MONASH University

MONASH MEDICINE NURSING AND HEALTH SCIENCES

EPILEPSY AND AUTOIMMUNE ENCEPHALITIS

Plain Language Summary

Source - Wesselingh, R., Broadley, J., Buzzard, K., Tarlinton, D., Seneviratne, U., Kyndt, C., Stankovich, J., Sanfilippo, P., Nesbitt, C., D'Souza, W., Macdonell, R., Butzkueven, H., O'Brien, T. J., & Monif, M. (2022). Prevalence, risk factors, and prognosis of drug-resistant epilepsy in autoimmune encephalitis. Epilepsy & behavior : E&B, 132, 108729. Advance online publication. https://doi.org/10.1016/j.yebeh.2022.108729

WHY WE DID THIS WORK

- **Seizures** (or sudden, uncontrolled electrical disturbances in the brain) are a common initial neurological symptom that occurs in people with autoimmune encephalitis. In **autoimmune encephalitis** a person's immune system mistakenly targets different proteins in their brain causing damage and inflammation.

- For some people, the seizures can progress to very severe and ongoing seizures called status epilepticus, requiring treatment to stop them happening. While some patients will stop having seizures after immune system suppressing treatment, others will continue to have seizures that do not respond, even to increasing amounts of anti-seizure medications. This is known clinically as treatment- or **drug-resistant epilepsy**. Drug-resistant epilepsy has a significant impact on the quality of life of people with autoimmune encephalitis. We currently do not know why some patients with autoimmune encephalitis develop drug-resistant epilepsy whilst others do not.

- It is important for doctors to be able to predict how and why people with autoimmune encephalitis develop drug-resistant epilepsy because it is a disabling complication that may be preventable. For this research, we wanted to find out answers to following questions –

  1. How common is drug-resistant epilepsy after autoimmune encephalitis?

  2. What are the risk factors for the development of drug-resistant epilepsy after autoimmune encephalitis?

  3. In the early part the disease, can the use of EEG tell us about a person's likelihood of developing drug-resistant epilepsy?

  4. Can we use this information to predict which patients with autoimmune encephalitis are going to develop drug resistant epilepsy?

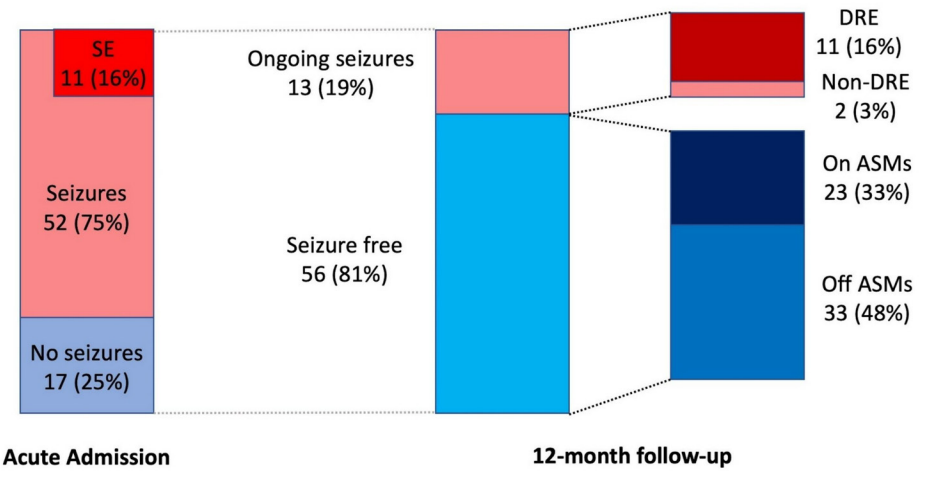

Figure 1 - Schematic showing a breakdown of patients with or without seizures following acute hospital admission and then their outcome 12 months down the track. Patients on or off anti-seizure medications (ASMs) and further patients who had developed drug-resistant epilepsy (DRE). SE - status epilepticus

HOW WE DID THIS WORK

- We looked through the medical records of seven hospitals in Victoria (Australia) for people who met the diagnosis of autoimmune encephalitis and had an EEG when they first became unwell.

- Two hundred and eight patients were identified and selected for analysis. We then collected available data from 69 patients of their symptoms, seizures, treatment, and whether they developed drug-resistant epilepsy at 12 months after their initial illness.

- We analysed EEGs from patients to find any brain wave irregularities or signatures (called **EEG biomarkers**) that were more common in those with autoimmune encephalitis who developed drug-resistant epilepsy than those that did not develop drug-resistant epilepsy. Finally, we combined all the factors and created a tool that doctors can use to predict an individual's risk of developing drug-resistant epilepsy after autoimmune encephalitis.

WHAT WERE THE INTERESTING THINGS WE FOUND

- We found that it was not uncommon to develop drug-resistant epilepsy after autoimmune encephalitis. It occurred in 16% of patients with autoimmune encephalitis in our analysis.

- We also identified that a key risk factor for the development of drug-resistant epilepsy after autoimmune encephalitis was people who experienced status epilepticus

- On EEG, large spikes of abnormal electrical activity called ‘periodic discharges’ combined with their specific location in the brain can predict the development of drug-resistant epilepsy after autoimmune encephalitis.

WHAT DO THESE FINDINGS MEAN?

The research could help clinicians to –

1. Identify those patients with autoimmune encephalitis at risk of developing drug-resistant epilepsy and potentially change their treatment strategy (creating a risk assessment tool to use in practice), and

2. Address risk factors such as status epilepticus with the goal to try and reduce the long-term risk of drug-resistant epilepsy.

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We are also a member of the Monash Central Clinical School Community and Research Engagement (CaRE) Program.

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References

Research group - monash.edu/medicine/ccs/neuroscience/research/monif-group

Australian Autoimmune Encephalitis Consortium project website - monash.edu/medicine/autoimmune-encephalitis

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