

Seizure Update: What's New in the Neurons?

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Dr. Rowland is a graduate of Rush Medical College in Chicago, Illinois, and completed her residency at Advocate Illinois Masonic Medical Center in Chicago. She is an associate medical editor for the AAFP's *FP Essentials* and serves on the editorial board for *Journal of Family Practice*. She enjoys teaching about topics that are not always easy to think about and require research, synthesis, and empathy to understand. In addition, she enjoys teaching about research and evidence-based medicine topics. Dr. Rowland strives to make her lectures relevant to practice, thought provoking, and informative.

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Learning Objectives

1. Evaluate children presenting with febrile seizure in accordance to current AAP guidelines.
2. Develop individualized treatment plans for adult patients with an unprovoked first seizure, in accordance with current AAN/AES guidelines.
3. Establish protocols to routinely screen cognition, mood, and behavior in patients with new-onset epilepsy.
4. Establish protocols to coordinate care of referred patients.

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Audience Engagement System

The image displays three sequential screenshots of the Audience Engagement System interface.
Step 1: A dashboard with a grid of icons representing various CME activities.
Step 2: A list of CME events. The first event, 'CME001 Acute Coronary Syndromes: Broken Hearts and Spare Parts', is highlighted with a red arrow.
Step 3: Detailed information for the selected event, including the title 'CME001 Acute Coronary Syndromes: Broken Hearts and Spare Parts', location 'Room 11400', date 'Thursday, Sep 15 9:00 AM', and a 'CME Report' button. A red arrow points to the 'CME Report' button.

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Seizures

- Seizure
 - *To be grabbed or taken*
 - Electrical discharges of the brain that cause alterations in behavior, consciousness, or sensation
- Epilepsy:
 - From the Latin (via the French): *To take hold of, to attack*
 - Defined as either:
 - Two unprovoked seizures, with the second occurring at least 24 hours after first
 - Or one unprovoked seizure with a >60% risk of having another within 10 years
- Early mentions in writings of Hippocrates
- Mentioned in Shakespeare

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AES POLL QUESTION

Febrile seizures

- A. Are correlated with a later risk of epilepsy
- B. Are correlated with a later risk of learning disability
- C. Are correlated with a family history of epilepsy
- D. Will occur in up to 10% of children
- E. Are common in children until age 12

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Febrile seizures

- Common in children 3 months-5 years
 - Can occur in older children
 - Will occur in up to 5% of children
- FHx of febrile seizure increases risk of febrile seizures, but a FHx of epilepsy does not

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Simple vs complex febrile seizures

Simple febrile seizures

- No more than 15 minutes
- No associated neurologic deficits
- Not recurrent within 24 hours
- No known lasting neuropsych, behavioral, or intellectual sequelae

Complex febrile seizures

- >15 minutes
- >1 seizure within 24 hours
- Residual neuro deficits
- Focal seizures
- May slightly increase the risk of epilepsy

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Febrile seizures

- About 1/3 will have a recurrence
 - Most common within 1 year of initial seizure
 - More likely with *lower* fevers
 - More likely with young age at first febrile seizure
 - Complex febrile seizures not associated with recurrence risk
- Antipyretics not effective to prevent recurrence
- Antiepileptic medications not used to prevent recurrence (may be effective but harms>>benefits)

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Febrile seizures

- Simple febrile seizures often require no further workup beyond a history and physical.

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AES POLL QUESTION

Which of the following are true regarding seizures?

- A. Only general seizures involve loss of consciousness
- B. Up to 20% of people will have at least 1 seizure during their lifetime
- C. The majority of people who have one seizure will have a second seizure
- D. Up to 4% of people will have a diagnosis of epilepsy
- E. Epilepsy is more common in developed countries

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Kinds of seizures

- General
 - Involve both hemispheres of the brain
 - Characterized by loss of consciousness
 - Often manifest as “tonic-clonic”
- Partial or focal
 - Initially involve just 1 hemisphere, may spread
 - Variable presentation
 - May include behavioral, sensory, motor, or emotional changes
 - May include loss of consciousness

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Risk factors and correlations

- Genetic disorders
- Neuroanatomic abnormalities or changes
 - Congenital anomalies
 - Degenerative diseases (Alzheimer disease)
- Metabolic disorders
- Demyelinating diseases
- CNS infections
- Anoxic or traumatic brain injuries
 - Birth injuries
 - Head injuries

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Classifications

- Provoked seizures
 - Also called “situational” seizures
 - Traced to a specific, sometimes treatable cause
 - Patients with focal neurologic deficits after postictal phase are MUCH more likely to have an identifiable cause (97%) than those with return to baseline.
- Unprovoked seizures
 - Only meet definition of “epilepsy” if unprovoked

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Provoking factors

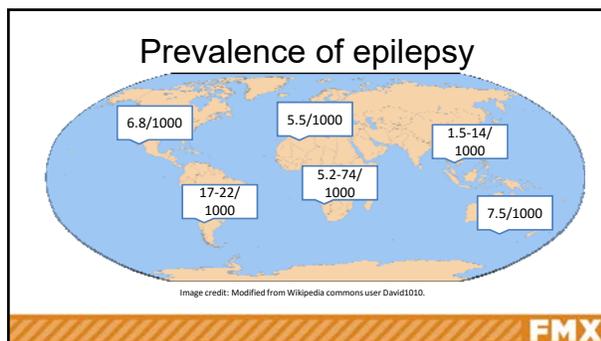
- Stroke
- Tumor
- Traumatic brain injury (recent or remote)
- Infection
 - Acute
 - Chronic (HIV)
 - Acute on chronic
- Surgery
- Drugs (prescribed, legal, and recreational)
 - Intoxication
 - Normal use
 - Withdrawal

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Seizures are common

- 10% of people will have at least 1 non-febrile seizure
 - Those with a normal EEG and no neuro sequelae:
 - 20% have a second seizure within a year
 - 5% more will have a second seizure by the second year of follow-up
 - 75% are seizure-free after two years
 - Neuro findings or EEG changes greatly increase recurrence rate
- Lifetime prevalence of epilepsy is 4%

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Work-up of seizures in adults

- Neuroimaging: CT or MRI
 - Usually noncontrast CT
- Labs: CBC, CMP, glucose, antiepileptic levels if appropriate, tox screen, alcohol level

Image credit: wikipedia user Kieran Maher

Work-up of seizures in adults

- LP if any reason to suspect CNS infection or subarachnoid bleed
- EEG
 - Within 3 days
 - Awake and asleep
 - Hyperventilation or light stimulation protocols

http://commons.wikimedia.org/wiki/File:EEG_cap.jpg

2015 AAN guidelines

- Treatment of a first unprovoked seizure in adults
 - AAN recommends shared decision making after first seizure
 - After second, risk of third is 50+%, treatment is recommended

Treatment of seizures in adults

- Strongly consider treatment:
 - Patients with EEG abnormalities
 - Patients with persistent deficits on neuro exam
 - Patients with known or discovered reason for seizure (tumor)
- These patients have the highest risk of recurrence and are most likely to benefit from treatment.

Treatment of seizures in adults

- Determining which patients are likely to benefit from pharmacotherapy for seizures can be very difficult.
- Access to pharmacist comanagement can be useful if available.
- Lack of available neurology consultants can be a barrier to practice.

Pharmacotherapy options

- Phenobarbital
- Phenytoin (Dilantin)
- Valproic acid/divalproex (Depakote)
- Carbamazepine (Tegretol)
 - Oxcarbazepine (Trileptal)
- Gabapentin (Neurontin)
- Lamotrigine (Lamictal)
- Levetiracetam (Keppra)
- Topiramate (Topamax)
- Zonisamide (Zonegran)

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Treatment considerations

- Seizure type
- Side effects and toxicity
- Efficacy

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Adherence to medication

- For dozens of reasons, patients do not always take their medications as we ask them to.
- One study of patients with epilepsy found that 50-70% of AED doses are taken as prescribed.
- (An unrelated study of asthma patients found that about 50% met the long-term criteria of taking 70% of their doses as directed. Food for thought when we prescribe)

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Pharmacotherapy decisions

- Generalized seizures:
 - Levetiracetam 500 mg BID; titrate up to 1500 mg BID
 - Lamotrigine 25 mg daily; titrate up to ~125 mg BID
 - Use higher doses with concomitant carbamazepine, phenytoin or phenobarbital
 - Use lower doses with concomitant valproic acid
 - May cause Stevens-Johnson Syndrome
 - Valproate 15 mg/kg/day in 2 doses; titrate to no more than 60 mg/kg
- Phenytoin 100 mg TID; titrate to 300-400 mg TID
 - 15 mg/kg/day in 3 doses loading then 5 mg/kg/day in 1-2 doses
 - May cause Stevens-Johnson Syndrome
- Topiramate 50-100 mg daily; titrate to 200 mg BID
- Zonisamide 100-200 mg daily or divided; titrate to 400-600 mg

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Pharmacotherapy decisions

- Partial and secondarily generalized:
 - Carbamazepine 2-3 mg/kg/day in 3 doses; titrate to 10 mg/kg
 - Multiple medication interactions
 - Risk of Stevens-Johnson syndrome
 - Lamotrigine
 - Levetiracetam
 - Gabapentin
 - Phenytoin
 - Topiramate
 - Valproate
 - Zonisamide

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Pharmacotherapy decisions

- Atonic or myoclonic seizures:
 - Lamotrigine
 - Levetiracetam
 - Lamotrigine
 - Topiramate
 - Zonisamide
- Absence seizures:
 - Ethosuximide 20-40 mg/kg/day in 1-2 doses
 - Valproate

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Pharmacotherapy toxicity

- Therapeutic levels:
 - Phenobarbital: 10-40 mcg/mL
 - Phenytoin: 10-20 mcg/mL
 - Valproate: 50-100 mcg/mL
 - Ethosuxamide: 40-100 mcg/mL

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AES POLL QUESTION

Which of the following medications does not require any special considerations for women of childbearing age (regarding pregnancy or metabolism of contraception options)?

- A. Carbamazepine
- B. Lamotrigine
- C. Phenytoin
- D. Topiramate
- E. Valproate

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Special considerations when choosing an antiepileptic

- Drug-drug interactions
 - Worse with older meds like valproate, phenytoin, carbamazepine
- Childbearing potential
 - Valproate: category D (neural tube defects)
 - Carbamazepine: category D (neural tube defects)
 - Topiramate: category D (palate defects)
- Contraception
 - Gabapentin, levetiracetam, lamotrigine, valproate among those with NO effect on OCPs
 - Carbamazepine, phenytoin, phenobarb, topiramate can decrease OCP effectiveness

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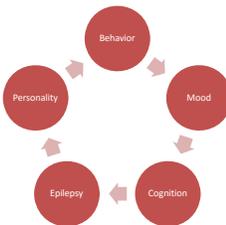
AES POLL QUESTION

Which of the following conditions are not more common in patients with epilepsy than in the general population?

- A. Benign essential tremor
- B. Major depression
- C. Memory impairment
- D. Cognitive delay
- E. Attention deficit disorder

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Mood, behavior, and cognition in epilepsy



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Mood and epilepsy

- Incidence of depression 30-60% of adults, ~25% of children with epilepsy
- >50% of patients with epilepsy and depression had mood symptoms for >1 year before any treatment was started
- 80% of neurologist report no screening for mood disorders: it's going to be us!

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Cognition and epilepsy

- By 9-12 months after first seizure, cognition delays are common
- Cognition delays or academic difficulty may predate epilepsy in children
 - ?neurologic insult causing both delay and seizure
- Progressive cognitive and memory impairments seen in adults

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Behavior and epilepsy

- Comorbid behavior diagnoses are common
 - ADHD
 - Psychotic disorders
 - Anxiety disorders
 - Aggression
 - Personality disorders
- May be due to:
 - Neurologic damage from seizures
 - Iatrogenic from seizure medicine
 - Stigma/coping of condition
 - Genetics; chance; luck

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Primary care of mood, cognition and behavioral problems in epilepsy

- Neuropsych eval indicated
 - Cognitive or memory complaint
 - Academic underperformance
 - Developmental delay
- Screening for depression or mood disorders
 - Many of us already do this for adults and adolescents
- Multidisciplinary care
 - Neurology, psychology, psychiatry, interdisciplinary therapy

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Coordination of care

- Children with special needs with epilepsy received worse care management than children with special needs without epilepsy
- Best practices include
 - Team based care
 - Communication among team members
 - Frequent PCP visits or contact
 - Use of care coordination or management

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CMS and IOM quality measures

- 2012 Institute of Medicine report "Epilepsy Across the Spectrum" offers 3 quality measures adopted by CMS:
 - The frequency of each seizure type should be reported at each visit
 - The etiology (or epilepsy syndrome) should be reported at each visit
 - Counseling for women of childbearing potential with epilepsy should be provided annually

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AES POLL QUESTION

- Which of the following is true regarding seizure after stroke?
 - A. Seizures may present as the initial symptom in up to half of strokes
 - B. Levetiracetam is the treatment of choice
 - C. Seizure with stroke is an indication for antiepileptic therapy with a first seizure
 - D. Seizure with stroke is a poor prognostic feature for stroke

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Seizure after stroke

- Seizure as presenting sign of a stroke can be a poor prognostic feature
 - May indicate a large area of cerebral involvement
- Seizure during stroke recovery not uncommon
 - 3-23% incidence
- Generally do not begin antiepileptics for a single seizure within first 2 weeks after stroke
- Lamotrigine is preferred antiepileptic when treatment is needed
 - Recurrent seizure
 - Seizure >2 weeks after stroke

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Special considerations for treatment

- Driving
 - All states have laws restricting patients with epilepsy from driving
 - Many set a seizure-free period (3-6 months is typical)
 - Some require the doctor to simply sign off (Illinois leaves it to my discretion!)

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Nonepileptic seizures

- “Pseudoseizure” or “psychogenic seizure”
- Seizures: electrical discharges of the brain that cause alterations in behavior, consciousness, or sensation
- Nonepileptic seizures: Involuntary alterations of behavior, consciousness, or sensation not associated with electrical discharges of the brain
- Factitious seizures: Voluntary alterations of behavior or apparent conscious to mimic a seizure

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Nonepileptic seizures

- Common, even among patients with epilepsy diagnosed by experts
- Dx should be considered in patients with treatment-resistant epilepsy
 - May coexist with epileptic seizures
- Considered a maladaptive coping strategy
- Treatment: affirming accurate diagnosis and psychotherapy

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Practice recommendations

- Simple febrile seizures often require no further workup beyond a history and physical. (SOR A)
- After first non-febrile seizure, discuss risks of recurrent seizure vs risk of treatment with the patient. After second, treatment is recommended. (SOR A)
- Many AEDs are teratogenic or reduce the efficacy of contraceptives (SOR B)

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Coding

- Epilepsy: G40
 - Partial/generalized
 - Intractable/not intractable
 - Adult/childhood onset
 - Status/not status epilepticus
 - Adult-onset generalized controlled seizures not in status: G40.309
- Simple febrile seizure: R56.00
- Seizure due to alcohol: G40.5
- Psychogenic seizure: G44.5
- Post-traumatic seizure: R56.1

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Questions



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Contact info

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