Child-Youth Epilepsy
Overview, epidemiology, terminology

Glen Fenton, MD
Professor, Child Neurology and Epilepsy
University of New Mexico
New onset seizure case

An 8-year-old girl has a witnessed seizure this morning as she is awakening from sleep. Her sister, who shares a room with her, heard gurgling noises and said the patient was “shaking all over”. She yelled for her parents, who put the patient on her side. The seizure stopped after 1-2 minutes and she was then confused and slept for 30 minutes. Now, an hour later, she is back to baseline. Her past medical history is unremarkable, with no identified risk factors for seizures. Family history is remarkable for a maternal cousin with childhood epilepsy.

Was the event a seizure and if so, what type?
What caused it?
Will it happen again?
What treatment, if any, is needed?
Improving epilepsy care

- In 2012, the Institute of Medicine published “Epilepsy Across the Spectrum: promoting health and understanding” which offered 13 evidence-based recommendations to enable short- and long-term improvements for people with epilepsy and their families. CYE ECHO can impact:
  - Recommendation 4: improve early identification of epilepsy and it’s comorbid health conditions
  - Recommendation 6: establish accreditation of epilepsy centers and an epilepsy care network
Seizures are common!

- Epilepsy affects 1-2% of the general population
  - Higher number in childhood, at least 4%
  - Statistics vary depending on how “epilepsy” is defined and whether febrile or other “provoked” seizures are included.
  - In New Mexico, about 20,000 children are affected.
Pediatric neurologists are rare!

- There is a current and projected future shortage of child neurologists by at least 20%.

- In New Mexico, there are fewer than 10 pediatric neurologists.
Most patients respond well to treatment.

- Not all patients with epilepsy require treatment
  - Infrequent minor seizures in Rolandic epilepsy

- 50-70% of patients achieve seizure control with minimal adverse effects with a single, appropriately selected anti-seizure medication at therapeutic doses.

- Primary care providers can manage these patients very well.

- Patients who do not respond as expected or who have complicating additional neurologic conditions should be referred to a specialist.
Quality measures: AAN 2011

1. Seizure type and current frequency
2. Etiology or epilepsy syndrome documented
3. EEG results reviewed, requested, or ordered
4. MRI reviewed, requested, or ordered (when appropriate)
5. Inquire about anti-seizure medication side effects
6. Surgical treatment referral considered for intractable epilepsy
7. Counseling about epilepsy specific safety issues
8. Counseling for women of childbearing potential with epilepsy
Terminology and categorization

- Epilepsy
- Focal vs generalized
- **Convulsive vs nonconvulsive**
- Tonic vs clonic vs myoclonic vs atonic vs combined
- **Status epilepticus**
- Etiology known or not known
What is epilepsy?

- International League Against Epilepsy
  - “epilepsy” no longer requires 2 unprovoked seizures for diagnosis
  - 1 seizure in a person deemed to have an enduring predisposition to generate epileptic seizures.
    - What evidence of an enduring predisposition is needed?
    - What does “enduring” mean?
- Epilepsy is not just the seizure disorder, but also the neurobiological, cognitive, psychological and social consequences of having the seizures.
<table>
<thead>
<tr>
<th>Categorizing seizures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generalized</strong></td>
</tr>
<tr>
<td>- Tonic-clonic</td>
</tr>
<tr>
<td>- Tonic</td>
</tr>
<tr>
<td>- Clonic</td>
</tr>
<tr>
<td>- Atonic</td>
</tr>
<tr>
<td>- Myoclonic</td>
</tr>
<tr>
<td>- Myoclonic</td>
</tr>
<tr>
<td>- Myoclonic atonic</td>
</tr>
<tr>
<td>- Myoclonic tonic</td>
</tr>
<tr>
<td>- Absence</td>
</tr>
<tr>
<td>- Typical</td>
</tr>
<tr>
<td>- Atypical</td>
</tr>
<tr>
<td>- With special features</td>
</tr>
<tr>
<td>- Myoclonic absence</td>
</tr>
<tr>
<td>- Eyelid myoclonia</td>
</tr>
<tr>
<td><strong>Focal (AKA partial)</strong></td>
</tr>
<tr>
<td>- Without impairment of consciousness</td>
</tr>
<tr>
<td>- With observable motor or autonomic components</td>
</tr>
<tr>
<td>- Involving subjective or psychic phenomena only (aura)</td>
</tr>
<tr>
<td>- With impairment of awareness (dyscognitive)</td>
</tr>
<tr>
<td>- Evolving to a bilateral convulsive seizure</td>
</tr>
</tbody>
</table>
Why categorize seizures?

- Helps localize which brain area is involved.
- Might suggest whether neuroimaging is required.
- Helps with optimal treatment.
  - Ethosuximide for absence seizures but not for focal nonconvulsive seizures
  - Carbamazepine helps with tonic, clonic, tonic-clonic, but worsens atonic and myoclonic seizures
Be sure the episodes are seizures!

- An accurate description of the event(s) is imperative!
- Know the characteristics of **paroxysmal events** which can be mistaken for seizures
  - Syncope
  - Breath-holding spells
  - Tics
  - Cardiac arrhythmias
  - Psychogenic events
- Know that seizures can also mimic syncope, migraine, sleep disorders, panic attacks, etc.
- Know the limitations of using EEG to confirm or refute suspicion of seizure.
Was the seizure provoked?

- Identify any immediate provoking factors
  - Fever
  - Trauma
  - Hypoglycemia
  - Hyponatremia

- Reactive seizures are not synonymous with epilepsy
Define the cause!

- **A complete history** is the best way to find the cause.
  - Pre/peri/post-natal complications
  - Head trauma
  - Prior CNS infections
  - Family members with epilepsy

- If a cause is not evident and the patient is otherwise neurologically normal, he/she likely has one of the known epilepsy syndromes.
What lab studies should be done?

- Circumstances dictate the workup!
  - GI symptoms: glucose, electrolytes
  - Fever: CSF exam

- For an otherwise healthy child who has recovered to baseline, routine lab studies like glucose, chem panel, cbc are not necessary

- Imaging (MRI preferred) when focal findings on exam or a focal seizure (not attributed to a benign seizure syndrome)

- EEG is recommended.
The medical history

- Details of the paroxysmal event(s); all types and not just the most dramatic ones
  - From onset to end
- Circumstances under which the paroxysmal events occurred
- Timing and circadian distribution (wake vs sleep)
- Body position
- Possible triggering factors
  - Sleep deprivation, trauma, illness
- Personal and family medical history
  - Risk factors like birthing complications, head trauma, etc.

- The second visit may be more informative!
- Video-recordings of events can be extremely helpful.
Treatment

• What should a caregiver do to/for a child during the seizure?
  ◦ Assess ABCs
  ◦ Positioning patient to optimize airway patency
  ◦ Abortive medication if over 3-5 minutes duration

• What should be done following the seizure?

• Caregivers need to closely observe during certain activities, like swimming, sports, climbing heights, being around heat sources.
Treatment

- What is the likelihood of a seizure recurrence?
  - Overall recurrence risk is 25-50% after the 1st seizure.
    - Is the “first” episode actually the initial spell?
      - 75% of patients presenting with a first convulsive seizure have history of prior seizures, often “little seizures”.

- If medication is warranted, which antiseizure medication should be chosen?
  - Efficacy, formulation, adverse effects

- What laboratory studies need to be done relative to the antiseizure medication?
  - Monitoring for side effects and drug levels

- Should abortive medication be prescribed?
- Is lifelong treatment required?
Lecture topics

- Convulsions
- Staring spells
- Febrile seizures
- Seizure look-alikes
- Epilepsy syndromes
- Status epilepticus
- Important aspects of the history and exam
- Utility of the EEG
- When to get neuroimaging
- First aid and prevention of complications
- Abortive agents
- Preventative agents: when to start, when to stop
- Preventative agents: choosing and using
- When to refer
References