Chapter 20

Drugs for Degenerative Diseases of the Nervous System

Alzheimer’s Disease
- Most common degenerative disease of CNS
- Progressive loss of brain function
  - Memory loss, confusion, dementia

Amyotrophic Lateral Sclerosis
- Progressive weakness and wasting of muscles
- Destruction of motor neurons

Huntington’s Chorea
- Autosomal dominant genetic disorder
- Progressive dementia
- Involuntary, spasmodic movements
- Muscles of limbs and face affected

Multiple Sclerosis
- Demyelination of neurons in CNS
- Progressive weakness, visual disturbances
- Mood alterations, cognitive deficits
Parkinson’s Disease

- Second most common CNS disease
- Progressive loss of dopamine
- Tremor, muscle rigidity
- Abnormal movement and posture

Symptoms of Parkinson’s Disease

- Tremors
- Muscle rigidity
- Bradykinesia
- Postural instability

Cause of Symptoms

- Degeneration and destruction of dopamine-producing neurons
  - Substantia nigra portion of brain
- Corpus striatum
  - Normally controls unconsciousness muscle movement

Neurotransmitters

- Dopamine and acetylcholine in corpus striatum
  - Affect balance, posture
  - Affect muscle tone, involuntary movement
- Absence of dopamine
  - Allows acetylcholine stimulation

Drug Therapy for Parkinsonism

- Restores dopamine function
- Blocks acetylcholine

Role of the Nurse: Dopaminergic Drug Therapy

- Contraindicated in narrow-angle glaucoma
- Monitor for hypotension and tachycardia
- Look for symptoms of drug toxicity
Dopaminergic Agents

- **Prototype drug**: levodopa (Larodopa)
- **Mechanism of action**: restore functional balance of dopamine and acetylcholine in corpus striatum
- **Primary use**: inhibit enzymes that destroy levodopa or directly activate dopamine receptor in the brain
- **Adverse effects**: nausea/vomiting, dyskinesias, postural hypotension, psychosis, dark urine and sweat, activation of malignant melanoma

Dopaminergics Client Teaching

- Increase fiber and fluids
- Avoid food and drugs high in pyridoxine
- May take several months for full effect
- Abruptly stopping the drug may cause Parkinsonism crisis

Anticholinergics Client Teaching

- Relieve dry mouth with frequent drinks or sugarless hard candy
- Take with food or milk to prevent GI upset
- Avoid alcohol
- Wear dark glasses; avoid bright sunlight
- Do not stop taking abruptly

Nursing Considerations with AChE Inhibitors

- Assess baseline vitals
- Monitor for hypotension
- Monitor for change in mental status or mood
- Monitor for dizziness, insomnia, anorexia
- Clients with narrow-angle glaucoma should not take revastigmine (Exelon)

AChE Inhibitors Client Teaching

- Take with food or milk to avoid GI upset
- Take as prescribed
- Teach signs and symptoms of overdose
  - Severe nausea/vomiting, sweating, salivation, hypotension
  - Bradycardia, convulsions, increased muscle weaknesses (including respiratory muscles)

Levadopa Animation

Click here to view an animation on the topic of levadopa.
Anticholinergic Agents

- **Prototype drug:** benztropine mesylate (Cogentin)
- **Mechanism of action:** block acetylcholine; inhibit overactivity in brain
- **Primary use:** in early stages of disease
- **Adverse effects:** dry mouth, blurred vision, photophobia, urinary retention, constipation, tachycardia, glaucoma

Acetylcholinesterase (AChE) Inhibitors

- **Prototype drug:** donepezil hydrochloride (Aricept)
- **Mechanism of action:** to prevent breakdown of acetylcholine; enhance transmission in neurons
- **Primary use:** slow progression of the disease
- **Adverse effects:** nausea/vomiting, dizziness and headache, bronchoconstriction, liver injury (tacrine/Cognex)

Alzheimer's Disease (AD)

- **Cause unknown**
- **Possible causes**
  - Genetic defects
  - Chronic inflammation
  - Excess free radicals
  - Environmental factors

Structural Damage in Brain

- **Consists of**
  - Amyloid plaques
  - Neurofibrillary tangles
- **Changes found during autopsies**
- **Symptoms result from progressive damage to neurons in hippocampus**
  - Requires acetylcholine as neurotransmitter

Symptoms of Alzheimer's Disease

- Impaired memory and judgment
- Confusion and disorientation
- Inability to recognize family and friends
- Aggressive behavior
- Depression
- Anxiety and psychoses

Goals of Pharmacotherapy for Alzheimer's Disease

- Slow memory loss
- Slow dementia symptoms
- Improve activities of daily living
- Improve behavior
- Improve cognition
Efficacy of Drug Therapy

- No cure
- Moderate efficacy
- All drugs have equal efficacy
- Ineffective in late stages
- New drugs under investigation
- Medications given as adjunct therapy

Acetylcholinesterase (AchE) Inhibitors

- For Alzheimer’s disease
- Prevent breakdown of acetylcholine
- Enhances transmission in cholinergic neurons
- Only slow progression

Acetylcholinesterase (AchE) Inhibitor Examples

- Donepezil hydrochloride (Aricept)
- Galantamine (Reminyl)
- Tacrine (Cognex)
- Rivastigmine tartrate (Exelon)

Dopaminergics

- For Parkinson’s disease
- Restore balance of dopamine and acetylcholine
- Dopaminergic examples
  - Levodopa (Larodopa)
  - Levodopa and carbidopa (Sinemet)

Dopaminergic Adjunct Agents

- Inhibit enzymes
- Activate dopamine receptors
- Dopaminergic adjunct examples
  - Ropinirole (Requip)
  - Bromocriptine (Parlodel)

Anticholinergic Agents

- For Parkinson’s disease
- Centrally acting
- Block acetylcholine
  - Inhibits overactivity in brain
- Used in early stages
Anticholinergics Examples

- Benztropine mesylate (Cogentin)
- Triexyphenidyl hydrochloride (Artane)

Drugs for Degenerative Diseases of the Nervous System

- Assessment
  - Complete health and drug history
  - Assess severity of disease
  - Monitor vital signs and lab tests
  - Assess client/family knowledge of disease

Drugs for Degenerative Diseases of the Nervous System (continued)

- Nursing Diagnoses
  - Risk for falls
  - Deficient knowledge related to drug therapy
  - Deficient knowledge related to disease process
  - Impaired physical mobility
  - Self-care deficit
  - Constipation

Drugs for Degenerative Diseases of the Nervous System (continued)

- Planning
  - Goals
    - Increased ease of movement
    - Decrease in symptoms
    - Understanding of drug regimen/disease
    - Adherence to drug regimen
    - Reporting of side effects

Drugs for Degenerative Diseases of the Nervous System (continued)

- Implementation
  - Monitor vital signs and lab tests
  - Ensure client safety
  - Monitor behavior changes
  - Observe for symptoms of overdose
  - Monitor for improved functional status
  - Monitor for drug side effects

Drugs for Degenerative Diseases of the Nervous System (continued)

- Evaluation
  - Effectiveness of drug therapy
  - Client goals/outcomes met
Dopaminergic Drugs Used for Parkinsonism

Table 20.2 Dopaminergic Drugs Used for Parkinsonism

Anticholinergics & Parkinsonism

Table 20.3 Anticholinergics & Parkinsonism

Acetylcholinesterase Inhibitors for Alzheimer’s Disease

Table 20.4 Acetylcholinesterase Inhibitors for Alzheimer’s Disease