Cerebral Vascular Accident

- Communication Difficulties
  - Aphasia
    - Inability to comprehend or express language
  - Receptive aphasia (Wernicke’s)
    - Fluent speech that may not make sense
    - Inability to read or understand spoken word (L frontal lobe)
    - Inability to process information in the brain
Cerebral Vascular Accident

- Communication difficulties
  - Expressive aphasia (Broca’s)
    - Severe difficulty in verbal expression
    - Moderate to severe naming and repetition difficulties
    - Non-fluent, effortful, slow speech
    - Impaired in writing abilities
    - Due to large, deep lesion in frontal lobe
    - Comprehension is excellent
Cerebral Vascular Accident

- **Dysarthria**
  - Words cannot be articulated clearly
- **Agraphia**
  - Impaired writing ability
- **Alexia**
  - Impaired reading ability
- **Agnosia**
  - Inability to recognize objects and their meaning
CVA Timeline

- Cerebral Infarct
  - Immediate and gradual
    - Edematous brain tissue
    - Neurologic deficits
  - Few days
    - Edema subsides
    - Seriousness improves
    - Survival rate increases
Spinal Cord Injury

- **Primary injury**
  - Structural damage occurring instantly after the traumatic event
  - Primary destruction of the neurons at the level of injury

- **Secondary injury**
  - Cascade initiated shortly after injury
    - Ischemia
    - Edema
    - Hypoxia
    - Harmful biochemical events
Spinal Cord Injury

- Clinical manifestations:
  - Depend on level of injury
  - Differences may exist between motor and sensory levels of impairment
  - Complete lesion: complete loss of sensory and motor function below level of lesion
  - Incomplete lesion: partial loss of sensory and motor function below level of lesion
Spinal Cord Injury

- Clinical manifestations
  - Autonomic system changes
  - Muscle tone changes
  - Respiratory complications
  - Cardiovascular conditions
  - Pressure ulcers
  - Bowel and bladder control
Guillain-Barre Syndrome

- Auto immune disease triggered by previous infection or trauma
- Symptoms evolve rapidly
  - Muscle weakness
  - Tingling
  - Can result in almost total paralysis
- Recovery may take years
  - May have residual weakness
Guillain-Barre Syndrome

PT

- PROM in initial stages
- Avoid overfatigue with therex
- Gain training
- Balance/coordination
- ADL training
Infectious Diseases of the CNS

- Meningitis
  - Inflammation of the meninges of the brain and spinal cord

- Syphilis
  - Develops years after exposure
    - Generalized paresis
    - Ataxic motion & decreased kinesthetic sense
Viral Diseases of the CNS

- **Encephalitis**
  - Acute inflammatory disease of brain
  - Caused by viral invasion or hypersensitivity initiated by virus
  - West Nile virus

- **Post vaccine encephalitis**

- **Poliomyelitis**
  - Post polio syndrome
Viral Diseases of the CNS

- Rabies
  - Excitement, aggressiveness, dementia, paralysis and then death

- Herpes
  - Zoster “shingles” vesicles along sensory nerves
    - Simplex – unilateral eruption
Multiple Sclerosis (MS)

- Demyelination of axons of white matter cause formation of plaques
- Plaques (lesions) slow or block neural transmission resulting in:
  - Weakness
  - Sensory loss
  - Visual dysfunction
  - Other symptoms
- Signs and symptoms vary greatly from person to person
MS

- **Sensory**
  - Loss of touch
  - Paresthesia
  - Blurred vision

- **Motor**
  - Muscle weakness
  - Unsteady gait
  - Uncoordinated movement
  - Intention tremor
  - Balance dysfunction
MS

- Chronic illness manifested in multiple forms and courses
  - Relapsing-remitting
  - Secondary progressive
  - Primary progressive
  - Progressive relapsing
MS

- **diagnosis**
  - Difficult process
  - Usually requires elimination of other diseases

- **Prognosis:**
  - Average frequency of attacks 1x/yr
    - Vary in severity
  - Life expectancy reduced by modest amount
  - 25% will require assistance with ADLs
MS

- PT
  - More energy in a.m., fatigue in early afternoon, some recovery in the evening
  - Postural control
  - Functional independence
  - Balance
  - Aquatic therapy (???)
  - Schedule rest breaks, avoid over stressing or over heating
Parkinson’s Disease

- Chronic, progressive disease of the motor component of CNS
- Etiology: not fully understood
  - Genetic
  - Exposure to toxins, infections
Parkinson’s Disease

- Dysfunction with subcortical grey matter in basal ganglia
- Substantia nigra loses ability to produce dopamine
- Movement disorder with dysfunction of movement preparation and execution
- Lesions change the character of movement
Parkinson’s Disease

- **Clinical manifestations:**
  - Tremor
    - Rhythmic, back-and-forth motion of thumb and finger- “pill rolling”
    - Most obvious at rest or during stress
  - Rigidity
  - Gait and postural changes
  - Dementia
  - Flat affect
Parkinson’s Disease

- Clinical manifestations
  - Bradykinesia or akinesia
    - Bradykinesia - Slowness of movement
    - Akinesia - disorder of movement initiation
      - Freezing may occur
  - Weakness and fatigue
Parkinson’s Disease

- **Treatment**
  - Levodopa - improves most of major symptoms
    - Converted to dopamine
    - Used in combination with Carbidopa (inhibits breakdown of levodopa)
  - Deep brain stimulation

- **Prognosis**
  - Does not significantly decrease life expectancy when diagnosed between 50 and 60
Diseases of the CNS

- Huntington’s Disease
  - Neurodegenerative disease with involuntary gyrating movements and progressive dementia
  - Genetic disorder
    - Atrophy of the cortex
    - Appears in midlife
    - Mental incapacitation by 50-60
Huntington’s Disease

- Pathogenesis
  - Atrophy and loss of nerve cells in the basal ganglia
  - Volume of brain decreases
  - Atrophy of motor cortex of the frontal lobe
Huntington’s Disease

- Clinical manifestations
  - Choreiform movements - involuntary gyrating movements
  - Dysarthria
  - Dysphagia
  - Personality and behavioral changes
  - Progressive dementia
Huntington’s Disease

- **Prognosis**
  - Advance of disease is slow
  - Death 10 to 30 years after onset

- **Treatment**
  - Symptomatic
Diseases of the CNS

- Alzheimer’s Disease
  - Form of dementia
  - Idiopathic etiology and incurable
  - Atrophy of the cortical parts of the frontal and temporal lobes of the brain
  - Progressive loss of cognitive functions
Alzheimer’s Disease

- Clinical manifestations:
  - Early symptoms may be overlooked
  - Memory loss
  - Speech difficulties
  - Personality changes
  - Functional disorders
  - Depression
  - Abnormal motor signs
Alzheimer’s Disease

- Prognosis
  - 4th leading cause of death in adults
  - Onset to death- 7-11 years

- PT
  - Increased risk for falls
  - Maintain function
  - Assistive devices
Amyotrophic Lateral Sclerosis (ALS)

- Motor weakness and Progressive wasting of muscles in the extremities
- Generalized muscle loss and death (3-10 yrs)
- Etiology unknown

Pathology
- Degeneration of motor cells in the spinal cord, brainstem, cerebral cortex
- Leads to denervation and atrophy of muscles
ALS

- Clinical manifestations
  - Progressive wasting and atrophy of muscles
  - Difficulty chewing and swallowing
  - Death due to respiratory muscle paralysis
  - Cognitive impairments may be present
  - In most, intellect is not affected

- Treatment
  - No cure
  - Symptomatic therapy
Neoplasms

- Brain tumors have high mortality rate
  - Compress vital centers
- 50% are primary tumors, 50% are metastasis
- Etiology
  - Unknown
  - May have genetic or familiar link
Neoplasms

- Gliomas
  - Arise from glial cells
  - All are malignant
  - 80% are astrocytic tumors
    - Astrocytomas - less malignant
    - Glioblastoma multiforme - highly malignant
Neoplasms

- Precursors and undifferentiated cells
  - Medulloblastomas
    - Originate from fetal cell precursors
    - Found in children
    - Limited to cerebellum
    - Grow rapidly
    - Poor prognosis
Neoplasms

- **Meningioma**
  - Arise from meninges
  - Most are benign
  - May cause epileptic seizure or motor deficits
  - Prognosis good
    - Surgical excision
Neoplasms

- Neuromas
  - Tumors arising from nerves
  - Most are benign
  - Can originate along cranial or spinal nerves
  - Can originate along peripheral nerves
Neoplasms

- Metastasis to brain
  - 50% of brain tumors
  - Mets from lung, breast, melanoma
Alcoholism

- Continued consumption of large quantities of alcohol with dependency
  - Alcohol is a neurotoxin
    - Cortical atrophy
    - Progressive mental deterioration
    - Loss of memory
    - Inability to concentrate
    - Irritability
    - Adverse effects on striated muscle cells
    - Cerebellar atrophy
Nervous System Diseases

- **Headaches**
  - Any diffuse pattern in any portion of the head
  - **Cause**
    - Irritation of one or more of the pain sensitive structures in the head, neck, back cranial arteries, veins, cranial nerves, spinal nerves and cervical muscles
Nervous System Diseases

- Migraine Headache
  - Incapacitating headache
  - Nausea
  - Vomiting
  - Visual disturbances
Peripheral Nerve Diseases

- Bell’s Palsy
  - Disease of the facial nerve (7th cranial nerve)
  - Paralysis of muscles on one side of the face
  - Occurs between 20-60
  - Idiopathic or vascular ischemia or viral or autoimmune
    - 15% of those with Lyme’s Disease develop bilateral Bell’s
Peripheral Nervous System

- Peripheral neuropathy
  - Etiology:
    - Diabetes
    - Guillain-Barre Syndrome
    - Alcoholism
    - Auto immune diseases
    - Cancer
    - Thyroid dysfunction
    - Infections
Peripheral neuropathy

- Symptoms:
  - Pain
  - Weakness and atrophy
  - Cramping
  - Altered sensation