

ANTIMICROBIALS - I
ANTIMICROBIALS FOR PERINATAL AND NEONATAL INFECTIONS

***Suman Rao PN**
****Swapnik Kandepi**

Abstract: *Antimicrobials are the most commonly used therapeutics in the neonatal intensive care units, as neonatal sepsis is the third leading cause of neonatal mortality. The signs of neonatal sepsis are non-specific and accurate diagnostic tests are not available immediately. With dynamic neonatal pharmacokinetics, attention to the dose and frequency of the antimicrobials are important. With increasing antibiotic resistance, the search for an ideal empiric antibiotic is still on. This review will include the antimicrobials most commonly used in the management of perinatal and neonatal infections.*

Keywords: *Neonatal sepsis, Management, Infection,*

Perinatal infection.

Points to Remember

- *Antimicrobials are the most frequently used therapeutic agents in neonates.*
- *Empiric antibiotic therapy for neonatal sepsis should be based on local antibiograms.*
- *Empiric therapy should be of sufficiently narrow spectrum and from the “Access category” of “WHO AWaRe antibiotics”.*
- *Antifungal and antiviral therapy are warranted in a select group of neonates.*

References

1. Schulman J, Benitz WE, Profit J, Lee HC, Dueñas G, Bennett MV, et al. Newborn antibiotic exposures and association with proven bloodstream infection. *Pediatrics* 2019; 144(5):e20191105.
2. Hauge C, StålsbyLundborg C, Mandaliya J, Marrone G, Sharma M. Up to 89% of neonates received antibiotics in cross-sectional Indian study including those with no infections and unclear diagnoses. *ActaPaediatr* 2017; 106(10):1674-1683.
3. Dong Y, Speer CP. Late-onset neonatal sepsis: recent developments. *Arch Dis Child - Fetal Neonatal Ed* 2015; 100(3):F257-263.
4. Agarwal R, Chaurasia S, JeevaSankar M, Yadav CP, Arya S, Kapil A, et al. Characterisation and antimicrobial resistance of sepsis pathogens in neonates born in tertiary care centres in Delhi, India: a cohort study. *Lancet Glob Heal* 2016; 4(10):e752-760.
5. Schrag SJ, Farley MM, Petit S, Reingold A, Weston EJ, Pondo T, et al. Epidemiology of invasive early-onset neonatal sepsis, 2005 to 2014. *Pediatrics* 2016; 138(6):e20162013.
6. Shane AL, Sánchez PJ, Stoll BJ. Neonatal sepsis. *Lancet* 2017; 390:1770-1780.
7. Simonsen KA, Anderson-Berry AL, Delair SF, Dele Davies H. Early-onset neonatal sepsis. *ClinMicrobiol Rev* 2014; 27(1):21-47.
8. Russell AB, Sharland M, Heath PT. Improving antibiotic prescribing in neonatal units: time to act. *Arch Dis Child - Fetal Neonatal Ed* 2012; 97(2):F141-146.

* Professor

** Senior Resident,
 Department of Neonatology,
 St. John's Medical College Hospital, Bengaluru.
 email: raosumanv@gmail.com

9. WHO. Pocket Book of Hospital Care for Children. Guidelines for the Management of Common Childhood Illnesses. Geneva:World Health Organization 2013; 125-143. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK154447/>
10. Metsvaht T, Ilmoja ML, Parm Ü, Maipuu L, Merila M, Lutsar I. Comparison of ampicillin plus gentamicin vs. penicillin plus gentamicin in empiric treatment of neonates at risk of early onset sepsis. *Acta Paediatrica, International Journal of Paediatrics*. 2010; 99(5):665-672.
11. Cantey JB, Wozniak PS, Sánchez PJ. Prospective surveillance of antibiotic use in the neonatal intensive care unit: results from the SCOUT study. *Pediatr Infect Dis J* 2015; 34(3):267-272.
12. Tziella C, Borghesi A, Serra G, Stronati M, Corsello G. Antimicrobial therapy in neonatal intensive care unit. *Ital J Pediatr* 2015; 41(1):27.
13. Bizzarro MJ, Shabanova V, Baltimore RS, Dembry LM, Ehrenkranz RA, Gallagher PG. Neonatal sepsis 2004-2013: the rise and fall of coagulase-negative staphylococci. *J Pediatr* 2015; 166(5):1193-1199.
14. Stockmann C, Spigarelli MG, Campbell SC, Constance JE, Courter JD, Thorell EA, et al. Considerations in the pharmacologic treatment and prevention of neonatal sepsis. *Paediatr Drugs* 2014; 16(1):67-81.
15. Korang SK, Safi S, Nava C, Gordon A, Gupta M, Greisen G, et al. Antibiotic regimens for early-onset neonatal sepsis. *Cochrane database Syst Rev* 2021; 5(5):CD013837.
16. Korang SK, Safi S, Nava C, Greisen G, Gupta M, Lausten-Thomsen U, et al. Antibiotic regimens for late-onset neonatal sepsis. *Cochrane database Syst Rev* 2021; 5:CD013836.
17. Tewari VV, Jain N. Monotherapy with Amikacin or Piperacillin-Tazobactam Empirically in Neonates at Risk for Early-Onset Sepsis: A Randomized Controlled Trial. *J Trop Pediatr* 2014; 60(4):297-302.
18. Keij FM, Kornelisse RF, Hartwig NG, Reiss IKM, Allegaert K, Tramper-Stranders GA. Oral antibiotics for neonatal infections: a systematic review and meta-analysis. *J Antimicrob Chemother* 2019; 74(11):3150-3161.
19. Duby J, Lassi ZS, Bhutta ZA. Communitybased antibiotic delivery for possible serious bacterial infections in neonates in low and middleincome countries. *Cochrane Database Syst Rev* 2019; 4(4):CD007646.
20. Fuchs A, Bielicki J, Mathur S, Sharland M, Van Den Anker JN. Reviewing the WHO guidelines for antibiotic use for sepsis in neonates and children. *Pediatr Int Child Health* 2018; 38(1):S3-S15.
21. Esaiassen E, Fjalstad JW, Juvet LK, Van Den Anker JN, Klingenberg C. Antibiotic exposure in neonates and early adverse outcomes: a systematic review and meta-analysis 2017; 72(7):1858-1870.
22. Hsia Y, Lee BR, Versporten A, Yang Y, Bielicki J, Jackson C, et al. Use of the WHO Access, Watch and Reserve classification to define patterns of hospital antibiotic use (AWaRe): an analysis of paediatric survey data from 56 countries. *Lancet Glob Heal* 2019; 7(7):e861-871.
23. World Health Organization. AWaRe classification. Available from: <https://www.who.int/publications/i/item/2021-aware-classification>.
24. Darlow CA, da Costa RMA, Ellis S, Franceschi F, Sharland M, Piddock L, et al. Potential Antibiotics for the Treatment of Neonatal Sepsis Caused by Multidrug-Resistant Bacteria. *Pediatr Drugs* 2021; 23(5):465-484.
25. Fanaroff AA, Fanaroff JM. Advances in Neonatal Infections. *Am J Perinatol* 2020; 37(1):S5-9.
26. Parikh TB, Nanavati RN, Patankar CV, Rao PNS, Bisure K, Udani RH, et al. Fluconazole Prophylaxis against Fungal Colonization and Invasive Fungal Infection in Very Low Birth Weight Infants. *Indian Pediatr* 2007; 44(11):830-837.
27. Ferreras-Antolín L, Sharland M, Warris A. Management of Invasive Fungal Disease in Neonates and Children. *Pediatr Infect Dis J* 2019; 38(6):S2.
28. Kimberlin DW, Jester PM, Sánchez PJ, Ahmed A, Arav-Boger R, Michaels MG, et al. Valganciclovir for Symptomatic Congenital Cytomegalovirus Disease. *N Engl J Med* 2015; 372(10):933-943.