Clinical Epilepsy

Seizures vs Epilepsy
Definition: the clinical manifestation of an abnormal and excessive excitation of a population of cortical neurons

Incidence: approximately 80/100,000 per year

Lifetime prevalence: 9%
(1/3 benign febrile convulsions)

Partial (focal) Seizures
- Simple Partial Seizure
  - no loss of awareness
- Complex Partial Seizure
  - Impaired consciousness/level of awareness (staring)
  - Clinical manifestations vary with origin & degree of spread
  - Presence & nature of aura
    - Temporal lobe: smell, epigastric sensation, deja vu
    - Autonomic (sweating, other autonomic symptoms)
    - Other motor activity
      - Frontal: bicycling and fencing posture
      - Duration (typically 30 seconds to 3 minutes)
      - Amnesia for event
- Partial Seizure with Secondary Generalization

Temporal Lobe Complex Partial Seizure

Primarily Generalized Seizures
- Absence
  - Typical (3 Hz spike and wave)
  - Atypical (2.5-4.5 Hz spike and wave, polyspike)
  - Brief staring (<30 sec); automatisms rare; not post-ictal confusion
- Myoclonic
  - Brief, shock-like muscle contractions
  - Head, upper extremities
  - Usually bilateral, symmetrical
  - Consciousness preserved
  - Precipitated by awakening or falling asleep
  - May progress into clonic or tonic-clonic seizure
  - May be associated with a progressive neurologic deterioration
  - Juvenile Myoclonic Epilepsy (JME)
    - Polyspike wave
  - Onset late adolescence
  - Chromosome 6p
- Progressive Myoclonic Epilepsies
  - Atonic/ Tonic/ Tonic-Clonic

Absence Seizure

Seizure vs Epilepsy

Psychogenic Nonepileptic Seizures
- Represent genuine psychiatric disease
- 10-45% of refractory epilepsy at tertiary referral centers
- Females > males
- Psychiatric mechanism:
  - Dissociation, conversion, unconscious (unlike malingering)
- Association with physical, sexual abuse
- Epileptic and nonepileptic seizures may co-exist
- Video-EEG monitoring often helps clarify the diagnosis
- Once recognized, approximately 50% respond well to specific psychiatric treatment

Epidemiology of Seizures and Epilepsy

Seizure Precipitants

EEG Abnormalities

EEG Abnormalities
Medical Treatment of First Seizure(s)

First Tonic-clonic Seizure

Choosing Antiepileptic Drugs

- Seizure type/Epilepsy syndrome
- Comorbid conditions
- Adverse side effects or events
- Interactions/other medical conditions
- Pharmacokinetic profile
- Cost
- Efficacy
- **ALL FEMALES** (and also consider in males):
  - Folate 1 - 4 mg/day
  - MVI
  - Calcium (1200-1330 mg per day)

Rational Use of AEDs: Flooding the Market

FDA Indications for AEDs: Monotherapy and/or Add-On Therapy

Rational Use of AEDs: All Prescriptions

Market Dynamics for All Indications and Epilepsy

“All substances are poisons; there is none which is not a poison. The right dose differentiates a poison from a remedy.”

Summary of Serious and Non-serious Adverse Events of the Newer AEDs

Pregnancy and AED Therapy: Risks of Congenital Abnormalities

- Congenital malformations
  - Most common: orofacial clefts, heart defects
  - Less common: microcephaly, neural tube defects
- Major malformations
  - General population: 2% to 4%
  - Newborns prenatally exposed to AEDs: 4% to 8%
  - Multiple AEDs and higher doses may substantially increase malformation rate
- Minor malformations
  - Increased 2 to 3 fold (10% to 30%)

AEDs and Bone Health

- Increased incidence of osteopenia, osteomalacia, and fracture with some AEDs
  - No prospective trials have been performed to define the frequency of fractures in epilepsy
- Factors associated with reduced BMD
  - Polypharmacy
  - Generalized seizures
- All tested AEDs have been shown to reduce BMD
  - Primarily associated with enzyme-inducing AEDs and phenytoin
- Strong association for decreasing bone mineral density
  - Carbamazepine
  - Phenytoin
  - Phenytoin
29  AEDs and Bone Health

30  

31  Treatment/Evaluation Sequence for Pharmacoresistant Epilepsy

32  Other Treatments of Epilepsy
   • Medical
     – Experimental AED trials
     – Ketogenic diet
   • Surgical
     – Resective
     – Multiple Subpial Transection
     – Vagal Nerve Stimulator
   • Experimental
     – Thalamic Stimulators
     – Stereotactic Radiosurgery
     – Responsive Neurostimulators

33  Evaluation for Surgery- Neuroimaging

34  Epilepsy Surgery- Neuroimaging

35  Evaluation for Surgery- Subdural Grid Electrodes

36  Left Anterior Temporal Loectomy