EPILEPSY: DIAGNOSIS AND MANAGEMENT

Jeffrey W Boyle, MD, PhD
Avera Medical Group Neurology
Sioux Falls, SD
Disclosures:

- None
Objectives

- Recognize the incidence of seizure and epilepsy in the US population
- Appreciate the differences in seizure types
- Identify common non-epileptic spells
- Understand the strategies in utilizing antiepileptic agents
- Develop knowledge around counseling patients with epilepsy
Definitions

- “Spell” – any transient neurologic event. Usually used with diagnostic uncertainty
Def: Seizure

- Clinical or electrographic diagnosis indicative of abnormal rhythmic electrical activity within the cortex.
Def: Epilepsy

- clinical diagnosis in which a patient has a high likelihood of recurrent unprovoked seizures.
  - Not hypoglycemia
  - Not alcohol withdrawal
  - Not trauma
  - Not hypoperfusion
- Recurrent more than 24h apart
- One seizure with evidence of more to come.
Significance

- 4th common neurologic disorder
- 3.4 million people in the US with epilepsy
- 1/26 will develop epilepsy at some point in their lifetime
- 10% of Americans will have at least 1 seizure during their lifetime

Background

- Biblical reference
  - Boy “Seized by an unclean spirit”
  - Often falls into fire and into water
  - Sudden scream, foaming at the mouth, convulsions, lack of speech, falling, rigid, then corpse-like.
Seizure semiology (study of signs)

- Beginning/Middle/End
- Stereotypic
- Positive/negative symptoms
- Precipitants
Seizure Description

- Preceding aura
- Vocalization
- Amnesia
- Tongue Bite
- Incontinence
- Tonic
- Clonic
- Duration
- Post ictal stupor/confusion
- Todd’s Paralysis

Find a witness!
Types of seizures

<table>
<thead>
<tr>
<th>Focal Onset</th>
<th>Generalized Onset</th>
<th>Unknown Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware</td>
<td>Impaired Awareness</td>
<td>Motor</td>
</tr>
<tr>
<td>Motor Onset</td>
<td></td>
<td>Tonic-clonic</td>
</tr>
<tr>
<td>Non-Motor Onset</td>
<td>Non-Motor (Absence)</td>
<td>Other motor</td>
</tr>
<tr>
<td>focal to bilateral</td>
<td></td>
<td>Non-Motor</td>
</tr>
<tr>
<td>tonic-clonic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Definitions, other seizure types and descriptors are listed in the accompanying paper & glossary of terms

2. Due to inadequate information or inability to place in other categories

Epilepsy Foundation. https://www.epilepsy.com/article/2016/12/2017-revised-classification-seizures
Seizure classification

- Simple partial/focal
- Complex partial/focal
- Complex partial/focal with secondary generalization
- Generalized seizure (GTC, grand mal)
- Absence seizure (petit mal)
- Myoclonic Seizure
- Status epilepticus
Other

- Hypermotor seizures
  - Frontal lobe
  - Intention
Pathophysiology

- Runaway Diesel engine
- Positive feedback loop
- Location
- Spread/size
- Seizure arrest
- Post-ictal recovery
Risk Factors

- Family History
- Birth trauma
- Genetic syndrome
- CNS infection/meningitis
- Febrile convulsions
- Mechanical trauma
- Chemical trauma (Illicit and Rx)
- Mass lesion
- Stroke/MS/AD
Differential Diagnosis

- Cardiac
- TIA
- Migraine
- Tic
  - Verbal
  - Motor
- Movement D/O
- Psychogenic
- Syncope
- Parasomnia
- Cataplexy
- Metabolic myoclonus
New onset seizure

- Provoked (usually generalized)
  - Metabolic
  - Medication
  - Drug
  - Withdrawal

- Unprovoked
  - Focal
  - Generalized
New onset seizure

- Vitals/Labs
- EEG
  - EEG x1 50% Sensitivity
  - EEG x3-4 80-90% Sensitivity
  - Specificity: 3%
- Imaging
  - CT
  - MRI
- Cardiac/Syncope/TIA workup

Diagnosis of Epilepsy and Related Episodic Disorders
St. Louis, EK et al. Continuum Vol.22, No.1. February 2016,
New onset seizure

- **Unprovoked:**
  - 33-50% risk of recurrence
  - After 2\textsuperscript{nd} seizure: 76% recurrence
  - After 3\textsuperscript{rd}: 87%
  - Better for children
New onset seizure recurrance

Treatment in new onset seizure

- **Treat**
  - Focal Seizure
  - Abnormal MRI/EEG
  - Unprovoked with risk factors
  - Nocturnal seizure

- **Consider holding treatment**
  - Provoked seizure (withdrawal, drugs)
Anti-Epileptic Drug treatment (AED)

- Sodium channel blockers
- Calcium channel blockers
- Receptor antagonists
- GABA receptor agonists
- Synaptic inhibition
- Governor on the run away engine
  - Cognitive side effects
  - Balance
AEDs

- Leveteracetam
  - 500mg twice daily (No titration)
  - In general levels not needed.
- Valprioc Acid
  - 250-500mg twice daily (No titration)
  - Follow levels, CBC, CMP, Hepatic panel
- Carbamazepine (No titration)
- Lacosamide (on patent)
- Lamotrigine (long titration)
AED Side effects

- Leveteracetam
  - Behavior (face tattoo)
  - Somnolence (elderly)
- Valprioc Acid
  - Hepatic dysfunction
  - Alcohol
- Lamotrigine – SJS
- Carbamazepine - hyponatremia
AED Adverse events

- All AEDs are teratogenic
  - Valproic Acid more than others
- AEDs also lower the efficacy of oral contraceptive pills.
- Barrier methods with OCP
- Intrauterine device
  - Most effective
  - Most safe
  - No interactions
AEDs that lower OCP efficacy

- Carbamazepine
- Clobazam (Onfi)
- Eslicarbazepine (Aptiom)
- Felbamate (Felbatol)
- Lamotrigine (Lamictal) at doses of 300 mg daily or more
- Oxcarbazepine (Trileptal)
- Phenobarbital
- Phenytoin (Dilantin)
- Primidone (Mysoline)
- Rufinamide (Banzel)
- Topiramate (Topamax) at doses of 200 mg daily or more
Some AEDs do not lower OCP efficacy
- Valprioc Acid
- Leveteracetam
Counseling

- Circumstancial injury and death
  - Driving
  - Water
  - Heights
  - Power tools/machinery
- Status epilepticus
- Sudden Unexpected Death in Epilepsy (SUDEP)
Counseling

- “When do I call for an ambulance?”
- Acute seizure management
  - www.epilepsy.com
- Triggers/Precipitants
  - Alcohol
  - Sleep deprivation
  - Stress
  - Drugs
  - Excessive caffeine
  - Infection
  - Surgery
Medications that lower seizure threshold

- Tramadol
- Imipenem
  - Beta lactams
- Theophylline
- Buproprion
When to refer?

- Unusual spells
- Frequent spells
- Refractory to treatment
- Focal neurologic signs
- Noncompliance to treatment
- Pregnancy
Pregnancy and Epilepsy

- Neurologist 6-9 months prior to pregnancy.
- Folate
- AED levels
- Gestational seizure
- Breast feeding on an AED
Other issues

- Psychogenic Non-epileptic spells
- Prolactin
- Surgical procedures and epilepsy
Psychogenic spells

- “Pseudoseizures”
- Blame
- Conversion/somatiform disorder
  - Clinical diagnosis
  - EEG helpful
- “Poor prognosis”
- Epilepsy and non-epileptic spells
- Techniques for assessment
Prolactin

- Increases with Seizure
- Hypothalamus
- Half life of 15-20 minutes
- Diurnal and ovulatory cycles
- High protein meals
- Mechanical stimulation
- Emotional experiences

Summary: Not reliable in distinguishing epileptic and non-epileptic spells
Epilepsy and surgery

- Optimization of management prior to surgery
- AED levels
- Avoidance of medications that lower seizure threshold
Pearls

- 10% of Americans will have a seizure
- Get a witness!
- Focal and unprovoked seizures need treatment
- Provoked seizures do not need treatment
- Patients need to be counseled
- Women of childbearing age should consider an IUD
Thank you!