**NICU Early Onset Sepsis (EOS <72 hours of life)**

**Risk Factors for EOS:**
- + blood or CSF culture within 72 hours of birth > 35 wks gestation.
- Chorioamnionitis/intra-amniotic infection (IAI)
- Prolonged rupture of membranes (ROM) >18 hours
- Maternal GBS colonization
- Lack of administration of appropriate intrapartum antibiotics if indicated ≤ 34 6/7 weeks gestation.

**Higher Risk Factors:**
- Delivery due to cervical incompetence
  - Preterm labor
  - Premature ROM
  - Chorioamnionitis/IAI

**Lower Risk Factors:**
- Obstetric indications for preterm delivery (spectrum of maternal-hypertensive disorders, worsening maternal health, etc.)
- Birth via c-section
- Absence of labor, absence of attempt to induce labor, or absence of ROM prior to delivery

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**NICU Patient < 72 hours of age at risk for early onset sepsis**

- **Need for sepsis evaluation recognized by team member**

  - **Team huddle:**
    - Bedside RN
    - Team Leader
    - LIP

  - **Initial Workup**
    - Consider congenital heart disease*
    - Obtain IV access, consider NS bolus
    - Perform lumbar puncture (CSF PCR/cultures)
    - CBC, blood cultures
    - Consider HSV studies
    - Antibiotics: Administer ASAP (goal within 60 minutes)

  - **Antibiotic Recommendations**

  - **For ongoing management of septic shock consider:**
    - Fluid Resuscitation
    - Pressors
    - Steroids

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**NICU specific antibiogram**

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**Conventional Heart Disease** can present similar to sepsis

For neonates < 2 weeks of age with perfusion abnormality and hypotension, consider:
- Evaluating for ductal dependent lesion (monitor pre- and post-ductal saturations)
- Cardiology consult
- ECHO
- Initiating prostaglandin infusion

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* Last Updated 11/1/2022

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*Note: The diagram includes a flowchart with decision points for low suspicion, suspect infection without organ dysfunction, and severe sepsis or septic shock. It outlines the initial workup and management steps for each scenario, emphasizing the importance of timely antibiotic administration and ongoing monitoring.*
Early Onset Sepsis Evaluation & Antibiotic Recommendations

Evaluation:
- CBC at 6 – 12 hours of life (HOL); if > 12 HOL, collect specimen at evaluation initiation
- Consider LP and CSF studies
  - Positive blood culture
  - If not pretreated with antibiotics: gram stain and culture are first priority
  - If pretreated with antibiotics: CSF and cell count are first priority
  - Apnea in preterm/term infant
  - Suspected/confirmed seizures
  - Critically III appearing infant
- Consider HSV studies and Acyclovir
  - HSV 1&2 NAAT surface cultures, HSV PVR plasma, CSF sample for HSV PCR, ALT
- In the case of multiples, if one infant is diagnosed with EOS, the other infant(s) should be monitored closely and evaluated/treated empirically if any sign of illness occurs due to increased risk factors
- If a patient has a central line in place at the time of a positive blood culture, removal of the line should be considered unless additional intravenous access is not available

Antibiotic Management:
- Ampicillin 100 mg/kg/dose IV Q8 hours
- Gentamicin 4 mg/kg/dose IV Q36 hours < 28 weeks OR Q48 hours ≥ 28 weeks

Negative Cultures WITH concern for clinical sepsis:
- Suspected sepsis based on clinical status and other lab results, but without a positive culture, should be treated with Ampicillin and Gentamicin for 7 days
- Therapeutic drug monitoring of Gentamicin as listed below

Negative Cultures WITHOUT suspicion for clinical sepsis:
- If blood culture (+/- CSF culture) is obtained appropriately and prior to the initiation of antibiotics, should continue for a minimum of 48 hours pending results
- At 48 hours, unless there is a site-specific infection and if the sterile body culture(s) remain negative, antibiotics may be discontinued
- The infant and sterile culture results should be monitored for any change in status

Positive cultures:
(Therapeutic Drug Monitoring of Gentamicin)

Indicated for patients continuing on Gentamicin for > 48 hours due to either suspected clinical sepsis or culture-positive sepsis:
- Draw trough level if therapy is to continue > 3 days or if the patient is critically ill to ensure non-toxic level
- Check a trough with 3rd or 4th dose, after dose adjustment, or if renal function changes significantly
- Timing of serum samples:
  - Draw trough immediately before dose is given (normal trough < 1.5 mg/L)
  - Draw peak 30 min after infusion is complete. Discuss results with pharmacist
- If both peak and trough are drawn, recommend obtaining both levels around same dose (trough, dose, peak) to achieve most accurate kinetics
- Please check with pharmacist with any questions concerning levels and goals of therapy

Group B Strep
- Ampicillin is drug of choice
- 10 days from first negative blood culture (2 negative blood cultures before discontinuing Ampicillin)
- 14 days minimum for meningitis
  - Consult Infectious Disease
  - Consider repeat LP 24-48 hours into therapy
  - Close follow-up testing (hearing, neurologic, development) for any patient diagnosed with meningitis

Listeria
- Combination therapy of Ampicillin and Gentamicin is recommended
- 14 days for bacteremia
- 21 day minimum for meningitis
  - Consult Infectious Disease
  - Consider diagnostic imaging near end of treatment course to assess for parenchymal involvement

Other Gram-Positive Organisms (i.e., Enterococcal and other Streptococcal species)
- Initial empiric therapy with Ampicillin and Gentamicin (should be continued with coverage narrowed based on susceptibilities)
- *Varying degrees of resistance warrants Infectious Disease consult

Gram-Negative Organisms
- Bacteremia alone should be treated with Ampicillin and Gentamicin, or a cephalosporin (i.e. cefepime) based on susceptibilities for 10 – 14 days
- Meningitis should be treated with Ampicillin or a cephalosporin (i.e. cefepime) based on susceptibilities for a minimum of 21 days
  - Gentamicin should be considered initially if in combination with a cephalosporin as empiric therapy until susceptibilities are available
  - Consult Infectious Disease to guide meningitis treatment
  - Consider repeat LP 24 – 48 hours into therapy
- Close follow-up testing (hearing, neurologic, development) is warranted for patient treated for gram-negative meningitis
- ID consult recommended for any infection involving multi-resistant organisms or ESBL-producing infection

Fungal Infections = IMMEDIATE Infectious Disease consult
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