UC DAVIS HEALTH | CHILDREN'S HOSPITAL

NICU Antibiotics Guidelines

Clinical Concern	Initial Regimen	Considerations	Duration
Early Onset Sepsis (< 72 hours) - Common: GBS, E. Coli - Less common: Other Strep species, Enterococci, other enteric gram negatives, anaerobes - Rare: Listeria, Staph aureus, fungal	1. **Ampicillin + Gentamicin** → First Line	Notes: -Fungal infections should be particularly considered in <28wk with systemic illness, +/- thrombocytopenia -Review Maternal History, any pending cultures and/or placenta pathology	- 36 hours initial, reassess after positive cultures. -Consider a 5-7day course if highly concerned for culture-negative sepsis. *If < 25^0 wks: 7d - 10 *if ≥25^0 wks: 5-7d *Course is up to clinical discretion. Consider discussion with ID stewardship team.
Late Onset Sepsis (> 72 Hours) - Common: CONS, Staph aureus, E coli, Klebsiella - Less common: Enterococcus, GBS, Enterobacter, Pseudomonas, Serratia	1.**Vancomycin + Gentamicin** → First Line (consider ceftazidime if patient has nephrotoxicity) 2. **Vancomycin + Cefepime** →Second line (needs ASP approval during daytime hours) 3.**Meropenem** → For severe illness not responding to first or second line therapy -->Consult NICU Attending AND	Notes: -Fungal infections should be particularly considered <28wk with systemic illness, +/- thrombocytopenia -Review Maternal History, any pending cultures and/or placenta pathology	- 36 hours initial, reassess after positive cultures. - Consider 5-7 day* course if highly concerned for culture-negative sepsis. *If < 28 wks, 7d *if >28 wks, 5-7d -Stop vancomycin if MRSA negative and cultures negative for resistant gram positive after 36 hours

	Infectious Disease when escalating to Meropenem		
Meningitis - Common: GBS, E. Coli, Gram neg enteric Bacilli - Less Common: CoNS, Enterococcus, Listeria, S Aureus, Other Strep species, Candida albicans	1.(<72 hr. old) **Ampicillin + Ceftazidime** 2.(>72 hr. old) **Vancomycin+ Ceftazidime +/-acyclovir**	Notes: - Of the organisms listed the MEP will only detect GBS, K-1 strain of E coli, Listeria, and HSV. It will not detect Staph species, Enterococcus, other enteric gram negatives. -If questions on how to prioritize limited CSF studies consider discussing with ID or stewardship	- 48 hours initial, then discuss with ID if positive cultures or suspected infection
Pneumonia - Common: GBS - Less Common: Enterobacter, Klebsiella, Pseudomonas, Staph, Serratia, Chlamydia - Consider viral pathogens	1. (<72 hr. old) **Ampicillin + Gentamicin** 2. (>72 hr. Old) **Vancomycin + Gentamicin** 3. **Vancomycin + Cefepime or Ceftazidime** Second line 4. **+ Metronidazole** → if concerned for Aspiration, recommendation to discuss with Peds Stewardship 5. **Azithromycin** → Chlamydia trachomatis	Notes: - Other potential organisms include Mycoplasma and Ureaplasma. Unclear if treatment for these is beneficial.	- Consider 5-day course for culture negative pneumonia. - Consider 7-day course for confirmed hospital or ventilator associated pneumonia. -Stop vancomycin if MRSA swab negative and blood and resp cx (if sent) do not grow a resistant gram positive.
Skin, Soft Tissue - Common: S. Aureus, GBS,	1.**Vancomycin**	-Vanco trough goal of 10-15	

GAS	→ Use for MRSA colonization 2.**Cefazolin** → Use for all MRSA negative infants or unknown MRSA status 3. **Vancomycin + Gentamicin** (consider ceftazidime if patient has nephrotoxicity) → Use for surgical site infections		
GI Tract - E. Coli, Klebsiella, Gram Neg Bacilli, Clostridium, Bacteroides	1a**. Ampicillin + Gentamicin** +/- (Metronidazole*) → first line 1b. **Vancomycin + Gentamicin** +/- (Metronidazole*) → Consider for infants with known MRSA colonization 2. **Piperacillin-tazobactam** (+/- Vancomycin if known MRSA colonization) → Alternative to #1 or #2 if limited access/ compatibility Note: Adding vancomycin with piperacillin-tazobactam has added risk of nephrotoxicity. Could probably do piperacillin-tazobactam monotherapy for many babies. Obtain ASP		- Stop vancomycin and start ampicillin after 48 hours if negative blood culture. - Typical duration is 7 days, though some infants may need longer

	approval during daytime hours. 4. **Meropenem** → For severe or rapidly progressing systemic illness or known history of ESBL → Consult NICU Attending AND Infectious Disease when escalating to Meropenem 5. **Metronidazole** → Add for concern for perforation or Bells 2a or greater (Requiring a Vasopressor, acidosis, thrombocytopenia) 6. **+/- Fluconazole** → Consider for concern for or history of esophageal perf or extreme prematurity		
<u>GU Tract</u> - E. Coli, Klebsiella, Enterococcus	1.**Ampicillin + Gentamicin** 2. **Ampicillin + cefepime** (If renal insufficiency or known history of resistant organism). Cefepime needs ID approval. 3.**Meropenem** →Hemodynamic instability or prior history of ESBL →Consult NICU Attending AND Infectious Disease when		- Consider 7-day duration for uncomplicated UTI - Consider 10-14 days for febrile UTI/pyelonephritis. - Adjust antibiotics based on culture data.

	escalating to Meropenem		

Quick Reference for Classes of Bacteria

Gram Negative	Gram Positive
• Enterobacter (Bacilli/Rods) • E. Coli (Bacilli/Rods) • Klebsiella (Bacilli/Rods) • Serratia (Bacilli/Rods) • Pseudomonas (Bacilli/Rods) • Proteus (Bacilli/Rods) • Bacteroides (Bacilli/Rods)	• Staph (cocci) • Enterococcus (cocci) • Clostridium (Bacilli/Rods) • Group B Strep (GBS) (cocci)

Notes:

Blood Cultures

- Initial Blood Culture should be drawn prior to starting ANY antibiotics.
- If a blood culture becomes positive, repeat daily Blood cultures until 2 blood cultures are NGTD x 48 hours.
- Volume of Blood required: 1ml.
    - If <1ml collected, nurse is to annotate sample and notify lab.

LP's

- If patient has limited CSF available, Discuss with ID priority of what Tubes/Studies to send.
- Not all bacteria are tested for on ME panel, so do not prioritize the ME panel if you are looking for an organism that is not part of the panel It will not detect Staph species (Staph aureus and Coag negative staph), Enterococcus species, other enteric gram negatives (including Enterobacter or Serratia), or Candida species. It is less helpful for patients with indwelling devices such as VP shunts or Ommaya reservoirs.
- ME panel includes the following (common neonatal pathogens are bolded)
    - Bacteria: **E coli K1**, Haemophilus influenzae, **Listeria monocytogenes**, Neisseria meningitidis, **Streptococcus agalactiae (GBS)**, Streptococcus pneumoniae
    - Viruses: **CMV, enterovirus**, **HSV-1, HSV-2**, **HHV-6, Human parechovirus**, Varicella zoster virus
    - Yeast: Cryptococcus species

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