

THE CHILD WITH CEREBRAL DYSFUNCTION

❖ CHAPTER 28

❖ Mary Murray RN, MSN

Assessment

❖ Family hx

❖ Genetic disorders

❖ health hx

❖ Find the cause

❖ physical eval of infants

❖ Head

❖ Activity: body, eye, swallowing, coordination

❖ Sensory

❖ Attitude

❖ Symmetry

❖ Skin & hair

Clinical manifestations (Box 28-1)

❖ The more ICP, LOC decreases

❖ Infant:

❖ Bulging fontanel, Irritability, High-pitched cry, Distended scalp veins

❖ Child:

❖ h/a, n/v seizures, blurred vision

❖ Personality & behavior:

❖ restless, decline of school performance, memory loss, weight loss, fatigue

Altered states of consciousness

❖ Levels of consciousness (LOC)- Box 28-2

❖ Full consciousness, confusion, disorientation, lethargy, obtundation, stupor, coma, PVS

❖ Coma assessment

❖ Glasgow Coma Scale (GCS): the lower score, the deeper the coma

❖ Eye opening

❖ Verbal response

❖ Motor response

Neurologic examination

❖ VS: report any changes

❖ Temp: infection, heat stroke, drugs, cerebral bleed, seizure

❖ Pulse

❖ Respirations: sedatives, post seizure, infection, metabolic acidosis

❖ breathing patterns: Cheyne-stokes

❖ Odor: fruity, foul, fetid, alcohol

❖ Skin: examine cause

Eye assessment

❖ Pinpoint: opiate or barbiturate poisoning, brainstem dysfunction

❖ Widely dilate & reactive: p seizure

❖ Dilated: eye trauma

❖ Widely dilated & fixed: paralysis of CNIII

❖ Unilateral fixed: lesion on same side

❖ Bilateral fixed: brainstem damage

❖ Dilated & unreactive: hypothermia, anoxia, ischemia, mydriatic drugs, atropine poisoning

Eye tests

- ❖ Doll's head maneuver
 - ❖ Caloric test or oculovestibular response: not done on awake child or have a ruptured tympanic membrane
 - ❖ Funduscopic exam
 - ❖ Preretinal hemorrhages or papilledema
 - ❖ Rule out cervical spine injury before doing any test
- Motor function
- ❖ Paralysis
 - ❖ Hemiplegia, quadraplegia, paraplegia
 - ❖ Deep coma
 - ❖ tremors, twitching, restless, purposeless pluck or tossing, combative or negativistic behavior, hyperactivity, seizures, spasms
- Posturing
- ❖ Decorticate: cerebral cortex dysfunction
 - ❖ Decerebrate: midbrain dysfunction
 - ❖ Reflexes: absent in coma
 - ❖ Tonic neck
 - ❖ Babinski: should not be present > 18 mos

Labs

- ❖ BG
- ❖ urea nitrogen
- ❖ Electrolyte
- ❖ H/h, clotting, CBC
- ❖ Liver function
- ❖ BC
- ❖ Lead
- ❖ drugs

Cerebral Procedures (28-3)

- ❖ Explain what to expect, why, & how they can help
 - ❖ Pictures, dolls, orientation to equipment
 - ❖ Conscious sedation/general anesthesia:
 - ❖ IV access, chloral hydrate, EMLA
- ❖ Support & reinforcement
- ❖ Postanesthesia:
 - ❖ VS & LOC & documenting
 - ❖ Prevent aspiration
 - ❖ Pupil & motor response, wound
- ❖ Educate parents: tests & results

NURSING CARE OF THE UNCONSCIOUS CHILD (UCC)

UCC Assessment

- ❖ LOC, pupillary reaction, VS, neurologic signs
 - ❖ Pupils, nuchal rigidity, tone, strength, body position, seizures
 - ❖ Report ANY changes immediately
- ❖ Temp (>104 R): light covers, tepid sponge baths, hypothermia blanket
- ❖ Pain signs: change in behavior or VS
 - ❖ Opioids: Norcuron, Fentanyl, Versed
 - ❖ Naloxone: reverse opioids
 - ❖ Mild to moderate: Tylenol & codeine

❖ Prevent constipation: softeners & laxatives

UCC Nonpharmacologic comfort measures

❖ Environment

❖ Quiet, dim light

❖ Avoid sudden, jarring movement

❖ Limit visitors

❖ Positioning to prevent straining

UCC: Nursing Diagnoses (P. 1022-1024)

❖ Risk for suffocation

❖ Risk for injury

❖ Risk for impaired skin integrity

❖ Feeding, bathing/hygiene, toileting self-care deficits

❖ Sensory/perceptual alterations

❖ Altered family processes

UCC: Respiratory Management

❖ Airway #1; hypoxia > 4 minutes -> irreversible brain damage

❖ Prevent aspiration

❖ ETT, NTT, OTT, trache

❖ Suction prn

❖ Mechanical ventilation: ABG's & pH monitoring, O2 prn

❖ CPT

❖ Turn Q2

UCC: Intracranial pressure monitoring (ICP)

❖ 4 types of ICP monitors

❖ Intraventricular catheter: gold standard

❖ External ventricular drain (EVD): if empties too rapidly can cause bleeding & pain

❖ Subarachnoid bolt: do not touch dressings

❖ Epidural sensor

❖ Anterior fontanel

UCC: Tx cerebral edema:

❖ Osmotic diuretic: lasts ~ 6 hrs

❖ Mannitol or urea: most commonly used for rapid reduction; give slowly

❖ Indwelling catheter

❖ Maintain PaCO₂ (25-30) to maintain vasoconstriction

UCC: Preventing ↑ICP

Avoid:

❖ neck vein/jugular compression: positioning

❖ Pain or emotional distress

❖ Gentle ROM

❖ Environmental noise & noxious procedures

❖ frequent suctioning (brief if done) & percussion

❖ Followed by 100% O₂

* Do: vibration 1st

❖ Hypoxia & valsalva maneuver

UCC: Nutrition and hydration

- ❖ IV then NG or gastrostomy
- ❖ Assess for dehydration & cerebral edema
 - ❖ Prevent aspiration from overfeeding
 - ❖ Maintain hydration
 - ❖ Fluid restriction
 - ❖ Assess skin & mucous membranes

UCC: Altered pituitary secretion

- ❖ Syndrome of inappropriate antidiuretic hormone secretions (SIADH)
 - ❖ Sx: scant urine, hyponatremia, hyposmolality & overhydration
 - ❖ Tx: restrict fluids
- ❖ Diabetes insipidus (DI)
 - ❖ Sx: \wedge urine \rightarrow dehydration \rightarrow \wedge Na
 - ❖ Tx: replace fluids, Vasopressin

UCC: Meds

- ❖ Antibiotics
- ❖ Corticosteroids
- ❖ Osmotic diuretics/osmotherapy
- ❖ Sedative/Antiepileptics
- ❖ MSO₄, Versed, & Pavulon
- ❖ Paralyzing agent: pancuronium for diagnostic tests

UCC: Thermoregulation & elimination

- ❖ Hyperthermia tx:
 - ❖ Antipyretics, cooling device, labs
- ❖ Elimination: daily I&O
 - ❖ Foley or weigh diapers
 - ❖ Intermittent cath
 - ❖ Prevent impaction:
 - ❖ Sx: liquid (ribbon-like) stool p period of no bowel activity
 - ❖ Tx: Stool softeners, suppositories, enemas

UCC: Hygienic care

- ❖ Skin: prevent skin breakdown & infection
 - ❖ Frequent assessments: skinfolds
 - ❖ Pressure-reducing or relieving device: prone position
 - ❖ Change position regularly
 - ❖ Clothing & bed: dry & wrinkle free
- ❖ Mouth: BID & prn
 - ❖ Teeth: brush, NS & gauze, toothettes
 - ❖ Lips: moisturize

UCC: Hygienic care

- ❖ Eyes: assess for irritation or inflammation
 - ❖ Artificial tears, dressings
- ❖ Hair: clean, combed & secured (braid, ponytail)
 - ❖ Dry or wet shampoo
 - ❖ Shave to tests or procedures: give hair to parents or donate to “Locks of Love”

UCC: Positioning & exercise

- ❖ Prevent aspiration
 - ❖ \wedge HOB

- ❖ Side-lying or semiprone
- ❖ Prevent contractures: gentle full ROM
 - ❖ Rolled pad
 - ❖ Footboards or boots
 - ❖ splints
- UCC: Stimulation
 - ❖ Tactile: hold or rock
 - ❖ Auditory: last sense to be lost but 1st one to be regained
 - ❖ Speak directly to child
 - ❖ Watch conversations
 - ❖ Explain procedures
 - ❖ Encourage radio, singing, stories
 - ❖ Regaining Consciousness may vary: may be silent & withdrawn

UCC: Family Support

- ❖ Recovery phase: give info & clarify, involve with care
- ❖ Death: grief & coping
- ❖ Suspended grief: lack finality
- ❖ Unconscious permanently
 - ❖ Look for hope: be honest, open communication
 - ❖ Miracles happen but are rare
 - ❖ Chronic care facility or home care: education & involvement

UCC: Family support

- ❖ Listen, provide information, support their decisions
- ❖ Difficult decisions: removal of life support
- ❖ Physical or mental limits: rehab & uncertainty
- ❖ Follow-up & respite care planning

CEREBRAL TRAUMA

- ❖ Head injury
- ❖ Near drowning

Head Injury (HI)

- ❖ Involves scalp, skull, meninges, or brain due to mechanical force
- ❖ Etiology: falls, MVA, bikes
- ❖ *Young children have more ability to tolerate ^ ICP because of the ability of cranium to expand & thin skull is more compliant*

Concussion

- ❖ transient & reversible with loss of awareness & responsiveness (minutes-hrs) followed by confusion & amnesia
- ❖ Contusion: petechial hemorrhages along superficial brain at site or remote from site of impact
- ❖ Laceration: penetrating or depressed skull fracture
- ❖ fractures

HI: Complications

- ❖ Epidural hemorrhage: b/t dura & skull
- ❖ Subdural hemorrhage: b/t dura & cerebrum
 - ❖ Peak: 6 months, develops more slowly
 - ❖ Assess for child abuse & retinal hemorrhage
 - ❖ Treatment:
 - ❖ repeated subdural taps & CT scan follow-up

❖Surgical evacuation of hematoma

❖Cerebral edema: 24-72 hrs p trauma

HI: Diagnostic eval

❖Detailed hx:

❖disorders (drug allergies, DM, epilepsy), minor traumatic injury, alterations in LOC & behavior

❖Assess: ABC's, VS

❖Shock

❖Neuro & pupils

❖Seizures

❖Scalp

❖CSF leakage: + glucose

HI: Special tests

❖CT scan

❖All children with: alteration LOC, h/a, vomit, skull fx, seizure, or predisposing medical condition

❖MRI & Neurobehavioral assess

❖EEG: seizure activity or lesions

❖ICP monitoring

HI: Posttraumatic syndromes

❖postconcussion syndrome

❖Manifestations vary

❖Occur minutes to an hr p injury

❖posttraumatic seizures

❖More common in children than adults

❖Occur within 1st few days of injury

❖structural complications (hydrocephalus)

❖Behavioral disturbances

❖Sleep, phobia, emotional lability, altered school performances, aggressiveness or withdrawal

HI: Therapeutic Mgt

❖Mild-moderate at home

❖Teach: dx & tx

❖Complications

❖neuro checks Q2hrs: even while sleeping

❖epidural hematoma signs (p 24hrs)

❖Maintain contact with health professional

HI: In hospital

❖NPO or clears, IVF

❖Dly wts, I&O, serum osmolality (SIADH or DI)

❖MX: Tylenol: h/a

❖Antiepileptic: seizures

❖Abx: laceration, SCF leakage, cerebral tissue damage

❖Tetanus toxoid prophylaxis

❖Hyperthermia: tepid sponge, hypothermia blanket

HI: Surgical therapy

❖Sutures: lacerations

❖Surgical reduction & removal of bone

❖Ping-pong ball skull fx: correct themselves

❖Outcome most favorable for children

❖Fatalities & neuro sequelae is lower

- ❖ More vulnerable for long term cognitive & behavior problems, personality changes, learning difficulties

HI: Nursing Considerations

- ❖ VS, neuro, LOC, I&O: pupils, temp (ax)
 - ❖ LOC changes appear earlier in injury progression than VS or neuro
- ❖ BR, ^HOB, positioning, ROM
- ❖ Safety & seizure precautions
 - ❖ Carefully observe & describe in detail
- ❖ Quiet environment
- ❖ Sedation & analgesia: careful response
 - ❖ Decreased restlessness= pain control
 - ❖ Narcan to reverse (give slowly)

HI nursing

- ❖ Position & movement assessment
 - ❖ H/a: fussy & resist handling
- ❖ Assess any drainage (or bleeding)
- ❖ Undetected injuries: bruises, lacerations, fractures
- ❖ Nutrition: adv as tol
 - ❖ IV or clear liquid
 - ❖ I&O
- ❖ Unusual behavior from normal

HI: family support

- ❖ Listen & allow expression of feelings
- ❖ Be honest & kind, don't promise; give competent care
- ❖ Involve family in care
- ❖ Encourage bringing in belongings, taping voices, touch & cuddle
- ❖ Teach posttraumatic sx
- ❖ Follow-up or home care

HI: Nsg considerations

- ❖ Rehab as soon as able
 - ❖ Brain Injury Association
 - ❖ Rehab facility or home
- ❖ Prevention
 - ❖ growth & development
 - ❖ Adequate supervision!!
 - ❖ Public education & legislative support

Near-Drowning

- ❖ 2nd cause of accidental death in children
- ❖ Survival at least 24 hrs p submersion
- ❖ Cause: inadequate supervision, child abuse. Toddlers top-heavy, homicide, not wearing life-preservers, overestimate endurance
- ❖ 5X's more in boys; 40% <5years; 90% private pools

Near- drowning mgt

- ❖ Irreversible brain damage p 4-6 minutes
 - ❖ Lungs & heart can survive up to 30 min

- ❖ Resuscitate at scene of drowning until help arrives
 - ❖ Restore O₂ prevent further hypoxia
 - ❖ ETT & mech vent: ABG's & PH
 - ❖ Admit all near-drowning d/t complications 24 hrs p
- Complications:
- ❖ Hypoxia & asphyxia
 - ❖ Aspiration
 - ❖ Pneumonia: 48-72 hrs p
 - ❖ Hypothermia: may maintain cardiac function if body temp <86°F
 - ❖ Other:
 - ❖ Bronchospasm
 - ❖ Alveolocapillary membrane damage
 - ❖ Atelectasis
 - ❖ Abscess
 - ❖ ARDS

Near-drowning nursing

- ❖ ICU: VS, vent/trache, ABG's, CPT, IV
- ❖ Care of unconscious child
- ❖ Parental coping & guilt
 - ❖ Refer: psychiatric, SW, community, religion, self help groups
- ❖ Neglect: Assess own feeling about situation in order to attend to needs of family/child
- ❖ Prevention: supervision
 - ❖ Teach water safety, survival training, CPR

NERVOUS SYSTEM TUMORS

- ❖ Brain Tumors
- ❖ Neuroblastoma

Brain Tumors

- ❖ Infratentorial: (60%) posterior 1/3, cerebellum/brainstem
- ❖ Supratentorial: anterior 2/3, cerebrum
- ❖ S/sx are directly related to their anatomic location & size & age of child
 - ❖ Manifestations: Table 28-2
 - ❖ H/a, vomit, neuromuscular or behavioral change, CN neuropathy, VS disturbances

Diagnostic Eval (Table 28-2)

- ❖ Subjective sx
 - ❖ Infants: no early sx
 - ❖ Older child: nonspecific: h/a on awakening, vomiting unrelated to food
- ❖ Tests:
 - ❖ MRI: location & extent
 - ❖ CT, Angiography, EEG, Lumbar puncture
 - ❖ Definitive dx: brain tissue specimen

Brain tumors mgt

- ❖ surgery (TOC): total removal
- ❖ radiotherapy
- ❖ Chemotherapy: delay rx <3yrs
- ❖ Prognosis depends on tumor type, size & extent, age of child

Brain tumors Assessment

- ❖ VS & neuro: preoperative baseline data
- ❖ Head circumference: infants & young child
- ❖ H/a, vomit, seizure
- ❖ Discomfort
- ❖ Gait, head tilt

Brain tumor: prepare for procedures

- ❖ Honesty, clarify misconceptions, avoid false hope
- ❖ Hair shaving: sensitive approach & privacy
 - ❖ appearance, donate or save
 - ❖ Scarf, wig, or cap
- ❖ Dressings: use doll
- ❖ Feelings p surgery, visit ICU, h/a's
- ❖ Parents: explain equipment, dressing, normal behavior, respite
- ❖ Attend conferences

Brain tumor: prevent postoperative complications

- ❖ Hyperthermia/hypothermia: cooling blanket, VS
- ❖ Infection & drainage
- ❖ Dressing: reinforce, circle drainage
 - ❖ May need temporary restraints
- ❖ ^ICP: neuro, positioning
 - ❖ S/sx: ^lethargy, sluggish, dilated or unequal pupils
- ❖ Aspiration: positioning, NPO then AAT

Brain tumor: prevent postoperative complications

- ❖ H/a : quiet, dim, restrict visitors, prevent jarring & straining
- ❖ Pain: opioids: morphine & naloxone
 - ❖ Tylenol & codeine: mild to moderate
 - ❖ Ice bag: n/a facial edema
- ❖ Constipation: stool softeners
- ❖ Corneal ulcers: NS gtts or artificial tears

Brain Tumors: support

- ❖ support at diagnosis & when physician visits
- ❖ Encourage normal life, maximum potential
- ❖ Verbalize feelings, how to discuss with child
- ❖ Resume usual activities within limits
 - ❖ Restrictions: Helmet with sports
- ❖ Prepare child for remarks
- ❖ Continued medical & emotional support: residual disability

Neuroblastoma

- ❖ “silent tumor” extracranial solid tumor (70% dx p mets)
- ❖ 8-10% all childhood cancers
- ❖ 1/10,000 live births; >males
- ❖ Present before 10 years (~22 mos)
- ❖ Develop in adrenal gland or retroperitoneal sympathetic chain

Diagnostic Evaluation (Box 28-6)

- ❖ S/sx depend on location & stage & adjacent structure
- ❖ Tests:
 - ❖ skeletal survey
 - ❖ CT scans
 - ❖ bone marrow aspiration & bx
 - ❖ Metaiodobenzylguanidine (MIBG): involvement of bone &/or tissue.
 - ❖ urine excretion of catecholamines
 - ❖ *N-myc* gene & chromosome abnormalities

Neuroblastoma

Neuroblastoma mgt

- ❖ Surgery
 - ❖ Early TOC
 - ❖ Larger: before & after radiation
- ❖ Radiation: also for spinal cord compression or palliation
- ❖ Chemotherapy

Neuroblastoma: Nursing

- ❖ Parental support: coping, guilt
- ❖ Prepare for dx, surgery, SE's of tx's
- ❖ Prevent complications post-op
- ❖ Prognosis (5 year survival rate)
 - ❖ Low-risk: 88-90%
 - ❖ High-risk: 22-30%
 - ❖ The younger the child at dx the better survival rate
 - ❖ ?spontaneous regression

INTRACRANIAL INFECTIONS

- ❖ Bacterial meningitis
- ❖ Nonbacterial (aseptic) meningitis
- ❖ Encephalitis
- ❖ Reye syndrome
- ❖ HIV Encephalopathy
- ❖ Rabies

Bacterial Meningitis

- ❖ Acute inflammation of meninges & CNS
- ❖ Majority of cases: 1 mos – 5 years
- ❖ Site of entry:
 - ❖ Penetrating wound
 - ❖ skull fx
 - ❖ LP or surgical procedure
 - ❖ anatomic abnormality
 - ❖ Foreign body

BM Causes:

- ❖ *S. pneumoniae* (pneumococcal): > 2mos
- ❖ *N. meningitidis* (meningococcal): >2 mos -> school age & adolescents
 - ❖ Transmits by droplet
- ❖ *group B streptococci*: neonatal
- ❖ *Escherichia coli*: neonatal

Meningitis

Bacterial Meningitis sx (Box 28-8)

- ❖ Child & Adolescent:
 - ❖ Abrupt onset, altered sensorium
 - ❖ Fever, chills, H/a, vomit
 - ❖ Seizures, irritability, agitation
 - ❖ Nuchal rigidity ->opisthotonos
- ❖ Infants:
 - ❖ Fever, vomit, irritability
 - ❖ Poor feeding, frequent seizures
 - ❖ Bulging fontanel

Diagnostic Eval (BM)

- ❖ LP: definitive
 - ❖ Cx, grams stain,
 - ❖ White blood cell count: elevated
 - ❖ Glucose: reduced
 - ❖ Protein: elevated
 - ❖ Nose & throat cx
- ❖ Sedate for pain & fear: Demerol or fentanyl & Versed
 - ❖ pain (EMLA): 1 hr before LP

Therapeutic Mgt (BM)

- ❖ Resp Isolation precautions: start asap; off 24° p 1st abx dose
- ❖ Antimicrobial therapy: start asap
- ❖ Nutrition & Hydration: IV, NPO then AAT
- ❖ Ventilation: reduce ICP
- ❖ Dexamethasone: *H. influenzae* type b
- ❖ Manage shock & correct anemia
- ❖ Control seizures: antiepileptics

Therapeutic Mgt (BM)

- ❖ Comfort, pain & safety
- ❖ Control temperature extremes
- ❖ Tx complications:
 - ❖ Subdural effusion: aspirate
 - ❖ DIC: heparin therapy
 - ❖ Shock: ^BV & electrolytes
 - ❖ Effectiveness of therapy: LP
- ❖ Vaccine prevention: begin @ 2 mos
 - ❖ H. influenzae type b
 - ❖ Pneumococcal conjugate

Nonbacterial (Aseptic) Meningitis

- ❖ Cause: mainly viruses
 - ❖ Assoc with: measles, mumps, herpes, leukemia
- ❖ Onset: abrupt or gradual
- ❖ Initial Manifestations:
 - ❖ H/a, fever, malaise, GI sx (abd pain & n/v), & meningeal irritation, maculopapular rash
 - ❖ Subside 3-10 days, no residual effects

Nonbacterial meningitis

- ❖ Dx: CSF

- ❖ Tx: symptomatic

 - ❖ Tylenol: h/a & muscle pain

 - ❖ Positioning

 - ❖ Abx & isolation

Encephalitis

- ❖ Inflammation of CNS, altering brain & spinal cord function

- ❖ Cause: bacteria, spirochetes, fungi, protozoa, helminths, & viruses

 - ❖ Direct invasion of CNS: mosquitoes & ticks

 - ❖ Postinfection p viral disease

- ❖ Encephalitis Manifestations: vary (Box 28-9)

- ❖ Initial sx nonspecific: fever & altered MS

- ❖ Dx: CSF & serum:

 - ❖ IgM Antibody to HSV type 1

Encephalitis Mgt

- ❖ Hospitalized

 - ❖ Supportive tx: nutrition & hydration

- ❖ Prognosis: <2 yrs may exhibit ^ed neurologic disability (learning & seizure)

- ❖ Nursing same as unconscious & meningitis

Reye Syndrome (RS)

- ❖ Acute noninflammatory encephalopathy & hepatopathy

- ❖ Etiology:

 - ❖ Tx with ASA p viral illness (influenza or varicella)

- ❖ Dx: ^ ammonia levels

 - ❖ Liver bx: definitive

- ❖ Prevention: ASA & non-containing salicylates

Reye Syndrome nursing

- ❖ Acute care: ICU

 - ❖ dehydration & cerebral edema: I&O

 - ❖ hypovolemic shock: VS (CVP & CO)

 - ❖ liver dysfunction: PTT

- ❖ Family support

 - ❖ Explain dx & mgt

 - ❖ National Reye's Syndrome Foundation

Human Immunodeficiency Virus (HIV) Encephalopathy

- ❖ A complication of AIDS

- ❖ Unexplained neurodevelopmental regression & focal seizures

 - ❖ Poor prognosis; fatal

- ❖ Early intervention; slower progression

- ❖ Careful handling

 - ❖ Pain, isolation, social stigma: hold, rock comfort

 - ❖ Infection, abandonment

Rabies

- ❖ acute infection of the nervous system caused by a virus (almost fatal if left untreated).

- ❖ Transmission: saliva of infected mammal (wild or domestic)

 - ❖ Via bite or skin abrasion

 - ❖ 88% wild animals; 12% domestic

- ❖ Majority are provoked
 - ❖ Incidence highest: child <15 years
 - ❖ Infection risk: 5% dog; 20-50% cat
 - ❖ Rabid if: unprovoked attack or unusual behavior
- Dx: hx & clinical features (Box 28-10)
- ❖ Initial: malaise, fever, sore throat
 - ❖ Excitement phase: hypersensitivity, & ^ reaction to stimuli, seizure, maniacal behavior, choking
 - ❖ Severe spasm of respiratory muscles: apnea, cyanosis, anoxia

Rabies mgt

- ❖ Cleanse wound
- ❖ Human diploid cell rabies vaccine: inactivated (HDCV)
- ❖ Human rabies immune globulin: (HRIG)
- ❖ Tetanus shot
- ❖ Abx prn

Rabies Nursing

- ❖ Anticipatory guidance, support, reassurance
- ❖ Prevention: close supervision
- ❖ EMLA cream
- ❖ Vaccination if traveling: stray dogs

SEIZURE DISORDERS

- ❖ Epilepsy
- ❖ Febrile seizures

Epilepsy

- ❖ Chronic seizure disorder with recurrent & unprovoked seizures
- ❖ Etiology:
 - ❖ Idiopathic: ?genetics
 - ❖ Acquired: brain injury, biochemical events
 - ❖ Infants: birth injuries
 - ❖ Late infancy-early child: acute infections
 - ❖ >3yrs: idiopathic

Seizure Classification:(box 28-12)

- ❖ partial seizures become generalized
 - ❖ simple partial: no alt of consciousness with motor or sensory signs
 - ❖ complex partial: complex sx & impairment of consciousness

Generalized seizures

- ❖ Both hemispheres involved, loss of consciousness, no aura
 - ❖ tonic-clonic (grand mal)
 - ❖ absence seizures (petit mal or lapses)
 - ❖ atonic and akinetic (drop attacks)
 - ❖ myoclonic
 - ❖ infantile spasms

Epilepsy: Dx

- ❖ Hx, physical & neuro assessment
 - ❖ FH: migraine, febrile seizure, neuro diseases

- ❖ Hx of seizure: type, age of onset, time
- ❖ Precipitating factors: fever, infection, falls, anxiety, fatigue, activity & environment
- ❖ Sensory phenomena
- ❖ Duration & progression
- ❖ Postictal feelings/behavior: confusion, inability to speak, amnesia, h/a, sleep

Epilepsy Labs:

- ❖ CBC & WBC
- ❖ CSF glucose & blood
- ❖ LP
- ❖ Skull radiographs, CT scans
- ❖ MRI
- ❖ EEG: all children; most useful tool

Epilepsy: therapeutic mgt

- ❖ partial/general tonic-clonic: Tegretol, Dilantin, Cerebyx (IV or IM), Depakote, Depakene
- ❖ Absence: Zarontin & valproic acid
- ❖ Single-drug preferred: Neurontin, Lamictal
- ❖ Dosage changes as child grows

Epilepsy mgt

- ❖ Mx withdrawal: seizure free for at least 2 years w/normal EEG
 - ❖ Reduce gradually over 1-2 weeks
 - ❖ Avoid sudden withdrawal-> ^# & severity of seizures & status epilepticus
 - ❖ Continue if: puberty or infection
 - ❖ EEG Q 6mos to 2 years
- ❖ Surgical removal if tumor primary cause

Status epilepticus: a medical emergency

- ❖ Continuous seizure lasting >30 min or a series of seizures & no regaining consciousness
- ❖ Tx:
 - ❖ Airway (O2)& hydration
 - ❖ IV or PR diazepam (Valium)
 - ❖ Phenobarbital
 - ❖ Lorazepam (Ativan): DOC: long duration, less resp distress >2yrs
 - ❖ Give rectally for home tx
 - ❖ Last resort: IV lidocaine, general anesthesia, skeletal muscle relaxant

Epilepsy: Nursing

- ❖ Observation during seizure (Box 28-13)
 - ❖ Describe
 - ❖ Onset
 - ❖ Movement
 - ❖ Face
 - ❖ Eyes
 - ❖ Respiratory effort
 - ❖ postictally

Seizures: Emergency tx (p. 1052)

- ❖ Keep calm, time episode
- ❖ Only move the person if in danger
- ❖ Protect and turn head & body to one side if possible
- ❖ Do not try and stop the seizure
- ❖ DO NOT FORCE ANYTHING INTO MOUTH
- ❖ Stay with the person and allow them to rest after the seizure
- ❖ Reintegrate into environment asap

Recovery position

Epilepsy: Drug therapy

- ❖ Plan convenient administration times: AC & HS
- ❖ Tablet preferred (crush)
- ❖ Phenobarbital or phenytoin: ^Vit D & folic acid; do not take with milk
 - ❖ SE's: gum hyperplasia, learning & behavioral changes: personality, indifference to school activities & family, hyperactivity, psychotic)
- ❖ Wear medical identification
- ❖ Notify MD if illness (vomiting, fever)

Epilepsy: Triggering factors

- ❖ Dark-light pattern changes: camera
 - ❖ Headlights
 - ❖ Picket fence
 - ❖ Flections: snow or water
 - ❖ Rotating fan blades
- ❖ Sudden loud noises
- ❖ Specific voice, song, rhyme
- ❖ Startling or sudden movements
- ❖ Drastic temperature change
- ❖ Dehydration
- ❖ Fatigue
- ❖ Hyperventilation
- ❖ Hypoglycemia
- ❖ Caffeine
- ❖ Low protein diet

Epilepsy: Family & child support

- ❖ Individualize Restriction of activity: stress "CAN DO's"
- ❖ Clarify fears & misconceptions:
 - ❖ Promote self-esteem & positive attitude
 - ❖ Can have normal life & intelligence
- ❖ Make other providers aware: teacher, school nurse
- ❖ Know state laws: limitations (license, employment insurance)
- ❖ Avoid overprotecting, honest & open
- ❖ Epilepsy foundation of America

Family teaching

Febrile Seizures

- ❖ Transient disorder associated with fever
- ❖ >6 months & <3 years; boys 2x's > girls
- ❖ Most generalized & <5 minutes
- ❖ Cause: ?genetic, height of temperature (>101.8°F)
- ❖ Accompanied by URI or GI infection

Febrile seizure mgt

- ❖ TX: diazepam (Valium) & Acetaminophen
- ❖ Educate: Little risk of sequelae
 - ❖ Benign (95% will not develop epilepsy or neuro damage)
 - ❖ Protect child & observe event
 - ❖ No benefit in preventing seizure
 - ❖ Avoid tepid sponge baths
 - ❖ If >10 min, seek medical attention

CEREBRAL MALFORMATIONS

- ❖ Cranial deformities

- ❖ hydrocephalus

Cranial Deformities

- ❖ types of cranial deformities (box 28-15)
 - ❖ 1-2 days p birth cranial bones are highly mobile
 - ❖ 8 weeks: post fontanel closes
 - ❖ 18 mos: anterior fontanel closes
 - ❖ 12 years: sutures unable to separate
 - ❖ Late childhood: solid union

2 Microcephaly brothers

Cranial deformities: nursing

- ❖ Microcephaly: adjust parent to rearing with brain damage
- ❖ Surgery
 - ❖ Monitor H/H, infection, pain, swelling, hemorrhage
 - ❖ Teach: suture care, & safety
 - ❖ S/sx of infection: redness, drainage, swelling, Temp >101F)

Hydrocephalus

- ❖ Imbalance of CSF in ventricular system; production > absorption or obstruction
- ❖ Causes:
 - ❖ Congenital: maldevelopment, intrauterine infection, Arnold-Chiari malformation, aqueduct stenosis or gliosis & Dandy-Walker syndrome, myelomeningocele
 - ❖ Acquired: neoplasm, infection, trauma
- ❖ Sx: Manifestations (Box 28-16)
 - ❖ Infancy: head enlargement
 - ❖ Older infants & children: neuro signs

Hydrocephalus

Arnold-Chiari malformation

Hydrocephalus

- ❖ Dx: CT, MRI with sedation
- ❖ Mgt:
 - ❖ Surgery: removal of obstruction (tumor)
 - ❖ Shunt: VP shunt placement: 1-way pressure valve
 - ❖ Endoscopic third ventriculostomy in noncommunicating (obstructive) hydrocephalus

❖ <http://www.hydroassoc.org/newsletter/etv.html>

Shunt Complications

- ❖ Infection: 1-2 mos p placement
 - ❖ Tx: IV abx
 - ❖ Removal of shunt & EVD
- ❖ Malfunction: kink, plug, separation or migration of tube
- ❖ Prognosis: 80% survival with surgery
 - ❖ Mortality within 1st year
 - ❖ 1/3 intellectually & neurologically normal
 - ❖ 1/2 neuro disabilities

Hydrocephalus: Nursing

- ❖ Infants: daily head measurements
 - ❖ Palpate fontanel & suture lines
- ❖ Worsening sx: irritable, lethargic, seizures, altered VS & feeding
- ❖ **Sx of ^ ICP: alteration in LOC
- ❖ Older children: LOC & behavior
- ❖ Nutrition: schedule, small feeds & frequently, extra time

Nursing

- ❖ Pre-diagnostic sedation: IV pentobarbital or (PO) chloral hydrate
 - ❖ No IV in scalp vein
- ❖ Support head & neck: prevent strain
- ❖ Avoid immobility complications & pressure areas
- ❖ Long term care if irreversible brain damage or hydranencephaly

Hydrocephalus: Postoperative care

- ❖ Positioning: unoperated side, flat or elevate HOB
 - ❖ Avoid skin pressure, irritation & infection, aspiration
- ❖ Pain: acetaminophen, with or without codeine->opioids
- ❖ ^ICP & neuro assess (pupils & BP)
- ❖ Infection: decreased response, seizures, operative site, poor feed, vomit
 - ❖ Tx: Abx (IV or intraventricular)
 - ❖ Assess site
- ❖ Nutrition: NPO then AAT (when BS), I&O

Hydrocephalus: family support

- ❖ Diagnostic & surgical procedures
 - ❖ Reinforce information & what to expect
 - ❖ Explain rationale, listen
 - ❖ Reactions of other children & relationships
 - ❖ Shunt malfunction or infection
 - ❖ Safe transportation
 - ❖ Regular follow-ups
 - ❖ Avoid overprotection & contact sports
 - ❖ National hydrocephalus foundation (NHF) & Hydrocephalus Association
- VP & VA shunt