Introduction to Seizures and Epilepsy

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State-of-the-Art Diagnostic & Therapeutic Services

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SFVA Epilepsy Center

- Established in 1997 to provide Veteran patients with access to specialized epilepsy care
- Designated as one of four national Centers of Excellence in 2002
- Named as a regional Epilepsy Center of Excellence site by in 2008
SFVA Epilepsy Center

- Outpatient consultation and long-term care
- Video/EEG Monitoring on inpatient Epilepsy Monitoring Unit
- High-resolution neuroimaging
- Expert pharmacological treatment
- Device-based therapy (vagus nerve stimulation)
- Epilepsy surgery
- Experimental treatments
What Is the Difference Between Epilepsy & Seizures?

- **Epilepsy** is a disorder characterized by recurring seizures (also known as “seizure disorder”)
- **A seizure** is a brief, temporary disturbance in the electrical activity of the brain
Who Has Epilepsy?

- About 2.3 million Americans have epilepsy
- Roughly 181,000 new cases of seizures and epilepsy occur each year
- 50% of people with epilepsy develop seizures by the age of 25; however, anyone can get epilepsy at any time
- Now there are as many people with epilepsy who are 60 or older as children aged 10 or younger
Groups at Increased Risk for Epilepsy

- About 1% of the general population develops epilepsy
- The risk is higher in people with certain medical conditions:
  - Traumatic Brain Injury
  - Stroke
  - Alzheimer’s disease
  - Autism
  - Brain Tumors or blood vessel abnormalities
What Causes Epilepsy?

* In about 70% of people with epilepsy, the cause is not known

* In the remaining 30%, the most common causes are:
  - Head trauma
  - Infection of brain
  - Brain tumor and stroke
  - Heredity
The Brain Is the Source of Epilepsy

- All brain functions -- including feeling, seeing, thinking, and moving muscles -- depend on electrical signals passed between nerve cells in the brain.

- A seizure occurs when too many nerve cells in the brain “fire” too quickly causing an “electrical storm”
Seizure Types

- A person with epilepsy may have more than one seizure type.
- Seizures that began early in life may change as the child grows older.
Epileptic Seizure

- Partial (focal)
  - Simple
    - Secondary generalized
  - Complex
- Generalized
  - Tonic
  - Clonic
    - Tonic-Clonic
  - Absence
    - Myoclonic
  - Atonic
Symptoms That May Indicate a Seizure Disorder

* Periods of blackout or confused memory
* Occasional “fainting spells”
* Episodes of blank staring in children
* Sudden falls for no apparent reason
* Episodes of blinking or chewing at inappropriate times
Seizure Triggers

* Missed medication (#1 reason)
* Stress/anxiety
* Hormonal changes
* Dehydration
* Lack of sleep/extreme fatigue
* Photosensitivity
* Drug/alcohol use; drug interactions
First Aid for Seizures

* Stay calm and track time

* Do not restrain person, but help them avoid hazards
  * Protect head, remove glasses, loosen tight neckwear
  * Move anything hard or sharp out of the way
  * Turn person on one side, position mouth to ground

* Check for epilepsy or seizure disorder ID

* Understand that verbal instructions may not be obeyed

* Stay until person is fully aware and help reorient them

* Call ambulance if seizure lasts more than 5 minutes or if it is unknown whether the person has had prior seizures
Potentially Dangerous Responses to Seizure

**DO NOT**

- Do not: Put anything in the person’s mouth
- Do not: Try to hold down or restrain the person
- Do not: Attempt to give oral antiseizure medication
- Do: Keep the person on their back with their face up during the seizure
When to Call 911 or Emergency Medical Services

* A convulsive seizure occurs in a person not known to have seizures or lasts more than 5 minutes
* A complex partial seizure lasts more than 5 minutes BEYOND its usual duration for the individual
* Another seizure begins before the person regains consciousness
* Also call if the person:
  * Is injured or pregnant
  * Has diabetes/other medical condition
  * Recovers slowly
  * Does not resume normal breathing
How Is Epilepsy Diagnosed?

* **Clinical Assessment**
  * Patient history
  * Tests (blood, EEG, CT, MRI or PET scans)
  * Neurologic exam
What to Tell Your Doctor About Your Seizures

- Symptoms
- Seizure patterns: Seizure clusters
- Pre-seizure activity (if any)
- How well is your medication working?
- Medication side effects

Keep a seizure record
Treatment Goals in Epilepsy

- No or as few as seizures as possible
- No or acceptable side effects from anti-seizure medication
- Help person with epilepsy lead full and productive life
What factors influence our decision to treat with medication?

- We don’t have to treat a first provoked seizure if provoking factor removed (low blood sugar, illicit drugs)

- For an unprovoked seizure
  - Treat if first presentation was status epilepticus (i.e. a prolonged seizure)
  - Most doctors will treat after second seizure:
  - Consider treating after first seizure.
    - Exam, EEG, MRI
    - Patient preference
    - Other Epilepsy risk factors including family history.
Types of Treatment

- Medication
- Surgery
- Nonpharmacologic treatment
  - Ketogenic diet-not useful in adults
  - Vagus nerve stimulation
  - Lifestyle modifications
Factors That Affect the Choice of Drug

- Seizure type/
  Epilepsy syndrome
- Side effects
- Patient age
- Lifestyle
- Childbearing potential
- Other medications
How well do antiepileptic medications work?

- Seizures eliminated (50% of people)
- Seizures markedly reduced (30%)
- Seizures do not respond (20%)
  = Refractory epilepsy
What factors influence how well patients respond to antiepileptic medications?

- Consistent use
- Inadequate dosage or ineffective medication
- Drug factors
- Disease
Tolerating Medications

Most Common Side Effects
- Rash
- Clumsiness
- Drowsiness
- Irritability
- Nausea

Warning Signs of Possible Serious Side Effects
- Prolonged fever
- Rash, nausea/vomiting
- Severe sore throat
- Mouth ulcers
- Easy bruising
- Pinpoint bleeding
- Weakness
- Fatigue
- Swollen glands
- Lack of appetite
- Abdominal pain

- Side effects may be related to dose
- Care must be taken in discontinuing drug due to risk of seizure recurrence
Surgery

Factors influencing decision

- Likelihood seizures are due to epilepsy
- Likelihood surgery will help
- Ability to identify focus of seizures
- Other treatments attempted
- Benefits vs risks
Vagus Nerve Stimulation

- Delivers electrical stimulation to the vagus nerve in the neck, which relays impulses to widespread areas of the brain
- Used to treat partial seizures when medication does not work
- Often reduces, but usually does not completely control seizures
- Offered at SFVA since 1998
Ketogenic Diet

- Based on finding that starvation -- which burns fat for energy -- has an antiepileptic effect
- Used primarily to treat severe childhood epilepsy, has been effective in some adults & adolescents
- High fat, low carbohydrate and protein intake
- Usually started in hospital
- Requires strong family commitment
Effect of Epilepsy on Family

- Activity restrictions
- Financial stress
- Mood and emotions
Epilepsy in Women

- **Hormonal effects**
  - Hormonal changes during puberty, menopause, and the monthly cycle may affect seizure frequency
  - Polycystic ovary syndrome

- **Sexuality & contraception**
  - Sexual dysfunction
  - Birth control pills may be less effective

- **Pregnancy & motherhood**
  - Need to continue medication
  - Slight increased risk for birth defects
Epilepsy in Older Adults

- Epilepsy is common in the elderly, and is often unrecognized or misdiagnosed
- Special issues:
  - Increased susceptibility to side effects
  - Interactions with other medications
Driving and Epilepsy

* All states have different laws

* In CA, report any seizure to the Department of Public Health (DPH)
  * DPH informs DMV, hearing arranged
  * Doctor fills out Driver Med Eval (DME)
  * DMV Medical Officer ultimately decides if license gets suspended, guided by DME

* Typically 6 months seizure free (on or off AEDs) before lifting suspension
Resources

* VA Epilepsy Website
  * www.epilepsy.va.gov

* Epilepsy Foundation Website
  * www.epilepsynorcal.org

* Epilepsy.com