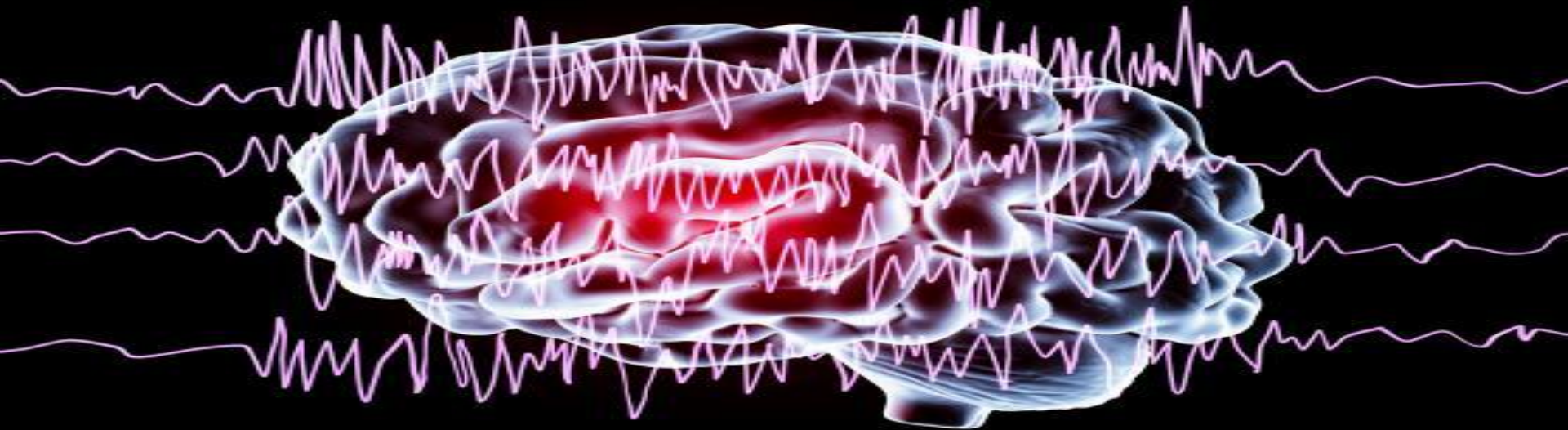


Introduction to Clinical Pharmacology

Chapter 28 Antiepileptics

Seizure Disorders

- Idiopathic
- Hereditary seizure disorder
- Acquired seizure disorder
- Treatment goal is to treat the underlying cause of the seizure



Antiepileptics

- Antiepileptics or anticonvulsants are drugs used to manage seizure disorders
- Drug categories used as antiepileptics
 - hydantoins
 - carboxylic acid derivatives
 - succinimides
 - Benzodiazepines
 - Non-specified drugs

Antiepileptics—Actions #1

- Hydantoins stabilize the hyperexcitability postsynaptically in the motor cortex of the brain.
- Carboxylic acid derivatives increase levels of gamma (γ)-aminobutyric acid (GABA), which stabilizes cell membranes.
- Succinimides depress the motor cortex, creating a higher threshold before nerves react to the convulsive stimuli

Antiepileptics—Actions #2

- Benzodiazepines elevate the seizure threshold by decreasing the postsynaptic excitation
- Nonspecified drugs have differing properties; for example, gabapentin is a GABA agonist, and topiramate blocks the seizure activity rather than raising the threshold

Antiepileptics—Uses #1

- Prophylactically to prevent seizures after trauma, neurosurgery, or with a brain tumor
- Treatment of seizures of all types
- Neuropathic pain
- Bipolar disorders
- Anxiety disorders



Antiepileptics—Uses #2

- **Examples**

- Lorazepam—status epilepticus
- Phenytoin—ongoing seizure control
- Clobazam—adjuvant for Lennox-Gastaut syndrome

Antiepileptics—Adverse Reactions #1

- **Central Nervous System Reactions:**

- Drowsiness, somnolence
- Weakness, dizziness
- Headache
- Nystagmus
- Ataxia
- Slurred speech



Antiepileptics—Adverse Reactions #2

- **Gastrointestinal System Reactions:**
 - Nausea, vomiting
 - Anorexia
 - Constipation
 - Diarrhea
 - Gingival hyperplasia
 - Acute liver failure (Felbamate)



Antiepileptics—Adverse Reactions #3

- Other Reactions:
 - Skin rashes
 - Pruritus
 - Urticaria



Antiepileptics—Adverse Reactions #4

- **Severe Adverse Reactions:**
 - Stevens-Johnson syndrome (Lamotrigine)
 - Hematologic changes; pancytopenia, leukopenia, aplastic anemia, thrombocytopenia with select antiepileptics (Carbamazepine and Felbamate)



Antiepileptics—Contraindications #1

- **Contraindicated in clients with:**
 - **known hypersensitivity to the drugs**
- **Phenytoin is contraindicated in clients with:**
 - **bradycardia, sinoatrial block, Adams-Stokes syndrome, and second- and third-atrioventricular block**
 - **pregnancy and lactation**

Antiepileptics—Contraindications #2

- Ethotoin is contraindicated in clients with:
 - hepatic abnormalities
- Succinamides are contraindicated in clients with:
 - Bone marrow depression
 - hepatic or renal impairment
- Oxcarbazepine contraindicated in clients with:
 - dementia

Antiepileptics—Contraindications #3

- Carbamazepine is contraindicated in clients:
 - who have taken MAOIs within the last 14 days
 - bone marrow suppression
 - hepatic or renal impairment
 - who are pregnancy
- Valproic acid is contraindicated in clients with:
 - renal impairment
 - pregnancy

Antiepileptics—Precautions #1

- Use cautiously in clients with liver or kidney disease and neurologic disorders.
 - The newer mediations such as Eslicarbazepine and Oxcarbazepine can cause hyponatremia
- Benzodiazepines are used cautiously
 - during pregnancy
 - in clients with psychosis
 - in clients with acute narrow-angle glaucoma
 - in elderly or debilitated clients

Antiepileptics—Precautions #2

- Phenytoin and Lacosamide are used cautiously in clients with:
 - severe myocardial insufficiency and hepatic impairment
- Non-specified antiepileptics are used cautiously in clients with:
 - glaucoma or increased ocular pressure
 - a history of cardiac, renal, or liver dysfunction
 - psychiatric disorders

Antiepileptics—Interactions #1

Interacting Drug	Common Use	Effect of Interaction
Antibiotics/ antifungals	Anti-infective agent	Increased effect of the antiepileptic
Tricyclic antidepressants	Manage depression	Increased effect of the antiepileptic
Salicylates	Pain relief	Increased effect of the antiepileptic
Cimetidine	Control GI upset	Increased effect of the antiepileptic
Theophylline	Treatment of respiratory problems	Decrease serum levels of the antiepileptic

Antiepileptics—Interactions #2

Interacting Drug	Common Use	Effect of Interaction
Antiepileptics medications	Reduce seizure activity	May increase seizure activity
Protease inhibitors	Treatment of HIV	Increased carbamazepine levels resulting in toxicity
Oral contraceptives	Birth control	Decreased effectiveness of birth control resulting in breakthrough bleeding or pregnancy
Analgesics or alcohol	CNS depressants	Increased depressant effect
Antidiabetic medications	Manage diabetes mellitus	Increase blood glucose levels

Nursing Process—Client Receiving an Antiepileptic

- **Pre-administration Assessment**
 - Prior to initial administration of the drug.
- **Objective Data**
 - Description of seizures
 - Frequency of seizures
 - Average length of a seizure
 - Vital signs (respiratory rate & depth)



Nursing Process—Client Receiving an Antiepileptic

- Pre-administration Assessment
- Prior to initial administration of the drug.
- Objective Data
 - Neurological diagnostic testing—electroencephalogram (EEG), computed axial tomography (CAT) scan, and magnetic resonance imaging (MRI) scan
 - Laboratory tests—complete blood count, lumbar puncture (LP), and hepatic and renal function tests



Nursing Process—Client Receiving an Antiepileptic

- **Pre-administration Assessment**
- **Prior to initial administration of the drug.**
- **Subjective Data**
 - **Description of the aura (sensation preceding seizure)**
 - **Description of the degree of impairment of consciousness**
 - **Description of anything that seems to bring on the seizure**
 - **Medical history, history of head or other injury**
 - **Family history of seizure activity**
 - **List of all current drugs**

Nursing Process—Client Receiving an Antiepileptic

- Ongoing Assessment
 - Treatment with antiepileptics is indefinite
 - Ongoing assessment is important
 - Carefully document each seizure with regard to time of occurrence; duration of seizure; psychic or motor activity occurring before, during, after seizure
 - Dosage adjustments are based on client's response to therapy, as well as occurrence of adverse reactions.
 - Serum plasma levels of anticonvulsant are measured regularly to monitor for toxicity

Nursing Process—Client Receiving an Antiepileptic

- Ongoing Assessment

- Monitor for adverse reactions including signs that the body is not able to fight infection; laboratory tests

TABLE 28.1 Specific Routine Laboratory Monitoring While Taking Select Antiepileptic Medication

ANTIEPILEPTIC DRUG (AED)	LABORATORY TESTS
Carbamazepine	White blood cells
Eslicarbazepine	Serum sodium
Felbamate	Liver function study
Oxcarbazepine	Serum sodium
Phenytoin	Serum phenytoin levels
Valproic acid	Platelet count/serum ammonia

Nursing Process—Client Receiving an Antiepileptic

•Ongoing Assessment

- Assessment questions to ask during a seizure in an inpatient setting:
 - What is your name?
 - What are you feeling?
 - What do you see?
 - Where are you and where do you live?
 - Touch your left ear.
 - What is this called? (hold up a familiar object)

Nursing Process—Client Receiving an Antiepileptic

- **Nursing Diagnosis**

- **Injury Risk**

- related to seizure disorder, drowsiness, ataxia and vision disturbances

- **Altered Skin Integrity**

- related to adverse reactions (rash)

- **Infection Risk**

- related to immunosuppression secondary to drug therapy

- **Impaired Oral Mucous Membranes**

- related to gum overgrowth secondary to Hydantoins

Nursing Process—Client Receiving an Antiepileptic

•Planning

- Expected client outcomes depend on the type and severity of the seizure but may include:
 - Optimal response to therapy
 - Management of adverse drug reactions
 - Confidence in an understanding of the prescribed medication regimen

Nursing Process—Client Receiving an Antiepileptic

• Implementation

- Promoting Optimal Response to Therapy
 - Make notation on the care plan and inform all health care team members that client is on an antiepileptic
 - Do not omit or miss a dose except by order of primary health care provider
 - If discontinuing drug, drug is gradually withdrawn

Nursing Process—Client Receiving an Antiepileptic

- **Implementation**

- **Promoting Optimal Response to Therapy—Hydantoins**
 - Monitor serum levels of Phenytoin regularly due to possibility of a genetically linked inability to metabolize Phenytoin to detect toxicity
 - Therapeutic levels = 10 to 20 mcg/mL; greater than 20 mcg/mL is toxic level
 - Phenytoin can be given orally or parenterally; should be administered with food if taken orally; IV route is preferred if given parenterally
 - Monitor serum levels more frequently in clients receiving phenytoin through enteral feeding tube

Nursing Process—Client Receiving an Antiepileptic

- **Implementation**

- **Promoting Optimal Response to Therapy - Benzodiazepines**
 - **Dosage of benzodiazepines is highly individualized; increase the dosage cautiously to avoid adverse reactions, particularly in elderly and debilitated clients**
 - **IV Lorazepam acts and wears off quickly; continue to monitor for seizures**
 - **Do not mix Diazepam with other drugs**
 - **When used to control seizures, Diazepam is administered over 2 minutes**

Nursing Process—Client Receiving an Antiepileptic

- Implementation

- Monitoring and Managing Client Needs

- Injury Risk

- Assist the client with all ambulatory activities

- Use caution when giving an oral preparation as aspiration of tablet, capsule, or liquid may occur if client experiences drowsiness

- Test swallowing ability of client by offering small sips of water before giving drug

Nursing Process—Client Receiving an Antiepileptic

- **Implementation**

- **Monitoring and Managing Client Needs**

- **Injury Risk**

- **Seizure precautions: prevent falls and other injuries until seizures are controlled by the drug**
- **Clients on Vigabatrin should see an ophthalmologist for vision screenings regularly due to risk of loss of vision**
- **Clients on antiepileptics can develop photosensitivity so should be advised to stay out of the sun and wear sunscreen and protective clothing**

Nursing Process—Client Receiving an Antiepileptic

- Implementation

- Monitoring and Managing Client Needs

- Altered Skin Integrity

- Carbamazepine, Eslicarbazepine, Lamotrigine, and Phenytoin often produce hypersensitivity
- Risk for severe skin rashes is higher in Asian population; consider genetic testing
- Carefully examine all affected areas and provide an accurate description and report findings to the primary health care provider
- If severe rash is present, drug is not resumed
- If mild rash is present therapy might be resumed after rash disappears

Nursing Process—Client Receiving an Antiepileptic

- Implementation

- Monitoring and Managing Client Needs

- Infection Risk

- Be alert for signs of pancytopenia, such as sore throat, fever, general malaise, bleeding of the mucous membranes, epistaxis, easy bruising and report immediately
- Routine laboratory tests, such as complete blood counts and differential counts, should be performed periodically

Nursing Process—Client Receiving an Antiepileptic

- **Implementation**

- **Monitoring and Managing Client Needs**

- **Infection Risk**

- If bone marrow suppression is evident, primary health care provider may discontinue or change antiepileptics
- If pancytopenia develops, implement protective measures (e.g., soft-bristled toothbrush and extremities protected from injury)

Nursing Process—Client Receiving an Antiepileptic

- Implementation
 - Monitoring and Managing Client Needs
 - Impaired Oral Mucous Membranes
 - Long-term administration of Hydantoins can cause gingivitis and gingival hyperplasia
 - Periodically inspect mouth, teeth, gums of clients in a hospital or long-term clinical setting
 - Report any changes in gums or teach to the primary health care provider
 - Teach clients to perform oral care after each meal

Nursing Process—Client Receiving an Antiepileptic

- **Implementation—Educating the Client and Family**
 - When client receives diagnosis of epilepsy, nurse must assist client and family to adjust to diagnosis
 - Instruct family members in care of client before, during, and after seizures
 - Explain importance of restricting some activities until seizures are controlled by drugs



Nursing Process—Client Receiving an Antiepileptic

- **Implementation—Educating the Client and Family**
 - Assist client to look for other modes of transportation in order to continue typical activities or employment
 - Review adverse drug reactions associated with the prescribed anticonvulsant with the client and family members
 - Referral to social work, discharge planning coordinator, or public health nurse as needed



Nursing Process—Client Receiving an Antiepileptic

- **Implementation—Educating the Client and Family**
 - **Teach client and family:**
 - **To monitor for adverse reactions and report to primary health care provider**
 - **To take the medication as prescribed and not to stop or omit doses or change medications without direction from a provider; discontinuation may cause a recurrence of seizures**
 - **That blood levels will be monitored**
 - **To not put anything in the person's mouth if they are having a seizure**

Nursing Process—Client Receiving an Antiepileptic

- **Implementation—Educating the Client and Family**
 - **Teach client and family:**
 - **To not drive or do hazardous activities; drink alcohol, or take nonprescription medications unless approved by a primary health care provider**
 - **To avoid alcohol unless directed otherwise by primary health care provider**
 - **To wear a medical alert bracelet**
 - **To keep a record of all seizures**

Nursing Process—Client Receiving an Antiepileptic

- **Implementation—Educating the Client and Family**
 - **Hydantoins:**
 - Inform dentist and other primary health care providers of use of this drug; notify primary care provider about any adverse reactions
 - Brush and floss teeth after each meal and make periodic dental appointments for oral examination and care
 - Take medication with food and shake suspensions immediately prior to use
 - Do not take discolored capsules

Nursing Process—Client Receiving an Antiepileptic

- Implementation—Educating the Client and Family
 - Succinimides:
 - Take drug with food for GI upset
 - Notify primary health care provider of and adverse reactions
 - Vigabatrin
 - Periodic vision assessment and restricted administration through the SHARE program is required to recognize and reduce vision loss

Nursing Process—Client Receiving an Antiepileptic

• Evaluation

- Was the therapeutic effect achieved and convulsions controlled?
- Were adverse reactions: identified, reported, and managed?
 - No injury evident
 - Skin and mucous membranes remain intact; mucous membranes moist
 - No evidence of infection is seen
- Did client and family express confidence and demonstrate understanding of drug regimen?

Pharmacology in Practice Exercise #1

- Which of the following are ways to categorize the seizure disorders?
Select all that apply.
 - a) Voluntary
 - b) Hereditary
 - c) Idiopathic
 - d) Acquired

Pharmacology in Practice Exercise #2

- A nurse is caring for a client who has a history of status epilepticus. Which drug should be available in parenteral form should this happen to the client again?
 - a) Phenytoin
 - b) Lorazepam
 - c) Barbiturate
 - d) Diazepam

Pharmacology in Practice Exercise #3

- A client prescribed an antiepileptic complains of chronic pain and requests an analgesic to be taken over time. Which possible interaction of analgesics with antiepileptics should the nurse monitor for in this client?
 - a) Increased carbamazepine levels
 - b) Increased seizure activity
 - c) Increased blood glucose levels
 - d) Increased depressant effect