New Onset Seizure

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Neurology

Disclosures

- None
Outline

- Epidemiology
- Definitions
- History taking
- Workup
- Counseling
- Differential diagnosis

Epidemiology

- 10% of the population will experience a seizure during their lifetime
  - 1% of the population with epilepsy

- Unprovoked seizure
  - 1/1500 adults in the US
  - 50-70/100,000
    - Highest in males > 85 (96/100,000), and
    - Under 1 year of age (77/100,000)
Impact

- Physical
  - Elderly
- Financial
  - Driving restrictions
  - Medical bills
- Psycho-social
  - Disorienting
  - Traumatic
  - Stigma
  - Isolation
Definitions

- Seizure
  - A transient occurrence of signs/symptoms due to abnormal excessive or synchronous neuronal activity in the brain

Definitions

- Unprovoked seizure
  - Occurring in the absence of precipitation factors
  - May be caused by static or progressive injury

- Acute symptomatic seizure
  - In close temporal association with transient CNS or systemic insult
  - Presumed to be acute manifestation of the insult
Definitions

- **Focal seizure**
  - Initial onset originates within one part of a cerebral hemisphere
    - Awareness intact or impaired
    - Motor or non-motor
    - Focal to bilateral tonic-clonic

- **Generalized seizures**
  - Initial activity is consistent with rapidly engaging networks distributing in bilateral cerebral hemispheres
    - Motor
    - Non-motor/absence
### ILAE 2017 Classification of Seizure Types Basic Version

<table>
<thead>
<tr>
<th>Focal Onset</th>
<th>Generalized Onset</th>
<th>Unknown Onset</th>
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<td>Aware</td>
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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

### ILAE 2017 Classification of Seizure Types Expanded Version

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1. Definitions, other seizure types and descriptors are listed in the accompanying paper and glossary of terms
2. Degree of awareness usually is not specified
3. Due to inadequate information or inability to place in other categories
Case 1 - DB

- 32 y male
- No health concerns
- 1-2 minutes of right arm uncontrollable shaking
- From sleep, 1 min whole body shaking
  - Confused after
- No provoking factors
- No history of risk factors

Does he have epilepsy?

Definitions

- Epilepsy
  - Disorder of the brain characterized by an enduring predisposition to generate epileptic seizures
  - 2 or more unprovoked seizures occurring more than 24 hours apart
  - 1 unprovoked seizure and a high risk (at least 60%) of recurrent unprovoked seizures over the next 10 years
Case 1 – DB - continued

- Sent home from ED
- Seen by you in the clinic
- Further questions
- Tingling in arm

History and physical exam

- Patient’s experience, recollection, awareness
- Prior events
- Witness accounts

- Lateral tongue bite
- Acute injury
- System disorder
- Focal brain dysfunction
Case DB

- Recurrent focal seizures without impairment of consciousness
  - Typically characterized as brief right arm tingling
- One seizure with generalized tonic clonic activity
- Epilepsy
- Needs complete workup and treatment

Case 2 - HH

- 45 male
- Remembers talking to friends and then waking up in the ambulance
- Witnesses saw him stop talking, stare off, turn his head to one side, & fall to the ground
- On the ground, became tense with a moan then shaking “all over”
- Eyes open
Case 2 - HH

- Slow to respond, oriented
- Lateral tongue bite
- Bruising to arms

Seizure history taking

- Description of event
- Risk factors
- Medications including recent stops, starts, or dose changes
- Medical, surgical, family, and social history
Risk factors

- Head trauma
- CNS infection
- Prior stroke
- Prior CNS surgery
- Febrile seizures
- Family history of seizures
- Major birth or developmental issues

Risk factors

- Excessive sleep deprivation
- Use/withdrawal of EtOH
- Recreational drugs
- Medications
- Acute infectious/metabolic processes
Case 2 - HH

- Patient stopped drinking “about 2 days ago”
- “acute symptomatic seizure secondary to EtOH withdrawal”

Case 2 - HH

- Back to baseline
- Labs and CT head WNL
- Good support at home
- Strong relationship with outpatient physician
Case 2 - HH

- Follow up appointment
- EEG
- MRI brain

Workup of New Onset Seizure

- Neuroimaging
  - CT head
  - MRI brain
    - Epilepsy protocol
    - Neuroradiology
- EEG
  - Sleep deprived
Case HH

- Normal MRI brain and EEG
- Normal exam
- Encouraged to stay sober
Case EEG – say what?

Normal study.
There are no epileptiform discharges on this study. The lack of such activity on a routine EEG cannot conclusively rule out an epileptiform disorder.

Abnormal study.
The slowing described above is consistent with a mild degree of non-specific encephalopathy. There are no epileptiform discharges...

Abnormal study.
The slowing described above is suggestive of a structural lesion or focal neuronal dysfunction in the left temporal region. There are no epileptiform discharges...

Abnormal study.
The sharp and slow wave discharges described above place the patient at increased risk of seizures arising from that area.

When to order an EEG

- New onset unprovoked seizure
  - May be done outpatient
- Recurrent seizure in a patient with previous normal EEG
- Suspected new onset seizure with patient not to baseline (30-60 min), waxing/waning consciousness, focal dysfunction not explained by structural lesion
  - Long term video EEG
Case JA

- 78 yr male
- Hospital follow up appointment
- “They told me I had a seizure”

“...why did it happen? Do I need medication? Will it happen again? Can you fix it?”

Risk of seizure recurrence

- 35% chance of recurrence within 5 years
- Abnormal imaging or EEG higher
  - Abnormal MRI, 50-90%
  - Generalized spike wave EEG, 30-60%
- Nocturnal seizures have higher risk
- After 2\textsuperscript{nd} seizure, 75% risk within 5 years
FINDINGS: There are multifocal punctate, nonspecific, nonenhancing signal alterations within the deep white matter of both cerebral hemispheres. Similar to milder changes noted in the basal ganglia brainstem and posterior fossa. No restricted diffusion evident to suspect acute or subacute infarct and findings are most consistent with diffuse chronic small vessel ischemic change. There is no mass effect, enhancing mass lesion, or findings of acute infarction or intracranial hemorrhage. Ventricular system is median and unremarkable. No abnormal intraxial or extraxial fluid collection evident. Major vasculature at the skull base demonstrates normal flow void character. Calcification is intact and unremarkable.

Agree with preliminary interpretation.

IMPRESSION:
Atrophic and chronic small vessel ischemic change. No acute intracranial process.
Neuroimaging – is it abnormal?

- Abnormal ≠ epileptogenic

“Incidental” findings in epilepsy/seizure

- Pituitary lesions
- Pineal lesions
- Aneurysms
- Developmental venous abnormalities
- Cerebellar infarcts
- Subcortical infarcts
- Benign meningiomas
- Typical small vessel ischemic disease
Case JA

- One unprovoked seizure
- Normal neuro exam
- Normal EEG
- Normal MRI brain

Case JA - counseling

- Discuss risk of recurrence
- Guidelines regarding treatment
- The Michigan Law regarding driving
  - Decided by the state, not by physicians
  - Unexplained loss of consciousness
    - Seizure diagnosis is not the issue
  - No driving until 6 months spell free
  - 12 months for CDL
Case JA - counseling

- Remember seizure safety precautions
  - Balance with living life
- Things that lower the seizure threshold
  - Sleep deprivation
  - EtOH (or cessation)
  - Other drugs
  - Medications
  - Illness

Michigan Form OC-88
Case VL

- 24 y female
- Presents with boyfriend who helps with history
- At work started feeling “funny”
- Then “had a seizure”
- Remembers waking up on the floor in breakroom

Case VL

- Boyfriend was there
  - She slid out of the chair, fists were tight, breathing hard, and then started shaking all over
  - Sometimes would seem like it was improving & then she would shake again
  - Eyes tightly closed
Case VL

- Just prior to the event
  - Work was feeling “really toxic”
  - Boss had been yelling
- History of head trauma secondary to abuse as a child
- “Doesn’t remember much” about childhood

Case VL

- Likely psychogenic non-epileptic spells
  - Most common – conversion disorder
    - Not intentional or “faking”
- Need spell capture for certainty
  - 1 hour video EEG
  - Epilepsy Monitoring Unit (EMU) admission
Differential diagnosis for spells

- TIA
- Migraine
- Syncope
- Psychogenic non-epileptic seizures (spells)
- Focal seizure
- Generalized seizure
Summary

- Document a detailed history of the event
  - Is the first seizure really the first?

- Is it is seizure?
  - Consider the differential

- Remember recent and remote risk factors
Summary

- Workup
  - CT/MRI
  - EEG
  - Inpatient/outpatient

- Counseling
  - Recurrence
  - Driving

Summary

- Be clear and sound smart
  - Use the most recent definitions
  - Use the diagnosis Epilepsy
Resources

- Michigan Epilepsy Foundation – epilepsymichigan.org

Sources

- Epilepsy Foundation of Michigan, michiganepilepsy.org (accessed May/June 2017)
Thank you!

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