Management of Status Epilepticus in Children: Quality Improvement Gold Project


Mayo Clinic Children’s Center, Rochester, Minnesota

Divisions of Pediatric Emergency Medicine, Pediatric Critical Care Medicine, Pediatric Neurology

Abstract

Objective: To develop evidence-based treatment guidelines for pediatric status epilepticus, identify the gaps in current care standards at Mayo Clinic Rochester, and implement best practice enterprise-wide to reduce variation and improve the care of this high-risk, pediatrics population.

Methods: We developed pediatric status epilepticus evidenced-based guidelines through a literature review and multidisciplinary expert consultation. We utilized retrospective and prospective chart reviews and PDSA cycles to implement these guidelines as standard of care at Mayo Clinic Rochester, and standardized evidence-based practice guidelines as standard of care at Mayo Clinic Children’s Center.

Results: The Mayo Clinic Guideline for Treatment of Pediatric Status Epilepticus was used in 100% of pediatric patients presenting with seizure/status epilepticus. There was also a 140% utilization of pediatric antiepileptic drugs in 100% of pediatric patients presenting with seizure/status epilepticus, and there was a 16% reduction in the median time to initiation of first benzodiazepine (BZ) administered pre-ED among patients who had a benzodiazepine administered pre-ED.

Conclusions: The Management of Status Epilepticus in Children Quality Improvement resulted in the following successful improvements:

1. Development of an evidence-based guidelines for management of status epilepticus in both the neonatal and pediatric patient population
2. Sustained improvement in utilization of these guidelines and decrease in variability of practice
3. Sustained improvement in timely medication administration to seizing children
4. Sustained improvement in POCT glucose documentation
5. Availability of new guideline enterprise-wide with availability on AskMayoExpert
6. Development of simulation training program for management of pediatric SE for residents

Background

Status Epilepticus Protocol

Despite a paucity of well-designed randomized controlled trials and the presence of a complex relationship among seizures, brain injury, and outcomes, there is no question that effective and timely reduction in seizure burden is best for the child. Longer duration seizures are more refractory to treatment, and seizures independently contribute to brain damage. In response to a multi-departmental perception at Mayo Clinic Children’s Center that our management of pediatric status epilepticus was widely variable and delayed across departments (EMS, Emergency Department, general care wards, and intensive care units), we created the Management of Status Epilepticus in Children Quality Improvement Gold Project.

Goal Statement

AIME: Improve safety and effectiveness of status epilepticus management in children

GAP: variability in pediatric status epilepticus management and delay in treatment

MEASURE: Retrospective and prospective chart reviews

CHANGE: Implementation of a standardized evidence-based practice guideline as standard of care through PDSA cycles

Cycle 1: Baseline Data

Table 1: Baseline Data

<table>
<thead>
<tr>
<th>Measure</th>
<th>Cycle 1</th>
<th>Cycle 2</th>
<th>Cycle 3</th>
<th>Cycle 4</th>
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<tbody>
<tr>
<td>% of patients with first BZ started within 5 minutes of seizure recognition</td>
<td>95%</td>
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<td>% of patients with first BZ started within 15 minutes of seizure recognition</td>
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<td>% of patients with first BZ started within 60 minutes of seizure recognition</td>
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<td>% of patients with first BZ started within 24 hours of seizure recognition</td>
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<tr>
<td>% of patients with first BZ started within 48 hours of seizure recognition</td>
<td>95%</td>
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</tbody>
</table>

Results

The Management of Status Epilepticus in Children Quality Improvement resulted in the following successful improvements:

1. Development of an evidence-based guidelines for management of status epilepticus in both the neonatal and pediatric patient population
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Acknowledgments

• Mayo Clinic Children’s Center
• Department of Emergency Medicine, Division of Pediatric Emergency Medicine
• Department of Pediatrics, Divisions of Pediatric Critical Care Medicine and Neurolgy
• Department of Neurology, Division of Pediatric Neurology
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