Chapter 23
Disorders of the Nervous System

Learning Objectives

- Discuss the anatomy, physiology of organs, structures related to the nervous system
- Discuss indications for neurological assessment

Learning Objectives (Cont'd)

- Discuss and practice components of neurological assessment, including:
  - Posture and gait
  - Mental status
  - Examination of cranial nerves
  - Sensory examination
  - Motor examination
  - Deep tendon reflexes
  - Meningeal examination
  - Glasgow Coma Scale
Learning Objectives (Cont’d)

- Describe the etiology, epidemiology, history, physical findings for:
  - Altered mental status
  - Delirium
  - Dementia
  - Seizures
  - Status epilepticus
  - Syncope
  - Headache
  - Brain tumor

Learning Objectives (Cont’d)

- Describe the etiology, epidemiology, history, physical findings for:
  - Brain abscess
  - Stroke
  - Transient ischemic attack

Learning Objectives (Cont’d)

- With the patient history, physical examination findings, develop a treatment plan for:
  - Altered mental status
  - Delirium
  - Dementia
  - Seizures
  - Status epilepticus
  - Syncope
  - Headache
  - Brain tumor
Learning Objectives (Cont'd)

- With the patient history, physical examination findings, develop a treatment plan for:
  - Brain abscess
  - Stroke
  - Transient ischemic attack
- Identify risk factors that may affect the nervous system

Learning Objectives (Cont'd)

- Describe the etiology, epidemiology, history, physical findings for:
  - Meningitis
  - Encephalitis
  - Shingles
  - Poliomyelitis

Learning Objectives (Cont'd)

- With the patient history, physical examination findings, develop a treatment plan for:
  - Meningitis
  - Encephalitis
  - Shingles
  - Poliomyelitis
Learning Objectives (Cont'd)

- Describe the etiology, epidemiology, history, physical findings for:
  - Alzheimer's disease
  - Parkinson's disease
  - Amyotrophic lateral sclerosis
  - Multiple sclerosis
  - Guillain-Barré syndrome
  - Myasthenia gravis
  - Huntington's disease

Learning Objectives (Cont'd)

- With the patient history, physical examination findings, develop a treatment plan for:
  - Alzheimer's disease
  - Parkinson's disease
  - Amyotrophic lateral sclerosis
  - Multiple sclerosis
  - Guillain-Barré syndrome
  - Myasthenia gravis
  - Huntington's disease

Learning Objectives (Cont'd)

- Describe the etiology, epidemiology, history, physical findings, and management of spinal cord disorders
- Describe the etiology, epidemiology, history, physical findings, and management of autonomic dysreflexia
Learning Objectives (Cont'd)

- Describe the etiology, epidemiology, history, physical findings, and management of hydrocephalus
- Describe the etiology, epidemiology, history, physical findings, and management of spina bifida

Learning Objectives (Cont’d)

- Define:
  - Muscular dystrophy
  - Dystonia
  - Trigeminal neuralgia
  - Bell’s palsy

Anatomy and Physiology of the Nervous System

- Neuron
  - Conduit, sends signals to/from other neurons, muscles, glands
  - Receive sensory information
  - Dendrites
  - Cell body
  - Axon
  - Nerve cells
Nerves
- Several neurons bundled within connective tissue
- Supplied with O₂ and nutrients from bloodstream by blood vessels contained in nerve

Nerve conduction, neurotransmitters
- Neuroeffector junction
- Synapse
- Neurotransmitter
- Reuptake
Anatomy and Physiology of the Nervous System (Cont’d)

Central & Peripheral Nervous System

1. Nervous system
   - Central nervous system (CNS)
     - Brain
       - Primary organ of the nervous system
       - Control center
       - Protected by cranium
       - Blood supply through carotid, vertebral arteries
       - Blood-brain barrier

Anatomy and Physiology of the Nervous System (Cont’d)

Brain
Anatomy and Physiology of the Nervous System (Cont’d)

Nervous system
- CNS
  - Cerebrum
    - Outermost portion of the brain
    - Cerebral cortex
  - Brainstem
    - Diencephalon contains thalamus, hypothalamus
    - Thalamus: sensory switchboard
    - Hypothalamus: core temperature, hormone release, maintain body homeostasis
    - Midbrain and pons: bridge between brainstem and upper brain
    - Medulla oblongata: heart rate, breathing, blood pressure
Anatomy and Physiology of the Nervous System (Cont’d)

- Nervous system
  - CNS
    - Reticular formation
      - Filters, sends impulses to excite cerebrum, keeps body awake
      - With cerebral cortex, consciousness

- Nervous system
  - CNS
    - Spinal cord
      - Impulses to/from brain must travel through, except transmission by cranial nerves

- Nervous system
  - CNS
    - Meninges
      - Layered connective tissues that surround, protect, suspend brain and spinal cord
      - Dura mater
      - Arachnoid membrane
      - Pia mater
Anatomy and Physiology of the Nervous System (Cont’d)

Meninges

Anatomy and Physiology of the Nervous System (Cont’d)

- Nervous system
  - Peripheral nervous system
    - Somatic nerves
      - Innervate skin, most skeletal muscle
      - Senses, responds to information from external environment
    - Spinal nerves
      - Dermatomes correspond to spinal nerves
      - Myotomes, portions of muscle tissue controlled by spinal nerves

Anatomy and Physiology of the Nervous System (Cont’d)

Spinal Nerves

Anatomy and Physiology of the Nervous System (Cont’d)
Anatomy and Physiology of the Nervous System (Cont’d)

Map of Dermatomes

Nervous system
- Peripheral nervous system
  - Visceral nerves
    - Innervate organ systems
    - Follow indirect paths to CNS
  - Autonomic nervous system role
    - Sympathetic division
    - Parasympathetic division
Anatomy and Physiology of the Nervous System (Cont’d)

Parasympathetic Nerve Roots

Nervous system
- Peripheral nervous system
  - Cranial nerves
    - Exit cranium through small holes
    - Originate from brain, except CN XI
    - Sight, hearing, balance, smell, taste
    - Innervate muscles of eye, face, neck, shoulders, tongue, pharynx
    - Some have sensory and motor function

Assessment of the Neurological System

- Posture and gait
  - Position
  - Involuntary movements
  - Gait
  - Posturing
    - Flexion (decorticate)
    - Tension (decerebrate)
Assessment of the Neurological System (Cont’d)

- Mental status
  - AVPU
  - Glasgow Coma Scale
  - General appearance
  - Patient’s speech
  - Affect
  - Form of thought, thought content
  - Orientation
  - Memory

Assessment of the Neurological System (Cont’d)

- Examination of cranial nerves
  - CN I, olfactory
Assessment of the Neurological System (Cont’d)

- Examination of cranial nerves
  - CN II, optic

Assessment of the Neurological System (Cont’d)

- Examination of cranial nerves
  - CN III, oculomotor

Assessment of the Neurological System (Cont’d)

- Examination of cranial nerves
  - CN V
Assessment of the Neurological System (Cont’d)

- Examination of cranial nerves
  - CN V
    - Patient differentiates between sharp and dull sensations on face

Assessment of the Neurological System (Cont’d)

- Examination of cranial nerves
  - CN VII
  - Facial nerve
  - Facial muscles
  - Stroke

Assessment of the Neurological System (Cont’d)

- Examination of cranial nerves
  - CN VIII
Assessment of the Neurological System (Cont’d)

- Examination of cranial nerves
  - CN IX and X

Assessment of the Neurological System (Cont’d)

- Examination of cranial nerves
  - CN XI

Assessment of the Neurological System (Cont’d)

- Examination of cranial nerves
  - CN XII
Assessment of the Neurological System (Cont’d)

- Sensory examination
  - Palpate down body, checking dermatomes
  - Anesthesia, complete lack of sensation
  - Paresthesia, pins and needles

Assessment of the Neurological System (Cont’d)

- Motor examination
  - Strength test on both sides
- Deep tendon reflexes
- Reflex hammer, stethoscope
- Absent indicates spinal nerve/cord problem

Assessment of the Neurological System (Cont’d)

- Meningeal examination
  - Brudzinski sign
  - Kernig sign
  - Pain with either, meningitis
  - Never test in trauma
- Glasgow Coma Scale
Altered Mental Status

- Description and definition
  - Disruption of emotional, intellectual functioning
  - Dysfunction of reticular formation, cerebral cortex
- Etiology
  - Toxic metabolic states
  - Structural lesions

Altered Mental Status (Cont’d)

- History and physical findings
  - Changes in personality, behavior, responsiveness
  - AVPU, GCS scores
  - Odor, breathing, bruises, rashes, cardiac, vitals
  - Increased cranial pressure
Altered Mental Status (Cont’d)

- Therapeutic interventions
  - ABCs
  - Stabilize head, neck if cervical spine injury
  - Intubate as necessary
  - IV, blood draw, blood glucose level
- Patient and family education
  - Decision-making capability altered, may need assistance

Wernicke's Encephalopathy

- Description and definition
  - Deficiency of vitamin B1
  - Confusion, ataxia, oculomotor disturbances
- Etiology
  - Depleted thiamine, chronic alcoholism, malnutrition

Wernicke’s Encephalopathy (Cont’d)

- History and physical findings
  - Malnutrition, altered mental status, ataxia, oculomotor disturbances
  - Korsakoff's psychosis, same, memory impairment, learning inability, confabulation
- Therapeutic intervention
  - Airway management, oxygenation, assisted ventilations, administer fluids
  - Thiamine before glucose
Delirium Versus Dementia

- Delirium
  - Short-term, temporary mental confusion, fluctuating consciousness
  - Widespread brain tissue dysfunction
  - Caused by condition outside the CNS
  - Aged, cardiovascular conditions, infections, medications
  - Correct cause

Delirium Versus Dementia (Cont'd)

- Dementia
  - Long-term decline in mental facilities
  - Degenerative neurologic disorders
  - Most common in elderly
  - Supportive care
  - Continuous supervision

Delirium Versus Dementia (Cont'd)

- Therapeutic interventions
  - Delirium, correcting cause
  - Dementia, supportive
- Patient and family education
  - Dementia, continuous supervision
Seizures

- Temporary alteration in behavior and consciousness caused by abnormal electrical activity of the neurons in the brain

Seizures (Cont’d)

- Etiology
  - Hypoxia
  - Hypoglycemia
  - Cranial cavity bleeding
  - Brain tumor, abscess
  - Head trauma
  - Metabolic imbalances
  - Body temperature rapid rise
  - Alcohol withdrawal, certain medications, street drugs

Seizures (Cont’d)

- Types
  - Partial
    - Simple
    - Complex
  - Generalized
    - Absence
    - Tonic-clonic
    - Febrile
    - Pseudoseizures
Seizures (Cont’d)

- Therapeutic interventions
  - Epilepsy, supportive
  - If seizing on arrival, do not restrain
  - 100% O₂ by nonrebreather mask
  - Ventilation with bag-mask
  - Nasal airway
  - Benzodiazepine
  - Pulse oximetry, ECG, cardiac monitor

Seizures (Cont’d)

- Status epilepticus
  - Seizure lasting more than 30 minutes
  - Cell death
  - Hypoxia worsens
  - Body cells undergo anaerobic metabolism, generate toxic waste
  - Nasopharyngeal airway may be needed
  - Transport immediately

Seizures (Cont’d)

- Therapeutic interventions
  - Remove clothing compromising airway
  - Nasopharyngeal airway
  - Consider nasal intubation
  - 100% O₂ with nonrebreather
  - Benzodiazepines
  - Transport immediately
Syncope

- Transient loss of consciousness, fainting, passing out, blacking out
- Types
  - Cardiac
  - Noncardiac
- Actual length of unconsciousness, history of present illness

Syncope (Cont’d)

- Therapeutic interventions
  - Identify, fix underlying cause
  - Pulse oximetry, cardiac monitoring, IV access
  - Blood glucose
  - 12-lead ECG

Headache

- Vascular
  - Migraine
    - Abdominal pain, nausea, vomiting
    - Throbbing, pulsatile pain
    - One side of head
    - Associated aura
    - Relief after rest/sleep
    - Positive family history
Headache (Cont’d)

• Vascular
  ➢ Cluster
    • Severe stabbing pain
    • Localized behind, around eye, temple, forehead, cheek region

Headache (Cont’d)

• Nonvascular headaches
  ➢ Hypertension
  ➢ Stroke
  ➢ Subarachnoid hemorrhage
  ➢ Brain tumors, abscesses
  ➢ Tension headache

Headache (Cont’d)

• Therapeutic interventions
  ➢ Supportive care
  ➢ Standard precautions
  ➢ Supplemental O₂
Brain Tumor

- Primary
  - Starts in brain
- Secondary
  - Cancer began in another part of body

Brain Tumor (Cont’d)

- Benign, malignant
- Increased cranial pressure
- Therapeutic interventions
  - Primary survey problems first
  - If already diagnosed, ask about DNR
  - Supportive care

Brain Tumor (Cont’d)

- Patient and family education
  - Call 9-1-1 if:
    - Unexplained, persistent vomiting
    - Double vision, blurring, one side
    - Increased sleepiness
    - Seizures
    - Headaches of different type than usual
Brain Abscess

- Description and definition
  - Collection of pus
  - No space for swelling
  - Causes neurological dysfunction
- Etiology
  - Penetrating head injury
  - Neurosurgery
  - Infection of nearby structure

Brain Abscess (Cont’d)

- History and physical findings
  - Headache, altered mental status, focal neurological deficits, fever, seizures, nausea, vomiting, neck stiffness
- Differential diagnosis
  - Meningitis, encephalitis, stroke, brain tumor
- Therapeutic interventions
  - Surgery, supportive care

Cerebrovascular Accident (Stroke)

- Description and definition
  - Sudden change in neurological function caused by alteration in cerebral blood flow
Cerebrovascular Accident (Stroke) (Cont’d)

- Central blood flow
  - Anterior circulation
    - Originates in carotid system
    - Supplies frontal, anterior parietal, anterior temporal lobes

Cerebrovascular Accident (Stroke) (Cont’d)

- Central blood flow
  - Posterior circulation
    - Originates in vertebral arteries
    - Supplies brainstem, cerebellum, posterior parts of cerebrum

Cerebrovascular Accident (Stroke) (Cont’d)

- Central blood flow
  - Circle of Willis
    - Allows continuation of perfusion if anterior or posterior circulation is blocked
    - Collateral circulation limited to vessels in dura mater, arachnoid membrane
Cerebrovascular Accident (Stroke) (Cont'd)

- Ischemic
  - Blood flow in artery is blocked
  - 80% of all strokes
  - Thrombus, blood clot develops at site of blockage
  - Embolus, blood clot travels to site of blockage

Cerebrovascular Accident (Stroke) (Cont'd)

- Ischemic
  - Atherosclerotic plaques form in cerebral vasculature
    - Cardiovascular disease
    - Lacunar stroke

Cerebrovascular Accident (Stroke) (Cont'd)

- Ischemic
  - Embolic stroke
    - Atrial fibrillation
    - Mural thrombus
Cerebrovascular Accident (Stroke)  
(Cont’d)

- Ischemic
  - Hemorrhagic stroke
    - Blood vessel in brain ruptures
    - Intracerebral hemorrhage
    - Subarachnoid hemorrhage
    - Hypertension
    - Arteriovenous malformations
    - Existing aneurysms

Cerebrovascular Accident (Stroke)  
(Cont’d)

- Ischemic
  - Area of primary injury
  - Ischemic penumbra
  - Time crucial, "window of treatment"

Cerebrovascular Accident (Stroke)  
(Cont’d)

- History and physical findings
  - Intracranial pressure (ICP)
  - Cerebral perfusion pressure (CPP)
  - Mean arterial pressure (MAP)
    - CPP = MAP - ICP
    - MAP = DBP + 1/3PP
Cerebrovascular Accident (Stroke) (Cont'd)

- Differential diagnosis
  - Trauma
  - Transient ischemic attack
  - Meningitis, encephalitis
  - Hypersensitive encephalopathy
  - Intracranial mass
  - Spinal cord, peripheral nerve disease
  - Brain abscess
  - Seizures, Todd’s paralysis
  - Infections
  - Complex migraines
  - Bell’s palsy
  - Guillain-Barré syndrome
  - Hypoglycemia
  - Drug, alcohol intoxication

Cerebrovascular Accident (Stroke) (Cont’d)

- Therapeutic interventions
  - Begin transport, notify receiving facility
  - Focused examination en route
  - Airway, pulse oximeter, cardiac monitor, oxygen, consider intubation, IV access, blood glucose level
  - Stroke center if possible

Transient Ischemic Attack

- Reversible, localized neurological dysfunction
- Blood flow decreased in cerebral arteries, may have partial blockage, undergo vasospasm
Transient Ischemic Attack

- History and physical findings
  - Mini strokes
  - Cardiac dysrhythmias
  - Atrial fibrillation
  - Stimulant use
  - Cocaine
- Therapeutic interventions
  - Same as for stroke

Infectious Nervous System Disorders

- Meningitis
  - Infection of layers of connective tissue covering brain and spinal cord
  - Viruses, bacteria, fungi

Infectious Nervous System Disorders (Cont'd)

- Meningitis
  - Etiology
    - Enteroviruses, herpes, mumps
    - Children, infection secondary to another bacterial infection
    - Direct entry of bacteria to CNS
Meningitis

- Epidemiology and demographics
  - Vaccines
  - Increases in late winter, spring
- History and physical findings
  - Pulse symptoms
  - High fever, headache, stiff neck, nonblanching rash

Meningitis: Brain with Pus

- Therapeutic interventions
  - Standard precautions
  - Supportive
  - Pain management
  - Monitor for seizures
  - Patent airway, suction, oxygen, pulse oximeter, cardiac monitor, IV, blood glucose level, mental status, vitals every 5 minutes
Encephalitis
- Brain tissue infection
- Viral infection, bacterial, parasitic
- West Nile rarely fatal
- Flulike, fever fatigue, sore throat, headache, nausea, vomiting, drowsiness, photophobia, altered mental status
- As progresses, nervous system dysfunction

Differential diagnosis
- Brain abscess, tumor
- Hypoglycemia
- Meningitis
- Psychiatric disorder
- Status epilepticus
- Subarachnoid hemorrhage

Therapeutic interventions
- Supportive, O₂, pulse oximeter, airway, IV, transport

Shingles
- Infection of spinal nerve by varicella-zoster virus
- Same virus as chickenpox
- Virus travel to sensory nerve deep within body, lies dormant, reactivated
Infectious Nervous System Disorders (Cont’d)

- Shingles
  - History and physical findings
    - Extreme sensitivity, pain develops along unilateral dermatome
    - Progresses to reddened rash, raised bumps, blisters, fill with pus, scab
    - Scabs fall off, rash disappears
    - Pain lasts 3-5 weeks
  - Differential diagnosis

- Shingles
  - Therapeutic interventions
    - Standard precautions
    - Not contagious, except in immunocompromised patients
    - Supportive, consider analgesics for pain

Infectious Nervous System Disorders (Cont’d)

- Poliomyelitis
  - Highly infectious viral disease
  - Etiology
    - Direct fecal-oral contact, indirect contact with saliva/feces, contaminated water
    - Enters through mouth, multiples in intestines, spreads to lymph nodes, blood
    - Attacks motor neurons of spinal cord, brainstem
Infectious Nervous System Disorders (Cont’d)

- Poliomyelitis
  - History and physical findings
    - Asymptomatic
    - Fever, nausea, vomiting, fatigue, headache, neck stiffness, extremity pain
    - Paralysis can occur
    - Postpolio syndrome, 20-30 years later, excessive fatigue, progressive weakness of formerly paralyzed muscles

- Therapeutic interventions
  - Supportive
  - Airway, positive-pressure ventilation
  - Analgesics
  - Avoid narcotics, risk of respiratory depression

Degenerative Nervous System Disorders (Cont’d)

- Alzheimer’s disease
  - Degenerative nervous system disorder causing dementia
  - Etiology
    - Clumps, bundles grow onto and between neurons, choking, widespread cell death
    - Brain atrophies, begins in hippocampus, spread to frontal and temporal lobes of cerebrum affecting personality, motor function, causing hallucinations
Degenerative Nervous System Disorders (Cont’d)

- Alzheimer’s disease
  - History and physical findings
    - Early stages
    - Slight memory lapses
    - Cognition
    - Communication issues
    - Unable to perform simple daily tasks
    - Late stages
    - Complete loss of short- and long-term memory
    - Bedridden
    - Hostile (not intentional)

Degenerative Nervous System Disorders (Cont’d)

- Alzheimer’s disease
  - Differential diagnosis
    - Parkinson’s disease
    - Stroke
  - Therapeutic interventions
    - Supportive
  - Patient and family education
    - Emotional support to family
    - As progresses, assistance with daily chores
    - Decision-making capacity fails

Degenerative Nervous System Disorders (Cont’d)

- Parkinson’s disease
  - Brain degenerative disorder
  - Extrapyramidal system, responsible for fine motor coordination, posture
  - Deficiency of dopamine in cerebellum
Degenerative Nervous System Disorders (Cont’d)

- Parkinson’s disease
  - Differential diagnosis
    - Alzheimer’s disease
    - Stroke
  - Therapeutic interventions
    - Supportive
    - Monitor airway, breathing

Degenerative Nervous System Disorders (Cont’d)

- Amyotrophic lateral sclerosis (ALS)
  - Degenerative disease of motor spinal nerves
  - Etiology
    - Lose voluntary muscle control
    - Sensation, mental abilities unaffected
    - Phrenic nerve that controls the diaphragm dies, unable to breathe
    - Early respiratory paralysis, death

Degenerative Nervous System Disorders (Cont’d)

- ALS
  - History and physical findings
    - Clumsiness, weakness in one hand, spreads throughout body
    - Death within 5 years
  - Differential diagnosis
    - Brain tumor
    - Dementia
    - Diabetic neuropathy
    - Myasthenia gravis
Degenerative Nervous System Disorders (Cont’d)

- ALS
  - Therapeutic interventions
    - Equipment malfunction, catheter infection, pneumonia causes respiratory failure, aspiration
    - Airway, check for DNR order

Degenerative Nervous System Disorders (Cont’d)

- Multiple sclerosis
  - Autoimmune disorder
  - Immune system attacks nervous system
  - Myelin sheath under attack, causes dysfunction of the nervous system

Degenerative Nervous System Disorders (Cont’d)

- Multiple sclerosis
  - History and physical findings
    - Vision loss
    - Fine motor control loss
    - Extremity pain
    - Facial pain
    - Paralysis
    - Hearing loss
    - Vertigo
Degenerative Nervous System Disorders (Cont’d)

- Multiple sclerosis
  - Differential diagnosis
  - Brain tumor
  - Therapeutic interventions
    - Supportive
    - Airway

Degenerative Nervous System Disorders (Cont’d)

- Guillain-Barré syndrome
  - Autoimmune disorder, attacks peripheral nervous system
  - Insult to immune system

Degenerative Nervous System Disorders (Cont’d)

- Guillain-Barré syndrome
  - History and physical findings
    - Weakness, tingling in legs
    - Muscle strength in extremity weakens
    - Paralysis
    - Mechanical respiration
    - Eventually goes away
Degenerative Nervous System Disorders (Cont’d)

- Guillain-Barré syndrome
  - Differential diagnosis
    - Encephalitis
    - Heavy metal poisoning
    - Hypokalemia
    - Hypermagnesemia
    - Hypokalemia
    - Meningitis
  - Myasthenia gravis
  - Organophosphate poisoning
  - Poliomyelitis
  - Snake envenomation
  - Spinal cord infection, injury

Degenerative Nervous System Disorders (Cont’d)

- Guillain-Barré syndrome
  - Therapeutic interventions
    - Airway, breathing problems
    - Pulse oximeter, cardiac monitor, oxygen, tracheal intubation, IV
    - Atropine for bradycardia

Degenerative Nervous System Disorders (Cont’d)

- Myasthenia gravis
  - Autoimmune neurological disorder
  - Muscle weakness
  - Fatigue
  - Lymphocytes attack acetylcholine receptors on voluntary skeletal muscle side of neuroeffector junctions
  - Blocks neurotransmitters
  - Thymus related
Degenerative Nervous System Disorders (Cont'd)

- Myasthenia gravis
  - History and physical findings
    - Muscles of eye
    - Eyelid movement
    - Facial expression
    - Swallowing
    - Ptosis
    - Respiration muscles

Degenerative Nervous System Disorders (Cont'd)

- Myasthenia gravis
  - Differential diagnosis
    - Acute respiratory distress syndrome
    - ALS
    - Aspiration pneumonia
    - Brain tumor
    - Brown-Sequard syndrome
    - Chronic obstructive pulmonary disease
  - Guillain-Barré syndrome
  - Heart failure
  - Hypercalcemia
  - Hypermagnesemia
  - Hypokalemia
  - Hypothyroidism
  - Ischemic stroke
  - Spinal cord injury

Degenerative Nervous System Disorders (Cont'd)

- Myasthenia gravis
  - Therapeutic interventions
    - Airway
    - Suction
    - Pulse oximeter
    - Cardiac monitor
    - $O_2$
    - Ventilation
    - Tracheal intubation
    - IV
    - Transport
Degenerative Nervous System Disorders (Cont’d)

- Huntington’s disease
  - Degenerative neurological condition
  - Neurons within brain undergo genetically programmed death
  - Brain shrinks
  - Radical personality change
  - Loses intellectual function
  - Physically debilitated

Degenerative Nervous System Disorders (Cont’d)

- Huntington’s disease
  - History and physical findings
    - Irritability, moodiness, depression
    - Cognitive function
    - Progressive dementia
    - Movement disorders
    - Psychotic symptoms

Degenerative Nervous System Disorders (Cont’d)

- Huntington’s disease
  - Differential diagnosis
    - Alcoholism
    - Alzheimer’s disease
    - Bipolar disorder
    - Parkinson’s disease
  - Therapeutic interventions
    - Supportive care
Spinal Cord Disorders

- Spinal cord compression
  - Vertebrae out of line, bone fragments, torn ligaments, swelling, penetrating objects, vertebral discs out of place
  - Lead to neuronal death
  - Spinal shock

Spinal Cord Disorders (Cont’d)

- Spinal cord compression
  - If lesion is high on the cervical spine, respirations compromised
  - Full neurological examination, spinal immobilization
  - Respiratory assistance, IV fluids

Spinal Cord Disorders (Cont’d)

- Autonomic dysreflexia
  - Life-threatening spinal injury
  - Spinal cord injury above T5, T6, brain unable to communicate with sympathetic nervous system
  - Hypertension with bradycardia
  - Life-threatening
Spinal Cord Disorders (Cont’d)

- Autonomic dysreflexia
  - Patient upright
  - Mostly caused by distended bladder, impacted bowel
  - Check catheter for kinks, twists, flush to clear blockages
  - If no catheter, insert
  - Remove impacted faces with gloved hand
  - Transport immediately if no change in BP

Spinal Cord Disorders (Cont’d)

- Hydrocephalus
  - Excessive amount of CSF
  - May be congenital
  - Illness, injury of CNS
  - Shunts to remove CSF from CNS, deposited into abdominal cavity for system reabsorption

Spinal Cord Disorders (Cont’d)

- Spina bifida
  - Meninges herniated through spine, outside of skin, incorrect spinal development
  - Occulta
  - Meningocele
  - Latex allergies common
  - Disability
Other Disorders

- Muscular dystrophy
  - Progressive muscle degeneration
  - Duschenne, sex-linked gene, males
  - Grower’s sign, toe-walking
  - Malformed cardiac muscle

Other Disorders (Cont’d)

- Dystonic reactions
  - Abnormal muscle tone
  - Head, neck, tongue
  - Side effect of antipsychotic drugs
  - Reversed with 25-50 mg diphenhydramine IV/IM

Other Disorders (Cont’d)

- Trigeminal neuralgia
  - Sharp, violent pain in face
  - Trigeminal nerve irritation, cranial nerve
  - Antiepileptic medications ease symptoms
Other Disorders (Cont’d)

- Bell’s palsy
  - Paralysis of facial nerve
  - Pain behind ears, altered sense of sight, hearing, drooling, eye-tearing
  - Herpes simplex
  - No cure, steroids reduce inflammation, antiviral agents
  - Resolves within 3 months to 1 year

Chapter Summary

- Most basic portion of nervous system is the neuron/nerve cell
- Each neuron has three parts: dendrites, cell body, axon
- Neurons send impulses to other cells by neurotransmitters, chemicals that cross the synapse

Chapter Summary (Cont’d)

- CNS composed of brain, spinal cord
- CNS is covered by three layers of connective tissue, meninges
- Meninges contain CSF, which circulates throughout the CNS
Chapter Summary (Cont’d)

- All nervous tissue not in the brain/spinal cord comprises the PNS
- PNS has two parts: somatic, which controls voluntary muscle movements, sensation from skin, and visceral, which comprises the ANS
- Spinal nerves branch off of the spinal cord, named for vertebra level at which they exit

Chapter Summary (Cont’d)

- ANS has two divisions that work against each other: sympathetic/fight-or-flight response and parasympathetic/rest-and-digest response
- 12 cranial nerves branch off brain and spinal cord

Chapter Summary (Cont’d)

- Perform complete neurological assessment if patient has/had altered mental status, loss of consciousness, alteration in strength/sensation, loss of extremity function
- Neurological assessment, find focal deficits, absent/altered functions of sensations of body part caused by damage to the nervous system
Chapter Summary (Cont’d)

- Altered mental status requires monitoring of blood glucose levels
- Dementia is a slow, progressive decline in mental functions, delirium is an acute, temporary state of mental confusion and/or fluctuating level of consciousness

Chapter Summary (Cont’d)

- Disruption of blood flow to area of brain tissue, cerebrovascular accident/stroke
- Seizure, massive, excessive neuronal firing in brain, alters behavior

Chapter Summary (Cont’d)

- Seizures are divided into partial seizures, which affect only part of the brain, and generalized seizures, which affect the entire brain
- After generalized seizure, patient goes through postictal period in which he or she may be combative, confused, fearful
Chapter Summary (Cont’d)

- Status epilepticus
  - Single seizure lasting longer than 30 minutes
  - Repeated seizures without full recovery of responsiveness between seizures, lasting longer than 30 minutes
  - Life-threatening conditions requiring aggressive care
- Syncope is transient loss of consciousness, often resulting in ground-level fall

Chapter Summary (Cont’d)

- Headaches, either vascular (caused by dilation of blood vessels within the head) or nonvascular (caused by something else)
- Brain neoplasm, tumor within brain, may be benign or malignant
- Brain abscess, collection of pus within brain

Chapter Summary (Cont’d)

- Ischemic stroke caused by blocked blood vessel in brain
- Hemorrhagic stroke caused by ruptured, bleeding blood vessel in brain
- Hypertension, bradycardia, abnormal respirations, hallmarks of Cushing’s triad, signifying rising ICP
• TIA shows same signs and symptoms as stroke but resolves within 24 hours
• Alzheimer’s disease, degenerative, progressive decline in memory, reasoning, cognition
  ➢ Most common cause of senile dementia in the elderly

• Parkinson’s disease, degenerative nervous disorder affecting fine motor control, extrapyramidal system
• Injury to spinal cord affects sensation, movement below the site of injury

Questions?