RECOGNITION AND MANAGEMENT OF THE CARDIAC PATIENT WITH NECROTIZING ENTEROCOLITIS (NEC) IN THE CICU & CACU

Final 11.4.16 Update 5.8.20 Update 3.3.23



Assessment for Indicators of NEC

Gastrointestinal

- ↑ Abdominal girth
- Abdominal tenderness
- Abdominal distension/cellulits
- Change in stooling pattern
- Presence of emesis (bilious or non-bilious)
- · Visible, grossly bloody stool

Respiratory

- Apnea
- Desaturation
- Need or change in respiratory support
- Changes in hemodynamics

Systemic

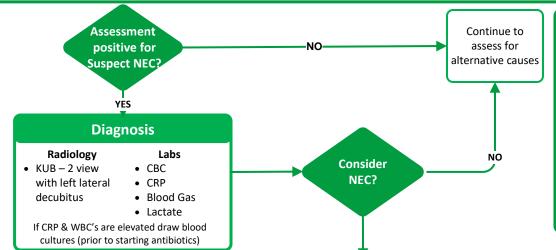
- · Temperature Instability
- HR Instability
- Increased need for sedation
- Irritability

Labs/Imaging

- ↑ CRP
- Changes in WBC
- Acidosis
 - Thrombocytopenia
- Concerning radiographic findings

Exclusion Criteria

- Patient ≥ 6 months
- History of NEC as a premature infant



Clinical Considerations

- Abd girth should be measured at the umbilicus q 12hr.
- Heme testing on stool is not recommended
- Presence or absence of bowel sounds is not a core indicator used by surgeons for diagnosis
- Feeds should NOT be diluted
- Draw Blood Cultures <u>prior to</u> starting antibiotics

Staging may change on daily assessment				Intervention may change if patient moves between stages						
	Radiographic	Gastrointestinal	Systemic	Radiographic	NPO/Feeding	Antibiotics see medication chart for dose & duration	Surgical			
Isolated Pneumatosis	Isolated Pneumatosis	None	None	KUB (2view) q 12hr x 48 hrs and/or change in clinical status	Consider NPO 24-48 hrs LIS with Anderson tube if NPO	None	None			
Stage I (Suspect)	Normal Intestinal dilation Ileus	↑ Abdominal girth Abdominal distention Presence of emesis (bilious or non-bilious) Visible grossly bloody stool	Apnea Irritability HR instability Change in respiratory support	KUB (2view) q 12hr x 48 hrs and/or change in clinical status	NPO LIS with Anderson tube when NPO Maintain fluid status Reassess in 48hrs	Piperacillin/ tazobactam	Call if not resolved in 48hrs			
Stage II (Definite)	Intestinal dilation Ileus Pneumatosis intestinalis Portal venous gas	Signs from Stage I Abdominal tenderness Abdominal cellulitis	Signs from Stage I Mild acidosis/↑ Lactate Thrombocytopenia	KUB (2view) q 12hr x 48 hrs then daily until KUB normalizes	NPO LIS with Anderson tube when NPO Start TPN	Piperacillin/ tazobactam +/- Vancomycin	Consult Surgery			
Stage III (Advanced)	Same as Stage II Pneumoperitoneum	Signs from Stage II Signs of Peritonitis Marked tenderness Abdominal distention	Signs from Stage II Hemodynamic instability Metabolic acidosis Respiratory acidosis Mechanical ventilation probable	KUB (2view) q 12hr x 48 hrs then daily until KUB normalizes	NPO LIS with Anderson tube when NPO Start TPN	Piperacillin/ tazobactam + Vancomycin Consult ID	Consult Surgery - likely surgical intervention			
Feeding Plan - start 24 hrs after KUB is normalized & antibiotics have been completed										

	Start	Advance	TPN	Fortification	Oral Medications	Guideline Completed
Stage I (Suspect)	Initiate feeds of BM or Formula 20 Cal/ounce at 30 mL/kg/day NG/NJ/PO	Advance by 30mL/kg/day as tolerated to a goal of 150mL/kg/day May transition to bolus as appropriate	Do not wean TPN until enteral feeds reach 80 mL/kg/day (half of goal). Then wean mL:mL with each increase in feed	feeds reached, add	Oral medications not used until feeds reach 100 mL/kg/day**	Tolerating full volume feeds x 24hrs
Stage II & III Initiate/advance feeds per General Surgery	Initiate feeds of BM or Formula 20 Cal/ounce at 20 mL/kg/day NG/NJ/PO	Advance by 20mL/kg/day as tolerated to a goal of 150mL/kg/day May transition to bolus	Do not wean TPN until enteral feeds reach 80 mL/kg/day (half of goal). Then wean mL:mL with each increase in feed	24 hrs after full volume feeds reached, add fortification to reach 22 Cal/ounce *	Oral medications not used until feeds reach 100 mL/kg/day**	Tolerating full volume feeds x 24hrs

Patients who remain in the hospital on 22 Cal/ounce for 1 week can be advance to 24 Cal/ounce while in the hospital

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^{**} Only oral meds that can be given are captopril & spironolactone

10mg/kg q 12hr



48 hrs

Empiric Treatment for the Cardiac Patient with Necrotizing Enterocolitis (NEC) Indicaton Antibiotic Dose & Schedule* Duration 48 hrs or determined by Stage | NEC Piperacillin/tazobactam 100mg/kg q8hr patient condition and (Suspect) (Zosyn) clinician judgement Piperacillin/tazobactam (Zosyn) 100mg/kg q 8hr 4 days from onset +/-Stage II NEC (Definite) Vancomycin should be Premature (<2kg) 15mg/kg q 24hr discontinued if no Gram Fullterm (<4wks) 15mg/kg q 12hr Vancomycin 1 positive organisms Fullterm (≥4wks) 15mg/kg q 8hr identified on culture at Any age, ≤14 days post-bypass 10mg/kg q 12hr 48 hs Piperacillin/tazobactam (Zosyn) 100mg/kg q8hr 10 -14 days + Stage III NEC Vancomycin should be (Advanced) Premature (<2kg) 15mg/kg q 24hr discontinued if no Gram Fullterm (<4wks) 15mg/kg q 12hr positive organisms Vancomycin Fullterm (≥4wks) 15mg/kg q 8hr identified on culture at

Any age, ≤14 days post-bypass

^{*}Vancomycin levels and dosing adjustments to be managed by Pharmacokinetics Service

Vancomyin recommended in NEC Stage II if Gram positive organism identified on culture, hemodynamic instability, and/ or clincal sepsis