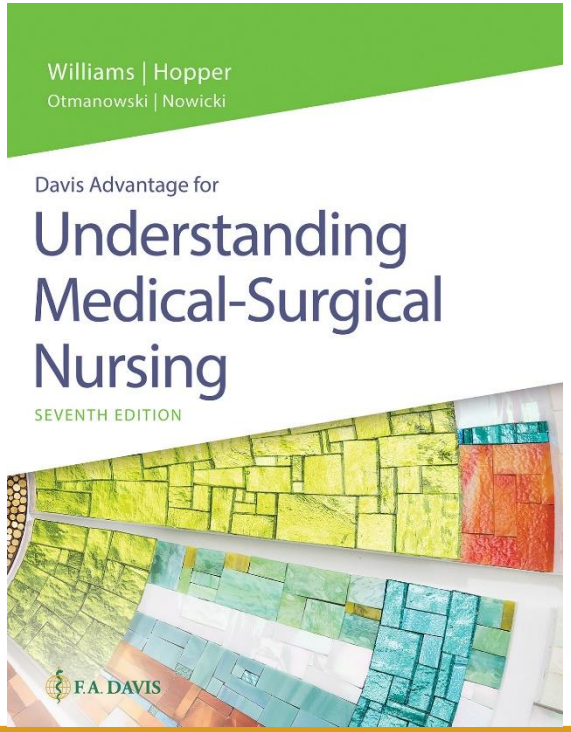


Chapter 48

Nursing Care of Patients With Central Nervous System Disorders

Learning Outcomes

- Explain causes, risk factors, and pathophysiology of central nervous system infections, including meningitis and encephalitis.
- Assist in planning nursing interventions for a patient with a central nervous system infection.
- Differentiate between the various types of headaches.

Learning Outcomes (continued_1)

- Identify teaching to be provided for a patient experiencing headaches.
- List the causes and types of seizures.
- Describe appropriate interventions for an individual experiencing a seizure.
- Recognize symptoms in a patient who is developing increased intracranial pressure.
- Identify nursing interventions that can help prevent increased intracranial pressure.

Learning Outcomes (continued_2)

- Explain the causes, risk factors, and pathophysiology of injuries to the brain and spinal cord.
- Assist in planning nursing care for a patient with an injury to the brain or spinal cord.
- Explain causes, risk factors, and pathophysiology associated with neurodegenerative disorders such as Parkinson, Huntington, and Alzheimer diseases.

Learning Outcomes (continued_3)

- Assist in planning nursing care for a patient with a neurodegenerative disorder.
- Assist in planning nursing interventions for the patient with dementia.

Meningitis

- Pathophysiology
  - Infection/inflammation of brain and spinal cord
  - Purulent exudate
  - Increased intracranial pressure (ICP)
  - Possible cranial nerve involvement

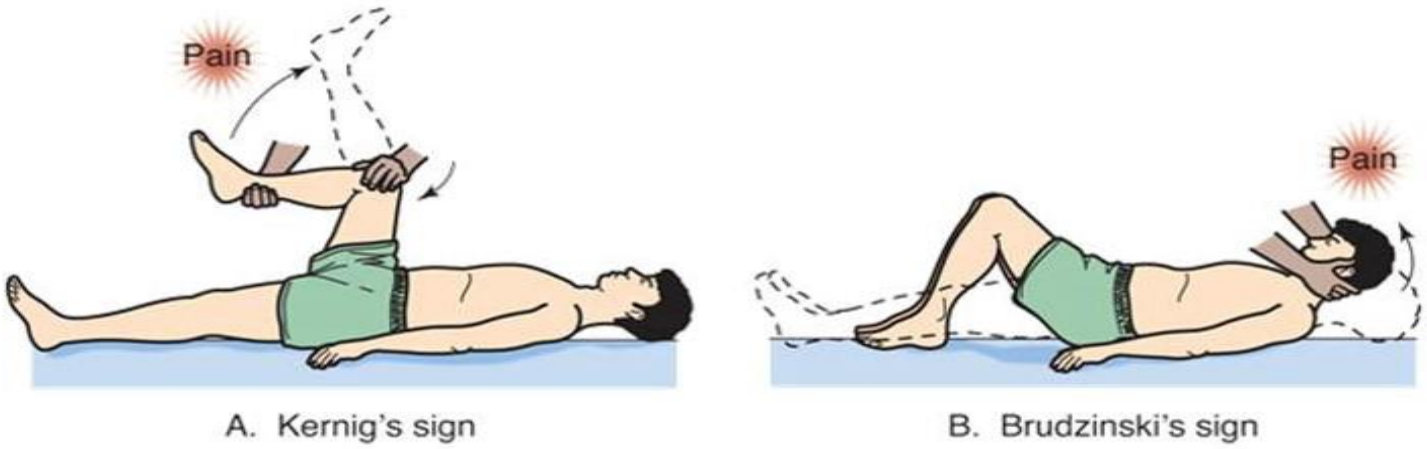
Meningitis (continued_1)

- Etiology
  - Bacterial
    - *Neisseria meningitidis*
    - *Streptococcus pneumoniae*
    - Group B *streptococcus*
    - *Haemophilus influenzae* type B
  - Viral

Meningitis (continued_2)

- Signs and symptoms
  - Severe headache
  - No appetite or thirst
  - Fever
  - Photophobia
  - Petechial rash
  - Nuchal rigidity
  - Positive Kernig and Brudzinski signs
  - Nausea and vomiting
  - Encephalopathy

Kernig and Brudzinski Signs



A. Kernig's sign

B. Brudzinski's sign

Learning Tip: Kernig sign starts with a **K**; you test for this by bending the **K**nee.
Brudzinski starts with **B**; you test for this by lifting the **B**ack of the head.

Meningitis (continued_3)

- Complications
  - Seizures
  - Cranial nerve damage
  - Occasional permanent neurological deficits

Meningitis (continued_4)

- Diagnostic tests
  - Lumbar puncture
  - Culture and sensitivity (C&S)
  - Computed tomography (CT) scan, magnetic resonance imaging (MRI)

Meningitis (continued_5)

- Therapeutic interventions
  - Antibiotics
  - Antipyretics
  - Cooling blanket as needed
  - Dark, quiet environment
  - Analgesics
    - Codeine products
  - Corticosteroids
  - Antiemetics
  - Droplet isolation if bacterial

Encephalitis

- Pathophysiology
  - Inflammation of brain tissue
  - Nerve damage, edema, necrosis
  - Increased ICP

Encephalitis (continued_1)

- Etiology
  - Viruses
    - West Nile
    - Infectious mononucleosis
    - Herpes simplex virus

Encephalitis (continued_2)

- Signs and symptoms
  - Headache
  - Fever
  - Nausea and vomiting
  - Nuchal rigidity
  - Confusion
  - Decreased level of consciousness (LOC)
  - Seizures
  - Photophobia
  - Ataxia
  - Hemiparesis
  - Tremors
  - Coma
  - Death

Encephalitis (continued_3)

- Complications
  - Cognitive disabilities
  - Personality changes
  - Ongoing seizures
  - Motor deficits
  - Blindness

Encephalitis (continued_4)

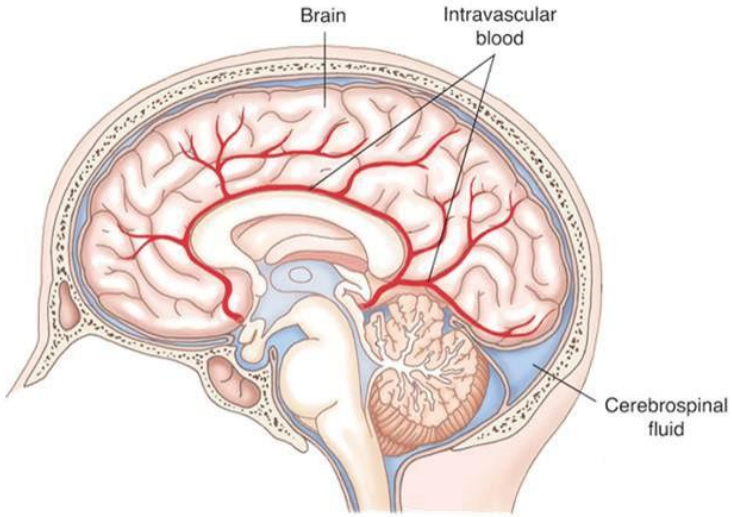
- Diagnostic tests
  - CT scan
  - MRI
  - Electroencephalogram (EEG)
  - Lumbar puncture with cerebrospinal fluid (CSF) analysis

Encephalitis (continued_5)

- Therapeutic interventions
  - Analgesics
  - Anticonvulsants
  - Antipyretics
  - Corticosteroids
  - Antivirals
  - Sedatives
  - Neurological assessment
  - Symptomatic care

Increased Intracranial Pressure

- Pathophysiology
  - Increase in
    - Brain
    - Blood
    - CSF



Increased Intracranial Pressure (continued_1)

- Etiology
  - Brain trauma
  - Brain tumor
  - Intracranial hemorrhage

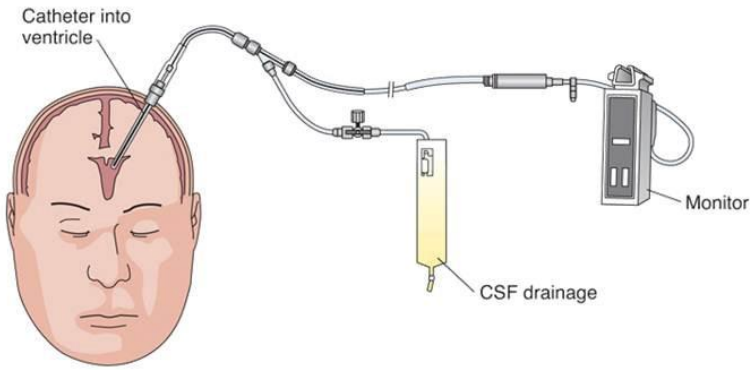
Increased Intracranial Pressure (continued_2)

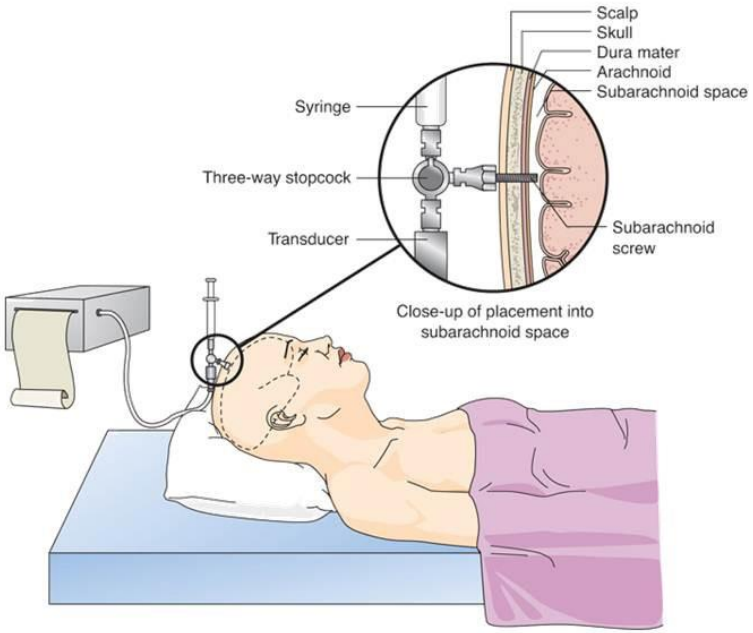
- Signs and symptoms
  - Restlessness
  - Irritability
  - Decrease in LOC
  - Hyperventilation
  - Pupil changes
  - Cushing triad

Increased Intracranial Pressure (continued_3)

- Monitoring
  - External ventricular drain
  - Subarachnoid bolt
  - Intraparenchymal monitor

Increased Intracranial Pressure (continued_4)





Nursing Diagnoses for Central Nervous System Infections

- *Hyperthermia*
- *Risk for Acute Confusion*
- *Self-Care Deficit (Dressing/Feeding/Toileting)*
- *Acute/Chronic Pain*
- *Risk for Injury*
- *Impaired Physical Mobility*

Primary Headaches

- Migraine
- Tension
- Cluster
- Other primary headaches

Secondary Headaches

- Head and/or neck trauma
- Infection
- Other

Nursing Care for Headaches

- Data collection: **WHAT'S UP**
  - **W**here is the pain?
  - **H**ow does the headache feel?
  - **A**ggravating or alleviating factors?
  - **T**iming: When does it typically occur? How long does it last?
  - Ask the patient to rate the **s**everity.
  - Ask about other **u**seful data.
  - Determine the patient's **p**erception of the headache.

Patient Education for Headaches

- Keep diary.
- Record triggers, timing, symptoms.
- Teach relaxation and stress reduction.
- Teach about medications.

Seizures

- Abnormal electrical discharges in the brain related to instability of neuronal cell membranes
- Classification
  - Partial
    - Begin on one side of cerebral cortex
  - Generalized
    - Both hemispheres involved

Seizures (continued_1)

- Etiology
  - Idiopathic
    - No cause identified
  - Acquired
    - Underlying neurological disorder
    - Brain injury

Seizures (continued_2)

- Signs and symptoms
  - Aura
    - Visual distortion
    - Odor
    - Sound
  - Partial seizures
    - Automatisms
    - Maintain consciousness
    - Usually <1 minute
    - Paresthesias
    - Visual disturbances

Seizures (continued_3)

- Signs and symptoms (continued)
  - Complex partial
    - Lose consciousness, 2 to 15 minutes
  - Generalized seizures
    - Absence (petit mal)
      - Staring
    - Tonic clonic
      - May have aura
      - Usually lose consciousness
      - Rigidity followed by muscle contraction and relaxation
      - Incontinence
      - Postictal period

Seizures (continued_4)

- Diagnostic tests
  - EEG
  - Look for underlying cause.

Seizures (continued_5)

- Therapeutic interventions
  - Correct cause.
  - Anticonvulsant medication
  - Surgical resection

Seizures (continued_6)

- Emergency care
  - Monitor airway.
  - Turn on side to prevent aspiration.
  - Pad side rails.
  - Prevent injury.
  - Do not restrain.
  - Suction as needed.
  - Observe and document.

Seizures (continued_7)

- Nursing diagnoses
  - *Risk for Injury*
  - *Risk for Ineffective Health Management*
  - *Risk for Situational Low Self-Esteem Related to Negative Perception of Self-Worth Due to Perception of Disease*

Status Epilepticus

- 30 minutes of continuous seizure activity
- Therapeutic interventions
  - Ensure airway and oxygenation.
  - Administer diazepam (Valium) or lorazepam (Ativan).

Traumatic Brain Injury

- Trauma
  - Hemorrhage
  - Contusion
  - Laceration
- Can cause
  - Cerebral edema
  - Hyperemia
  - Hydrocephalus
  - Brain herniation
  - Death

Traumatic Brain Injury (continued_1)

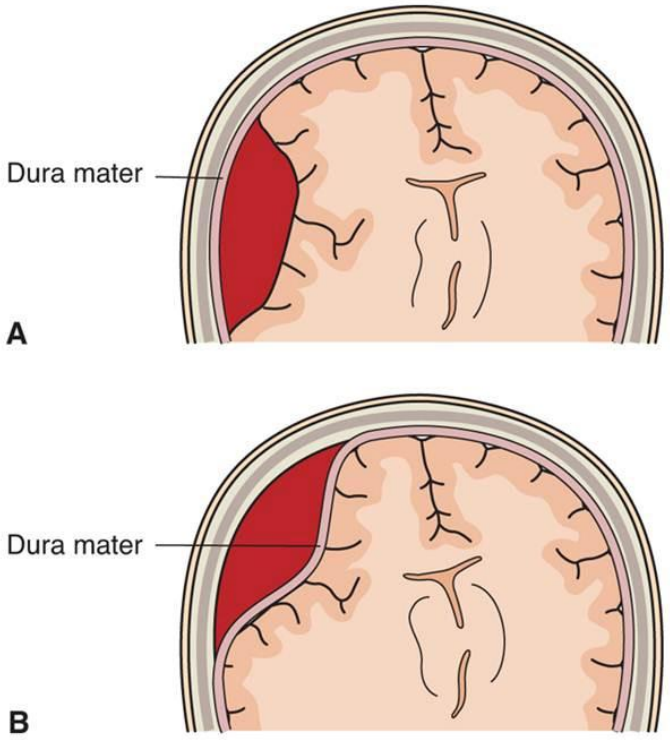
- Etiology
  - Motor vehicle collision (MVC) most common
  - Falls
  - Assaults
  - Sports-related injuries

Traumatic Brain Injury (continued_2)

- Mechanisms of injury
  - Acceleration
  - Deceleration
  - Acceleration-deceleration
  - Rotational

Traumatic Brain Injury (continued_3)

- Types of injury
  - Concussion
  - Contusion
  - Hematoma
    - Subdural
    - Epidural



Traumatic Brain Injury (continued_4)

- Diagnostic tests
  - CT scan
  - MRI
  - Neuropsychological testing

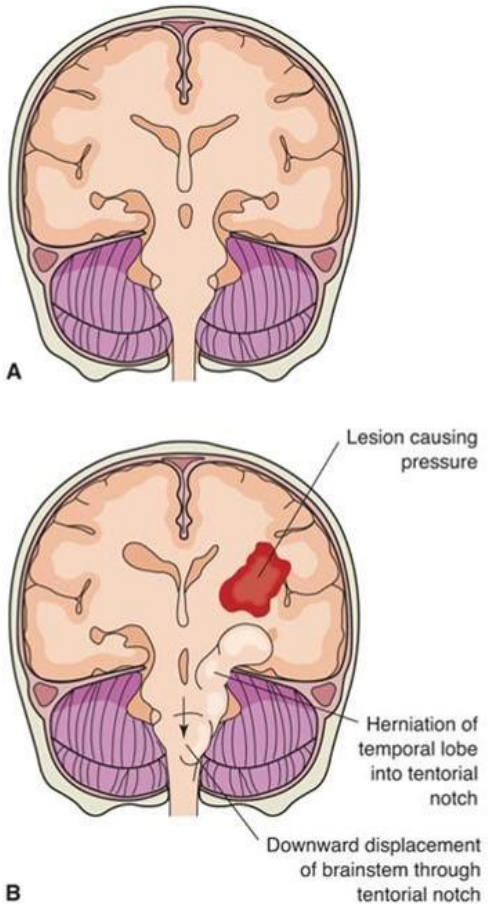
Traumatic Brain Injury (continued_5)

- Therapeutic interventions
  - Surgical removal of hematoma
  - Control increased ICP
    - ICP monitoring
    - Osmotic diuretic
    - Mechanical ventilation
  - Therapeutic coma

Traumatic Brain Injury (continued_6)

- Complications
  - Brain herniation
  - Diabetes insipidus
  - Acute hydrocephalus
  - Labile vital signs
  - Post-traumatic stress disorder
  - Cognitive and personality changes

Brain Herniation



Traumatic Brain Injury (continued_7)

- Nursing diagnoses
  - *Ineffective Cerebral Tissue Perfusion*
  - *Ineffective Airway Clearance*
  - *Ineffective Breathing Pattern*

Traumatic Brain Injury (continued_8)

- Additional nursing diagnoses
  - *Risk for Acute Confusion*
  - *Self-Care Deficit (Dressing/Feeding/Toileting)*
  - *Acute/Chronic Pain*
  - *Disturbed Sensory Perception*
  - *Impaired Physical Mobility*
  - *Risk for Injury*

Brain Tumor

- Pathophysiology
  - Neoplastic growth of the brain or meninges
  - Primary or metastatic
  - Compress or infiltrate brain tissue
  - Cause increased ICP

Brain Tumor (continued_1)

- Signs and symptoms
  - Seizures
  - Motor and sensory deficits
  - Headaches
  - Speech and vision disturbances
  - Personality changes
  - Hormone disturbances

Brain Tumor (continued_2)

- Diagnosis
  - MRI
  - Angiogram
  - Magnetic resonance angiogram
  - Hormone levels

Brain Tumor (continued_3)

- Therapeutic interventions
  - Surgical removal
  - Radiation therapy
  - Chemotherapy
  - Symptom control
    - Anticonvulsants
    - Steroids

Brain Tumor (continued_4)

- Complications
  - Seizures
  - Headaches
  - Memory impairment
  - Cognitive changes
  - Ataxia
  - Hemiparesis
  - Aphasia
  - Lethargy
  - Coma
  - Death

Brain Tumor (continued_5)

- Nursing diagnoses
  - *Risk for Acute or Chronic Confusion*
  - *Self-Care Deficit (Dressing/Feeding/Toileting)*
  - *Acute or Chronic Pain*
  - *Risk for Injury Secondary to Disturbed Sensory Perception*
  - *Impaired Physical Mobility*
  - *Risk for Injury*

Intracranial Surgery

- Indications
  - Hematoma
  - Tumor
  - Arteriovenous malformation
  - Trauma
  - Seizures

Intracranial Surgery (continued_1)

- Types
  - Craniotomy
  - Craniectomy
  - Cranioplasty

Intracranial Surgery (continued_2)

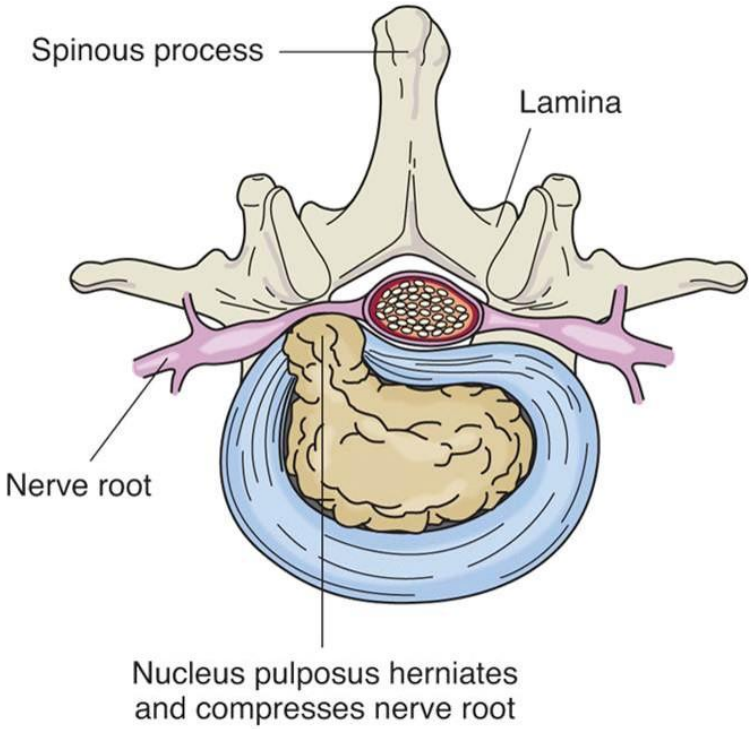
- Preoperative care
  - Patient education
  - Anxiety control
  - Intensive care unit visit

Intracranial Surgery (continued_3)

- Postoperative nursing diagnoses
  - *Risk for Ineffective Cerebral Tissue Perfusion*
  - *Risk for Infection*
  - *Disturbed Body Image*
  - *Deficient Knowledge*

Herniated Disk

- Pathophysiology
  - Herniation of nucleus pulposus
  - Compression of nerve root(s)
  - Cervical, lumbar most common



Herniated Disk (continued_1)

- Etiology
  - Injury
  - May be unknown
- Signs and symptoms
  - Pain
  - Muscle spasm
  - Numbness or tingling of extremity
  - Weakness
  - Atrophy

Herniated Disk (continued_2)

- Diagnostic tests
  - MRI
  - Myelogram

Herniated Disk (continued_3)

- Therapeutic interventions
  - Rest
  - Physical therapy
  - Traction
  - Muscle relaxants
  - NSAIDs, analgesics
  - Epidural anesthetic/steroid-caution excessive use
  - Surgery

Surgery

- Types
  - Laminectomy
  - Diskectomy
  - Spinal fusion
  - Artificial disk

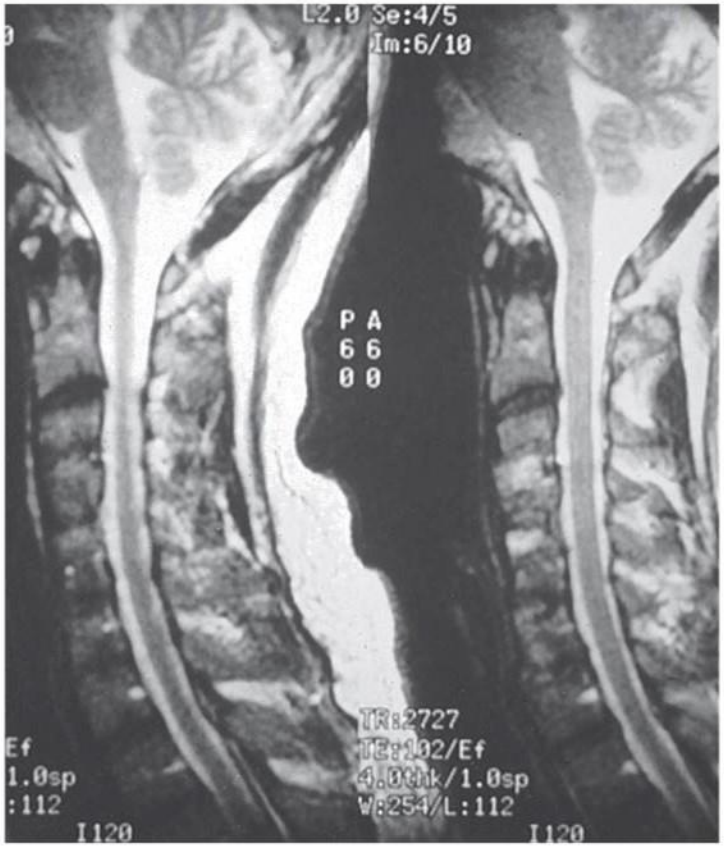
Surgery (continued_1)

- Complications
  - Hemorrhage
  - Nerve root damage
  - Reherniation
  - Herniation of another disk

Surgery (continued_2)

- Preoperative care
  - Routine teaching
  - Teach log-rolling technique
- Postoperative nursing diagnoses
  - *Acute Pain*
  - *Impaired Urinary Elimination*
  - *Impaired Physical Mobility*

Spinal Stenosis



Spinal Cord Injury

- Pathophysiology
  - Damage to nerve fibers
  - Interference with communication between brain and body
- Causes
  - MVCs
  - Falls
  - Sports injuries
  - Assault

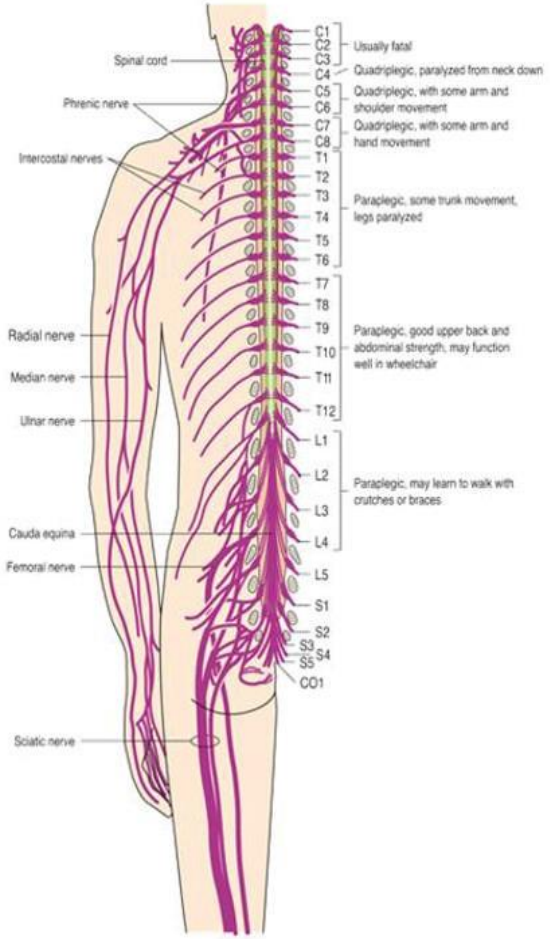
Spinal Cord Injury (continued_1)

- Signs and symptoms
  - Cervical injury
    - Paralysis
    - Paresthesias
    - Impaired respiration
    - Loss of bladder and bowel control
    - Quadriplegia/paresis
    - C3 or above fatal
  - Thoracic/lumbar injury
    - Paraplegia/paresis
    - Altered bowel and bladder control

Spinal Shock

- Sympathetic nervous system disruption
  - Vasodilation
  - Hypotension
  - Bradycardia
  - Hypothermia
  - Urine and feces retention

Spinal Cord Injury (continued_2)



Spinal Cord Injury (continued_3)

- Diagnostic tests
  - X-ray
  - CT scan
  - MRI

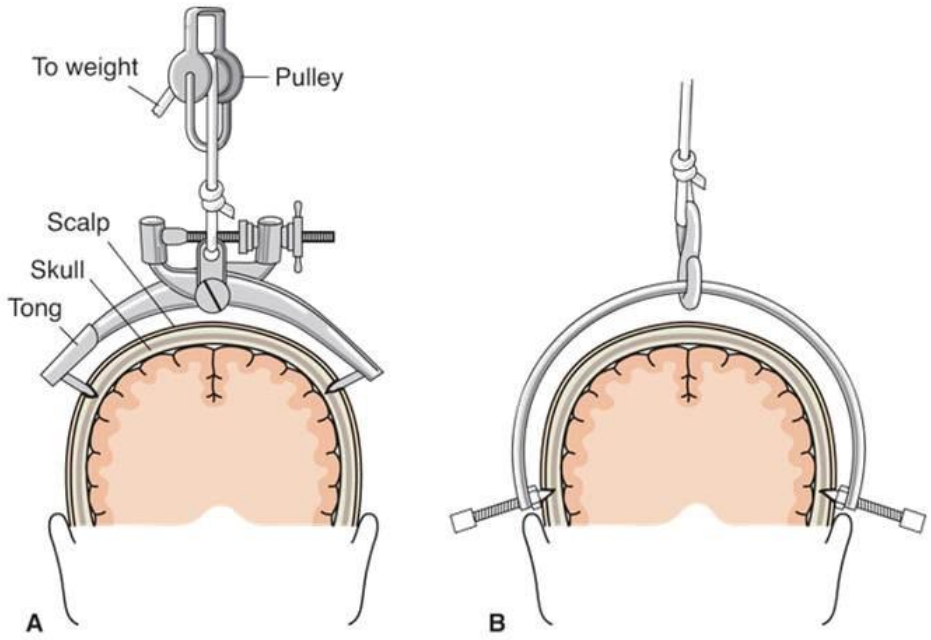
Spinal Cord Injury (continued_4)

- Emergency management
  - Respiratory
  - Gastrointestinal
  - Genitourinary
  - Immobilization

Spinal Cord Injury (continued_5)

- Surgical management
  - Stabilize spine
    - Halo brace
    - Rods
    - Corset
    - Brace
    - Body cast

Skeletal Traction



A. Crutchfield tongs B. Gardner-Wells tongs

Spinal Cord Injury (continued_6)

- Nursing diagnoses
  - *Impaired Gas Exchange*
  - *Ineffective Airway Clearance*
  - *Risk for Autonomic Dysreflexia*
  - *Reflex Urinary Incontinence*
  - *Constipation*
  - *Impaired Physical Mobility*

Spinal Cord Injury (continued_7)

- Nursing diagnoses (continued)
  - *Self-Care Deficit (Dressing/Feeding/Toileting/Bathing)*
  - *Risk For Impaired Skin Integrity*
  - *Ineffective Role Performance*
  - *Risk for Sexual Dysfunction*
  - *Anxiety*

Dementia

- Significantly impaired intellectual functioning
- Impaired normal activities and relationships
- Impaired problem solving and emotional control
- Personality changes
- Behavioral problems

Dementia (continued_1)

- Etiology
  - Huntington disease
  - Parkinson disease
  - Alzheimer disease
  - Vascular dementia
  - Chronic alcoholism
  - Medications

Dementia (continued_2)

- Lower risk
  - Higher education
  - Higher socioeconomic status
  - Engagement in simulating intellectual and leisure activities

Dementia (continued_3)

- Signs and symptoms
  - Recent memory affected first
  - Remote memory affected later
  - Forget how to perform simple tasks
  - Wandering
  - Aphasia
  - Behavioral problems
  - Total dependence

Dementia (continued_4)

- Diagnostic tests
  - Neuropsychological testing
  - Depression testing
  - Medication review
  - MRI, CT scan, positron emission tomography (PET) scan for underlying cause

Dementia (continued_5)

- Therapeutic interventions
  - Medications delay progression
    - Cholinesterase inhibitors
    - N-methyl-D-aspartate (NMDA) agonist
  - End-of-life decision making

Dementia (continued_6)

- Nursing diagnoses
  - *Risk for Injury*
  - *Imbalanced Nutrition*
  - *Chronic Confusion*
  - *Risk for Caregiver Role Strain*

Delirium

- Temporary mental disturbance
- Medical emergency
- Underlying cause must be corrected
  - Pain
  - Hypoxia
  - Medications
  - Illness

Parkinson Disease

- Destruction of substantia nigra
- Decreased dopamine production
- Relative excess of acetylcholine
- Impairment of semiautomatic movements

Parkinson Disease (continued_1)

- Etiology
  - Unknown
  - Genetic
  - Certain drugs
  - Encephalitis

Parkinson Disease (continued_2)

- Signs and symptoms
  - Muscular rigidity
  - Bradykinesia
  - Change in posture
  - Pill-rolling tremor
  - Difficulty initiating movement
  - Shuffling and freezing gait

Parkinson Disease (continued_3)

- Signs and symptoms (continued)

Masklike facial expression
Soft voice
Drooling, dysphagia

Hand tremors at rest

Constipation
Frequent urination

Flexion of knees and hips
shifts center of gravity
forward

Short, shuffling steps

Symptoms of Autonomic Nervous System Dysfunction

- Diaphoresis
- Constipation
- Orthostatic hypotension
- Drooling
- Dysphagia
- Seborrhea
- Frequent urination

Parkinson Disease (continued_4)

- Diagnostic tests
  - History
  - Physical examination
  - MRI

Parkinson Disease (continued_5)

- Therapeutic interventions
  - Dopamine agonists
  - Monoamine oxidase B inhibitors
  - Catechol-O-methyltransferase (COMT) inhibitor
  - Pallidotomy
  - Deep brain stimulation

Parkinson Disease (continued_6)

- Nursing diagnoses
  - *Impaired Physical Mobility*
  - *Self-Care Deficit (Dressing/Feeding/Toileting/Bathing)*
  - *Risk for Injury*
  - Also diagnoses for dementia

Huntington Disease

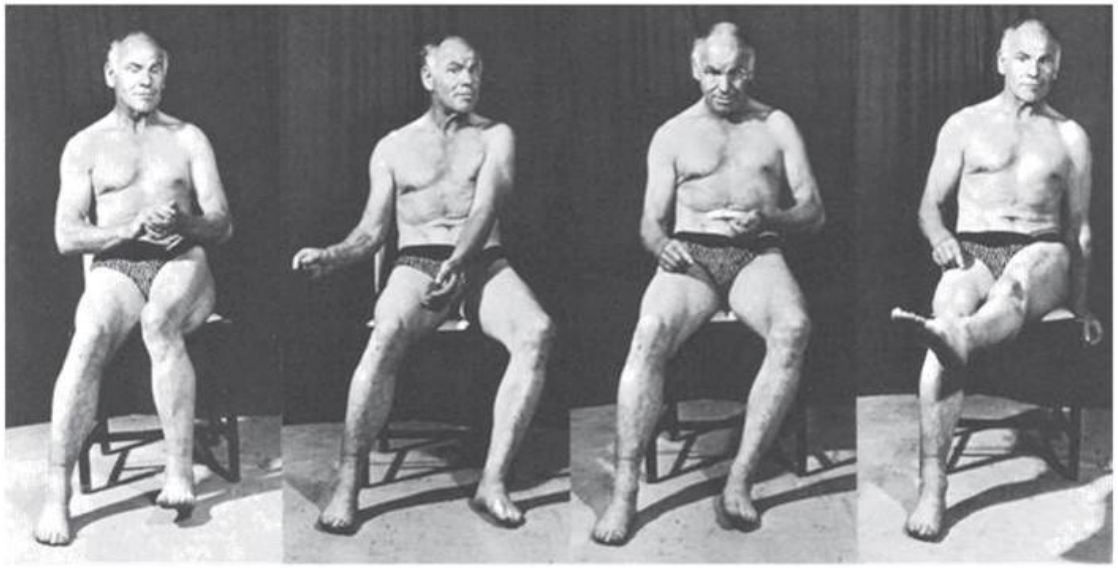
- Pathophysiology/etiology
  - Genetic
    - Autosomal dominant
  - Degeneration of parts of brain

Huntington Disease (continued_1)

- Signs and symptoms
  - Dementia
    - Personality changes
    - Inappropriate behavior
    - Paranoia
    - Violence
  - Choreiform movements
  - Dysphagia
  - Depression
  - Death

Huntington Disease (continued_2)

- Signs and symptoms (continued)



Huntington Disease (continued_3)

- Diagnostic tests
  - Family history
  - MRI
  - CT scan
  - Genetic testing
  - Counseling

Huntington Disease (continued_4)

- Therapeutic interventions
  - Antipsychotics
  - Antidepressants
  - Antichoreic agents
  - Stem cell transplants: Experimental

Alzheimer Disease

- Pathophysiology
  - Progressive degenerative disease
  - Neurofibrillary tangles
  - Neuritic plaques

Alzheimer Disease (continued_1)

- Etiology
  - Unknown
  - May be genetic
  - Down syndrome

Alzheimer Disease (continued_2)

- Signs and symptoms
  - Stage 1
    - Increasing forgetfulness
  - Stage 2
    - Progressive memory loss
    - Irritability
    - Depression
    - Aphasia
    - Sleep disruption
    - Hallucinations
    - Seizures

Alzheimer Disease (continued_3)

- Signs and symptoms (continued)
  - Stage 3
    - Complete dependency
    - Bowel and bladder control lost
    - Emotional control lost
    - Inability to recognize significant others
    - Death

Alzheimer Disease (continued_4)

- Diagnostic tests
  - History
  - Physical examination
  - MRI
  - PET scan, single-photon emission computed tomography (SPECT) scan
  - Autopsy

Alzheimer Disease (continued_5)

- Therapeutic interventions
  - Cholinesterase inhibitors
  - NMDA antagonists
  - Antidepressants
  - Antipsychotics
  - Antianxiety agents

Alzheimer Disease (continued_6)

- Nursing diagnoses
  - *Risk for Injury*
  - *Imbalanced Nutrition*
  - *Chronic Confusion*
  - *Risk for Caregiver Role Strain*

Practice Analysis Tip
Linking NCLEX-PN® to Practice

- The licensed practical nurse/licensed vocational nurse (LPN/LVN) will
  - Promote positive self-esteem of client.
  - Promote a therapeutic environment.
  - Assist in the care of the cognitively impaired client.
  - Provide care to immobilized client based on need.
  - Evaluate client oxygen saturation.
  - Participate in staff education (e.g., in-services, continued competency).

Case Study With Concept Map

Mr. Diaz – Spinal Cord Injury

Mr. Diaz is a 23-year-old veteran who returned home from being deployed overseas 2 years ago, with a T4 spinal cord injury from gunfire overseas. He presents to your emergency room with complaints of being tired all the time and not feeling well.

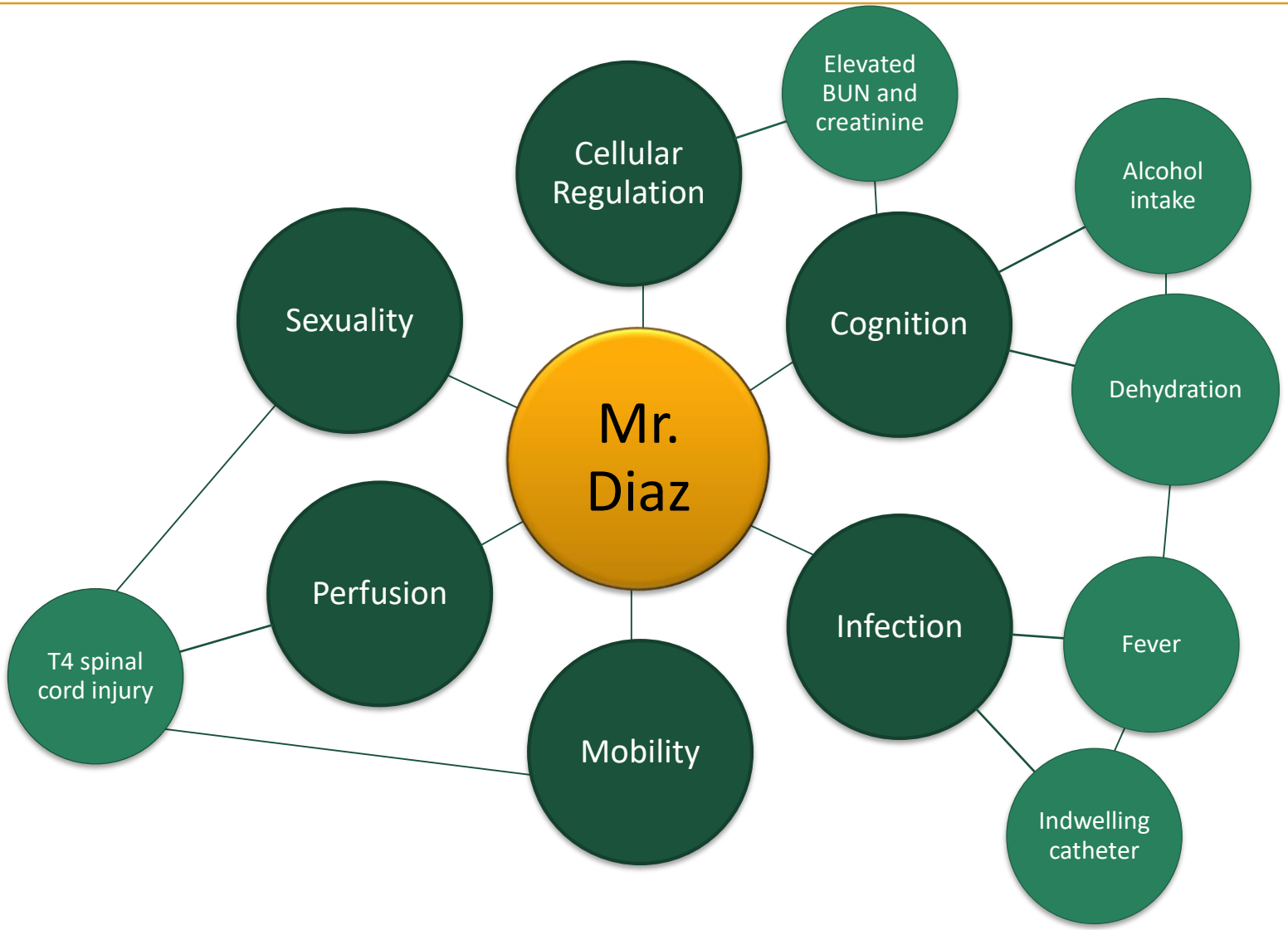
Case Study With Concept Map (continued)

He has a fever of 100.4°F (38°C) orally, BP 140/82, which is abnormally high for him. The nurse performs his intake assessment and interview and finds that he has been drinking about 10 beers a day, and states that “I don’t feel like a man anymore because I have to wear this catheter (urinary) and cannot control my bowels or do the things that I used to do before my accident.” The RN asked that you draw blood for a BUN and creatinine, which came back as BUN = 35 mg/dL with a creatinine of 1.56 mg/dL.

Case Study With Concept Map: Activity

- What nursing concepts would be used for Mr. Diaz's case?
- Can you see how the concepts in Mr. Diaz's care are related?
- Work with your group to create a concept map showing relationships between the concepts.
- Continue the map to show patient cues, nursing interventions, and collaborative relationships.

Mr. Diaz: Suggested Relationships



Case Study for SBAR Hand-Off Report

Mr. Gomez is an 87-year-old gentleman admitted at 1100 with anorexia due to Parkinson disease. He has a nasogastric tube (NG) in place to take oral medications. He is incontinent of bowel only. He is alert and oriented x3. The oncoming nurse needs to give his levodopa dose and initiate tube feedings. His vital signs are stable with active bowel sounds.

SBAR Hand-Off Report: Activity

- You are preparing to give a hand-off report at the end of your shift to the oncoming nurse.
- Think about the information you should include in the hand-off report.
- Now turn to your neighbor and communicate a hand-off report using SBAR.
- Afterwards, review suggested SBAR report on next slide.

SBAR Hand-Off Report: Suggested Answers

Situation: Mr. Gomez was admitted at 1100.

Background: Mr. Gomez has Parkinson disease.

Assessment of Situation: Admitted due to anorexia. He is alert and oriented x3. He has an NG tube in place. He is incontinent of stool only.

Recommendation: Keep head of the bed up 30 degrees. Levodopa due at 1600 via NG tube.

Review Question #1

How can the nurse best modify the environment for a patient admitted with nuchal rigidity and positive Kernig sign?

1. Provide distraction with music or television.
2. Provide a dark, quiet room.
3. Provide a continuous-motion bed.
4. Provide a room humidifier.

Review Question #1 Answer

Correct Answer: 2

Review Question #2

A patient with late stage 2 Alzheimer disease is throwing half-eaten food from the meal tray onto the floor. Which response by the nurse is best?

1. Say, “That food cost good money. Please don’t throw it on the floor.”
2. Ask, “Why are you throwing the food on the floor? Don’t you like it?”
3. Simply pick up the food and put it back on the tray.
4. Offer alternative foods and stay with the patient during mealtime.

Review Question #2 Answer

Correct Answer: 4

Review Question #3

A patient is admitted to the surgical unit following removal of a brain tumor. Which nursing intervention takes priority?

1. Assess speech and swallowing.
2. Pad side rails on bed.
3. Reorient to surroundings.
4. Administer medication for pain.

Review Question #3 Answer

Correct Answer: 2

Review Question #4

Which assessment findings does the nurse expect in a patient with Parkinson disease?
Select all that apply.

1. Intention tremor
2. Bradykinesia
3. Depression
4. Involuntary movements
5. Muscle rigidity

Review Question #4 Answer

Correct Answer: 2, 3, 5

Review Question #5

Which assessment should take priority in a patient with a cervical spine injury who suddenly exhibits a spike in blood pressure?

1. Perform a bladder scan.
2. Check hand grip strength.
3. Assess pulse rate.
4. Determine orientation.

Review Question #5 Answer

Correct Answer: 1