**Neonatal ICU: Empiric Antibacterial Therapy Guidelines**

**It is important to re-evaluate antibiotic treatment every 12-24 hours based on clinical and laboratory changes. Discussion of antibiotic treatment should occur with every handoff.**

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| **1. Suspected early-onset sepsis 🡪**  **(age less than 7 days)** | **ampicillin + gentamicin(1,2)** |

**2. Late Onset:**

Footnotes:

1. Maternal antibiotic therapy/special cases (immunocompromised, colonized with resistant organism): When antibiotics have been administered to the neonate’s mother for 3 or more days prior to delivery or if the mother has recently had a urinary tract infection, consider use of cefotaxime (instead of gentamicin) due to the possibility of infection with an ampicillin- and gentamicin- resistant Gram-negative bacillus. Be sure to review the mother’s antibiogram and call Pediatric Infectious Diseases for specific cases with more resistant infections.
2. Early-onset meningitis: Ampicillin + gentamicin are optimal for empiric therapy of suspected Group B streptococci or *Listeria meningitis* and should be continued if confirmed and an ID consult called to help optimize treatment. If a gram-negative organism is identified then change therapy as appropriate to avoid gentamicin toxicities and to cover appropriately, given sensitivities. (<http://www.ncbi.nlm.nih.gov/pubmed/20539251>)
3. Suspected intra-abdominal infection: This applies to early AND late-onset sepsis and would include stage 2 NEC or greater OR other suspected intra-abdominal pathology (post-operative infection, perforation, etc.)
4. Use of vancomycin: Vancomycin is indicated for Late-Onset Sepsis (LOS) if there is a deep line present (eg. PICC), if there were recent recurrent IV attempts, or any suspicion of or evidence of skin or skin-structure infection (SSSI). If none of these is present, ampicillin and gentamicin remains acceptable treatment for LOS. Re-evaluate based on clinical status and growth of cultures.
5. Late-onset meningitis: When meningitis is proven or highly suspected in a baby with nosocomial late-onset sepsis, administer cefotaxime as first line. This choice is based upon activity against nosocomial gram-negative bacilli (*as well as Group B streptococci, Streptococcus pneumoniae, Neisseria meningitidis)*. If *Listeria monocytogenes* is suspected (e.g., Gram-positive bacilli seen on CSF gram-stained smear), ampicillin should be added. Therapy for bacterial meningitis should be changed to an appropriate narrower spectrum agent (e.g., penicillin for Group B streptococci; cefotaxime for susceptible *E. coli*) once CSF culture results is available. ID consults are recommended with positive CSF cultures.
6. Resistant organisms: Empiric antimicrobial therapy for an infant known/suspected to be colonized with or convalescing from a recent infection with an antimicrobial-resistant pathogen, e.g., a gentamicin-resistant *E. coli*, should include an agent to which the pathogen is susceptible.
7. Use of nephrotoxic antibiotics with vancomycin: In cases of AKI or CKD, the combination of Zosyn + vancomycin or gentamicin + vancomycin should be avoided because of the potential for synergistic nephrotoxic effects. Use cefepime/flagyl in place of Zosyn or cefotaxime in place of Gentamicin if vancomycin must be prescribed. If using vancomycin or Gentamicin in renal compromise, dosing will need to be adjusted for adequate levels. Call Pediatric ID or pharmacy for assistance with this.

**Follow-up antibiotic therapy guidelines:**

1. These guidelines are for *empiric* therapy. Once culture results have been obtained, antimicrobial coverage should be modified to the appropriate most narrow spectrum agent(s).
2. Most often, antimicrobials for admission r/o sepsis can be discontinued after 36-48 hours. Clinical improvement is not generally an adequate reason for continuing vancomycin in the absence of a pathogen requiring therapy with vancomycin. (http://pediatrics.aappublications.org/content/129/5/1006.full)
3. Consider neonatal HSV infection in all neonates with suspected sepsis, especially in infants not responding to empiric antibiotic therapy, infants with high fever, infants with papular or papulovesicular skin lesions, infants with seizures, and rarely, infants with respiratory distress and pneumonia. Send blood for HSV PCR, CSF for HSV PCR, and HSV culture swabs from 4 sites (eye, oral, peri-rectal and axilla). CSF and blood studies for herpes can be performed after empiric antivirals have started.
4. Consider empiric anti-fungal therapy for systemic infection due to *Candida* spp. in infants with late-onset sepsis when blood cultures are negative and the baby is not responding to anti-bacterial antibiotic therapy. High-risk infants for candidiasis include gestational age of <27 weeks, new onset thrombocytopenia, and corticosteroid therapy. Pediatric Infectious Diseases should be consulted in these cases.
5. Vancomycin trough levels should be obtained after the third dose. Generally, trough levels should be >10 mcg/mL for skin, soft tissue infections and >15 mcg/mL for sepsis or meningitis. Max trough should be 20 mcg/mL. Peak levels are not needed.
6. Gentamicin peak and trough levels should be obtained after the third dose.