually develop epilepsy. The most prevalent subgroups of autoimmune-related epilepsy were those with epilepsy and GAD ab, as well as those with epilepsy in systemic autoimmune diseases. Clinical seizures that occur during a systemic or brain injury are referred to as acute symptomatic seizures.