

Necrotizing Enterocolitis (NEC) Antibiotic Pathway Based on Modified Bell's Classification

Stage classification	Systemic signs	Abdominal signs	Radiographic signs	Antibiotic Management		
IA / IB Suspected	Temperature instability, apnea, bradycardia	Gastric retention, abdominal distention, emesis, heme-positive stool; grossly bloody stool (IB only)	Normal or mild intestinal dilation, mild ileus	Stage IA/IB Suspected ^a	Nafcillin plus gentamicin ^b	Stage IA/B 48 hours ^c
IIA / IIB Definite: Mild to moderate illness	IIA: Same as Stage I	IIA: Stage I, + absent bowel sounds , +/- abdominal tenderness	IIA: Intestinal dilation, ileus, pneumatosis intestinalis , portal venous gas	Stage II – III ^a Definite or Advanced	Piperacillin-tazobactam	Stage II/IIIB 5 – 7 days
	IIB: Stage IIA, + mild metabolic acidosis and thrombocytopenia	IIB: Stage IIA, + abdominal tenderness +/- abdominal cellulitis	IIB: Same as IIA, + ascites			Stage IIIA 7 - 10 days
IIIA Advanced: Severe illness but no perforation	Same as IIB, + hypotension, bradycardia, severe apnea, combined respiratory and metabolic acidosis, DIC, and neutropenia	Same as Stage IIB signs, + signs of peritonitis , marked tenderness, and abdominal distention	Same as Stage IIB			Stage IIIB 7 days following source control is usually adequate (max 14 days)
IIIB Advanced: Severe illness with confirmed or suspected perforation	Same as IIIA	Same as Stage IIIA	Same as Stage IIB, + pneumoperitoneum			

References
1. Juhl, et al. Acta Paediatr 2019;108:842-8. 2. Aurora, et al. Pediatr 2022;150:e2022056616. 3. Mahmood, et al. J Perinatol 2024;44:587-593. 4. Pace, et al. J Peds Surg 2023;58:1982-9. 5. Goldfarb, et al. J Peds Surg 2024;59:1266-70. 6. Yee WH, et al. Pediatrics 2012;129:e298-304. 7. Autmizguine J, et al. Pediatrics 2015;135:e117-25. 8. Wu, et al. Pediatr Neonatol 2024. S1875-9572(24)00198-0.

^a Consider Pediatric ID consult if concern for meningitis, resistant gram-negative bacteria, or **severe, advanced NEC**. If a pathogen is identified, adjust antibiotic therapy for coverage while continuing NEC coverage.

^b Nafcillin can be replaced by ampicillin for early onset sepsis and low suspicion of methicillin-susceptible *Staphylococcus aureus* (MSSA) or replaced by vancomycin if prior history of methicillin-resistant *S. aureus* (MRSA). Gentamicin should be replaced by ceftazidime if concern for renal impairment or meningitis.

^c Duration of therapy may be up to 5 days if concern for culture negative sepsis (either early- or late-onset).