Seizures

- Abnormal or uncontrolled neuronal discharges in the brain
- Affect
  - Consciousness
  - Motor activity
  - Sensation
- Symptom of an underlying disorder

Convulsion

- Involuntary violent spasm of large muscles of face, neck, arms, and legs
- Not synonymous with seizure

Epilepsy

- Seizures occurring chronically
- International Classification of Epileptic Seizures
  - Partial (focal)
  - Generalized
  - Special epileptic syndromes

Known Causes of Seizures

- Infectious diseases
- Trauma
- Metabolic disorders
- Vascular diseases
- Pediatric disorders
- Neoplastic disease
Additional Known Causes of Seizures

- Medications
- High doses of local anesthetics
- Eclampsia
- Drug abuse
- Withdrawal syndromes from alcohol or sedative-hypnotic drugs

Seizures of Unknown Etiology

- Lower tolerance to environmental triggers
  - Sleep deprivation
  - Flickering lights
  - Fluid and electrolyte imbalances

Seizures in Neonates, Infants, and Children

- Congenital abnormalities of CNS
- Perinatal brain injury
- Metabolic imbalances

Later-Childhood Etiology

- CNS infections
- Neurological degenerative disorders

Adult Etiology

- Cerebral trauma or neoplasm
- Cerebrovascular disorders

Signs and Symptoms of Seizures

- Related to area of brain with abnormal activity
- International Classification of Epileptic Seizures: classifies seizures
Simple Partial (Focal) Seizures

- Occur in limited portion of brain
- Point of origin: abnormal focus or foci
- Clients experience
  - Feeling that location is vague
  - Hallucinations with all senses
  - Extreme emotions
  - Twitching of arms, legs, or face

Complex Partial (Focal) Seizures

- Altered levels of consciousness
- Involve sensory, motor, and autonomic symptoms
- Aura commonly precedes seizure
- No memory of seizure

Generalized Seizures

- Travel throughout brain

Absence Seizures

- Common in children
- Subtle symptoms
  - Staring
  - Transient loss of consciousness
  - Eyelid fluttering
  - Myoclonic jerks

Atonic Seizures

- Last a few seconds
- Characterized by stumbling or falling

Tonic-Clonic Seizures—Most Common

- Usually preceded by aura
- Tonic Phase
  - Intense muscle contractions
  - Hoarse cry at onset
  - Loss of bowel or bladder control
  - Shallow breathing
- Clonic Phase
  - Alternating contraction and relaxation of muscles
- Postictal state (postseizure state)
  - Drowsiness, disorientation, deep sleep
Special Epileptic Syndromes

- Febrile seizures
- Myoclonic seizures
- Status epilepticus

Febrile Seizures

- Last one to two minutes
- Tonic-clonic motor activity
- Common in 3- to 5-year-olds
- Occur with rapid rise in body temperature
- Affect 5% of all children

Myoclonic Seizures

- Large, jerking body movements
- Quick contraction of major muscles
- Stumbling and falling
- Similar to normal infantile Moro reflex

Status Epilepticus

- Medical emergency
- Continuously repeating seizure
- Common with generalized tonic-clonic seizures
- Continuous muscle contraction
  - May compromise airway
  - May cause hypoglycemia, hypothermia, acidosis
  - May produce lactic acid

Choice of Drug Depends Upon

- Type of seizure
- Client’s history and diagnostic studies
- Pathologic process causing seizures

Barbiturates and GABA Agents

- Monitor client’s condition
- Liver and kidney function
- Pregnancy Category D
- Depletion of nutrients
- Common side effects
- Alcohol and gingko biloba interactions
Client Teaching

- Use reliable contraception
- Immediately report pregnancy
- Report excessive signs of bleeding
- Report drowsiness and bone pain
- Avoid alcohol and gingko biloba

Benzodiazepines—Schedule IV Drug

- Monitor for drug-abuse potential
- Pregnancy risk—Pregnancy Category D
- Contraindicated in narrow-angle glaucoma
- Liver and kidney function should be monitored

Benzodiazepines—Schedule IV Drug

- Respiratory depression may result with other CNS depressants.
- Common side effects include dizziness, drowsiness
- Overdose—give flumazenil (Romazicon)

Status Epilepticus

- Give IV Valium and Ativan
- Do not mix with other drugs in IV line

Client Teaching

- Avoid alcohol, OTC drugs, and herbal medications
- Avoid nicotine
- Avoid driving and hazardous activities
- Rebound seizures if discontinued abruptly
- Take with food
- Drug often used illegally

Hydantoin and Phenytoin-like Drugs

- Monitor serum-drug levels
- Monitor for signs of toxicity
- Monitor for blood dyscrasias and bleeding disorders
- Monitor liver and kidney function
- Fatal hepatotoxicity can occur
Contraindications

- History of heart block
- History of seizures due to hypoglycemia

Client Teaching

- Routine labs for serum level
- Routine labs for liver and kidney function
- Immediately report signs of toxicity
- Immediately report unusual bleeding
- Immediately report liver or brain disease
- Immediately report heart block, hypoglycemia, or pregnancy

Succinimides

- Monitor liver and kidney function
- Use with caution with antiseizure medications, phenothiazines, and antidepressants
- Pregnancy risk—pregnancy Category C

Common Adverse Reactions

- Drowsiness, headache, fatigue, dizziness
- Depression or euphoria
- Nausea, vomiting, weight loss
- Abdominal pain

Life-Threatening Reactions

- Severe mental depression with suicide intent
- Stevens-Johnson syndrome
- Blood dyscrasias

Symptoms of Overdose

- CNS depression
- Stupor
- Ataxia
- Coma
Client Teaching

- Immediately report mood changes or suicidal thoughts
- Avoid driving and hazardous activities
- Do not suddenly stop taking
- Take with food
- Report symptoms of fever or sore throat
- Report weight loss and anorexia

Dosage Procedure

- Start with smallest initial dose
- Add additional drugs, if necessary
- Ensure compatibility with other medications
- Monitor serum-drug levels

Withdrawal of Antiseizure Medications

- Should be seizure free at least three years
- Withdraw gradually over several months
- Resume medications if seizures return
- Be aware of rebound seizures

Drugs That Potentiate GABA Action

- Barbiturates
- Benzodiazepines
- Miscellaneous GABA agents

Barbiturates

- **Prototype drug:** phenobarbital (Luminal)
- **Mechanism of action:** changing the action of GABA
- **Primary use:** controlling seizures
- **Adverse effects:** dependence, drowsiness, vitamin deficiencies, laryngospasm

Benzodiazepines

- **Prototype drug:** diazepam (Valium)
- **Mechanism of action:** similar to that of barbiturates but safer
- **Primary use:** for short-term seizure control
- **Adverse effects:** drowsiness and dizziness
Miscellaneous GABA Agents

- **Prototype drug**: valproic acid (Depakene)
- **Mechanism of action**: similar to that of barbiturates and benzodiazepines on GABA
- **Primary use**: as adjunct therapy
- **Adverse effects**: sedation, drowsiness, GI upset, prolonged bleeding time

Hydantoins

- **Prototype drug**: phenytoin (Dilantin)
- **Mechanism of action**: to densitize sodium channels
- **Primary use**: treating all types of epilepsy except absence seizures
- **Adverse effects**: CNS depression, gingival hyperplasia, skin rash, cardiac dysrhythmias, and hypotension

Phenytoin-Like Drugs

- **Prototype drug**: valproic acid (Depakene)
- **Mechanism of action**: to desensitize sodium channels
- **Primary use**: for absence seizures
- **Adverse effects**: limited CNS depression, visual disturbances, ataxia, vertigo, headache
- **Additional adverse reactions**: gastrointestinal effects, hepatotoxicity, pancreatitis

Succinimides

- **Prototype drug**: ethosuximide (Zarontin)
- **Mechanism of action**: suppress calcium influx
- **Primary use**: for absence seizures
- **Adverse effects**: rare but include drowsiness, dizziness, lethargy
- **Very rare but serious side effects**: systemic lupus erythematosus, leukopenia, aplastic anemia, Stevens-Johnson syndrome
Drugs That Potentiate GABA Action

- Include barbiturates, benzodiazepines, and miscellaneous GABA agents
- Suppress the firing ability of neurons

Examples of Barbiturates

- Phenobarbital (Luminal)
- Amobarbital (Amytal)
- Secobarbital (Seconal)
- Pentobarbital (Nembutal)

Examples of Benzodiazepines

- Clonazepam (Klonopin)
- Clorazepate (Tranxene)
- Lorazepam (Ativan)
- Diazepam (Valium)

Examples of Miscellaneous GABA Agents

- Gabapentin (Neurontin)
- Primidone (Mysoline)
- Tiagabine (Gabitril)
- Topiramate (Topamax)

Examples of Hydantoins

- Phenytoin (Dilantin)—most common
- Fosphenytoin (Cerebyx)

Hydantoins and Phenytoin-like Drugs

- Desensitize sodium channels
- Sodium movement is factor that determines whether neuron will undergo an action potential
Examples of Phenytoin-like Drugs

- Carbamazepine (Tegretol)—tonic-clonic and partial seizures
- Felbamate (Felbatol)
- Lamotrigine (Lamictal)
- Valproic acid (Depakene, Depakote)—absence seizures
- Zonisamide (Zonegran)

Succinimides

- Suppress seizures by delaying calcium influx into neurons
- Examples of succinimides
  - Ethosuximide (Zarontin)
  - Methsuximide (Celontin)
  - Phensuximide (Milontin)

Drug Therapy for Epilepsy

Assessment
- History of seizure activity
- Allergies and drug history
- Knowledge of disease process
- Knowledge of drug therapy
- Client lifestyle

Drug Therapy for Epilepsy (continued)

Nursing Diagnoses
- Disturbed sensory perception related to seizure activity
- Risk for injury related to seizure activity
- Deficient knowledge related to drug therapy
- Deficient knowledge related to disease process
- Noncompliance related to drug regimen
- Noncompliance related to serum lab testing

Drug Therapy for Epilepsy (continued)

Planning
- Absence of or reduction in number of seizures
- No injury during seizure activity
- Understanding of disease
- Understanding of drug regimen
- Compliance with lab testing

Drug Therapy for Epilepsy (continued)

Implementation
- Monitoring neurological status
- Ensuring lab values in normal range
- Client/family teaching about disease
- Client/family teaching about drugs
- Client/family teaching about care during seizure activity
Drug Therapy for Epilepsy (continued)

- Evaluation
  - Effectiveness of drug therapy
  - Client goals

Drugs used in the management of specific seizure types

Table 15.2 Management of Seizures

Antiseizure drugs that potentiate GABA action

Table 15.3 Antiseizure Drugs

Antiseizure drugs that potentiate GABA action

Table 15.3b Antiseizure Drugs

Hydantoins and phenytoin-like drugs

Table 15.4 Hydantoins and phenytoin-like drugs

Succinimides

Table 15.5 Succinimides