Neonatal Sepsis

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Objectives

• Be able to identify risk factors for infection
• Be aware of common neonatal infections
• Be able to identify physical exam findings that are worrisome in the newborn population

Outline

• Definition, incidence, mortality, epidemiology
• Cases 1 – 3
  o History, PE, Laboratory findings
  o Review of neonatal normals (BP, HR, RR, Saturations)
  o Infectious Differential Diagnosis
  o Treatment
Definition

- Systemic illness attributed to infection by positive culture or other markers
- Occurs within the first month of life
- Early onset
  - usually < 24 hours of birth
  - up to 7 days of life
- Late onset
  - > 7 days of life


Incidence and mortality

- Overall 1-5/1000 live born infants
- 15-19/1000 for those infants with birth weight under 1500 grams
- Mortality rate 13-25%
  - higher rates in premature infants and early fulminant disease


Epidemiology

- In utero
  - GBS, Hepatitis B, Hepatitis C, HIV, Rubella, CMV, toxoplasmosis, lysteriosis, syphilis, (herpes)
- Intra partum
  - GBS, Herpes, Gonorrhea, Chlamydia, Hepatitis B, Hepatitis C, HIV
- Post partum
  - Herpes, GBS, HIV, Hepatitis B
Many acquired with ascending infection

[Image of ascending infection]


Normal heart rate


Normal respiratory rate

Normal systolic and diastolic blood pressures


Example of Retractions, grunting

- https://www.youtube.com/watch?v=J2R8MOoQtd8
Chlamydia

- Antibiotic options and risks?
  - erythromycin 50 mg/kg/day PO QID x 14 days
  - azithromycin 20 mg/kg/day PO Daily x 3 days
  - risk infantile hypertrophic pyloric stenosis


Sexually transmitted diseases treatment guidelines, 2015.

Chlamydia incidence and prevalence

- Prevalence of C. trachomatis in pregnant women 2–20% highest in adolescent and young adults
- Vaginal birth to infected mother risk ~ 50%
- Neonatal-acquired conjunctivitis 20–50%
- Neonatal pneumonia 5–30%

Pammi, M. Chlamydia trachomatis infections in the newborn. In: UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed on August 10, 2015.)

Chlamydia Testing

- Culture "gold standard"
  - specificity and sensitivity of culture ~ 100%
  - long turn around time
- PCR's
  - close to 100% sensitivity and specificity
  - short turn around time
Chlamydia conjunctivitis

- Develops 5-14 days of life
- Eye redness and tearing progresses to secondary infection as traction damage allows an entry point for bacteria
- Leading cause of preventable blindness worldwide
- Eye prophylactic antibiotics after birth

Chlamydia pneumonia

- ½ have history of conjunctivitis
- Often preceding URI symptoms prior to pneumonia
- Diagnosis made by 4-12 weeks of age
- Minimal to no fever, staccato cough, tachypnea, apnea (if premature)

Streptococcus agalactiae
Group B Streptococcus.

- Most common early onset neonatal infection along with Gram negative rods (E. Coli)
- 1000 infants/year acquire early onset GBS
- 4-6% affected infants die although meningitis complicates some survivors (more common in late onset)

http://www.cdc.gov/groupbstrep/about/newborns-pregnant.html

Group B streptococcus

- 15-40% women carry GBS in cervovaginal area
- 0.2% of infant affected if mother untreated
- 4% false negative rate on maternal GBS screen done at 35-37 weeks gestation
  - 60% of early onset GBS infections occur in these women


Group B streptococcus

- Risk factors for GBS
- Delivery at less than 37 weeks of gestation
- Premature rupture of membranes at any gestation
- Rupture of membranes for 18 or more hours before delivery
- Chorioamnionitis
- GBS bacteriuria during the current pregnancy
- Temperature ≥38°C, or 100.4°F, during labor
- Prior delivery of an infant with GBS disease

HSV incidence and prevalence

- Incidence: 1/3000 to 20,000 live births
- US 1,500 cases of neonatal HSV infection/year
- >75% infants with HSV infection born to mothers w/o history or clinical findings of genital HSV infection during or preceding pregnancy
- 1st maternal genital infection infant risk ~ 25-60%
- Reactivated maternal infection with viral shedding infant risk ~ 2%

Demmler-Harrison, Gail J Neonatal herpes simplex virus infection: Clinical features and diagnosis Management and prevention. UpToDate, Post, TW (Ed), UpToDate, Waltham, MA, 2015.

Red Book http://aapredbook.aappublications.org/cgi/content/full/2009/1/3.57
HSV virology

- Infects sensory nerve endings
- Transported via retrograde axonal flow to the dorsal root ganglia
- Lifelong infection

Red Book
http://aapredbook.aappublications.org/cgi/content/full/2009/1/3.57

HSV classification

- Neonatal HSV may be classified into three main categories for therapeutic and prognostic considerations
  - Localized skin, eye, and mouth (SEM)
  - Central Nervous System infection
  - Disseminated Disease

Demmler-Harrison, Gail J Neonatal herpes simplex virus infection: Clinical features and diagnosis Management and prevention. UpToDate, Post, TW (Ed), UpToDate, Waltham, MA, 2015.


Signs and symptoms of neonatal herpes simplex virus infection

Demmler-Harrison, Gail J Neonatal herpes simplex virus infection: Clinical features and diagnosis Management and prevention. UpToDate, Post, TW (Ed), UpToDate, Waltham, MA, 2015.
HSV testing and treatment

- Mucus membrane culture and blood/CSF PCR for herpes
  - Eye, nose, mucus membranes, and umbilical area and any concerning skin lesions
- Acyclovir: 60 mg/kg/day
  - IV divided every 8 hours

Red Book
http://aapredbook.aappublications.org/cgi/content/full/2009/1/3.57

Objectives Review

- Be able to identify risk factors for infection
  - Fever PTD
  - Negative pre-natal labs or history
  - Preterm and prolonged ROM
- Be aware of common neonatal infections
  - GBS, HSV, Chlamydia
- Be able to identify physical exam findings that are worrisome in the newborn population
  - Outside of normal HR, RR, Blood pressures

Unanswered questions?

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- Children’s One Call:
  1-800-525-4871