The Child with Alterations in Cerebral Function
Neurologic Assessment

- **VS**
  - HR, BP, Respirations, Temperature
- **LOC**
  - Orientation
  - Pediatric Glasgow Coma Scale
- **Eyes**
  - Pupillary response and movement, extraocular movement, visual disturbances
- **Reflexes**
- **HC in infants**
- **Motor/Sensory Function**
  - Tactile and painful stimuli
  - Spontaneous activity
  - Response to pain
  - Twitching/seizures
Physical Assessment

- Reflexes
  - Kernig’s Sign
  - Brudzinski’s Sign
  - Both sign of meningeal irritation

- Posturing
  - Decerebrate
  - Decorticate
Intracranial pressure (ICP)

- Pressure within the cranium that surrounds the brain
- Normally 4-12 mm
- Pressure is caused by the volume of brain mass, CSF and blood
  - An increase in anyone of these must be compensated for by the others
Causes of Increase ICP

- Tumors
- Accumulation of CSF
- Intracranial bleeding
- Cranial cerebral trauma
- Hydrocephalus
- Brain tumor
- Meningitis/Encephalitis
- Intracerebral hemorrhage
Clinical Manifestations of ICP

- Infants
  - Tense bulging fontanel
  - Separated sutures
  - Macewen Sign
  - Setting sun sign
  - Irritability
  - High pitches cry
  - Changes in feeding

- Children
  - Headache
  - N&V
  - Diplopia
  - Seizures
  - Cognitive, behavioral and personality signs
Late Signs of Increased ICP

- Lethargy-coma
- Posturing
- Cheyne stokes respirations
- Decreased pupil size and reaction
- Decrease response to commands/stimuli
Nursing Care of the Unconscious Child

- Assess VS for Changes
- Decrease ICP
  - Elevate HOB 15-45 degrees
  - Keep head midline
  - Prevent constipation
  - Provide quiet, low stim environment
  - Therapeutic touch
Nursing Care of the Unconscious Child

- Maintain patent airway/prevent cerebral hypoxia
  - Positioning, O2, oral airway
- Administer sedatives or anticonvulsants as prescribed
- Osmotic Diuretics or corticosteroids
- Prevent skin breakdown
- Monitor Intake and Output
- Family Support
Seizures

- Disturbance in normal brain functioning
- Abnormal electrical discharge of brain
- LOC, uncontrolled body movements, staring, changes in behaviors
- Generalized, Partial or focal, Absence
Status Epilepticus

- Continuous seizure activity, generalized lasts >30 minutes
- Danger of cardiac, respiratory arrest, brain damage
- Airway, O2 administration, hydration, medication/treatment
Seizures

**Precautions**
- Side rails up, padded
- Safety
- Wear helmet
- O2, Sx at BS
- Prevent exposure to triggers

**Nursing Care**
- Protect child, do not restrain
- Do not put anything in mouth
- Loosen restrictive clothing
- Remain with child
- Administer meds as ordered; O2
Documentation of Seizure Activity

- Trigger if any, aura
- Time seizure began and ended
- Clinical manifestations of the seizure
- Any interventions
- VS during event
- Post seizure behavior and symptoms
Child and Family Education

- What to do if child has seizure,
- Safety and when to call EMS
- Wear med alert bracelet
- Activity restrictions,
  - Encourage normal lifestyle
  - Ketogenic Diet (high fat, low carb, low protein)
- Medications and side effects
  - Do not d/c or switch
  - Dilantin, Phenobarb, Carbamazepine
Febrile Seizures

- Occurs between 6 mos- 3yrs most frequently; can reoccur
- Related to how quickly the temp rises not necessarily how high the temp goes
- Possible genetic predisposition
- Accompany GI or URI
- Treat fever
Head Trauma

- Skull fx, contusions, hematomas
- Complications include: ICP, infection, cerebral edema, herniation
- Epidural – blood accumulates between the dura & skull (LOC - normal period-lethargy or coma)
- Subdural - b/t dura and cerebrum develops more slowly
  - Common in infants as result of birth trauma
Clinical Manifestations of Head Injury

- **Minor Injury**
  - LOC (maybe)
  - Transient period of confusion
  - Somnolence
  - Irritability
  - Pallor
  - Vomiting

- **Severe Injury**
  - S/S ICP
  - Retinal hemorrhage
  - Hemiparesis/quadrplegia
  - Increased temp, unsteady gait, papilledema
  - **Progression of injury**
    - Altered Mental status
    - Increased agitation
    - Marked changes in VS
Nursing Considerations for the Head Injured Child

- Monitor LOC with Pediatric Coma Scale
- Monitor VS & Neuro Checks frequently
  - Hypoxia, decreased perfusion, shock, ICP
  - Cushing’s triad (late sign)
    - Increased systolic blood pressure
    - Bradycardia
    - Irregular respirations
Nursing Considerations for the Head Injured Child

- Monitor O2 - continuous pulse ox
- Administer O2 keep sats > 95%
- Seizure precautions
- Good positioning, quiet environment, control body temp
- Medications
Hydrocephalus

- Imbalance in the production and reabsorption of CSF: CSF accumulates and causes dilation of ventricles
  - First two years of life: developmental defect; Older children: space occupying lesion, hemorrhage, infection;
  - communicating (impaired absorption)
  - non-communicating (obstruction)
Hydrocephalus

- Treatment
- Remove obstruction and place shunt

Complications of Shunts
- Infections
- Malfunctions
Clinical Manifestations

- **Infants**
  - Increased H.C.
  - High pitched cry
  - Bulging fontanel
  - Irritability when awake
  - Seizures

- **Children**
  - S/S Increased ICP
  - H/A on awakening improvement with emesis
  - Ataxia, irritability, lethargy, confusion
Nursing Considerations

- Assess for S/S Increase ICP
- Position child on side to facilitate drainage
- After surgery keep child flat 24 hours
- Monitor I&O
- Administer antibiotics- S/S infection
- Encourage age appropriate activities
Meningitis

- Most common infection of CNS; inflammation of the meninges
- **Viral**
  - Vial agents or enteroviruses
- **Bacterial**
  - H. Flu, strep pneumoniae, neisseria meningitides (meningococcal)
Clinical Manifestations

- **VIRAL**
  - *Infant - Toddler*
    - Irritability, lethargy
    - Vomiting
  - *Older Child*
    - Non specific illness
    - h/a, malaise, muscle aches, N/V
    - Photophobia

- **BACTERIAL**
  - *Infant – Toddler*
    - Poor feeding/suck
    - Vomiting
    - High pitched cry
    - Bulging fontanel
    - Hyper or hypothermia
    - Poor muscle tone
## Clinical Manifestations

### Older Child
- Abrupt onset fever, chills, h/a
- Nuchal rigidity
- Vomiting, altered sensorium
- Positive Kernig’s or Brudzinski’s sign
- Opisthotonus

### Diagnosis
- Lab findings
- LP

### Nursing Diagnosis
- Ineffective breathing pattern
- Pain
- Injury
- Thermoregulation
Therapeutic Management

- Isolation (if bacterial)
- Initiation of antibiotic therapy
- Monitor for and reduce ICP
- Control fever/seizures
- Treat complications
- Pain management
Encephalitis

- Inflammation of the CNS producing altered fx in the brain and spinal cord
- Can occur with direct invasion of a virus or after a viral disease
- S/S focal seizures and other neurologic
- Tx: supportive, neurologic monitoring, administration of meds
Reye Syndrome

- Metabolic encephalopathy develops after a mild viral illness (chicken pox)
- Fatty degeneration of the liver
- 5 stages
  - Vomiting and lethargy
  - Combativeness/confusion
  - Coma, decorticate posturing
  - Seizures, loss of deep tendon reflexes, respiratory arrest
Assessment/Treatment

- VS/ Neuro Assessment
- Abrupt changes in LOC
- Elevated liver enzymes and ammonia levels, decrease Glucose, increase PT normal bili
- Dx Liver biopsy

- Fluid restriction
- I& O, labs
- Monitor for cerebral edema
- Drug management
  - Corticosteroids
  - Mannitol, barbiturates
  - Phenytoin
  - Vit K