

Consent for Treating Minors

- Life / limb-threatening emergency
- State-protected right to treatment
 - Child abuse
 - Pregnancy
 - Sexually transmitted disease
 - Substance abuse
 - Outpatient mental health (some states)
- State-defined “emancipated minor” status
 - Married
 - Member of armed forces
 - Self-supporting and living on own

Inconsolable Crying (1)

- Intestinal colic – most common cause of excessive crying – 3 or more hours/day for 3 or more day/wk over a three week period / self-limited / 13% of neonates
 - Sudden onset of paroxysmal crying, flushed face, circumoral palor, tense abdomen, drawing up of legs, clenched fists
 - Normal physical and lab (usually not required) but colic is a diagnosis of exclusion
 - Colic is a risk factor for abuse / try to help arrange for caretaker assistance
 - Many remedies means we really don't know what to do / increase soothing, background noise, stroller or car rides, assure burping, consider stopping cow's milk

Inconsolable Crying (2)

- Trauma
 - Soft tissue or bony trauma (falls or battered child)
 - Strangulation of digit / penis (look under the diaper)
 - Corneal abrasion
- Infections
 - Meningitis, otitis, UTI, gastroenteritis, diaper dermatitis (look under the diaper), cellulitis, joint infections (move them all), pneumonia, stomatitis
- Surgical conditions
 - Incarcerated hernia (look under the diaper)
 - Testicular torsion (look under the diaper)
 - Anal fissure (look under the diaper)
 - Volvulus / Intussusception

Rapid Breathing in the Neonate

- Pneumonia, bronchiolitis, aspiration
- Dysfunction in other organs systems
 - Septicemia, CNS infection, metabolic acidosis
- Congenital diseases
 - Diaphragmatic hernia
 - Tracheoesophageal fistula, stenosis, web
- Heart disease
 - CHF (aortic stenosis, coarctation, PDA)
 - Cyanotic heart disease (tetralogy of Fallot)
- Neuromuscular disease
 - Botulism

Vomiting in Infants

- Vomiting (forceful compared to regurgitation = “spitting up”)
 - Increased ICP (shaken baby)
 - Infections (UTIs, sepsis, gastroenteritis)
 - Hepatobiliary disease (usually have jaundice)
 - Inborn metabolism errors (often have low glucose and metabolic acidosis)
 - Malrotation of the gut (**bilious vomiting [yellow, green] = surgical emergency** = obstruction distal to the ampulla of Vater) 1/500 births with half diagnosed in the first month of life
 - Pyloric stenosis (**projectile vomiting at the end of feeding**) / most common surgically correctable cause of vomiting in newborns / classically present at 2-6 mo
 - Incarcerated hernia / intussusception – age 2-12 mo

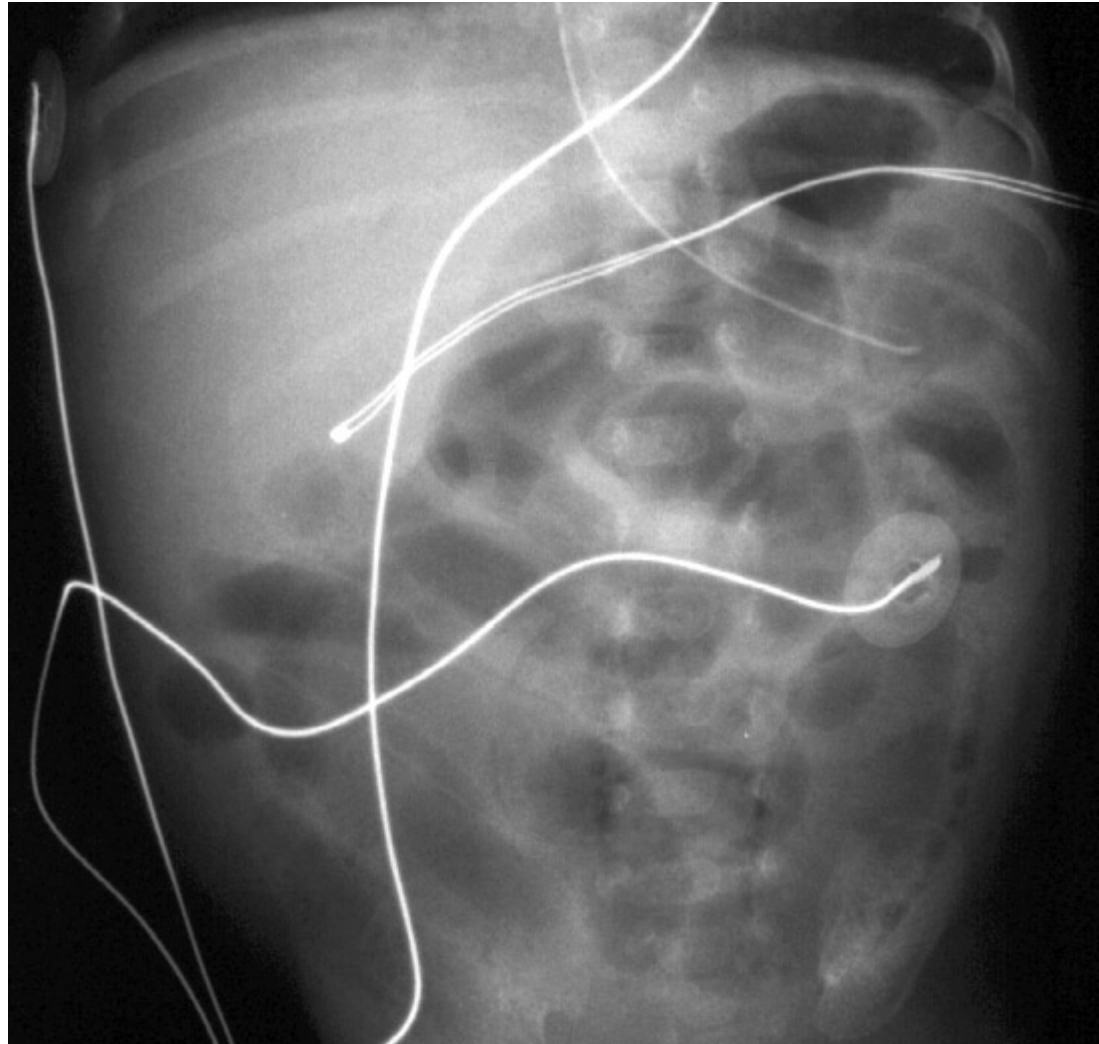
Diarrhea in Infants (1)

- Leading causes of blood in the stool in infants = cow's milk intolerance / anal fissure / swallowed maternal blood (only first several days) / swallowing of blood from nipple while nursing is very far fetched / vaginal bleeding from estrogen withdrawal / a single event can usually just be observed / most cases are idiopathic
- Necrotizing enterocolitis
 - Usually occurs on days 3-10 of life
 - Ischemia / death of the intestinal lining with desquamation
 - The most common GI emergency in neonates (2000-4000 cases/yr in US – mortality approaches 25%)
 - Multifactorial causes -- incompletely understood
 - Infection &/or hypoxia/ischemia play roles
 - Feeding intolerance, abdominal distention, bloody stools, shock
 - Usually child is quite sick / prematurity is a risk
 - Late x-ray finding = pneumatosis intestinalis, portal air, free air
 - Consult surgeon / broad spectrum antibiotics

Necrotizing Enterocolitis

Findings:

- Intramural air
- Double density layering of the abdominal wall
- Generalized bowel dilation
- Loss of haustrations
- Gas lucencies over the liver (intraportal gas)
- Intramural bowel gas



Diarrhea in Infants (2)

- Infections
 - Viruses = rotavirus (adenoviruses are 2nd most common) / 3-15 months / winter – vaccines now prevent almost all severe rotavirus episodes (85-98%) and 74%-87% of all episodes / 2 or 3 doses, depending on the vaccine brand – 2, 4 and 6 months of age
 - Bacteria = most common summer cause / bloody diarrhea = Salmonella & Shigella / Shigella = high fevers, febrile seizures then bloody diarrhea
- Overfeeding and food allergy
- Anatomic abnormalities – intussusception (bloody diarrhea [current jelly stools] a late finding), partial obstruction
- Inflammatory disorders / malabsorption syndromes
- Immunodeficiencies / endocrinopathies
- Antibiotic-associated (particularly amoxicillin-clavulanate [Augmentin])
- Secondary lactase deficiency (can result from gastroenteritis injury to small bowel) – results in inability to break down lactose which then is fermented in the colon causing gas and an osmotic diarrhea

Neonatal Jaundice (1)

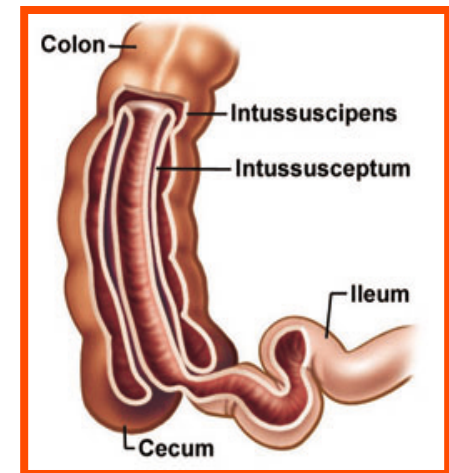
- Most common cause of readmission
- ED-presenting jaundice:
 - Physiologic (>50% of cases)
 - Due to hemolysis of fetal RBCs – just too much for the liver to handle
 - Characterized by bilirubin rising at <5mg/dl per 24 hrs
 - Peak of 5-6mg/dl during the 2nd to 4th days of life
 - Decrease to <2mg/dl by 5-7 days
 - Sepsis-related jaundice
 - Higher levels and associated signs of sepsis are likely
 - Breast feeding-related jaundice (5-10% of cases)
 - Glucuronyl transferase inhibitors in breast milk
 - Can reach a peak of 10-27mg/dl by days 10-21
 - Cessation of breast feeding leads to a rapid decline over 2-3 days but is not generally advised / Is unlikely to cause kernicterus (neurotoxicity)

Neonatal Jaundice (2)

- AAP advises light treatment in otherwise well infants if:
 - 25-48 hrs old and at least 15mg/dl,
 - 49-72 hrs old and at least 18mg/dl,
 - over 72 hrs and at least 20mg/dl
- Direct hyperbilirubinemia requires admission (implies inability of bilirubin to pass into the biliary tree or ducts draining into the duodenum [e.g., biliary atresia])
- Other screening tests = CBC, Coombs test for hemolytic antibodies

Intussusception

- Most common cause of bowel obstruction between 3 mo – 6 yr (2nd most common cause of an acute abdomen in children – after appendicitis)
- Children – usually “idiopathic” (lymphoid hyperplasia?) Predisposers = Meckel’s / polyp / HSP
- Ileocolic most common / US is the diagnostic method of choice
- “Currant jelly” stools is a late finding and only seen in 50% (but most have guaiac-positive stools)
- **Sudden pain with sudden relief of pain**
- Some become very still, listless and pale between episodes of pain
- Sausage shaped tumor mass in right abdomen or epigastrium in 2/3rds



CT Scan -- Intussusception



Google "intussusception yamamoto" for an extraordinary x-ray tutorial

US Study -- Intussusception



Sensitivity for ileocolic intussusception = 98% / Specificity, 98%

Apparent Life-Threatening Event (1)

ALTE Characteristics

- An episode that frightens the observer
- Some combination of
 - Apnea (central or obstructive)
 - Color change (cyanotic, pale, occasionally plethoric)
 - Marked change in muscle tone (usually limp)
 - Choking or gagging
- ALTE is not a diagnosis
- Usually occurs at 1-3 months (average 2 months - younger age than SIDS (average 4.5 months)
- Associated with increased risk of SIDS in more severe episodes

Apparent Life-Threatening Event (2)

ALTE Causes

- CNS infections -- ? LP / septic eval
- Seizures -- ? Chemistries, glucose
- Gastroesophageal reflux (laryngeal stimulation)
- Intracranial hemorrhage, increased ICP -- ? CT
- Botulism -- ? Stool for clostridial cult. / botulinum
- Airway obstruction, pneumonia -- ? CXR
- Low glucose, low calcium -- ? test
- Dysrhythmia, cardiomyopathy, congenital heart disease -- EKG
- Sepsis – septic eval with pan cultures
- Non-accidental (battering, OD, Munchausen)
- Idiopathic (apnea of infancy)

Apparent Life-Threatening Event (3) High Risk ALTE

- Greater than 10 seconds
- Occurs during sleep
- Associated with seizure activity
- Hypotonia (“looked dead”)
- Associated with feeding (possible reflux)
- Trauma / abuse

SIDS (1)

- SIDS is the most common cause of death from 1 month to 1 year (most common between 2-4 mo.)
- Peaks in January / increased incidence in Native and African Americans / mostly males
- Multiple causes suspected
- Risk is inversely related to maternal age
- Risk is directly related to parity
- Infant is at increased risk if sibling had SIDS
- ALTE is associated with an increased risk of SIDS (some disagree)
- Prematurity has increased risk of SIDS
- Increased risk if mother is a substance abuser

SIDS (2)

- Sleeping Position
 - Incidence of SIDS is lower in infants sleeping on back (side sleeping is considered unstable and should be avoided)
 - SIDS is associated with prone sleeping
 - Face-down may lead to upper airway obstruction
 - Rebreathing expired air results in hypercarbia
- Avoid having the child sleep with other children or adults, avoid soft bedding, pacifiers reduce the risk of SIDS, avoid exposure to smoke, never give honey to a child less than one (infant botulism), apnea monitors have no effect

Neonatal Pneumonia

- Lungs are the most common site of infection in neonates
- Group B Strep is the most common cause
 - Acquired in utero
 - Rapid, fulminant illness
- Other common causes: Strep. pneumoniae, H. flu, Chlamydia (3 weeks)
- Symptoms: Decreased appetite, fever, rapid breathing, nasal flaring, grunting, retractions, irritability
- Chlamydia: Afebrile, tachypneic, staccato cough, conjunctivitis, hyperinflation
- Viral: RSV, adenovirus, parainfluenza virus
- Pertussis: Paroxysms of cough and cyanosis, post-tussive vomiting

Bronchiolitis

- 50-70% caused by respiratory syncytial virus (RSV) / large droplet transmission / all need isolation
- Mucous plugging from necrosis of respiratory epithelium and submucosal edema = airway narrowing = increased airway resistance and increased work of breathing
- Wheezing, tachypnea, dyspnea, fever
- O2 sat less than 93-90% = admission
- **Can be associated with apnea – esp.in premature infants – not related to disease clinical severity**
- Treatment = isolation / humidified oxygen (most important) / rehydrate / antipyretics / nebulized epi (albuterol & ipratropium don't work) / heliox / steroids (?? efficacy) / ribavirin neb as inpt??
- Up to 4% may have a concomitant UTI (if febrile)

Pertussis (Whooping Cough)

- “URI” lasting two weeks (catarrhal phase) evolves to 2-4 weeks of paroxysmal coughing spasms / inspiratory whoop (only in 1/3) / post-tussive vomiting followed by a milder residual cough lasting up to months
- Adults = Primary reservoir / children at greatest risk (can get pneumonia – leading cause of death)
- Preventable with vaccine / DTaP (5 doses for children) / Tdap – single dose for ages 11-64 (can within 18 months of prior Td)
- Complications: Mucus plugs (obstructed airway), secondary bacterial infection, increased intrathoracic pressure (leads to rectal prolapse, ruptured diaphragm, hernias)
- Treatment goal – largely to decrease infectivity and carriage: Erythromycin (best), TMP-SMZ / isolation
- Chemoprophylaxis for household contact

Characteristics of Febrile Seizures

- Simple febrile seizures
 - Fever (usually over 39C)(rate of rise important)
 - Age 6 months to 6 years
 - Brief, generalized seizures
 - Resolve without treatment
 - Seizures occur in the first 24 hours of illness
 - Duration 5 minutes or less
 - Minimal postictal phase
 - Previously normal neurologically
 - No other cause
 - Tend to occur in families
- Complex febrile seizures
 - Longer than 15 minutes, recurs within 24 hrs, focal, age < 6mo or > 5yr without signs of serious infection
 - Full septic work-up advised

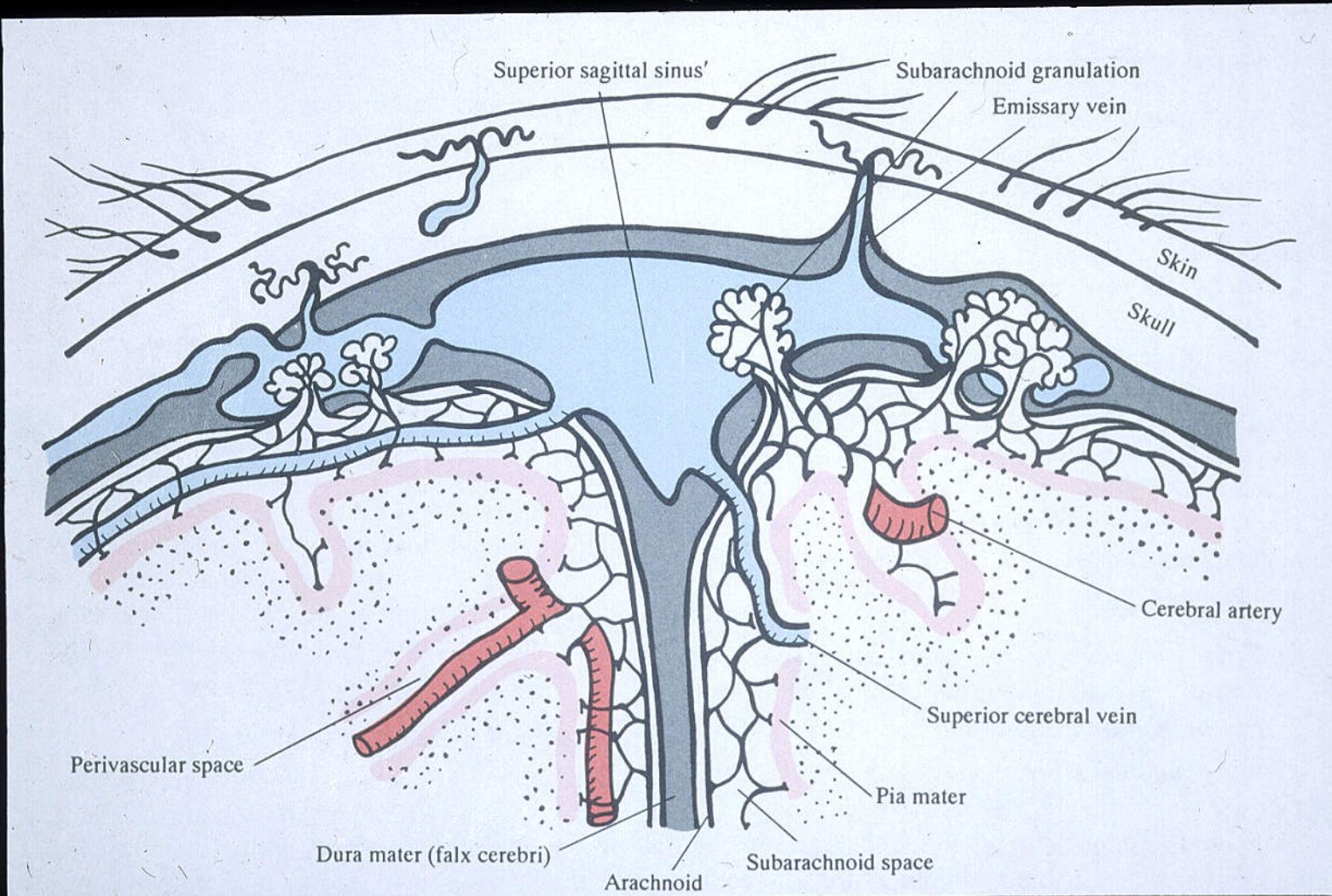
Causes of Seizures Amenable to Specific Treatment

- Hypoglycemia: D10W (is not uncommon with gastroenteritis – check glucose in these cases)
- Hyponatremia: 3% NaCl (water intoxication by care giver)
- Hypocalcemia: calcium gluconate
- Hypomagnesemia: magnesium sulfate
- INH ingestion: pyridoxine (mg. for mg. dosing)
- Hypertension: hydralazine

Pediatric Hydrocephalus (1)

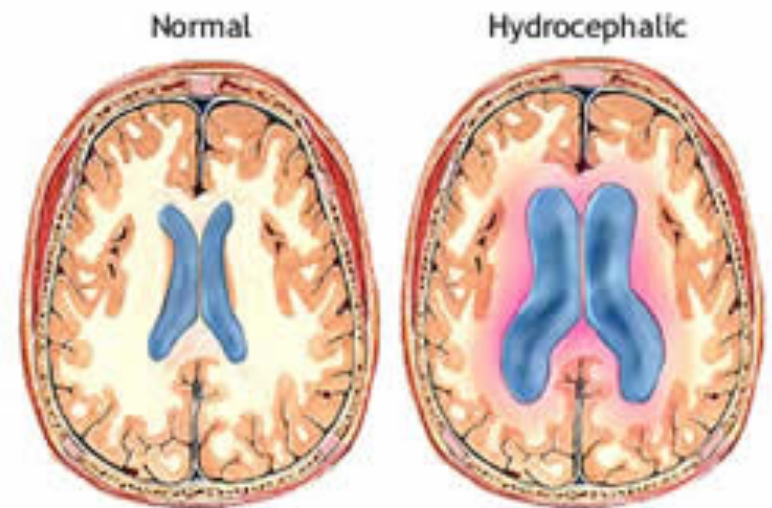
- Increased CSF volume, usually associated with increased CSF pressure
- Causes
 - Congenital: intrauterine infection, congenital abnormalities
 - Acquired: meningitis, IC bleeds, tumors
- Non-communicating: blockage between ventricles and subarachnoid space
- Communicating: impaired CSF absorption by arachnoid granulations
- Arnold-Chiari malformation: cerebellar malformation with non-communicating hydrocephalus

Arachnoid Granulations



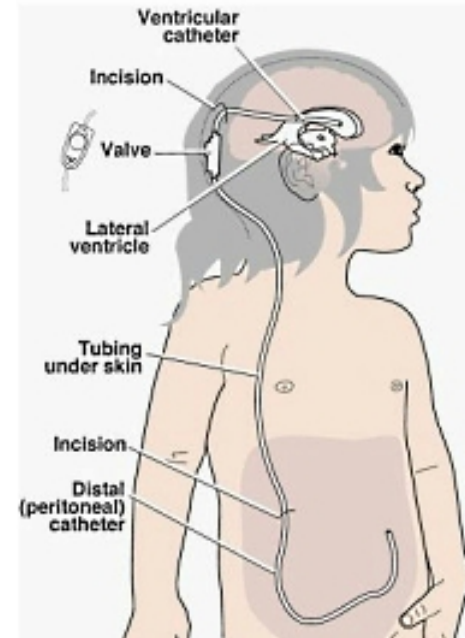
Pediatric Hydrocephalus (2)

- Large head, large fontanelles, dilated scalp veins
- Findings of increased CSF pressure
 - Headache, vomiting, lethargy, irritability
 - Papilledema
 - 6th nerve weakness, strabismus
 - Increased lower extremity tone, positive Babinski sign
 - “Cracked pot” sound on percussion
 - Enlarged ventricles on CT



Pediatric Hydrocephalus (3)

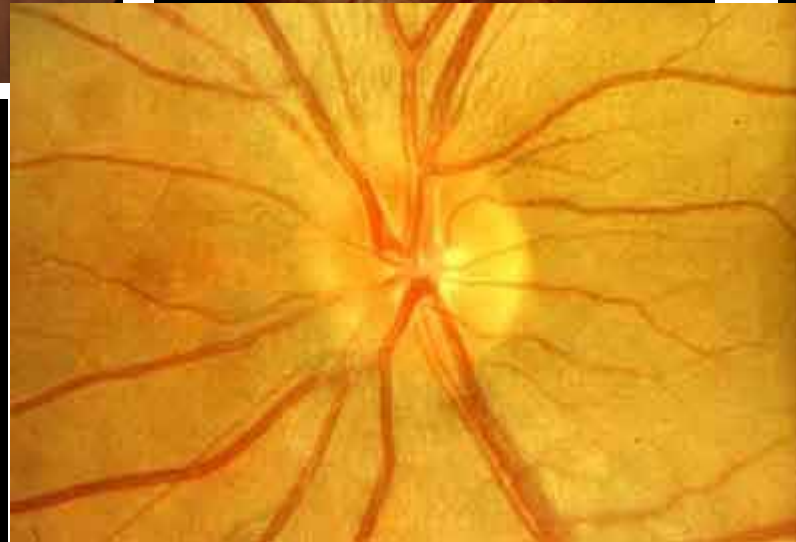
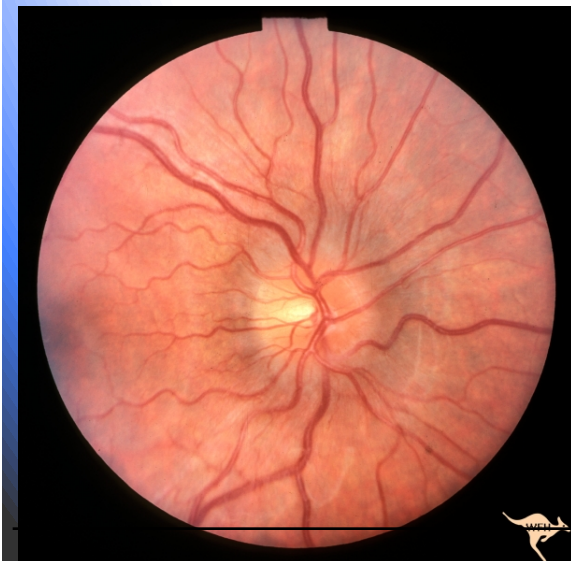
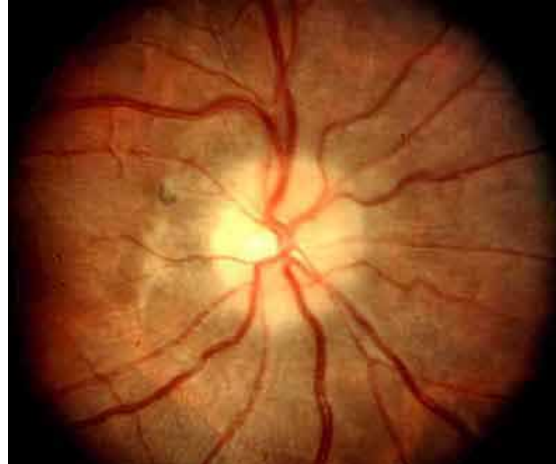
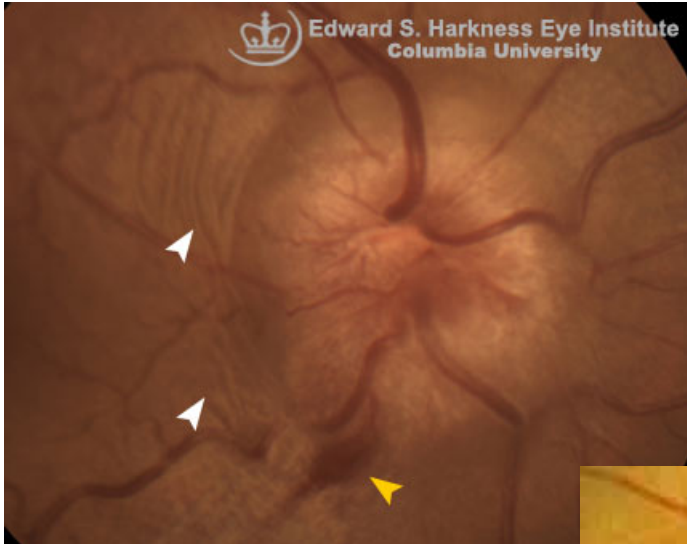
- Shunting: ventricular catheter, pumping chamber, one-way flow valve, distal tubing (usually ends in peritoneal cavity)
- Shunt-related emergencies
 - Obstruction (signs of increased ICP)
 - Resistance to compression pumping chamber
 - Increased ICP (over 20 cm)
 - Emergency tap of shunt if comatose, sudden deterioration, arrest
 - Infection: often within 6 months of insertion; usually skin flora
 - Meningeal signs, fever, sepsis
 - Vancomycin and ceftazidime



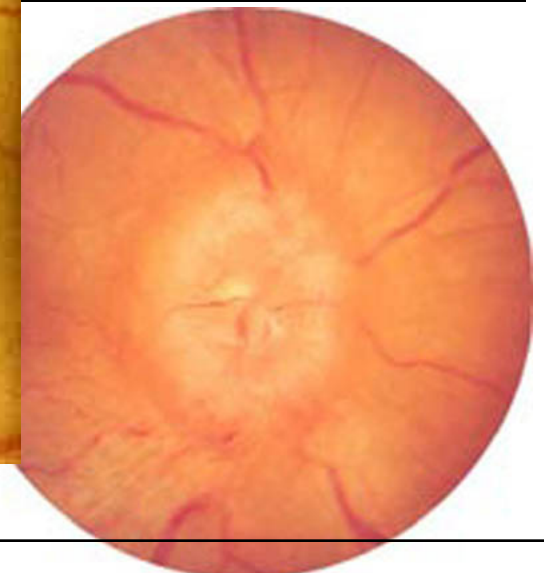
Idiopathic Intracranial Hypertension

- Former names are pseudotumor cerebri and “benign” intracranial hypertension
- CSF pressure increased without increase in ventricle size
- Most common in young, obese women / most diagnosed between ages 20-40 / rare in thin males
- Headache (94%), transient blurred vision (68%), pulse synchronous tinnitus (58%), pain behind the eye (44%), double vision (38%), visual loss (30%), pain with eye movement (22%)
- Papilledema (>90%), increased CSF pressure, CT WNL
- Periodic vision perimetry testing guides the progression of therapy – weight loss, symptomatic headache treatment, acetazolamide or furosemide, steroids, nerve sheath fenestration, lumbar shunt

Papilledema



Normal Optic Disk
for Comparison



Tetralogy of Fallot (1)

- Most common cause of congenital shunts
- X-ray: boot-shaped (“wooden shoe”) heart, decreased pulmonary vascular markings
- Major problems: RV outflow obstruction and VSD
- “Tet spells”: hypercyanosis, exertional dyspnea, hemoptysis, seizures, syncope (precipitated by crying or feeding) – results in **increased right to left shunting**
- Emergency treatment
 - Blow-by supplemental oxygen (is of limited value since reduced pulmonary blood flow is a major part of the pathophysiology)
 - Permit the child to remain with the parents
 - Do not provoke the infant by attempting to start an IV line (especially if not skilled at pediatric IVs)
 - Consider an intraosseous line as a life-saving tool

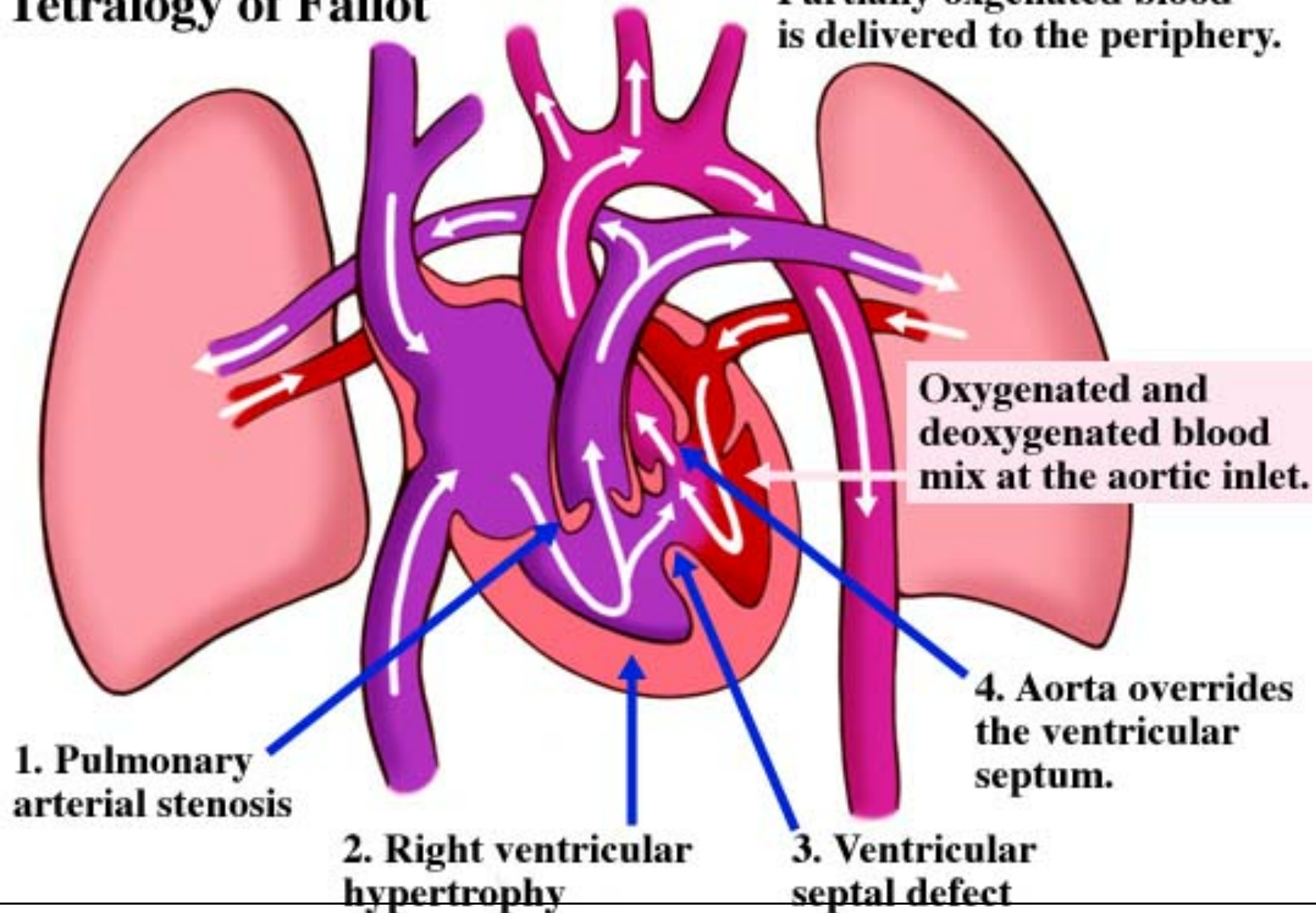
Tetralogy of Fallot (2)

- Emergency treatment (continued)
 - Knee-chest position to reduce systemic venous return and **increase systemic vascular resistance**
 - Morphine (decreases ventilatory drive [goal, decrease hyperpnea] but can decrease vascular resistance via vasodilatation a negative effect]),
 - Bicarbonate (decrease acidosis-induced respiratory drive),
 - Phenylephrine (increases SVR),
 - Propranolol (unclear how it works).
 - Ketamine ?? – sedates without causing vasodilation

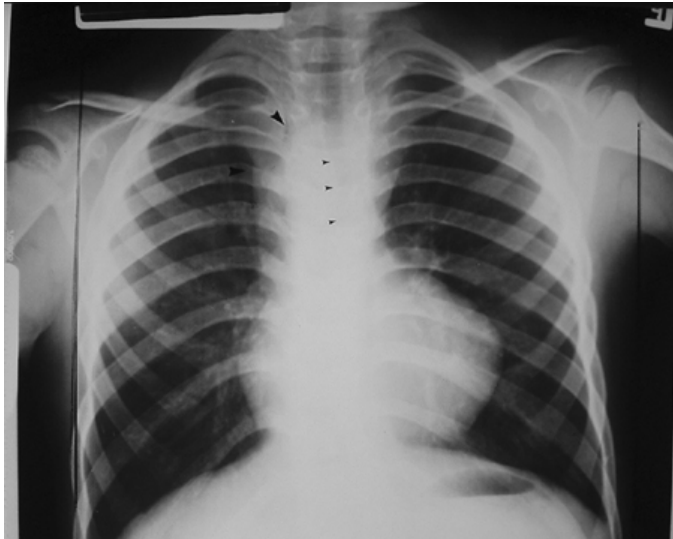
Tetralogy of Fallot

Tetralogy of Fallot

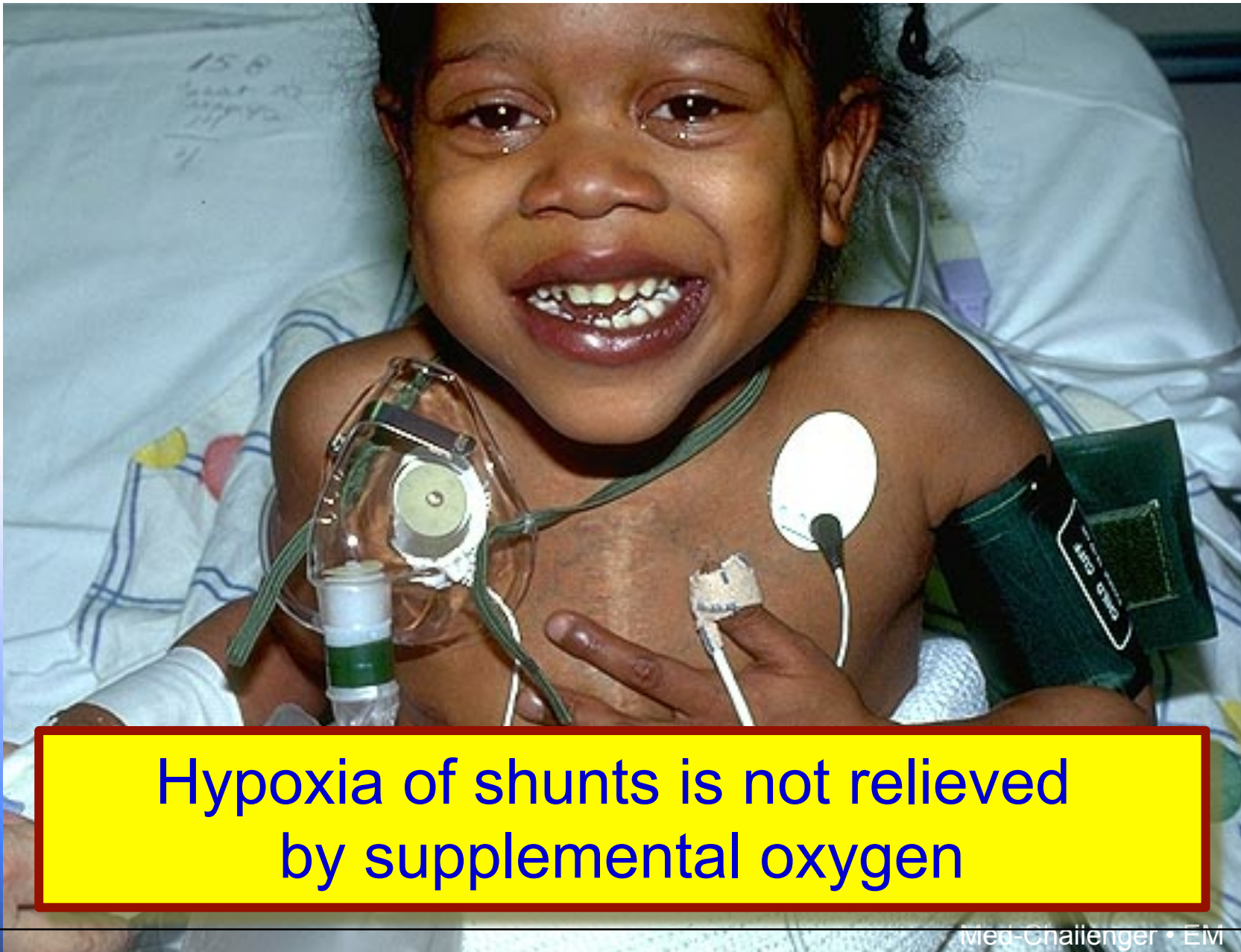
Partially oxygenated blood is delivered to the periphery.



Boot Shaped Heart of TOF



Cyanosis and Clubbing



Hypoxia of shunts is not relieved
by supplemental oxygen

HIV in Childhood

- 15-30% of children born to HIV-positive mothers are infected
- Growth retardation is very common
- Enlarged liver, spleen and nodes are the rule
- Strong association between STDs and HIV in adolescents

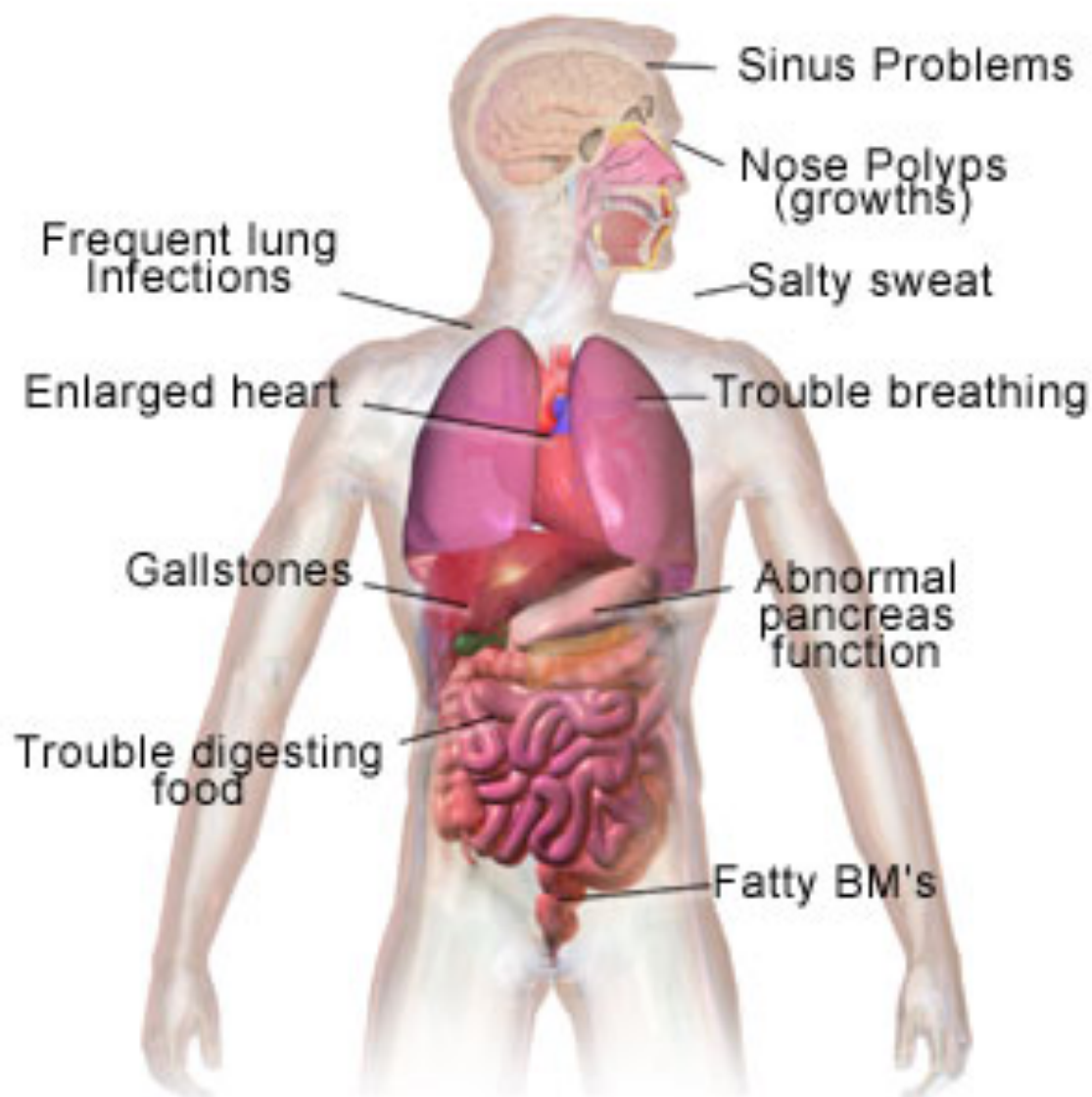
Febrile HIV-Positive Children

- Common bacterial pathogens are the major threat
- Pneumocystis carinii infection is the most common opportunistic infection
- In children with pneumonia, also treat for PCP (TMP/SMX)
- PCP is characterized by disproportionate hypoxemia compared to clinical findings

Cystic Fibrosis

- Most common lethal genetic disorder in whites
- Autosomal recessive
- **Abnormalities of all exocrine glands**
- Causes thick sticky mucous to build up in the lungs and digestive tract
- Recurrent respiratory infections, pancreatic exocrine deficiency, high sweat chloride
- Most present by age 1: neonatal SBO (meconium ileus), failure to thrive, diarrhea, recurrent respiratory infections, prolonged neonatal jaundice, dehydration with hypochloremic alkalosis, diabetes, rectal prolapse

Health Problems with Cystic Fibrosis



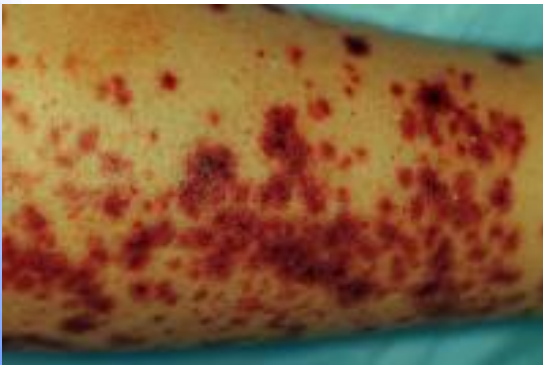
Cystic Fibrosis Emergencies

- Respiratory
 - Cor pulmonale
 - Hemoptysis
 - Pneumothorax
 - Respiratory failure
- Gastrointestinal
 - Obstruction (meconium or otherwise)
 - Intussusception
- Other
 - Dehydration
 - Electrolyte depletion (Na^+ , Cl^- , K^+)
 - Associated with heavy sweating, GI losses

Henoch-Schönlein Purpura

- Abdominal pain, GI bleeding, hematuria, palpable purpura (= vasculitis), arthritis
- Immunologically-mediated vasculitis
- Ages 2-11, whites, winter, males
- Skin lesions are pathognomonic: round, palpable, symmetrical, on dependent areas of legs and buttocks
- Can get colicky pain, bloody diarrhea and intussusception
- Migratory, large-joint arthritis
- Renal involvement: hematuria, proteinuria
- 4-6 week illness. Give steroids if symptomatic
- Normal platelets, PT, aPTT

Henoch-Schonlein Purpura



“Palpable purpura” classically reflects a vasculitis-caused reason for bleeding into the skin

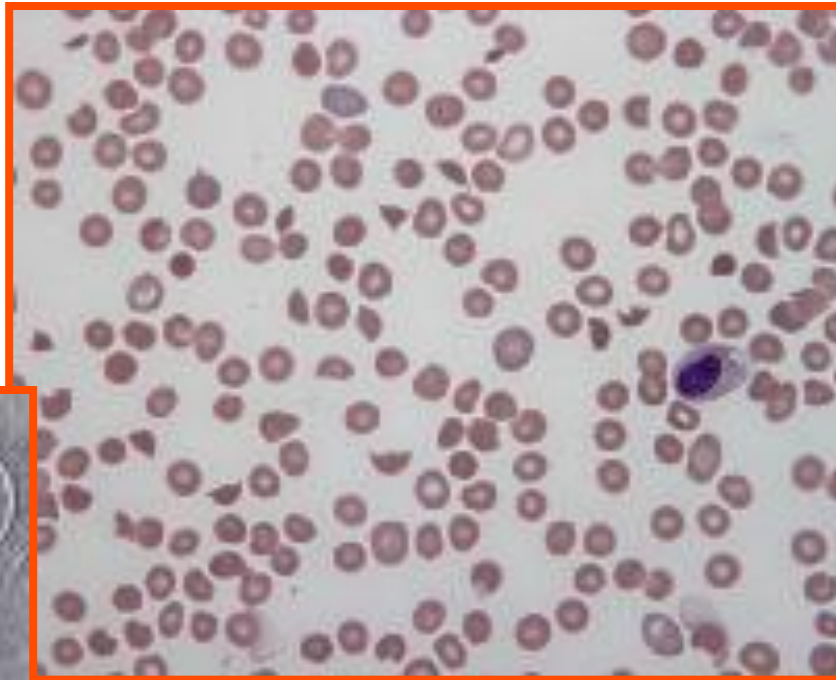
Hemolytic Uremic Syndrome

- Acute renal failure associated with microangiopathic hemolytic anemia and thrombocytopenia
- E. coli 0157:H7, other bacteria and viruses
- Acute diarrheal illness with bloody stools
- Schistocytes (helmet cells) on blood smear suggest the diagnosis
- Normal PT, aPTT, fibrinogen (unlike DIC)
- Uremia is almost universal
- UA: hematuria, proteinuria
- Similar to TTP, but kidney involvement is main feature (vs. CNS involvement in TTP)
- Antibiotics not advised – unclear risk of increasing HUS

Hemolytic Uremic Syndrome



E. coli 0157:H7



Schistocytes / helmet cells and decrease platelets



Meningitis in Children

- Age under two months
 - E. coli, group B Strep, Listeria (by far, least common)
 - Ampicillin (for Listeria) plus cefotaxime or gentamicin
- Age over two months
 - Strep. pneumoniae / Neisseria meningitidis
 - H. influenzae (rare)
 - Highest mortality: Strep. pneumoniae
 - Ceftriaxone (contraindicated in neonates receiving calcium-containing IV fluids – can cause a precipitant in the lungs and kidneys / also increase bilirubin) – cefotaxime is an alternative
 - Steroids prior to antibiotics (somewhat controversial) (especially for H. influenzae)
 - Chemoprophylaxis for contacts of N. meningitidis

Cloudy CSF



Hip Disease in Children

Disease	Age	Male/ Female	Bilateral	Race	Best Film	Other
<u>Congenital Hip Dysplasia</u>	Birth	5-9x more common in females 10x more common if breech	1/3	Almost never in Blacks	AP—not frog	ORTALANI CLICK— with leg flexed, dislocate by adduction, click on relocation with <i>abduction</i>
<u>Slipped Capital Femoral Epiphysis</u>	Teenagers 12-15 Heavy or tall Younger in girls (8-15)	Boys>girls June-September most often	1/4	Blacks more often	AP	Avascular necrosis in 6-15%
<u>Legg-Calve-Perthe's Disease</u> Avascular necrosis femoral head	~5 years	Male> females	1/10 Bilateral in females is rare	None	Frog lateral—for subarticular lucency	Arthrography usually neg Better prognosis under 5 Synovitis may be 1st sign

Pediatric Fluids

- Use totality of clinical findings to estimate degree of dehydration
- Mild dehydration: 3-5% body weight = 50 mL/kg fluid deficit
- Moderate dehydration: 6-9% body weight = 100 mL/kg deficit
- Severe dehydration: over 9% body weight = 150 mL/kg deficit
- AAP and WHO advises oral rehydration for mild to moderate dehydration (not IV)
- Severe dehydration – repeated IV fluid boluses of 20 mL/kg over 20 min -- NS (all are calorie depleted – give D5NS?)
Give until signs of rehydration noted – more alert, improved perfusion, normalized vital signs
- Up to 9% of children with gastroenteritis are hypoglycemic – always check a glucose in these cases
- Full age appropriate diet after rapid rehydration (4-6 hours)

IV Fluid Calculations in Pediatric Dehydration

- Maintenance fluids for 24 hours
 - 100 mL/kg for each of the first 10 kg of weight
 - 50 mL/kg for each of the second 10 kg of weight
 - 20 mL/kg for each remaining kg of weight
- Fluid deficit for 24 hours
 - 10 mL/kg for each % of dehydration
- Ongoing losses in 24 hrs not replaced by oral fluids
 - 10 mL/kg for persistent fever
 - 10 mL/kg for each loose stool
- Generally avoid the use of sedating antiemetics (promethazine, prochlorperazine) – may be associated with respiratory depression and extrapyramidal effects
- Generally avoid antidiarrheal medications – safety and efficacy issues

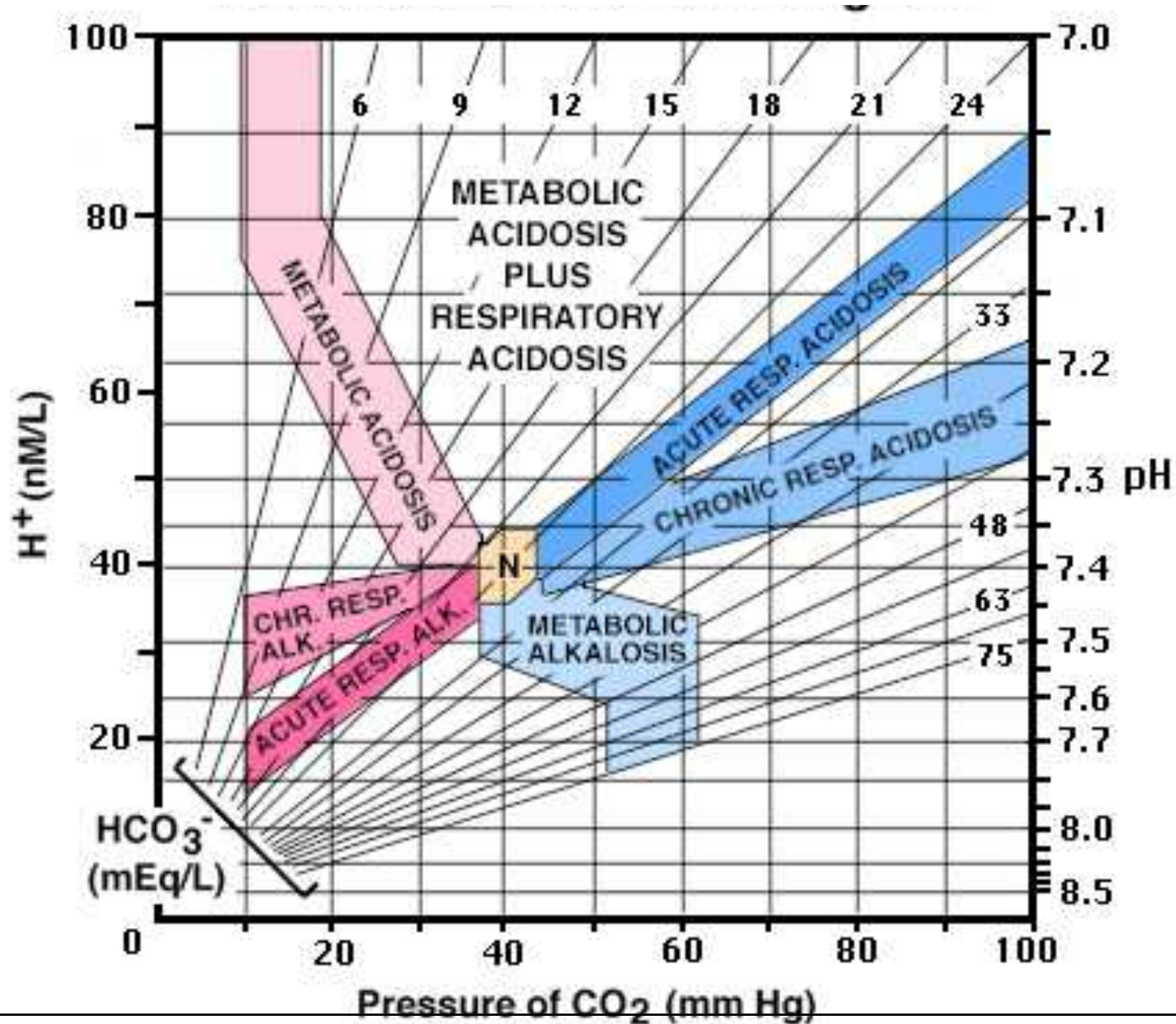
Pediatric ACLS (1)

- Defibrillation = 2 J/kg (double dose if unsuccessful)
- Cardioversion = 0.5 J/kg
- ET intubation: Cuffed or uncuffed acceptable
- ET size: $(16 + \text{age})/4$ = diameter of 5th finger
- Air leaks are normal with an uncuffed tube at peak inspiratory pressures
- Surgical cricothyrotomy is not recommended for children younger than 10 yrs
- Narrowest part of airway: cricoid cartilage
- Fluid resuscitation: 20 mL/kg NS boluses

Pediatric ACLS (2)

- Asystole is the most common arrest rhythm
- Epinephrine is the drug of choice in asystole
- Epinephrine is the inotrope of choice in children
- Bradycardia is 2nd most common arrest rhythm
- Always intubate, ventilate and oxygenate before giving drugs (“A-B-C” in children)
- Correctable causes of EMD: hypovolemia, tension pneumothorax, tamponade
- Vfib and Vtach are rare; think hyperkalemia, tricyclics, hypothermia

Acid-Base Blood Gas Diagram



Apgar Score

	Score of 0	Score of 1	Score of 2	Component of Acronym
Skin color	blue all over	blue at extremities body pink	normal	A ppearance
Heart rate	absent	<100	>100	P ulse
Reflex irritability	no response to stimuli	grimace/ feeble cry when stimulated	sneeze/cough/pulls away when stimulated	G rimace
Muscle tone	none	some flexion	active movement	A ctivity
Respiration	absent	weak or irregular	strong	R espiration

Additional Mnemonic: **How Ready Is The Child?**

H = heart rate, R = resp. effort, I = irritability, T = tone, C = color

Neonatal Resuscitation Priorities

- Dry, warm, positioning, suction, tactile stimulation
- Oxygen
- Bag-valve-mask ventilation
- Chest compression
- Intubation
- Drugs: epi, fluids, bicarb, naloxone, dopamine

Pediatric Pearls (1)

- Neonates increase respiratory volume almost exclusively by increasing their respiratory rate vs. increasing depth of ventilation (and are obligate nose breathers)
- Newborn infants, especially premature ones, can have periods of apnea. Spells lasting more than 20 second with bradycardia, cyanosis or a change in muscle tone warrant investigation
- Bradycardia in neonates is almost always due to hypoxia
- A respiratory rate over 60 or grunting should always be considered an emergency
- Fever of 39C (102.2) in the presence of a UTI = pyelonephritis (only 5-10% will have bacteremia)
- The incidence of bacteremia/sepsis in febrile children three months of age or less is about 2-3% (ill appearance or significantly abnormal labs [CBC] can have higher rates)
- Immunized children 3-36 months of age who are well appearing but febrile have bacteremia rates of 0.5-0.7%
- The incidence of meningitis in febrile infants less than three months of age is about 1%

Pediatric Pearls (2)

- The safest approach to febrile children less than 30 days of age is sepsis testing, admission and empiric antibiotics
- The AAP advises testing for a UTI in all febrile girls and in uncircumcised boys less than 2 years of age if there is no apparent focus of infection (one year in circumcised boys)
- Analgesics (oral or topical if no TM perf) is an important aspect of treating otitis media
- According to AAP guidelines, high-dose amoxicillin (80-90mg/kg/day) is the first line drug of choice for OM
- Variation in the pattern of stridor suggests a foreign body (are most common 1-3 yo) / Sudden onset is most reliable finding
- X-rays can confirm a FB but not exclude one / >75% are radiolucent
- Look for hemangiomas on the skin in a child with stridor as there may be a hemangioma in the airway causing it
- In a constipated child a rectal exam that reveals tonic constriction of the anus with an empty rectum suggests Hirschsprung disease
- Strep throat can cause abdominal pain in kids over 3 – check the throat

Pediatric Pearls (3)

- Although uncommon, a UTI can co-exist with a viral infection
- Nitrite testing has less sensitivity for a UTI when caused by Gram + bacteria
- In seizures lasting over 5 minutes unresponsive to benzos, the drugs of choice are fosphenytoin or phenobarbital / valproic acid has rarely caused liver failure
- Migraine headaches in children – rather sudden onset, intensify over 10 minutes, maximum at 1 hour
- About a third of migraines in children are unilateral
- Ergotamines should not be used in basilar or hemiplegic migraine (may decrease cerebral perfusion)
- Most serious causes of headaches will have concomitant neurologic findings
- In adolescents with altered mental status due to alcohol, concomitant hypoglycemia may also be present – look for it
- Blunt head trauma in children can be accompanied by diffuse cerebral swelling causing increase CSF pressure and altered mental status
- Children having concussions should not be allowed to participate in contact sports until cleared by another physician in follow-up

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Pediatric Pearls (4)

- Children presenting in metabolic crisis, regardless of cause, will have some combination of dehydration, metabolic acidosis and encephalopathy
- Don't give insulin and glucose to treat hyperkalemia in children – may result in severe hypoglycemia
- Unless clearly vasovagal, all children with syncope should have an EKG
- Syncope associated with exertion suggests a structural problem of the heart (aortic stenosis, coarctation of the aorta, hypertrophic cardiomyopathy)
- Other risk factors for serious causes of syncope – family history of sudden death, recurrent episodes (suggests arrhythmia), recumbent episodes (suggests arrhythmia), prolonged spells (hypotension with hypoperfusion of the brain), chest pain, palpitations, medications that alter conduction
- Loss of consciousness occurs simultaneously with shaking movements with seizures but after loss of consciousness with syncope
- Benzos should be considered second line drugs in the treatment of psychiatric disorders in children due to the potential to cause disinhibition

PEDIATRICS QUESTIONS

All but one of the following is classically associated with a mechanical cause for vomiting in an infant?

- A. Bilious vomiting
- B. Projectile vomiting
- C. A tender, tense mass under the diaper
- D. A low glucose and metabolic acidosis
- E. Current jelly stools

Which of the following is consistent with a high-risk ALTE?

- A. Occurred while the infant was awake
- B. Child became hypertonic and rigid
- C. No associated seizure activity
- D. Associated with feeding

A 2-year-old child presents with lethargy, high fever and a seizure. You position the child for a lumbar puncture and, in the process, notice a first episode of diarrhea with some blood in it. What is the most likely diagnosis?

- A. Rotavirus
- B. Salmonella
- C. Shigella
- D. E. coli
- E. Enterovirus

A neonate presents to the ED with jaundice. Which of the following considerations is the most important in determining the need for admission?

- A. The presence of greater elevations of direct reacting bilirubin in comparison to indirect reacting bilirubin
- B. A history of breast feeding
- C. A negative Coombs test
- D. Lack of evidence of hemolytic antibodies
- E. All of the above are similarly important

A 6-month-old child presents with low-grade fever, cough, wheezing and low-grade intercostal retractions. There is no family history of asthma nor any history consistent with foreign body aspiration. Which of the following is true of this disorder

- A. Albuterol aerosols are highly effective in most of these cases
- B. The addition of ipratropium to nebulization therapy produces substantial additional benefit
- C. The risk of apnea is directly related to the severity of disease
- D. Heliox is contraindicated in these patients
- E. All admitted cases require isolation

Peds 5

An 15-year-old with cystic fibrosis comes to your ED with what appears to be a severe chest infection. Which of the following is most typical of these patients

- A. They typically have the “pink puffer” pathophysiology in distinction to the “blue bloater”
- B. Bronchospasm is a primary pathology in these patients
- C. Respiratory failure is common in terminal patients
- D. Dehydration with concomitant hyperchloremic acidosis often accompanies other pathology in these patients
- E. Dysfunction of exocrine glands is the core pathology in this sex-linked genetic disorder

Regarding pertussis, which of the following statement is most correct?

- A. Vomiting frequently precedes coughing paroxysms
- B. Rarely lasts more than two weeks
- C. Most patients develop an inspiratory “whoop” with coughing
- D. Complications of increased intrathoracic pressure include rectal prolapse
- E. Children are the primary reservoir

Concerning pediatric meningitis, which of the following is a true statement?

- A. *Listeria* is most common after two months of age
- B. Steroids are unequivocally beneficial, particularly for decreasing mortality from *S. pneumoniae*
- C. N. meningitidis is associated with the highest mortality
- D. Chemoprophylaxis is appropriate for contacts of patients with most forms of meningitis
- E. Group B strep is acquired from the mother

A patient with a ventriculoperitoneal shunt presents to your ED. Things to remember about these patients include:

- A. Headaches may represent shunt dysfunction with decreased intracranial pressure
- B. Fevers in patients with shunts should cause one to consider meningitis which is generally caused by enteric pathogens from the gut.
- C. Resistance to compression of a pumping chamber is consistent with shunt obstruction
- D. As with benign intracranial hypertension, ventricle size is usually normal
- E. Most fevers associated with shunts occur more than six months after their insertion

A 15-year-old presents with recurring headaches over a six-month period. The CT scan and the CSF are normal except the pressure is significantly elevated. What would you expect to be additional considerations in this case?

- A. The patient can be expected to be a thin male
- B. Papilledema may be present on the eye exam
- C. Acetazolamide, furosemide or steroids are contraindicated
- D. Is rarely associated with tinnitus
- E. Visual acuity is a more sensitive measure of the progression of this condition than is visual field testing

Which of the following can be clues to the diagnosis of recurrent generalized seizures in a previously well, afebrile child?

- A. A newly positive PPD skin test in another family member who resides with the child
- B. A belief that forcing plenty of water will abort or treat childhood illnesses
- C. A 60-year old uncle who lives with the family who has had an amputation of the right foot
- D. A rhythm strip that shows a markedly prolonged QT interval
- E. All of the above

Peds 11

A 4-year-old child with episodic severe abdominal pain for the last three hours has the ultrasound study noted. What is a frequent associated finding with this disorder?

- A. A protruding mass into the bowel lumen
- B. A palpable mass in the left lower quadrant
- C. Bloody very soft stools is an early finding in this disorder
- D. Is a rare cause of bowel obstruction in a young child
- E. Is associated with projectile vomiting



Peds 12

Which of the following is appropriate therapy for “tet” spells in the setting of tetralogy of Fallot?

- A. Increase peripheral resistance
- B. Increase venous return
- C. Increase ventilatory efforts
- D. Avoidance of bicarbonate therapy
- E. Avoidance of sedation

Henoch-Schonlein purpura and hemolytic uremic syndrome have which of the following characteristics in common?

- A. Both are associated with low platelets
- B. Both are associated with characteristic skin lesions
- C. Both involve kidney dysfunction
- D. Both are caused by bacterial infections
- E. Both have abnormal aPPTs

A four-month old child presents with inconsolable crying. Which statement is most true related to this condition?

- A. Taking the diaper off may reveal multiple causes of inconsolable crying
- B. Colic is caused by feeding-related problems
- C. Assessing an infant for the presence of a corneal abrasion is routinely easily accomplished by a single provider
- D. Pain caused by a volvulus is associated with bilious vomiting
- E. Pain associated with an intussusception is characterized by constant, unrelenting crying

Peds 15

Which of the following is a true statement concerning pediatric gastroenteritis?

- A. A check for hypoglycemia should be routine in patients with gastroenteritis
- B. Moderate dehydration should routinely be treated with IV fluids
- C. Because viral enteritis is caused by viruses invading GI cells, occult blood is routinely found in these cases
- D. Age-appropriate diet should not be instituted until it is clear the child can tolerate the BRAT diet (bananas, rice, apples, toast)
- E. Dehydration should be treated conservatively (half of deficit over 8 hours, the remainder over 16 hours)

Peds 16

**A 20kg child presents with dehydration.
What is the approximate maintenance fluid
that is required over a 24 hour period?**

- A. 500ml
- B. 1000ml
- C. 1500ml
- D. 2000ml
- E. 2500ml

A child is clinically dehydrated. Which of the approximate fluid deficits are correct.

- A. Mild dehydration represents a loss of 3-5% of body weight and a fluid deficit of approximately 50ml/kg
- B. Moderate dehydration represents a loss of 6-9% of body weight and a fluid deficit of approximately 100ml/kg
- C. Severe dehydration represents a loss of greater than 9% of body weight and a fluid deficit of approximately 150ml/kg
- D. All of the above statements are correct
- E. At least one of the above statements is incorrect

Which of the following is a true statement regarding pediatric cardiac arrests?

- A. Most are caused by ventricular tachycardia or fibrillation
- B. Dopamine is the inotrope of choice
- C. Early use of drug therapy has been determined to be an essential part of successful resuscitation of pediatric arrests
- D. Contrary to adult CPR, bicarbonate therapy is associated with improved outcomes
- E. Electromechanical dissociation may be associated with decreased breath sounds on one side of the chest and tracheal deviation to the opposite side

What is the APGAR score of a neonate with the following characteristics – heart rate 90, strong respiratory efforts, decreased muscle tone, bluish extremities, feeble cry on intranasal catheter stimulation?

- A. 2
- B. 4
- C. 6
- D. 8
- E. 10

Pediatrics Answer Key

- | | |
|-------|-------|
| 1. D | 11. E |
| 2. D | 12. A |
| 3. C | 13. A |
| 4. A | 14. C |
| 5. E | 15. A |
| 6. C | 16. A |
| 7. D | 17. C |
| 8. E | 18. D |
| 9. C | 19. E |
| 10. B | 20. C |

Question 20 – Answer Explanation

The Five Criteria				
	Indicator	0 point	1 Point	2 Points
A	Skin Color	Pallor or <u>Cyanosis</u>	<u>Acrocyanosis</u> (Blue extremities, Body pink)	NO CYANOSIS/ Body and extremity skin color NORMAL
P	Pulse Rate	ABSENT	Less than 100 beats per minute	More than 100 beats per minute
G	Reflex Irritability	NO RESPONSE	MINIMAL RESPONSE to stimulation	Responds promptly with a cry or active movement
A	Muscle Tone	FLACCID, Limp	Minimal <u>Flexion</u> of Extremities	Good <u>flexion</u> , active motion
R	Respiratory Rate	ABSENT	Slow, irregular, weak cry	Good, vigorous cry