Motor & Sensory Functions Of The N.S.

• Motor system functions:-
  – The motor cortex a vertical band within each cerebral hemisphere governs the voluntary movement of the body.
  – The exact locations within the brain at which the voluntary movement of muscles are known “figure 56-13”
  – For muscle movement these particular cells must send the stimulus down ward along their fibers.
  -- The motor system is complex and motor function reflect the integrity of the corticospinal tract, the extrapyramedial system, & cerebellar function.
Motor & Sensory Functions Of The N.S.

• **Upper Motor Neurons**
  - Originate in cerebral cortex, the cerebellum, & the brain stem & modulate the activity of lower motor neurons, fibers make up the descending motor pathways & located in CNS.
  - Motor pathway from brain to spinal cord as well as from the cerebrum to the brain stem, are formed by upper motor neurons.

• **Lower Motor Neurons**: located in both the CNS & peripheral nervous system the lower motor neuron
  - Receive the impulse & run to the myoneural junction located in peripheral muscle *slide table “56-4”*
Motor & Sensory Functions Of The N.S.

• Sensory System Function :-
• The thalamus, a major receiving & transmitting center for the afferent sensory nerves, serves to integrate all sensory impulses except olfaction  
  (conscious awareness of pain & the recognition of variation in temperature & touch, movement, position & the ability to recognize size shape & quality of objects)
• Afferent impulses travel from their point origin to the destinations in the cerebral cortex via the ascending pathways directly
• Or they may cross at the level of the spinal cord or in the medulla depending on the type of sensation
Motor & Sensory Functions Of The N.S.

• Sensory Loss

• sensory loss according to level of transection

• Hemiplegia :- paralysis of an arm and leg on the same side of the body.

• Paraplegia :- when both legs are paralyzed.

• Quadriplegia :- paralysis of all four extremities.
Motor & Sensory Functions Of The N.S.

A – Neurologic Examination

1. Assessing Cerebral Function

• cerebral abnormalities may cause disturbances in communication and intellectual functioning & in patterns of emotional behaviors

  – Mental Status
    - orientation to time, place & persons.
    - noting patient dress, grooming, hygiene posture, gesture, activity, movement, manner of speech …etc.

  – Intellectual Function “IQ, serial 7s”
  – Thought Content “illusion or hallucinations”
Motor & Sensory Functions Of The N.S.

- Emotional Status "irritable, angry, anxious, pathetic euphoric, dose the pt swing from joy to sadness"
- Perception "agnosia chart 56-1"
- Motor Ability "performance of skilled acts"
- Language Ability "read newspaper, speak & communicate" (aphasia "chart 56-2"
- Impact on Lifestyle "limitation, adaptation"
- Documentation of Findings
Motor & Sensory Functions Of The N.S.

2 - Assessing “Examining the cranial nerve”
   *slide table 56-5 describes how to assess cranial nerves*

3 - Examining motor system :-
   A thorough examination of the motor system include an assessment of muscle Size, tone & strength, balance & coordination.

4 - Examining the Motor reflexes

5 - Sensory Examination
   tactile superficial pain, temperature, vibration, & position
Motor & Sensory Functions Of The N.S.

Diagnostic Evaluation

1. Computed Tomography Scanning  CT Scan
cross sectional views of brain.
2. Positron Emission Topography (PET)
produced images of actual organ functioning.
3. Magnetic Resonance Imaging “ MRI ”
4. Cerebral angiography’s
5. Myelography  x-ray of spinal subarchnoid space
6. Electroencephalography :- EEG
   sleep EEG
Motor & Sensory Functions Of The N.S. Diagnostic Evaluation

7- lumbar puncture
   – needle inserted between 3\textsuperscript{rd}-4\textsuperscript{th} or 4\textsuperscript{th} & 5\textsuperscript{th} lumber vertebra

• CSF pressure normal 70-200 mm H2O
• **Used** to obtain CSF for examination, to measure & reduce CSF pressure, to detect spinal subarchnoid block & to administer antibiotics.

• **Examine CSF**
  – should be clear & colorless
  – usually specimens are obtained for cell count, culture & glucose & protein to testing.
Motor & Sensory Functions Of The N.S.
Diagnostic Evaluation

Complication

- post L.P. headache
  - Management :-
    1. rest .
    2. small needle gage .
    3. analgesic
    4. hydration .
  - Herniation of intracranial content .
  - Spinal epidural abscess .
  - Spinal epidural hematoma .
  - Elevated temp . back ache or spasm
  - Meningitis are rear but serious .
Neurological Dysfunction

- 1-Increased Intra cranial Pressure ICP
- Skull contains brain tissue 1400gm, blood 75ml & CSF 75ml
- The volume & pressure of these three component are usually in a state of equilibrium.

- Diagnostic Findings
  - MRI, CT scan, Angiography to determine cause
  - Lumber puncture is avoided because the sudden release of pressure can cause the brain to herniate
Neurological Dysfunction

- **Clinical Manifestations**
  - Change in level of consciousness “*chart 57-1*”
  - Sudden change in patients conditions
    - Such as restlessness, confusion, & increase drowsiness
  - As pressure increase patient become stuporous, reacting only to loud auditory & painful stimulus
  - Comatose & flaccidity are seen “*Fig 57-3*”

- **Complications :-**
  - Brain Stem Herniation → anoxia & brain death.
  - Diabetes Insipidus result of ↓ secretion of ADH.
  - Syndrome of Inappropriate Antidiuretic Hormone (SIADH)
Neurological Dysfunction

• **Management**
  - **Monitoring ICP:** To identify increased pressure early before cerebral damage & to initiate treatment & provide drainage & evaluate effectiveness of treatment
  - **Decreasing Cerebral Edema:**
    - Osmotic diuretics (Manitol) to hydrate brain
    - Corticosteroids (Dexamethason) help to reduce edema
  - **Maintaining Cerebral Perfusion** (By improving cardiac output, by fluid volume & inotropic agents Dibutamin”)
  - **Reducing CSF & Blood Volume**
  - **Controlling Fever**
  - **Reducing Metabolic Demand**
Neurological Dysfunction

- **Nursing Care**
  - Maintaining a patient air way.
  - Attaining normal respiratory pattern.
  - Improving cerebral perfusion.
  - Monitoring fluid balance.
  - Preventing infection.
  - Monitoring & managing complications.
Neurological Dysfunction

• **2-The Unconscious Patient**

• **Unconsciousness** :- is a condition in which the patient is unresponsive to & unaware of environmental stimuli

• Differ from coma according to period

• **Diagnostic Finding**
  – to evaluate & identify cause “ CT scan, MRI , EEG “
  – blood sugar , urea , electrolytes , ammonia , Ketones & prothrompin
  – for assessment “ slide table 57-2 “
Neurological Dysfunction

• Complications
  – Respiratory Failure, Pneumonia, & Aspiration
  – Pressure sore, venous stasis, & musculoskeletal deterioration
  – Disturbed gastrointestinal functioning

• Medical Management
  – first priority is to obtain & maintain patient airway
  – intravenous catheter to maintain fluid balance & nutrition
  – feeding tube or gastrostomy tube
  – circulatory status “heart rate, & blood pressure” is monitored to insure a adequate perfusion for brain.
Neurological Dysfunction

• **Nursing Care**
  – Maintain the airway.
  – Protecting the patient & maintain safety.
  – Maintaining fluid & nutritional balance.
  – providing mouth care.
  – maintaining skin integrity.
  – preserving corneal integrity.
  – preventing urine retentions.
  – promoting bowel function.
  – providing sensory stimulation.
Neurological Dysfunction
Cerebrovascular diseases

Transient Islamic Attacks (TIA)

- Temporary episode of neurologic dysfunction, commonly manifested by a sudden loss of motor, sensory or visual function
- It may last a few seconds or minutes but does not last longer than 24 hrs, complete recovery occurs between attacks
- **Causes**: Risk factors include hypertension, Type 1 diabetes, cardiac disease history of smoking, family history of strokes & chronic alcoholism
Neurological Dysfunction
Cerebrovascular diseases

• Clinical Manifestations
• According to location
  – sudden loss of vision in one eye if interrupt carotid.
  – contra lateral weakness.
  – vertigo diplopia, numbness or parasthesea
    “if posterior cerebral & cerebellar arteries involved”
• Diagnostic Findings :-
  • Bruit over carotid artery
  • Carotid phono angiography
  • Oculoplethysmography “pulsation in ophthalmic artery”
Neurological Dysfunction
Cerebrovascular diseases

• Medical Management :-
  – Anticoagulant Therapy to prevent future attacks .
  – Platelet Inhibiting Agent “ Aspirin ”
  – Treatment of Hypertension, Hyperglycemia
  – Quit Smoking

• Surgical :-
  – Endarterectomy .
  – Angiography compress plaque against arterial wall .

.
Neurological Dysfunction
Cerebrovascular diseases

• **Stroke Cerebrovascular Accident**“ brain attack ”
  • It is sudden loss of brain function resulting from disruption of the blood supply to apart of brain
    – Non hemorrhagic 85%
    – Hemorrhagic 15%

• **Clinical Manifestations**
  deficit depending on the location of the lesion . the patient may have any of the following general signs or symptoms
Neurological Dysfunction
Cerebrovascular diseases

– Numbness or weakness of the face, arm, or leg especially one side of the body.
– Confusion or change in mental status
– Trouble speaking or understanding speech
– Visual disturbances
– Difficulty walking, dizziness or loss of balance & coordination
– Sudden severe headache

• Motor loss, comm. Loss, perceptual, & sensory
  *slid “57-4”*
Neurological Dysfunction
Cerebrovascular diseases

• **Assessment & Diagnostic Findings**
  – Complete physical examination.
  – CT scan, MRI to determine ischemic, or hemorrhagic & to determine area of Insult.

• **Complications :-**
  – Cerebral hypoxia
  – Decrease Cerebral blood flow
  – Extension of area of injury.
Neurological Dysfunction
Cerebrovascular diseases

• **Medical Management**

• **1- Thrombolytic Therapy for pt with ischemic stroke**
  – Rapid diagnosis of stroke & initiating of thrombolytic therapy in patient with Ischemic stroke ↓ size of stroke, & ↑ improvement

• **Therapy for patient Not Receiving TPA**
  – Heparin low molecule weight

• for patients with hemorrhagic stroke management of ICP “ osmotic diuretic, maintaining paco2 30-35 , & avoiding hypoxia”. 
Neurological Dysfunction
Cerebrovascular diseases

• **Other treatment measures include**: -
  – Elevate of the head of bed.
  – Intubations to establish secure airway.
  – Continuous monitoring of v/s especially BP.
  – Neurologic assessment.

• **Therapy of Complications**: -
  – O₂ supplement & patent airway.
  – Maintain Cardiac Output 3-8 L/min.
Neurological Dysfunction
Cerebrovascular diseases

- **Intracranial Surgery**
- **Craniotomy**
  - Supratentorial
  - Intratentorial
  - Trans phenoidal
- **Burr holes**
- **Craniotomy**
- **Cranioplasty**
1- Headache

- Headache is actually a symptom rather than a disease and may indicate organic disease:

- A - Primary headache
  
  Is one for which no organic cause can be identified “migraine Tension, & cluster hd. “

- B - Secondary headache :

  Is work load associated with organic causes, such as a brain tumor or aneurysm
Management Of Patient with Neurologic Disorders

- Diagnostic
- Detailed history.
- Physical assessment.
- Neurologic examination.
Management Of Patient with Neurologic Disorders

Intracranial Infections

• A - Meningitis :-

• It is inflammation of maninges ( membrane surrounding the brain & spinal cord ) And is caused by viral , bacteria or fungal organism

• Mode of transmission :-

• by direct contact , including droplet & discharge from the nose & throat of carriers or infected people .
Management Of Patient with Neurologic Disorders

Types :-

- **Aseptic** refer to either viral meningitis cases of meningitis irritation from other causes.

- **Septic** refer to meningitis caused by bacterial organism such as *maningococcus, staphylococcus* or *influenza bacillus*.

- **Tuberculus** meningitis caused by tubercle bacillus.
Management Of Patient with Neurologic Disorders

- Clinical Manifestations :-
  - Headache & fever are frequently the initial symptoms.
  - Change in level of consciousness associated with bacterial meningitis “disorientation & memory impairment”
  - Behavioral changes “lethargy, unresponsiveness, & coma”
  - Nuchal rigidity “stiff neck” is an early sign.
  - Positive kerning’s sign.
  - Positive brudzinski sign.
  - Photophobia or extreme sensitivity to light.
  - Seizure & increased ICP, rash & Death may occur within a few hours of onset of infection.
Management Of Patient with Neurologic Disorders

• Medical Management :-
  - Blood culture & CSF culture to determine course of infection, then antimicrobial therapy is started
    “penicillin, ampicillin, cephalosporins, chloramphenicol”
  - Vancomycin with Rifampin.
  - Dexamethasone “reduce incidence of deafness”
  - Valium & phenytoin for seizures.
  - Osmotic diuretic for cerebral edema
Management Of Patient with Neurologic Disorders

• Nursing Management :-
  - Monitoring vital signs.
  - Monitoring level of consciousness.
  - Attention to skin & oral hygiene.
  - Management of fever & pain.
  - Protection during seizures
Management Of Patient with Neurologic Disorders

• **B- Brain Abscess**

It is collection of infectious material within the tissue of the brain “it may occur by direct invasion, or by spread of infection from nearby sites, or by spread of infection from other organs”.

• **Clinical Manifestations**

  “slide chart 59-4”

  - Lethargy confusion, irritability.
  - Fever may or may not present.
  - Vomiting & headache are common.
Management Of Patient with Neurologic Disorders

- Antimicrobial therapy “large dose penicillin 20-24 mil & chloramphenical 5 gm/day in divided dose.
- Corticosteroid for cerebral edema & anticonvulsant
- Surgical incision or aspiration “stereotatic aspiration”
Management Of Patient with Neurologic Disorders

• **Multiple Sclerosis**

• It is a chronic, degenerative of central nervous system characterized by occurrence of small patches of demyelination in the brain & spinal cord.

• The cause of MS is not known

• **Diagnostic Findings**
  
  – MRI is the primary diagnostic tool “disease & ttt”
Management Of Patient with Neurologic Disorders

• Clinical Manifestations :-

  reflecting location of plague
  - Fatigue , weakness , numbness , difficult coordination .
  - Visual disturbances due to lesions in the optic nerve
  - Spasticity of extremities & loss of abd reflex “motor”
  - Parathesia & pain , depression “psychosocial problem
  - Involvement of basal ganglia → ataxia .
  - Bladder , bowel & sexual problems are common
Management Of Patient with Neurologic Disorders

**Medical Management:** *No cure exist of MS:*

- So- The goals of treatment are to delay the progression of disease, manage chronic symptoms & treat acute exacerbation.
- Immunotherapeutic medication to prevent nerve destruction
- Corticosteroids are used as anti-inflammatory agents
- Baclofen antispasmodic agent “for spasticity”
- Fluoxetine “Prozac “for fatigue
- Management of ataxia & convulsions
- Bladder & bowel control.
Management Of Patient with Neurologic Disorders

• Nursing Care :-
  - Prompting physical mobility
  - Preventing injury
  - Enhancing bladder & bowel control
  - Improving self care abilities
  - Promoting sexual functioning
Management Of Patient with Neurologic Disorders

• Parkinson’s Disease

It is a slowly progressing neurologic movement disorder threat eventually lead to disability

degenerative or idiopathic is the most common type
Management Of Patient with Neurologic Disorders

• Clinical Manifestation
  - Tremor
  - Rigidity
  - Bradykinesia
  - Other symptoms
    - excessive & uncontrolled sweating
    - orthostatic hypotension
    - gastric & urinary retention & constipation
    - sleep disorders are common
    - mental change & psychiatric manifestations
Management Of Patient with Neurologic Disorders

• **Medical Management :-**
• **Pharmacologic therapy :-**
  – “sinemet” - levodopa therapy producing symptom relief by t-dopa converted to dopamin
  – Anticholinergic therapy
  – Antidepressant
  – Antihistamin
• **Surgical Management :-**
  – Stereotactic procedures “thalamotomy, pallidotomy”
  – Neural transplantation
  – Deep Brain stimulation
Management Of Patient with Neurologic Disorders

• Alzheimer’s disease
  • It is a chronic, progressive, & degenerative brain disorder accompanied by profound effects on memory, cognition, & ability of self care
  • Neural damage occurs primarily in the cerebral cortex & result in decreased brain size
  • The enzyme active in producing acctylcholine is decreased which is specifically involved in memory processing
Management Of Patient with Neurologic Disorders

- Clinical Manifestations
  - Forgetfulness & subtle memory loss, patient may lose their ability recognize familiar faces, places & objects
  - Conversation becomes difficult and there are word-finding difficulties & disappeared ability to formulate concepts
  - Depressed, suspicious, paranoid, hostile & even combative.
  - Speak skill deterioration & dementia
  - Dysphagia & incontinence
  - In last stage the pt usually immobile & need total care
  - Death occurs as a result of complications.
Management Of Patient with Neurologic Disorders

• Medical Management :-
  - Tacrine hydrochloride for treatment of symptoms by enhancing acetylcholine because of liner toxicity monitoring L.F

• Nursing Management
  - supporting cognitive function
  - promoting physical activity & safety
  - reducing anxiety & agitation
  - improving communication
  - promoting balanced & adequate nutrition
Management Of Patient with Neurologic Disorders

- Myasthenia Gravis
- It is a disorder affecting the neuromuscular transmission of the voluntary muscles of the body. By excessive weakness and fatigability of voluntary muscles and those innervated by cranial nerves.
Management Of Patient with Neurologic Disorders

- **Clinical manifestations:**
  - Extreme skeletal muscle weakness worse after effort and relieved by rest.
  - Diplopia “Duple vision” because involvement of ocular muscles and optosis.
  - Sleepy and mask face expression.
  - Dysphonia “voice impairment” laryngeal muscle.
  - Respiratory distress it diaphragm and intercostals muscle involved.
Management Of Patient with Neurologic Disorders

- Medical management: -
- Pharmacologic Therapy: -
  1- *Anticholinesterase* “Mestinon and Prostegmin”
  Increase concentration of acetylcholin at the neuromuscular junction gradually increase the dose.
  2- *Immunosuppressives* Therapy “Predniselone, Imuran, and Cyclosporin” reducing the production of antibodies.
- **Plasma exchange** (plasma pharoses)
  Selective removal of plasma and plasma component.
- **Surgical management** “thymectomy”removal of thymus
- **Drug interaction precautions**
Management Of Patient with Neurologic Disorders

• **Seizures**
  
  Are episodes of abnormal motor, sensory autonomic or psychic activity (or combination of these) resulting from sudden excessive discharge from cerebral neurons.

• **Hypoxemia of any causes is the cause.**

• The patient often has memory loss during seizure.

• *The immediate therapeutic goal is to control the seizures, & the long term goal is to determine & control the cause.*
Management Of Patient with Neurologic Disorders

• *Nursing management During a seizure*
• A major responsibility is:
  - to observe & to record the sequences of symptoms
  - Preventing injury & supporting the pt “*slide Guidline*”
• *Nursing Management After A seizure*
  - observe patient for complications
  - put patient on side & suction to prevent aspiration
  
  *slide 59-1 Guidelines*
Management Of Patient with Neurologic Disorders

- Herniation of an Intervertebral Disk
- It is a cartilagous plate that forms a cushion between the vertebral bodies
- Continued pressure may produce degenerative changes in the involved nerve, such as changes in sensation & reflex action
Management Of Patient with Neurologic Disorders

• **Clinical Manifestations**
  – Pain may occur in any portion of the spin
  – Radiculopathy or sciatica
  – Progressing Neurologic Deficit
    • Muscle weakness & atrophy
    • Loss of sensory & motor function
    • Loss of sphincter control

• **Diagnostic Evaluation**
• MRI, CT scan, Myelogram, may EMG
• Neurologic Examination
Management Of Patient with Neurologic Disorders

• **Medical Management**
  1. Conservative Treatment “bed rest & medication”
  2. Surgical Management “excision of herniated disk”
     - Discectomy “removal herniated disk”
     - Laminectomy “removal of lamina”
     - Hemilaminectomy “removal of part of lamina & part of posterior arch of the vertebrae”
     - Laminotomy “division of lamina”
Management Of Patient with Neurologic Disorders

- **Head Injuries**
  - **Skull Fractures**: it is a break in the continuity of skull caused by forceful trauma
  - Fracture may be open or closed
  - Fracture may be linear comminuted, depressed or basilar
  - A major risk to the patient with head injury is damage to the brain from bleeding or swelling which cause ↑ICP
Management Of Patient with Neurologic Disorders

• Clinical Manifestations :-
  - Persistent, localized pain usually indicate fracture
  - Swelling in the region of fracture
  - In fracture of base of skull hemorrhage from nose, ear, or pharynx
  - An area of ecchymosis (bruising) may be seen over the mastoid (Battle’s sign)
  - When cerebrospinal fluid escapes from the ears & nose basal skull fracture is suspected rhinorrhea, otorrhea
  - “halo sign”
  - Bloody CSF suggests brain laceration or contusion
Management Of Patient with Neurologic Disorders

• Medical Management :-
  - Non depressed skull fracture usually not need surgical intervention, just close observation
  - for depressed fracture “scalp shaved & cleansed with large amount of saline & fracture exposed
  - fragments elevated the area is debrided
  - bone or artificial graft for large defect
  - if cerebral edema present repair defect delayed 3-6 M
  - Antibiotic treatment immediately
  - if base of skull # sterile cotton is placed in the ear & clean nasopharynx & external ear
  - Head elevated 30 degrees to promote closure
Management Of Patient with Neurologic Disorders

• **Brain injury**
  
  An injury to the skull or brain that is sever enough to interfere with normal functioning.

• **Concussion**: a temporary loss of neurologic function with no apparent structural damage.

• **Confusion**: is a more severe injury in which the brain is bruised with possible surface hemorrhage.

• **Diffuse Axonal injury**: widespread damage to axons in the cerebral hemispheres corpus callosum, & brain stem.

• **Intracranial hemorrhage**: Hematoma (collection of blood) that developed within cranial vault. slide 58-2.
Management Of Patient with Neurologic Disorders

- **Clinical Manifestation slide chart (58-1)**

**Management :-**

- presumed pt to have cervical spine.
- stabilization of cardiovascular & respiratory function to maintain adequate brain perfusion
- controlling of hemorrhage & correcting hypovolemia
- maintaining blood gases values at acceptable value
- treatment of ↑ Intracranial pressure
- supportive measurements “pain, anxiety, ventilation”
Management Of Patient with Neurologic Disorders

- **Spinal Cord Injury**
  - Damage to spinal cord ranges from transient concussion to contusion to complete transection

- **Clinical Manifestations “slide chart 58-4”**

- **Emergency Management**
  - rapid Assessment .
  - immobilization & extrication
  - stabilization or control of life threatening
  - transportation to an appropriate medical facility
Management Of Patient with Neurologic Disorders

- Management
- Pharmacological therapy :-
  - administration of high dose corticosteroids “prednisolone” improve prognosis & reduce disability if give 8hrs of injury
- Respiratory therapy
  Oxygen, diaphragmatic pacing
- Skeletal Reduction & traction
- Surgical intervention
- Management of complication
Management Of Patient with Neurologic Disorders

- Management Of The Quadriplegic Or paraplegic

Quadriplegic: refer to loss of movement & sensation in all four extremities and the trunk associated with injury to cervical spine

Paraplegic: refer to loss of motion & sensation in the lower extremities & all or part of trunk as a result of damage of the thoracic or lumber spinal cord or to the sacral root
Management Of Patient with Neurologic Disorders

• **Nursing Process**

• **Diagnosis :-** Immobility related to inability to walk

• **Goal :-** Increase Mobility

• **Interventions :-**
  • Exercise program
  • All unaffected muscle
  • Push up & sit up exercises
  • Ambulation activity
  • Mobilization

• **Evaluation :-** Attain some form of mobility