

N5- PHARMACOLOGY AND THERAPEUTICS

NEUROLOGIC AGENTS

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CNS Medications: Nursing Process

ASSESSMENT

- Ask questions to gather subjective data about how the patient is feeling. Use therapeutic communication.
- Use general survey techniques to assess for behavior changes.
 - Mood
 - Hygiene
 - Appearance
 - Movement
- Obtain objective data: vital signs, physical examination
- Check for allergies.

CNS Medications: Nursing Process

IMPLEMENTATION

- 10R's of Medication Administration
- Anticipate side effects and the expected outcome of the medication
- Note that patients may have changing behaviors and habits that influence the way they think and feel about taking the medication.
- Provide health education. Teach the patient about when the medication is expected to produce an effect. Some medications will take weeks to become therapeutic for the patient.
- Monitor laboratory results.
- Check for drug-food/ drug-drug interactions.



CNS Medications: Nursing Process

EVALUATION

1. Patient's response to medications.
2. Mood
3. Behavior
4. Movement improvement
5. Side effects



CNS Depressants




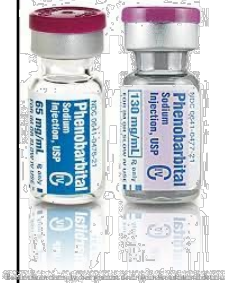
CNS Depressants

BARBITURATES

- enhance the action of GABA, a neurotransmitter that inhibits the activity of nerve cells in the brain.
- Historically, barbiturates were used in the treatment of anxiety, epilepsy, to induce sleep, and as anesthetics. Nowadays, their use is limited to a few specific conditions, such as:
 - extreme cases of insomnia
 - seizures that are unresponsive to other, less toxic, agents
 - the induction of anesthesia
 - in combination with acetaminophen and caffeine to relieve tension headaches.

CNS Depressants

BARBITURATES


GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/ THERAPEUTIC EFFECTS	SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
Phenobarbital 	Barbiturates 	produce sedation and drowsiness by altering cerebellar function and depressing the actions of the brain and sensory cortex.	primarily used as an anticonvulsant Also used as a sedative and may also be used as a preanesthetic agent	<ul style="list-style-type: none"> • CNS depression • suicidal thoughts or behaviors • Respiratory depression • GI disturbances • Rashes • some blood disorders that can be fatal 	<ul style="list-style-type: none"> • Do not use for children less than 1 month of age. • Advise contraception for sexually- active female patients on therapy. Barbiturates may harm the fetus during pregnancy. • Avoid use in geriatric patients. • Check history of alcohol use and medications. concomitant use of alcohol or other CNS depressants may produce additive CNS depressant effects that can cause death. • It should not be discontinued abruptly as this may cause onset of seizure activity.

CNS Depressants

BENZODIAZEPINES

- also called “benzos”
- They act on specific receptors in the brain, called gamma-aminobutyric acid-A (GABA-A) receptors. Benzodiazepines attach to these receptors and make the nerves in the brain less sensitive to stimulation, which has a calming effect.
- may be used to treat:
 - alcohol withdrawal
 - anxiety
 - as a muscle relaxant
 - panic disorder
 - seizures
 - sleep disorders
 - to induce relaxation and cause amnesia prior to surgical operations.

CNS Depressants BENZODIAZEPINES

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/ THERAPEUTIC EFFECTS	SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
Diazepam 	Benzodiazepine	bind to specific GABA receptors to potentiate effects of GABA.	used for sedation, antianxiety, and anticonvulsant effects.	<ul style="list-style-type: none"> • Oversedation and drowsiness • Respiratory depression • Unsteadiness and fall risk • Overdosage can cause coma and death 	<ul style="list-style-type: none"> • Black Box Warning: Concomitant use of benzodiazepines and opioids may result in profound sedation, respiratory depression, coma, and death • May cause fetal harm in pregnant women • May cause paradoxical effect in children • Use cautiously in elderly and with those with liver dysfunction

CNS STIMULANTS




CNS Stimulants

- medicines that stimulate the brain, speeding up both mental and physical processes.
- increase energy, improve attention and alertness, and elevate blood pressure, heart rate and respiratory rate
- decrease the need for sleep, reduce appetite, improve confidence and concentration, and lessen inhibitions.
- Experts aren't exactly sure how CNS stimulants work, although they suspect they increase levels of one or more neurotransmitters in the brain, such as dopamine, norepinephrine, or serotonin. They may also have other effects, depending on the actual drug.
- useful for the treatment of certain conditions characterized by symptoms such as prolonged fatigue, inability to concentrate, or excessive sleepiness.
 - Attention Deficit Disorder
 - Chronic Lethargy
 - Weight loss for morbid obese clients unresponsive to other treatments
 - Narcolepsy
 - Neonatal apnea
 - Postural orthostatic tachycardia syndrome
 - Prologued depression that is unresponsive to traditional antidepressants

CNS Stimulants

METHYLPHENIDATE

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/ THERAPEUTIC EFFECTS	SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
Methylphenidate 	CNS stimulant	stimulates the brain and acts similar to amphetamines. Methylphenidate is thought to block the reuptake of norepinephrine and dopamine into the presynaptic neuron	Increases mental focus and attention in patients with ADHD	<ul style="list-style-type: none"> • Immediately report signs and symptoms of abuse, cardiac or peripheral vascular complications, and priapism • Report mania or psychotic episodes • Common side effects: headache, insomnia, upper abdominal pain, decreased appetite, and anorexia • Gynecomastia 	<ul style="list-style-type: none"> • Check for presence of cardiac conditions. • Black Box Warning: High abuse potential • Patients should avoid alcohol • Monitor BP and HR • Monitor growth and weight in children • Monitor for signs of abuse • Contraindicated with MAOIs or use of an MAOI within the preceding 14 days

CNS Stimulants

METHYLPHENIDATE

CLIENT TEACHING

- Controlled Substance Status/High Potential for Abuse and Dependence
- Serious Cardiovascular Risks
- Blood Pressure and Heart Rate Increases
- Psychiatric Risks
- Priapism
- Circulation Problems in Fingers and Toes
- Suppression of Growth
- Alcohol Effect

Anti-Depressants




Anti-Depressants

- used to treat depression and other mental health disorders, as well as other medical conditions such as:
 - migraine headaches
 - chronic pain
 - premenstrual syndrome
- Antidepressants increase levels of neurotransmitters in the CNS, including serotonin (5-HT), dopamine, and norepinephrine.
- Treatment is based on the belief that alterations in the levels of these neurotransmitters are responsible for causing depression.
- Classes:
 - tricyclic antidepressants (TCAs)
 - selective serotonin reuptake inhibitors (SSRIs)
 - serotonin norepinephrine reuptake inhibitors (SNRIs)
 - monoamine oxidase inhibitors (MAOIs)


Anti-Depressants

TRICYCLIC ANTIDEPRESSANTS (TCAs)

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/THERAPEUTIC EFFECTS	SIDE/ADVERSE EFFECTS	NURSING CONSIDERATIONS
Amitriptyline 	Anti-Depressants TCA	an antidepressant with sedative effects. Its mechanism of action is not known. Amitriptyline inhibits the membrane pump mechanism responsible for uptake of norepinephrine and serotonin in adrenergic and serotonergic neurons. This interference with reuptake of norepinephrine and/or serotonin is believed to underlie the antidepressant activity of amitriptyline.	used to treat depression, neuropathic pain, and insomnia	<ul style="list-style-type: none"> • signs or symptoms of suicidality • Anticholinergic effects • Hypotension • May lengthen QT interval; risk for arrhythmias • Sedation • Sexual dysfunction • Altered seizure threshold 	<ul style="list-style-type: none"> • Administer at bedtime • Contraindicated with MAOIs. • Watch out for anticholinergic effects especially among the elderly. • Ensure safety. Monitor orthostatic blood pressures and consider fall risk precautions. • Taper dose when discontinuing; do not stop abruptly

Anti-Depressants

SELECTIVE SEROTONIN REUPTAKE INHIBITOR (SSRI)

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/ THERAPEUTIC EFFECTS	SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
Fluxetine Citalopram 	Anti-Depressants SSRIs	SSRIs inhibit the reuptake of serotonin.	primarily used to treat depression, but are also used to treat obsessive compulsive disorder, bulimia, panic disorder, posttraumatic stress disorder, other forms of anxiety, premenstrual syndrome, and migraines.	<ul style="list-style-type: none"> • signs or symptoms of suicidality • serotonin syndrome • Rash • Mania • Seizures • decreased appetite and weight • increased bleeding, • Hyponatremia • Anxiety • insomnia 	<ul style="list-style-type: none"> • Black Box Warning: Monitor for increased risk of suicidality • Do not stop abruptly; taper dose when discontinuing • Contraindicated with MAOIs • Use caution with liver dysfunction • May take up to 12 weeks before achieve therapeutic effect • Tell patients to avoid grapefruit juice due to its effect on the CYP3A4 enzyme that affects the bioavailability of the medication.

Anti-Depressants

SEROTONIN NOREPINEPHRINE REUPTAKE


INHIBITORS (SNRIs)

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/ THERAPEUTIC EFFECTS	SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
VENLAXAFINE	Anti-Depressants SNRI	inhibits the reuptake of serotonin and norepinephrine, with weak inhibition of dopamine reuptake.	treatment of a major depressive disorder	<ul style="list-style-type: none"> • Increased suicidality • Serotonin syndrome • Elevated BP • Anxiety • Insomnia • Decreased appetite • Weight loss • Mania • Hyponatremia • Increased bleeding • Elevated cholesterol • Somnolence • GI: Nausea and constipation 	<ul style="list-style-type: none"> • Black Box Warning: Monitor for increased risk of suicidality • Monitor BP • Gradually reduce dose when discontinuing when possible • Use with caution with patients with liver or renal disease



Anti-Depressants

MONOAMINE OXIDASE INHIBITORS (MAOI)


GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/ THERAPEUTIC EFFECTS	SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
TRANLYCYPROMINE 	Anti-Depressants MAOI	not fully understood, but is presumed to be linked to potentiation of monoamine neurotransmitter activity in the central nervous system resulting from its irreversible inhibition of the enzyme monoamine oxidase (MAO). MAO inactivates norepinephrine, dopamine, epinephrine, and serotonin. By inhibiting MAO, the levels of these transmitters rise.	treatment of major depressive disorder in adult patients who have not responded adequately to other antidepressants. The drug may also be used to treat Parkinson's disease.	<ul style="list-style-type: none"> • Increased suicidality • Hypertensive crisis • Serotonin syndrome • Mania • Orthostatic hypotension • Hepatotoxicity • Seizures • Hypoglycemia in diabetic patients • Decreased appetite and weight loss • CNS: dizziness, headache, drowsiness, and restlessness • May impair ability to operate machinery or drive 	<ul style="list-style-type: none"> • Black Box Warning: Monitor for hypertensive crisis and increased suicide ideation • Avoid foods containing tyramine • Many drug interactions • Monitor BP • Do not stop abruptly; taper dose when discontinuing • Discontinue if hepatotoxicity

Anti - Mania



Anti-Mania


LITHIUM

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/ THERAPEUTIC EFFECTS	SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
LITHIUM 	Anti-mania	alters sodium transport in nerve and muscle cells and effects a shift toward intraneuronal metabolism of catecholamines, but the specific biochemical mechanism of lithium action in mania is unknown.	the treatment of manic episodes of bipolar disorder and as a maintenance treatment for individuals with a diagnosis of bipolar disorder.	<ul style="list-style-type: none">• Lithium toxicity• Hyponatremia• Tremor• Cardiac arrhythmia• Polyuria• Thirst	<ul style="list-style-type: none">• Black Box Warning: Monitor for signs of lithium toxicity• Monitor serum lithium and sodium levels• Contraindicated in renal and cardiovascular disease and in dehydration

ANTRI- PSYCHOTICS




Anti- Psychotics

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/ THERAPEUTIC EFFECTS	SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
HALOPERIDOL 	1st generation (conventional) antipsychotic	Conventional antipsychotics, such as haloperidol, block dopamine receptors in certain areas of the CNS, such as the limbic system and the basal ganglia. These areas are associated with emotions, cognitive function, and motor function, and blockage thus produces a tranquilizing effect in psychotic patients. However, several adverse effects are also caused by this dopamine blockade.	schizophrenia and Tourette's disorder	<ul style="list-style-type: none"> • tardive dyskinesia, • neuroleptic malignant syndrome (NMS) • extrapyramidal symptoms. 	<ul style="list-style-type: none"> • Black Box Warning: Monitor elderly patients with dementia closely for symptoms of cardiovascular events or infection • Advise patients to avoid alcohol, operate machinery, or drive

Anti-Psychotics

RISPERIDONE

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/ THERAPEUTIC EFFECTS	• SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
<p>RISPERIDONE</p> 	<p>2nd generation (atypical) antipsychotic</p>	<p>Second-generation, or atypical, antipsychotics block specific dopamine 2 receptors and specific serotonin 2 receptors, thus causing fewer adverse effects.</p>	<p>primarily indicated for schizophrenia but is also used for acute manic episodes and for irritability caused by autism. Some atypical antipsychotics are also used as adjunct therapy for depression.</p>	<ul style="list-style-type: none"> • metabolic changes such as hyperglycemia, hyperlipidemia, and weight gain 	<ul style="list-style-type: none"> • Black Box Warning: Monitor elderly patients with dementia closely for symptoms of cardiovascular events or infection • Advise patients to avoid alcohol, operate machinery, or drive

ANTI- CONVULSANT




Anti-Convulsants

- Antiseizure drugs
- stabilize cell membranes and suppress the abnormal electric impulses in the cerebral cortex
- prevent seizures but do not provide a cure.
- classified as CNS depressants
- Main pharmacological effects:
 - they increase the threshold of activity in the motor cortex, thus making it more difficult for a nerve to become excited.
 - they limit the spread of a seizure discharge from its origin by suppressing the transmission of impulses from one nerve to the next.
 - they decrease the speed of the nerve impulse conduction within a given neuron.
- Some drugs work by enhancing the effects of the inhibitory neurotransmitter gamma-aminobutyric acid (GABA), which plays a role in regulating neuron excitability in the brain.


Anticonvulsants

PHENYTOIN

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/THERAPEUTIC EFFECTS	SIDE/ADVERSE EFFECTS	NURSING CONSIDERATIONS
<p>PHENYTOIN</p> 	<p>Anticonvulsant</p>	<p>improves evidence of seizures by interfering with sodium channels in the brain, resulting in a reduction of sustained high-frequency neuronal discharges.</p>	<p>for the treatment of tonic-clonic (grand mal) and psychomotor (temporal lobe) seizures and for the prevention and treatment of seizures occurring during or following neurosurgery.</p>	<ul style="list-style-type: none"> • Cardiovascular risk associated with rapid IV infusion • Discontinue and notify the provider if a rash occurs • Notify the provider immediately if fever, rash, lymphadenopathy, and/or facial swelling occur • Cardiovascular: arrhythmia and hypotension • CNS: Nystagmus, ataxia, slurred speech, decreased coordination, somnolence, and mental confusion • GI: Constipation, gingival hyperplasia, and hepatotoxicity • Hematology: Thrombocytopenia, pancytopenia, and agranulocytosis 	<ul style="list-style-type: none"> • Careful cardiac monitoring is needed during and after administering intravenous phenytoin • For IV infusions, an in-line filter (0.22 to 0.55 microns) should be used. Cannot be given with D5W due to precipitation and no faster than 50 mg/minute in adults • Monitor serum drug levels • Contraindicated with patient with heart block • Use cautiously in patients with hepatic or renal impairment • Taper dose; do not stop abruptly


Anticonvulsants

LEVETIRACETAM

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/ THERAPEUTIC EFFECTS	• SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
LEVETIRACETAM 	Anti-convulsant	improves evidence of seizures by interfering with sodium channels in the brain, resulting in a reduction of sustained high-frequency neuronal discharges.	Decrease seizure activity	<ul style="list-style-type: none"> • Behavioral/mood changes (psychotic symptoms, suicidal ideation, irritability, and aggressive behavior) • Anaphylaxis or angioedema • Somnolence • fatigue, and irritability • Serious skin conditions • Coordination difficulties • Hematopoietic abnormalities 	<ul style="list-style-type: none"> • Taper dose; do not stop abruptly or seizures may occur • Monitor plasma levels for pregnant women • Use cautiously if renal impairment

Anticonvulsants

GABAPENTIN

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION/ THERAPEUTIC EFFECTS	• SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
GABAPENTIN 	Anti-convulsant	The exact mechanism of action is unknown. It is structurally similar to GABA, but does not act on GABA receptors or influence GABA.	used for partial seizures and neuropathic pain.	<ul style="list-style-type: none"> • Increased suicidal ideation • Fever • Rash • lymphadenopathy • CNS depression: dizziness, somnolence, and ataxia 	<ul style="list-style-type: none"> • Administer first dose at bedtime to decrease dizziness and drowsiness • Monitor for worsening depression, suicidal thoughts or behavior, and/or any unusual changes in mood or behavior • Taper dose; do not stop abruptly

Anti Parkinson's Drugs

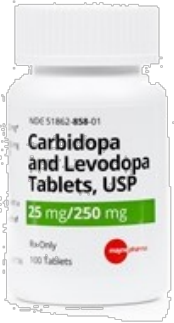


Anti-Parkinson Drugs

- Parkinson's disease is believed to be related to an imbalance of dopamine and acetylcholine and a deficiency of dopamine in certain areas of the brain, so drug therapies are aimed at increasing levels of dopamine and/or antagonizing the effects of acetylcholine.
- Drug therapy does not cure the disease, but is used to slow the progression of symptoms.

Anti-Parkinson Drugs

Carbidopa/ Levodopa

GENERIC NAME	DRUG CLASS	MECHANISM OF ACTION	INDICATION / THERAPEUTIC EFFECTS	SIDE/ ADVERSE EFFECTS	NURSING CONSIDERATIONS
<p>CARBIDOPA / LEVODOPA</p> 	<p>Anti-Parkinson drugs</p>	<p>Administration of dopamine is ineffective in the treatment of Parkinson's disease because it does not cross the blood-brain barrier, but levodopa, the metabolic precursor of dopamine, does cross the blood-brain barrier and presumably is converted to dopamine in the brain. Carbidopa is combined with levodopa to help stop the breakdown of levodopa before it is able to cross the blood- brain barrier. Additionally, the incidence of levodopa-induced nausea and vomiting is less when it is combined with carbidopa.</p>	<p>Slow progression of symptoms of Parkinson's disease (tremors, rigidity, and mobility issues)</p>	<ul style="list-style-type: none"> • Depression • suicidal ideation • hallucinations, and intense urges with inability to control them • Somnolence and fatigue • NMS symptoms with dose reductions or when discontinued • Dyskinesia • Discolored body fluids • Hypomobility with long-term use 	<ul style="list-style-type: none"> • Avoid high-protein diets due to decreased absorption • Monitor for sudden somnolence and increased depression • Contraindicated with MAOIs • Periodically monitor hepatic, renal, and hematopoietic functions

A bright pink sticky note is placed on a laptop keyboard. The note has the words "Thank You!" written in a bold, black, sans-serif font. The keyboard keys visible include 'A', 'Z', 'X', 'C', 'alt', and 'Enter'.

**Thank
You!**

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CNS STIMULANTS

