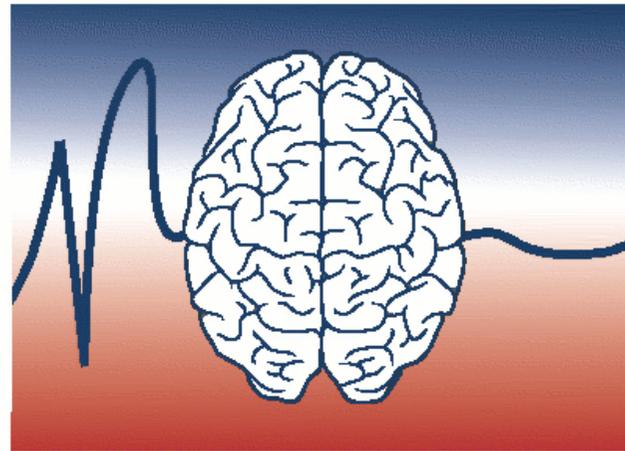


# Introduction to Seizures and Epilepsy

Karen Parko, M.D.

Director, San Francisco VA Epilepsy Center

Associate Professor of Neurology, University of California at San Francisco



Epilepsy Center  
of Excellence

SAN FRANCISCO VA MEDICAL CENTER

San Francisco VA  
Epilepsy Center of Excellence:

*State-of-the-Art Diagnostic &  
Therapeutic Services*

Nina Garga, M.D.

John Hixson, M.D.

William Marks, M.D.

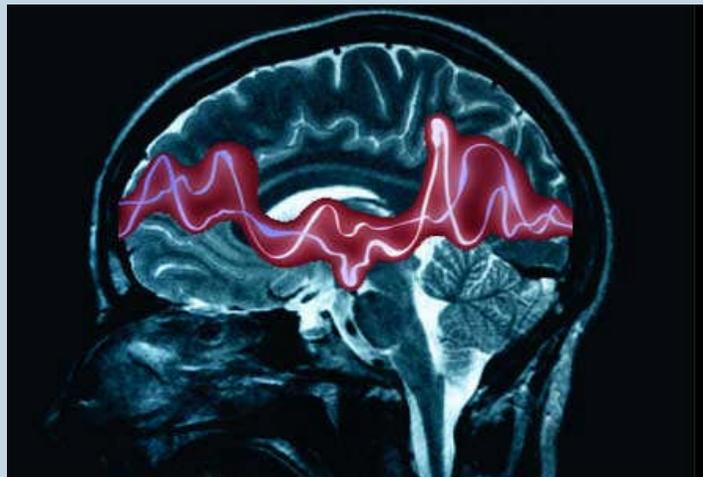
Karen L. Parko, M.D.





# 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

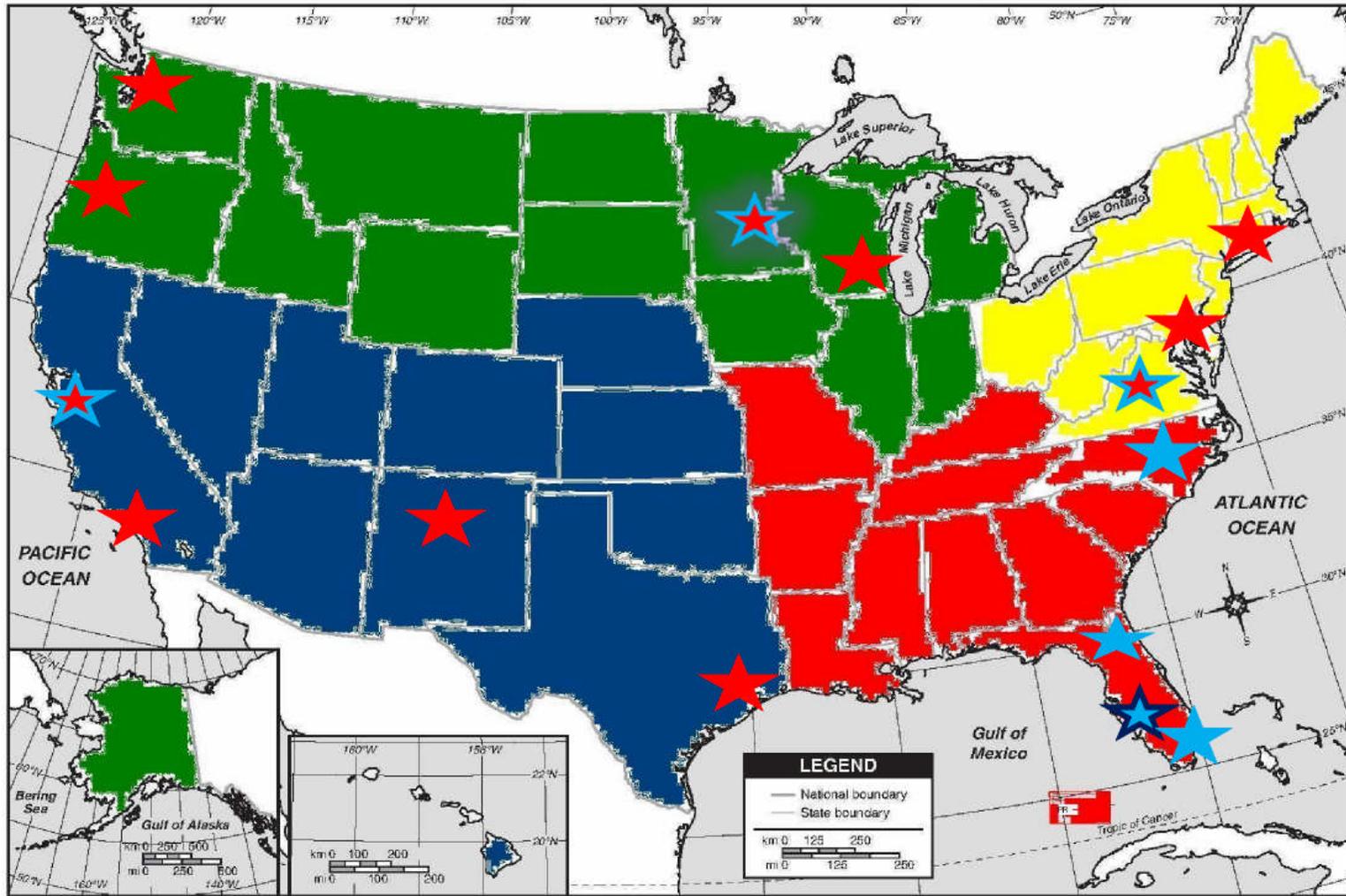




ECoE Site  
Polytrauma

### Territories of the Epilepsy Centers of Excellence

- Northwest
- Southwest
- Southeast
- Atlantic



# 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

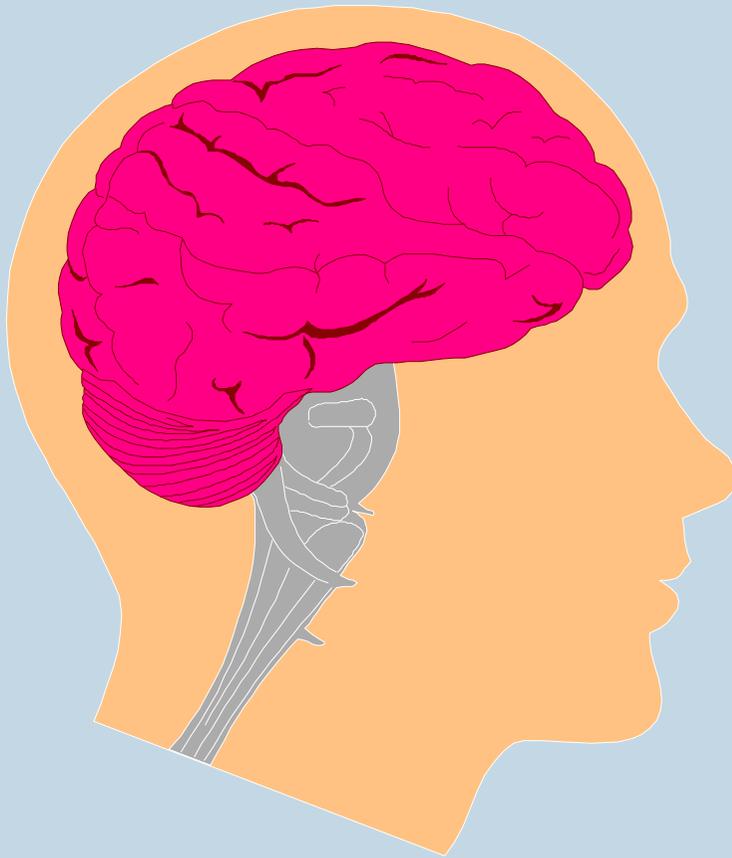
# Groups at Increased Risk for Epilepsy

- 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"

# Classifying Epilepsy and Seizures

- Classifying epilepsy involves more than just seizure type
- Seizure types:

## Partial

Simple

Complex



Consciousness is maintained



Consciousness is lost or impaired

## Generalized

Absence

Convulsive



Altered awareness



Characterized by muscle contractions with or without loss of consciousness

# What Happens During a Seizure

- Generalized seizure
  - Involve the whole brain and loss of consciousness
    - Absence: characterized by brief loss of consciousness
    - Tonic-clonic: characterized by rhythmic jerking of muscles
- Partial seizure
  - Involve only part of the brain; may or may not include loss of consciousness
    - Symptoms relate to the part of the brain affected

# 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
- Pre-seizure activity (if any)
- How the medication works for you

**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 Decision to Treat?

## **Treatment may be appropriate**

- Abnormal EEG
- Previous seizure
- Partial seizure
- Driver
- Other neurologic impairment
- Elderly

## **Treatment may NOT be appropriate**

- Single seizure
- No history
- Neurologically normal
- Young age
- Side effects

# Types of Treatment

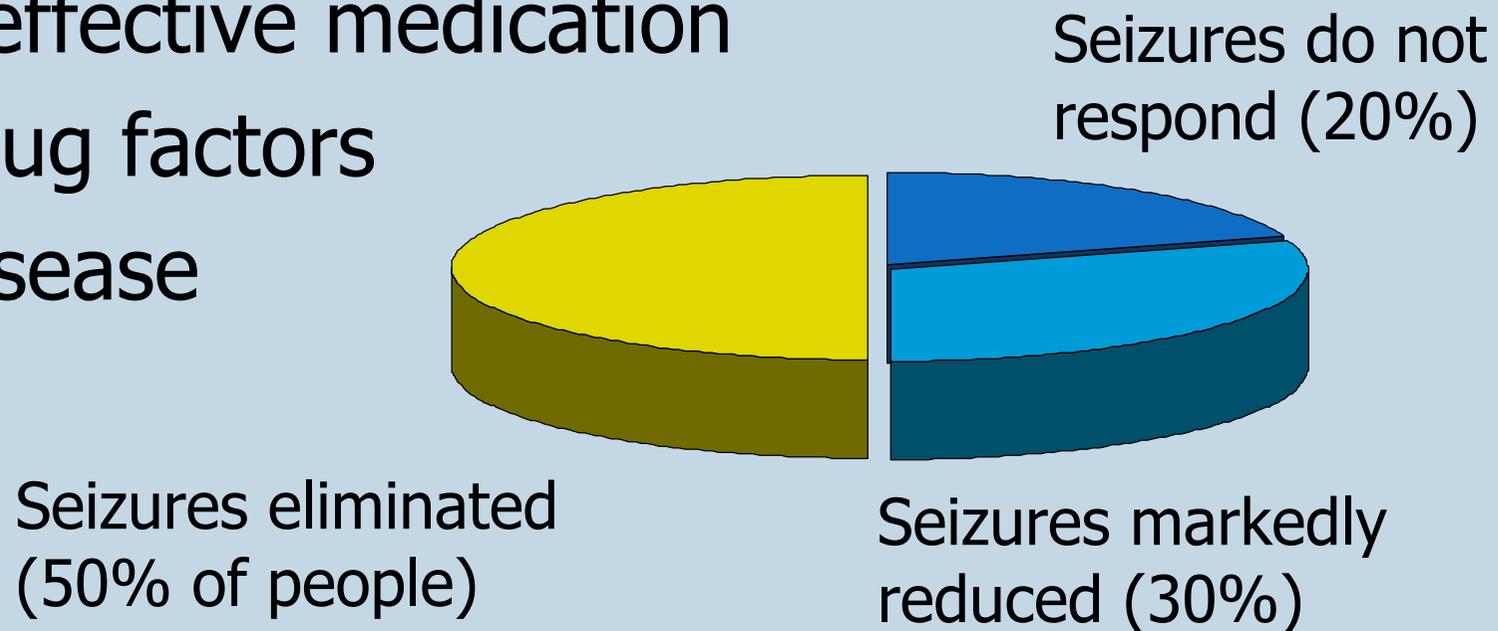
- Medication
- Surgery
- Nonpharmacologic treatment
  - Ketogenic diet-not useful in adults
  - Vagus nerve stimulation
  - Lifestyle modifications

# Factors That Affect the Choice of Drug

- Seizure type/  
Epilepsy syndrome
- Side effects
- Patient age
- Lifestyle
- Childbearing potential
- Other medications

# Factors That Influence Response to Medication

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



# Tolerating Medications

## **Most Common Side Effects**

- Rash
  - Clumsiness
  - Drowsiness
  - Irritability
  - Nausea
- 

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

## **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

# Surgery

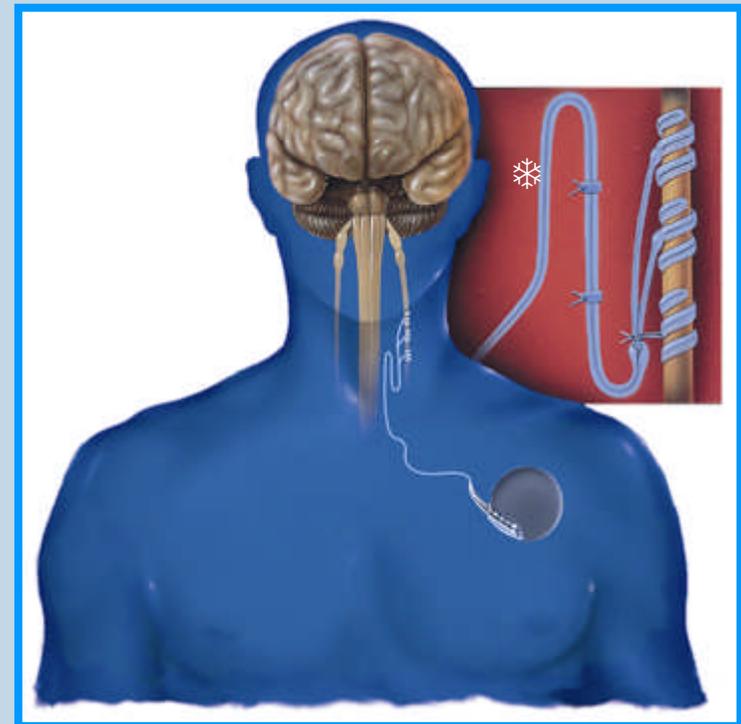
## Factors influencing decision

- 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

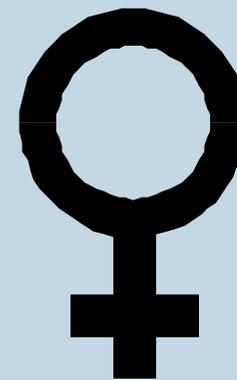
"...I just need to remember that things happen for a reason, and that we will cope with whatever comes our way. It is okay not to like it, as seizures aren't fun and can be scary.

Epilepsy doesn't have to rule our lives -- as long as we have people who will listen to us, believe us, and give us honest answers."



# 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



# 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

# Living Well With Epilepsy

“I have epilepsy,  
but epilepsy doesn't have me”

# Resources

- VA Epilepsy Website
  - [www.epilpesy.va.gov](http://www.epilpesy.va.gov)
- Epilepsy Foundation Website
  - [www.epilepsynorcal.org](http://www.epilepsynorcal.org)
- Epilepsy.com