Long-term neuropsychological outcomes for children with Febrile Infection-Related Epilepsy Syndrome (FIRES) treated with anakinra

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Background: Febrile-infection related epilepsy syndrome (FIRES) is a rare epilepsy syndrome in which a previously healthy individual develops refractory status epilepticus in the setting of a preceding febrile illness. Anakinra, an IL-1 receptor antagonist, is a recently considered therapy that has shown potential benefit in the acute period. However, there is limited data regarding detailed long-term outcomes. This study aims to describe the long-term neuropsychological outcomes in a series of pediatric patients with FIRES treated with anakinra.

Methods: This is a retrospective multi-center case series of pediatric patients with a diagnosis of FIRES treated acutely with anakinra who had neuropsychological testing at least 12 months after status epilepticus onset. Each patient underwent comprehensive neuropsychological evaluation as part of routine clinical care. Additional data collection included the acute seizure presentation, medication exposures, and outcomes.

Results: There were six patients identified with a median age of 11.08 years (IQR: 8.19–11.23) at status epilepticus onset. Anakinra initiation was a median of 11 days (IQR: 9.25–13.50) after hospital admission. All patients had ongoing seizures, and none of the patients returned to baseline cognitive function at a median follow-up of 40 months (IQR 35–51). Of the five patients with serial full-scale IQ testing, three demonstrated a decline in scores over time. Testing results revealed a diffuse pattern of deficits across domains, and all patients required special education and/or accommodations for academic learning.

Conclusions: Despite treatment with anakinra, neuropsychological outcomes in this series of pediatric patients with FIRES demonstrated ongoing diffuse neurocognitive impairment. Future research will need to explore the predictors of long-term neurocognitive outcomes in patients with FIRES and evaluate if acute treatment interventions improve these outcomes.