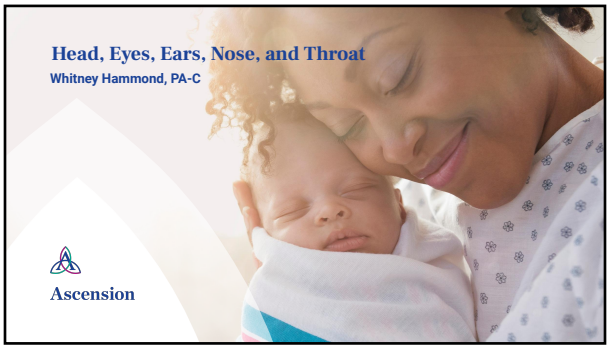


I have no conflict of interest to disclose

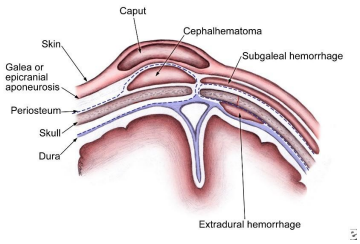
Objectives

- At the conclusion of this presentation, participants will be able to
  - Explain importance of eye prophylaxis
  - Understand the presentation, management, and complications of common NICU problems including but not limited to: cephalhematoma, choanal atresia, cleft palate/lip, ROP, and esophageal atresia.

Eye Prophylaxis

- Rationale: prevention of gonococcal ophthalmia
  - Occurs in approximately 28% of newborns delivered to women with gonorrhea
  - If untreated, can cause scarring and blindness
- Erythromycin 0.5% ophthalmic ointment
- Indicated in all newborns
- Timing: within 24 hours of birth
- Recommended by the U.S. Preventative Service Task Force (USPSTF)
- Infants at increased risk
  - Maternal history of sexually transmitted disease
  - Substance abuse
  - Poor or no prenatal care

Birth Trauma



Caput Succedaneum

- Presentation
  - Diffuse edematous swelling of soft tissues of the scalp that may extend across suture lines but is usually unilateral
  - Can elicit pitting edema by putting firm pressure to area
  - Can have overlying petechiae, purpura, or ecchymosis
- Etiology
  - Secondary to pressure of the uterus or vaginal wall during delivery, affecting the presenting portion of the scalp that was presenting part during delivery.
- Management
  - Observation, resolves in few days to week
  - Imaging should be considered in large caput that doesn't diminish in 48-72 hrs or with enlargement of swelling after 24 hrs of delivery
- Complications
  - Rarely, a hemorrhagic caput may result in shock and require a blood transfusion

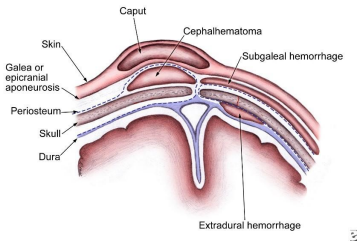
Cephalhematoma

- Presentation
  - Swelling of the scalp that is fixed and does not cross suture lines
  - Usually occurs over one or both parietal bones
  - Subperiosteal bleeding is slow, swelling may not be apparent for several hours or days after birth
- Etiology
  - Bleeding between the skull and periosteum
  - Secondary to fetal skull against the maternal pelvis during prolonged or difficult labor and/or trauma caused by use of forceps or vacuum
- Management
  - Close observation
  - Most resolve spontaneously in 3-4 weeks
- Complications
  - Hyperkalemia and hyperbilirubinemia
  - < 5% are associated with skull fractures
  - Intracranial hemorrhage
  - When hematoma doesn't spontaneously resolve, it may organize and calcify which can prolong resolution

Subgaleal Hemorrhage

- Presentation
  - Diffuse edematous swelling of the scalp
  - Can cross sutures lines and spread to neck or ear
  - Progresses after birth
  - When pressure is placed, a fluid wave can be appreciated
- Etiology
  - Bleeding in the area between to scalp and the skull (very large space which can accomodate the entire neonatal blood volume)
  - Occurs between the cranial aponeurosis and periosteum
  - Can be caused by asphyxia, vacuum extraction, forceps, or coagulopathy
- Management
  - Very close observation
  - Replace blood volume
  - Correct any coagulopathy
- Complications
  - Can be life-threatening (hypovolemic shock, DIC, multisystem organ failure, and death in 25% of cases)

Birth Trauma



Choanal Atresia

- Presentation
  - Respiratory distress, cyanosis
  - Degree of distress varies, from severe asphyxia to cyanosis only with sucking
  - Diagnose via inability to pass a 6 F catheter into the nasopharynx
    - CT scan is needed to determine stenosis vs. atresia and boney vs. soft tissue membrane
- Etiology
  - True atresia is complete and bilateral
  - Congenital blockage of the posterior nares caused by either a boney septum (90%) or soft tissue membrane (10%)
  - Blockage can be a total upper airway obstruction or partial (stenosis)
- Management
  - Making baby cry will cause mouth breathing and temporarily relieve respiratory distress
  - If severe, an oral airway
  - Definitive management is surgical (resection of the obstruction, stenting)

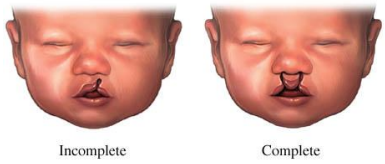
Choanal Atresia

- Complications/Associations
  - -CHARGE syndrome
    - *Autosomal dominant*
    - ***C**oloboma, **h**eart defects, choanal **a**tresia, **r**estricted growth, **g**enital abnormalities, **e**ar anomalies*
-

Cleft Palate and/or Lip

- Presentation
  - Opening or a split in the roof of the mouth or the lip
- Etiology
  - Failure of midline fusion
  - Unilateral clefts are usually an isolated finding
  - Bilateral or midline are sometimes associated with midline defects (brain)
  - Isolated cleft palate is different genetically from cleft lip
- Management
  - Haberman nipple (activated by tongue and gum pressure)
  - Obturator (temporarily closes cleft palate)
  - Surgery
- Complications
  - Feeding issues, speech problems, and frequent ear infections

Cleft Palate and/or Lip - Complete vs. Incomplete

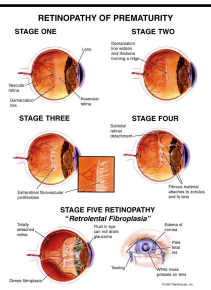


Incomplete Complete

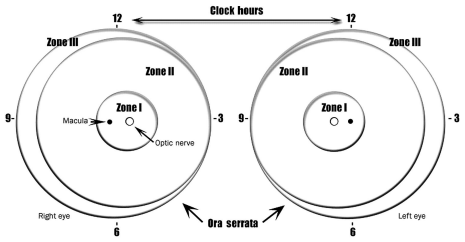
Retinopathy of Prematurity

- Presentation
  - Asymptomatic disease
- Risk factors
  - Extreme prematurity, low birth weight, oxygen therapy, hypoxia
  - Screening in all infants <30.6 weeks gestation or <1500 grams
- Etiology
  - There are two phases of development of ROP
    - *Vasoconstriction (occurs in response to high oxygen and low IGF)*
    - *Vasoproliferation (development of new vessels)*
- Management
  - Prevention: oxygen target saturations
  - Screening eye exams
  - Treatments available to prevent progression: laser treatment, cryotherapy, intravitreal bevacizumab injection
- Complications
  - Strabismus, visual disturbances, blindness

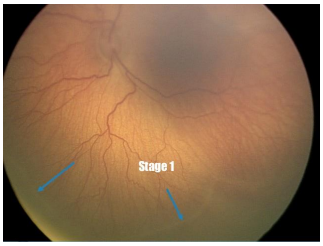
Retinopathy of Prematurity



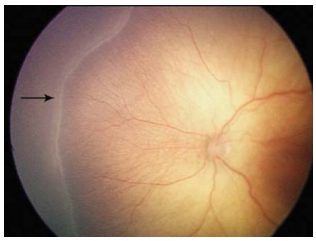
Retinopathy of Prematurity



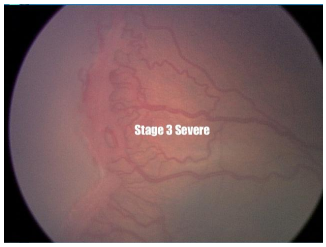
Retinopathy of Prematurity - Stage 1



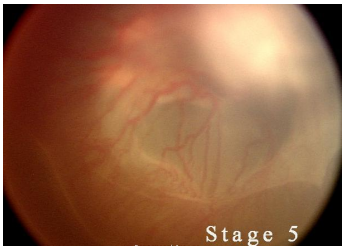
Retinopathy of Prematurity - Stage 2



Retinopathy of Prematurity - Stage 3



Retinopathy of Prematurity - Retinal Detachment



Retinopathy of Prematurity

- Outcomes
  - 90% of stage 1 and stage 2 will regress spontaneously
  - Current literature suggests ~50% of stage 3 will regress spontaneously

Tracheal Stenosis and Atresia

-Presentation
  -Respiratory distress, stridor, cyanosis, apnea
-Etiology
  -Can be acquired stenosis (due to ET tube trauma), congenital stenosis due to a web, abnormal cartilage, or tracheal ring
-Management
  -Balloon dilation
  -Laser ablation
  -Surgical resection
-Complications
  -Tracheal atresia is uniformly fatal
-Outcomes
  -Infants with pulmonary abnormalities have poorer outcomes

Tracheomalacia

-Presentation
  -Expiratory stridor and/or wheezing

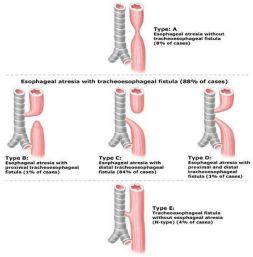
-Etiology
  -Defective cartilage support that causes expiratory collapse of the airway

-Management
  -Close observation if mild, usually resolves with time and growth
  -In severe cases, tracheal stents, aortopexy, or tracheostomies

Vocal Cord Paralysis

-Presentation
  -Weak cry, stridor, poor feeding and/or aspiration
-Etiology
  -Due to injury or damage to the nerve that innervates the vocal cord
  -Can be unilateral or bilateral
  -Most commonly due to nerve injury with heart surgery or TEF repair
  -Can occur with traumatic delivery
-Management
  -If mild, conservative management, most will resolve with growth and time
  -Thickening oral feedings or alternative feeding tube
  -Severe cases, surgery
-Complications
  -Most infants fully recover and have no long term issues with their voice
  -If severe and untreated, can have lifelong communication issues

Tracheoesophageal Fistula (TEF)



Tracheoesophageal Fistula (TEF)

- Presentation
  - Prenatally, mother may have polyhydramnios (fetus unable to swallow amniotic fluid)
  - Infant unable to manage oral secretions, frequent suctioning
  - Oral feedings result in coughing, choking, and cyanosis
  - Diagnosis: Inability to pass nasogastric tube beyond 10-12 cm. Chest x-ray will show curing of the nasogastric tube. Air in the GI tract confirms distal fistula

- Etiology
  - Abnormal embryological development
  - The trachea and esophagus share a common forgut precursor which become separated during development

Tracheoesophageal Fistula (TEF)

-Management
  -Place replogle to low intermittent suction to evacuate proximal pouch
  -Obtain echocardiogram to assess for any cardiac or aortic arch anomalies
  -Surgery via thoracotomy with fistula ligation and esophageal anastomosis

-Complications
  -Stricture
  -Increase risk for reflux
  -VATER/VACTERL
    - *Vertebral defects, anal atresia, tracheoesophageal fistula, and radial or renal dysplasia*
    - *Vertebral defects, anal atresia, cardiac anomalies, tracheoesophageal fistula, renal dysplasia, limb anomalies*

Esophageal Atresia

-Type A or “pure” esophageal atresia
-No fistula
-Similar presentation, without distal air in the GI tract

-Management
  -Higher risk for a long gap between the proximal and distal esophageal pouches
  -If long gap is present, surgical correction is usually delayed to allow growth of the segments
  -A gastrostomy tube is placed for enteral nutrition

Micrognathia

-Presentation
  -Excessively small/recessed mandible
-Etiology
  -Familial
  -Genetic disorders (trisomies, Turner Syndrome, Progeria, Treacher-Collins)
  -Pierre Robin Sequence (micrognathia, glossoptosis, and cleft palate)
  -Stickler Syndrome (can occur in conjunction with Pierre Robin) –visual issues, hearing defects, skeletal abnormalities, flattened face
-Management
  - Prone positioning
  - Nasopharyngeal airway
  - Mandibular distraction
  - Tracheostomy
-Complications
  -Respiratory distress, abnormal tooth alignment, feeding difficulties

Tracheostomy

-Indications
  -Bronchopulmonary Dysplasia (BPD), subglottic stenosis, tracheomalacia, Pierre Robin Syndrome, tumors such as cystic hygroma
-Types
  -Double-cannula tubes
  -Single –cannula tubes
    • *Used most commonly for infants and small children*

-Humidification must be provided
  -Tracheostomy bypasses nose and mouth, which provides warmth
  -Humidification keeps secretions thin and helps previous plugs

Tracheostomy

- Management
  - Daily skin care around site
  - If dressing is present, change daily
  - Change tracheostomy ties as needed –when soiled, wet, or loose
  - Change tracheostomy tube every 1-4 weeks
- Complications
  - Respiratory distress due to mucus plug
  - Tissue pressure or necrosis
  - Bleeding
  - Infection
  - Tracheitis (infection that develops due to inadequate humidification)

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