

Just the Facts – Epilepsy and Seizures

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Not another moment lost to seizures™

Definitions

Epilepsy – a general term for a variety of neurological conditions characterized by recurrent unprovoked seizures

Seizure - a brief disturbance in the electrical activity of the brain that causes temporary changes in movement, awareness, feelings, behavior, or other bodily functions

Epilepsy = Seizure Disorder

Prevalence & Incidence

- ▶ about 1% of population has epilepsy
- ▶ nearly 4% will develop epilepsy at some point
- ▶ about 10% will have at least one seizure at some point
- ▶ increased prevalence among people with autism, TBI, CP, intellectual disability
- ▶ Incidence is highest among the very young and the very old

Causes

About 2/3 of cases have no known cause

Among the remaining 1/3, the following are possible causes:

- ▶ Traumatic brain injury
- ▶ Stroke
- ▶ Brain Tumor
- ▶ Alzheimer's disease
- ▶ Prenatal or birth trauma
- ▶ Genetic factors
- ▶ Brain infections (e.g. encephalitis, meningitis)
- ▶ Developmental or congenital disabilities
- ▶ Poisoning (lead, drug or alcohol abuse)

Epilepsy Syndromes

Partial Epilepsies

Symptomatic or Cryptogenic

- ▶ Temporal lobe, frontal lobe, parietal lobe, & occipital lobe epilepsies
- ▶ others

Idiopathic

- ▶ Benign rolandic epilepsy (BCECTS), Childhood Epilepsy with Occipital Paroxysms (CEOP)

Epilepsy Syndromes (continued)

Generalized Epilepsies

Symptomatic, Cryptogenic, or Idiopathic

- ▶ Lennox-Gastaut syndrome, West syndrome
- ▶ others

Idiopathic

- ▶ Childhood absence epilepsy, juvenile absence epilepsy, juvenile myoclonic epilepsy
- ▶ others

Seizure Types

Generalized Seizures

- ▶ **Generalized Tonic-Clonic Seizure** – sudden fall, rigidity (tonic phase), muscle jerks (clonic phase); usually 1-2 minutes; postictal period
- ▶ **Absence Seizure** – most common in children; blank stare and unresponsiveness for 3 -10 seconds; quick return to full alertness; may happen over 100 times a day
- ▶ **Atonic Seizure** – sudden loss of muscle tone causing a fall or head drop; if consciousness lost, it returns promptly; uncommon and usually seen in children

Seizure Types

Generalized Seizures (continued)

- ▶ **Tonic Seizure** – sudden or gradual stiffening causing fall if standing; <60 seconds; longer seizures have loss of consciousness and postictal confusion/fatigue; often occur during sleep
- ▶ **Myoclonic Seizure** – brief shock-like jerk of one or more muscle groups; may cause fall if severe
- ▶ **Clonic Seizure** – rhythmic jerking of a group of muscles (arms, neck, face); no postictal confusion/fatigue; rare and usually seen in children

Seizure Types

Partial Seizures

- ▶ **Simple Partial Seizure** – fully aware; 30 – 60 seconds
 - ***Motor*** – jerking of part of body that may or may not spread
 - ***Sensory*** – tingling/numbness; sensory hallucinations or distortions
 - ***Autonomic*** – epigastric rising; goose bumps, heart rate increase
 - ***Psychic*** – déjà vu, jamais vu, fear, happiness, depersonalization

Seizure Types

Partial Seizures (continued)

▶ **Complex Partial Seizure** – consciousness impaired; lasts 1-2 minutes

- Unresponsiveness
- Automatism (lip smacking, picking at clothes, fumbling)
- Wandering
- Mumbling or nonsensical speech
- Impaired memory after seizure
- Postictal confusion, nausea, headache, fatigue

Seizure First Aid

For Complex Partial Seizures

- ▶ Explain what's happening to bystanders
- ▶ Speak to the person in a calm, reassuring manner
- ▶ Gently redirect or block from hazards
- ▶ Avoid grabbing or restraining (unless protecting from immediate harm)
- ▶ Help to reorient after seizure and stay with person until no longer confused
- ▶ Seek medical attention for seizure lasting 5 – 10 minutes or if seizure is followed by another without return to consciousness

Seizure First Aid

For Tonic-Clonic Seizures

- ▶ Check watch or clock
- ▶ Gently turn person on side to keep airway open
- ▶ Move any objects that may cause injury
- ▶ Protect head (with something soft or cradle with hands)
- ▶ Remove glasses & loosen any restrictive clothing
- ▶ Stay with person until fully recovered

Seizure First Aid

For Tonic-Clonic Seizures (continued)

- ▶ DO NOT restrain
- ▶ DO NOT put anything in the person's mouth
- ▶ DO NOT give oral medications, food, or water until fully alert

Treat as a Medical Emergency if...

- ▶ Seizure lasts for 5 minutes or more
- ▶ Seizure is followed by another without person regaining consciousness
- ▶ Person is seriously injured as a result of seizure
- ▶ Seizure takes place in water
- ▶ Person has diabetes or is pregnant
- ▶ Normal breathing/complexion doesn't return once seizure is over

Treatments

- ▶ Medication
- ▶ Surgery
- ▶ VNS
- ▶ Ketogenic Diet

Treatments: Medication

Broad Spectrum AEDs (for Partial & Generalized)	AEDs Used Primarily for Partial Epilepsy	Specialized AEDs
<p><u>Older</u> valproic acid</p> <p><u>Newer</u> lamotrigine leviteracetam topiramate zonisamide rufinamide felbamate</p>	<p><u>Older</u> carbamazepine phenytoin</p> <p><u>Newer</u> oxcarbazepine lacosamide pregabalin gabapentin tiagabine</p>	<p>vigabatrin <i>(infantile spasms)</i></p> <p>ACTH <i>(infantile spasms)</i></p> <p>ethosuximide <i>(absence only)</i></p> <p>phenobarbital <i>(neonatal & febrile seizures)</i></p> <p>benzodiazepines</p>

Medication Side Effects

Side effects common to all AEDs: drowsiness, unsteadiness, dizziness, blurry vision, stomach upset, memory/thinking problems, headaches, reduced resistance to colds

Weight Gain – valproic acid, carbamazepine, pregabalin, gabapentin, clobazam

Weight Loss – topiramate, zonisamide, felbamate

Cosmetic Problems (e.g. gum overgrowth, hairiness, hair loss, skin problems) – phenytoin, valproic acid

Bone Loss – carbamazepine, phenytoin, valproic acid, phenobarbital, topiramate

Low Blood Sodium – oxcarbazepine, carbamazepine

Depression or Irritability – lacosamide, levetiracetam, phenobarbital, benzodiazepines

Sleep Disturbance – benzodiazepines, phenobarbital, carbamazepine, phenytoin, valproic acid, levetiracetam, lamotrigine

Medication Side Effects

Warning signs of potentially serious side effects:

- Prolonged fever
- Rash
- Very sore throat
- Mouth ulcers
- Easy bruising
- Pinpoint bleeding
- Weakness
- Extreme fatigue
- Swollen glands
- Lack of appetite
- Increased seizures

Warning signs of toxicity:

- Lethargy
- Dizziness
- Slurred speech
- Balance problems
- Coordination problems
- Shakiness
- Confusion
- Double vision
- Stomach upset

***Be vigilant for toxicity in older adults**

When To Consider Other Options

- ▶ An epileptologist should be seen, and other treatment options should be explored if...

...patient has tried 2 first-line medications (and one drug combination) and is still having seizures and/or significant side effects

Epilepsy Surgery

- ▶ What makes a good surgical candidate?
 - Failure of 2 or more medication trials
 - Partial epilepsy
 - A single well-defined seizure focus
 - Temporal lobe focus (associated with the best outcomes)
- ▶ There may still be surgical options if you don't meet these criteria (but lower likelihood of seizure freedom)

Epilepsy Surgery

Surgery Types and Outcomes (curative)

- ▶ **Temporal Lobectomy:** (most common type) 60 - 90% are free of seizures that impair consciousness
- ▶ **Frontal Lobectomy:** 30 – 60% are free of seizures that impair consciousness
- ▶ **Hemispherectomy:** only considered if half of brain to be disconnected is already functioning poorly; 75% seizure-free or nearly seizure-free

Epilepsy Surgery

Surgery Types and Outcomes (palliative)

- ▶ **Corpus Callosotomy** – approach to reducing tonic, atonic, and tonic-clonic seizures; typically 60-90% reduction of these seizure types
- ▶ **Multiple Subpial Transection** – approach to reducing seizures when focus is located in area that controls important functions; not enough data to report reliably on outcomes

Epilepsy Surgery: Risks & Benefits

Potential Risks

- ▶ **Complications during or shortly after surgery** – brain swelling, bleeding/stroke (1%), allergic reactions, infection, hydrocephalus, death (very rare)
- ▶ **Functional deficits** – problems with memory, language, or movement; depression; visual field loss

Potential Benefits

- ▶ Fewer or less severe seizures
- ▶ Reduction or elimination of medication (and side effects)
- ▶ Improved mood or cognitive function

Vagus Nerve Stimulation

- ▶ Pacemaker-like device implanted under skin on chest wall
- ▶ Leads connect to vagus nerve in neck
- ▶ Device is programmed to periodically stimulate the brain via the vagus nerve
- ▶ Magnet can be used to activate or turn off the device

Vagus Nerve Stimulation

- ▶ For children and adults who are not surgical candidates and for whom medication is not working
- ▶ Can be useful for partial (including multifocal) and generalized epilepsies
- ▶ Palliative treatment – very unlikely to result in seizure freedom
- ▶ 30 – 50% are responders (reduction in seizures of 50% or more); response often improves over time

Vagus Nerve Stimulation

Risks

- ▶ **Side effects** – hoarseness of voice during stimulation, tingling in the throat, breathing problems during sleep or with exertion, cough, gastrointestinal complaints (*most are mild and/or temporary*)
- ▶ **Surgical complications** – pain at incision, infection, damage to vagus nerve, temporary vocal cord paralysis, device malfunction

Potential Benefits

- ▶ Reduction in seizures
- ▶ Added sense of control (with use of magnet)
- ▶ Reduction in medication (and side effects)
- ▶ Improved mood, cognitive function, and/or quality of life

Ketogenic Diet

- ▶ High-fat, low-carb, low-protein diet done under strict supervision of a physician and dietician
- ▶ All ingredients must be weighed and measured, and every morsel of food must be eaten
- ▶ Diet started in hospital (sometimes with 24 hours of fasting)
- ▶ Body burns fat instead of carbohydrates, producing ketones
- ▶ Common foods are butter, heavy cream, mayo, oils
- ▶ Must be very careful not to get extra carbohydrates (intentionally or accidentally)
- ▶ Seizure medications usually continued during diet (at lower doses)

Ketogenic Diet

- ▶ Over 50% respond (reduction in seizures of 50% or more); 10 – 15% become seizure-free
- ▶ Side effects – kidney stones, high cholesterol, weight gain, dehydration, constipation, slowed growth, bone fractures, nausea/vomiting, hypoglycemia, lethargy
- ▶ If seizure-free for 2 years, may be slowly weaned off diet
- ▶ Modified Atkins Diet and Low-Glycemic Index Diet are alternatives that may be more palatable (but less evidence of effectiveness)

Complementary & Experimental Treatments

- ▶ A number of experimental treatments are in clinical trials or animal studies
 - If nothing else has worked or if patient has no insurance, consider clinical trials
- ▶ Complementary therapies offer some promise, but little information on effectiveness and safety
 - Complementary therapy is a reasonable option if patient and neurologist agree that the therapy...
 - ▶ is safe (i.e. won't increase seizures or worsen health)
 - ▶ could be effective based on evidence
 - ▶ has a credible mechanism of action
 - ▶ is not overly expensive

Risks Associated With Epilepsy

- ▶ Seizure-related Injuries
- ▶ Status Epilepticus (prolonged or consecutive seizures)
- ▶ Long-term Effects of Medications (bone loss, obesity, reproductive disorders, etc.)
- ▶ Suicide
- ▶ SUDEP (sudden unexplained death in epilepsy)

Impact on Daily Life

- ▶ Memory & Thinking Problems
- ▶ Depression & Anxiety
- ▶ Social Isolation
- ▶ Family Issues
- ▶ Transportation Difficulties
- ▶ Unemployment and Underemployment
- ▶ Difficulties at School
- ▶ Financial Difficulties
 - lack of insurance
 - SSI/SSDI

Epilepsy Foundation of Michigan

Programs & Services

- ▶ Education & Consultation
- ▶ PROGRESS Toward Wellness
- ▶ Learn & Share Conference Calls
- ▶ Wellness & Epilepsy Conference
- ▶ Camp Discovery
- ▶ Individual & Public Policy Advocacy
- ▶ Social Opportunities
- ▶ Seizure Smart

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