STROKE

• Acid-Base Balance
• Cognition
• Concepts related to Cognition:
  • Perceptual disturbances/psychosis
  • Impaired attention
  • Memory problems
  • Problems with communication/social cognition
  • Problems with motor control/cognition
  • Problems with executive function
  • Problems with intellectual functioning and learning
• Mobility
• Oxygenation
• Perfusion
• Safety
• Stress and Coping

*What nursing physical assessments are involved?

• Ischemia to part of brain (what other system disease is this similar to?)
• Hemorrhage into brain that results in death of brain cells
• Severity of loss of function varies according to location and extent of brain damage
  – Physical, cognitive, and emotional impact on patient and family
As one of your clinical assignments, you are assisting an RN with health screening at a health fair. Which individual is at greatest risk for experiencing a stroke?

a. A 46-year-old white female with hypertension and oral contraceptive use for 10 years

b. A 58-year-old white male salesman who has a total cholesterol level of 285 mg/dl

c. A 42-year-old African American female with diabetes mellitus who has smoked for 30 years

d. A 62-year-old African American male with hypertension who is 35 pounds overweight
Risk Factors

Non-Modifiable
• Age
• Gender
• Ethnicity/race
• Heredity/family history

Modifiable
• Hypertension
• Heart disease – serum cholesterol
• Smoking
• Obesity
• Sleep apnea
• Metabolic syndrome
• Lack of physical exercise
• Poor diet
• Drug and alcohol abuse

Primary prevention is the priority for decreasing morbidity and mortality risk.

Management of modifiable risk factor
Cerebral Arteries

Circle of Willis
- Anterior communicating artery
- Anterior cerebral artery
- Internal carotid artery
- Middle cerebral artery
- Posterior communicating artery
- Posterior cerebral artery
- Superior cerebellar artery
- Internal auditory artery
- Basilar artery
- Anterior inferior cerebellar artery
- Posterior inferior cerebellar artery
- Vertebral artery
- Anterior spinal artery

Frontal Lobe
- Problem solving
- Emotional traits
- Reasoning (judgment)
- Speaking
- Voluntary motor activity

Parietal Lobe
- Knowing right from left
- Sensation
- Reading
- Body orientation

Occipital Lobe
- Vision
- Color perception

Temporal Lobe
- Understanding language
- Behavior
- Memory
- Hearing

Cerebellum
- Balance
- Coordination and control of voluntary movement
- Fine muscle control

Brain Stem
- Breathing
- Body temperature
- Digestion
- Alertness/sleep
- Swallowing
Transient Ischemic Attack

- Symptoms typically last < 1 hour
- There is no way to predict outcome
  - 1/3 do not experience another event
  - 1/3 have additional TIA
  - 1/3 progress to stroke

- History of TIA is associated with an increased risk of stroke
- TIA is a transient episode of neurologic dysfunction caused by focal brain, spinal cord, or retinal ischemia, but without acute infarction of brain
Types of Stroke

- **Ischemic**
  - Thrombotic
  - Embolic
- **Hemorrhagic**
  - Intracerebral
  - Subarachnoid

Based on previously learned knowledge, what is the priority plan of care?
Ischemic Stroke

Inadequate blood flow to brain from **partial** or **complete** occlusion of an artery

- **Thrombotic:**
  - Occurs from injury to a blood vessel wall and formation of a blood clot
  - Results in narrowing of blood vessel
  - Most common cause of stroke (60%)
    - Often associated with HTN and DM
    - Many times they are preceded by TIA
  - Extent of stroke depends on
    - Rapidity of onset
    - Size of damaged area
    - Presence of collateral circulation
Ischemic Stroke

Occurs when an embolus lodges in and occludes a cerebral artery

• Embolic:
  – Results in infarction and edema of area supplied by involved vessel

• Sudden onset with severe clinical manifestations
  – Warning signs are less common
  – Patient usually remains conscious
  – Prognosis is related to amount of brain tissue deprived of blood supply
  – Commonly recur

Hemorrhagic Stroke

- Results from bleeding into
  - Brain tissue itself
    - Intracerebral or intraparenchymal hemorrhage
  - Subarachnoid space or ventricles
    - Subarachnoid or intraventricular hemorrhage

What intervention will the patient immediately need?
Hemorrhagic Stroke

Intracerebral hemorrhage
- Bleeding within brain caused by rupture of a vessel
  - Sudden onset of symptoms (HA, N/V)
  - Progression over minutes to hours because of ongoing bleeding
  - Hemorrhage occurs during activity

Subarachnoid hemorrhage (SAH)
- Intracranial bleeding into cerebrospinal fluid–filled space between arachnoid and pia mater
- Commonly caused by rupture of a cerebral aneurysm, trauma, or drug abuse

Cerebral aneurysm
- Silent killer
  - Loss of consciousness may or may not occur
  - High mortality rate
  - Survivors often suffer significant complications and deficits
Diagnostic Studies – STROKE

Other studies:
- CTA or MRA
- Cerebral angiography
- Digital subtraction angiography
- Transcranial Doppler ultrasonography
- Lumbar puncture
- LICOX system
- Cardiac imaging

- Confirm that it is a stroke
- Identify the likely cause of stroke
- Noncontrast CT scan is priority
  - Indicate size and location of lesion
  - Differentiate between ischemic and hemorrhagic stroke *
- NIH Stroke Scale (NIHSS)
- MRI
- BMP, CBC, Coags, T&S, T&C, UA, Toxicology
Interprofessional Care – STROKE

NIH Stroke Scale – comprehensive neurologic examination of:
• Level of consciousness
• Cognition
• Motor abilities
• Cranial nerve function
• Sensation
• Proprioception
• Cerebellar function
• Deep tendon reflexes

• Primary assessment is focused on
  – Cardiac status
  – Respiratory status
  – Neurologic assessment

• Secondary assessment includes a comprehensive neurologic examination
  – Clear documentation of initial and ongoing neurologic examinations is essential to note changes in patient status
Interprofessional Care – STROKE Surgical Therapy

For patient with TIAs from carotid disease include:

• Carotid endarterectomy
• Transluminal angioplasty
• Stenting

Preoperative Postoperative
Interprofessional Care – STROKE
Surgical Therapy

Postoperative care is important

- Neurovascular assessment
- BP management
- Assessment for complications
  - Stent occlusion
  - Retroperitoneal hemorrhage
  - Minimize complications at insertion site
Interprofessional Care –STROKE

• Elevates BP is common immediately after a stroke – permissive hypertension
  – Body’s attempt to maintain cerebral perfusion

• Control fluid and electrolyte balance – adequate hydration*
  • Promotes perfusion
  • Decreases further brain injury

• Manage ICP
  – Use interventions that improve venous drainage

Goals for interprofessional care:
• Preserving life
• Preventing further brain damage
• Reducing disability

Time of onset of symptoms is critical information

ABC & ICP
Baseline neurologic assessment
NIH Stroke Scale
Monitor closely for:
• Signs of increasing neurologic deficit
Interprofessional Care – STROKE

Preventive Drug Therapy

• To prevent development of a thrombus or embolus are used in patients at risk for stroke
• Antiplatelet drugs are used in patients who have had a TIA related to atherosclerosis
• What medication are you familiar with?

Acute ischemic stroke:

• Recombinant tissue plasminogen activator (tPA)
  – Used to reestablish blood flow through a blocked artery to prevent cell death
  – Must be administered within 3 to 4 ½ hours of onset of clinical signs of ischemic stroke
  – Patients are carefully screened
Interprofessional Care –STROKE

Acute ischemic stroke:

• After the patient has stabilized and to prevent further clot formation, patients with strokes caused by thrombi and emboli may be treated with anticoagulants and platelet inhibitors

• ASA, clopidogel (Plavix)

• Bedside swallow evaluation by RN

• After stroke has stabilized for 12 to 24 hours, interprofessional care shifts from preserving life to lessening disability and attaining optimal functioning

  – Patient may be transferred to a rehabilitation unit, outpatient therapy, or home care–based rehabilitation once medically cleared
Interprofessional Care – STROKE

Manage:

• ABC & ICP
• Management of hypertension is main focus – why?
• SBP < 160 mm Hg
• Anticoagulants and platelet inhibitors are contraindicated
• Seizure prophylaxis is situation-specific

Hemorrhagic Stroke

• Surgical interventions necessary:
  – Resection
  – Clipping of an aneurysm
  – Evacuation of hematomas

Berry aneurysm

Clipping and wrapping on aneurysm

Coiling
Hemorrhagic Stroke

- Hyperdynamic therapy to increase cerebral perfusion:
  - Vasoconstricting agents
  - Crystalloid or colloid solutions

- Vasospasms can be treated with a calcium channel blocker nimodipine (Nimotop)
Clinical Manifestations of Stroke

- Related to location of stroke
  - Neural tissue destruction is basis for neurologic dysfunction
  - Affects many body functions
    - Related to artery involved and area/half of brain it supplies
- Time of the onset of symptoms /length of period of ischemia is important – why?
Clinical Manifestations
–STROKE

Motor Function
• Most obvious effect of stroke
• Think of 3 nursing priorities for each one

Impairment of
• Mobility
  – Loss of skilled voluntary movement (akinesia)
  – Impairment of integration of movements
  – Alterations in muscle tone
  – Alterations in reflexes
    • Changes from hyporeflexia to hyperreflexia
• An initial period of flaccidity
  – May last from days to several weeks
  – Related to nerve damage
• Spasticity of muscles follows flaccid stage
  – Related to interruptions of upper motor neuron influence
• Respiratory function
• Swallowing and speech
• Gag reflex
• Self-care abilities
Clinical Manifestations – STROKE

Motor Function

• Goal is to maintain optimal function by prevention of joint contractures and muscular atrophy
• In acute phase, range-of-motion exercises and positioning are important
• Paralyzed or weak side needs special attention when positioned
• Optimize musculoskeletal function
• Walking, Eating, Toileting
• Balance training
• Transferring from bed to chair
  – Methods for using the weak or paralyzed side
Clinical Manifestations – STROKE

Neurologic system
• Monitor closely to detect changes suggesting extension of the stroke
  ↑ ICP
• Vasospasm
• Recovery from stroke symptoms

Cardiovascular system
• Goals aimed at maintaining homeostasis
• Adjusting fluid intake to individual needs of the patient
• Monitoring lung sounds for crackles and wheezes (pulmonary congestion)
• Monitoring heart sounds for murmurs
• Watch for orthostatic hypotension before ambulating patient for 1st time
• ↓ cardiac reserves from secondary diagnoses of cardiac disease = cardiac efficiency may be compromised
• After stroke, patient is at risk for venous thromboembolism (VTE)

Respiratory system
• Management of respiratory system is a nursing priority
  – Risk for atelectasis
  – Risk for aspiration pneumonia
  – Risks for airway obstruction
  – May require endotracheal intubation and mechanical ventilation
• Monitoring lung sounds for crackles and wheezes (pulmonary congestion)
Clinical Manifestations – STROKE

Communication

- **Receptive** – loss of comprehension
- **Expressive** – loss of production of language
- **Global** – total inability to communicate

- Assess patient for both ability to speak and ability to understand
- Speak slowly and calmly, using simple words or sentences
- Gestures may be used to support verbal cues
- Speech, comprehension, and language deficits are most difficult problem for patient and family
  - Speech therapists can assess and formulate a plan to support communication
Clinical Manifestations – STROKE

Affect

• Patients who suffer a stroke may have difficulty controlling their emotions
• Emotional responses may be exaggerated or unpredictable
• Magnified by
  • Depression
  • Changes in body image
  • Loss of function

Intellectual Function

• Both memory and judgment may be impaired as a result of stroke
• Impairments can occur with strokes affecting either side of brain, some deficits are related to hemisphere in which stroke occurred
  – A left-brain stroke is more likely to result in memory problems related to language
  – Patients with a left-brain stroke often are very cautious in making judgments
  – The patient with a right-brain stroke tends to be impulsive and to move quickly
Spatial-Perceptual Alterations

- Stroke on right side of brain is more likely to cause problems in spatial-perceptual orientation
- Incorrect perception of self and illness
- Unilateral neglect of affected side
  - Related to hemisphere of brain in which stroke occurred
  - Visual problems

Spatial and perceptual deficits in stroke. Perception of a patient with homonymous hemianopsia shows that food on the left side is not seen and thus is ignored.

(Modified from Hoeman SP: Rehabilitation nursing, ed 2, St Louis, 1995, Mosby.)
Clinical Manifestations – STROKE

Nutrition

• Stress of illness contributes to a catabolic state that can interfere with recovery

• Nutritional needs require quick assessment and treatment – what types of diet will you anticipate?

• May initially receive IV infusions to maintain fluid and electrolyte balance

• First feeding should be approached carefully
  – Test swallowing, chewing, gag reflex, and pocketing before beginning oral feeding
  – May require nutrition support – failed swallow test

• Feedings must be followed by scrupulous oral hygiene
Clinical Manifestations – STROKE

Elimination

• Most problems with urinary and bowel elimination occur initially and are temporary

• When a stroke affects one hemisphere of brain, prognosis for normal bladder function is excellent

• In acute stage, poor bladder control results in incontinence
  – Efforts should be made to promote normal bladder function
  – Avoid use of indwelling catheters
  – Bladder retraining program

• Constipation is most common bowel problem
  – Prophylactic stool softeners or fiber
  – Physical activity promotes bowel function
  – High-fiber diet and adequate fluid intake
Clinical Manifestations – STROKE

Integumentary

• Susceptible to skin breakdown r/t:
  • Loss of sensation
  • Decreased circulation
  • Immobility

• Compounded by patient age, poor nutrition, dehydration, edema, and incontinence

• Prevention of skin breakdown
  – Pressure relief by position changes, special mattresses, wheelchair cushions
    • Position patient on weak or paralyzed side for only 30 minutes
  – Good skin hygiene
  – Emollients to dry skin
  – Early mobility!
Clinical Manifestations – STROKE

Coping

• Family members usually have not had time to prepare for illness
• Often a family disease
  • Emotionally
  • Socially
  • Financially
  • Changing roles and responsibilities

• Patients with a stroke may be coping with many losses (sensory, intellectual, communicative, functional, sexual, etc.)
  – Grief, mourning, depression

• Patient’s family should be given careful, detailed explanation of what has happened to patient

• Social services referral is often helpful
Nursing Management – STROKE

Diagnoses include but are not limited to:
- Risk for impaired cerebral tissue perfusion
- Decreased intracranial adaptive capacity
- Risk for aspiration
- Impaired physical mobility
- Impaired verbal communication
- Risk for skin breakdown
- Unilateral neglect
- Impaired swallowing
- Situational low self-esteem

• Goals include that patient will
  - Maintain stable or improved level of consciousness
  - Attain maximum physical functioning
  - Maximize self-care abilities and skills
  - Maintain stable body functions
  - Maximize communication abilities
  - Maintain adequate nutrition
  - Avoid complications of stroke
  - Maintain effective personal and family coping
Nursing Management
–STROKE
AMBULATORY CARE

Patient is usually discharged (medically cleared) from acute care setting to:
• Home
• Intermediate or long-term care facility
• Rehabilitation facility
• Critical factor: independence in ADLs

• Nurses have an excellent opportunity to prepare patient and family for discharge through
  • Teaching
  • Demonstration/return demonstration
  • Practice
  • Evaluation of self-care skills

• This all begins at ADMISSION!
Nursing Management: Stroke
Gerontologic Considerations

• Stroke is a significant cause of death and disability
• What is the likely cause of death for a patient that suffered a stroke?