Super-Refractory Status Epilepticus In Children: A Tertiary Care Intensive Care Unit Experience

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**Background**: Background Super-refractory status epilepticus (SRSE) is one of the most severe neurological emergencies, associated with a significant risk of mortality and morbidity. SRSE occurs in approximately 12-22% of the patients with Status Epilepticus. The published literature on SRSE comprise largely of case-reports or series, mostly in adults. The optimal approach to management remains controversial due to a lack of evidence from high quality clinical trials.

**Methods**: Methods - A prospective observational study was done in the pediatric intensive care unit of a tertiary care hospital over a period of 18 months. The study was approved by the Institutional Ethics Committee for Human Research. Inclusion criteria - Age 3m-12y, Meeting the case definition of SRSE (status epilepticus that continues for 24 h or more after the onset of anesthesia, or the status epilepticus recurs on the reduction or withdrawal of anesthesia), Parents/caregivers gave informed consent for inclusion. Exclusion criteria - Age 12y, Children with major congenital anomalies, pre-existing neurological impairment. For descriptive analysis of demographic and clinical variables data of age, sex, presence and type of prodromal symptoms, presence and type of seizures and SE before admission, consciousness level on admission, duration of SE, duration of hospital and intensive care unit (ICU) stay, and ultimate control of SE were recorded. We also collected the information of number and type of ant seizure medications, anesthetics, and immune therapies received, ventilator support, ionotropes support, mean arterial pressure, blood glucose and calcium level, PRISM Score on PICU admission, common co morbidities, complications, degree of disability, functional outcome, morbidity and mortality at ICU using a semi-structured pre-designed proforma. Continuous EEG (CEEG) monitoring was done to detect occurrence or cessation of seizure activity. Functional outcome at 6 months post discharge was graded according to the Glasgow outcome scale Extended Pediatric Revision (GOS-E Peds) , and classified as good (GOS 4 and 5) and poor (GOS 1, 2 and 3) outcome groups.

**Results**: Results - Fourteen children aged between 2 years and 10 years were diagnosed with SRSE, comprising 12.7% of all children admitted with status epilepticus. Encephalitis was the commonest etiology (6/14) followed by Nonparaneoplastic Autoimmune encephalitis (4/14), seizure disorder (2/14), acute disseminated encephalomyelitis (1/14) and Febrile infection related epilepsy syndrome (FIRES) (1/14). A median of 5 (range 4-7) anticonvulsant drugs were used. Besides midazolam infusion, thiopentone was the commonest anesthetic agent used. Immune therapies were used in 9 of 14 cases (64%). The median GOS-E Peds at 6 months post-discharge was 4 (range 1-7). In multivariate analyses, higher PRISM III score at admission (P=0.013), longer duration of intensive care unit stay (P=0.041) and requirement of general anesthesia >48h (P=0.029) were associated with worse outcomes. Half of the survivors (50%) remaining on antiseizure medications.

**Conclusion**: Conclusion - Infective encephalitis was the most commonly identified cause of Super refractory status epilepticus, followed by autoimmune encephalopathy. Outcome at discharge is poor but improves during follow-up. The role of anesthetics and immune therapies warrants further investigation.