Necrotizing Enterocolitis: Antibiotic Selection and Duration of Therapy
UCSF Benioff Children’s Hospital San Francisco ICN

- Clinical assessment
- Cultures (including blood culture)
- X-rays
- Other clinically directed evaluation

Neonate with Suspected or Definite NEC

If cultures from blood or other sterile site(s) are positive, therapy should be broadened if necessary to treat the isolated organism(s).

Suspected (Bell Stage IA or IB)

Definite (Bell Stage IIA-IIIB)

Nafillin + Gentamicin
Replace Nafillin with Vancomycin in neonate with history of MRSA colonization or infection

Duration: based on clinical evolution/suspicion for infection - at 48h either discontinue, or set defined course for sepsis (5-7d)

Definite (Bell Stage IIA-IIIB)

Renal Impairment/ Oliguria?

No

Yes

Perforation and/or Critical Illness? (Bell Stage IIB, IIIA, IIIB) or worsening on Ampicillin & Gentamicin?

Ampicillin + Gentamicin (Stage IIA only)

Ampicillin + Gentamicin + Metronidazole (Stage IIB, IIIA, IIIIB)

Piperacillin tazobactam (Zosyn)

Spontaneous Intestinal Perforation:
-- This is a distinct entity from necrotizing enterocolitis
-- Antibiotic therapy including anaerobic activity (Ampicillin + Gentamicin + Metronidazole)
-- Duration of therapy 7 days for most, unless clinical illness is prolonged


<table>
<thead>
<tr>
<th>Stage</th>
<th>Classification</th>
<th>Systemic Signs</th>
<th>Abdominal Signs</th>
<th>Radiographic Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA</td>
<td>Suspected</td>
<td>Temperature instability, apnea, bradycardia, lethargy</td>
<td>Gastric retention, abdominal distension, emesis, heme-positive stool</td>
<td>Normal or intestinal dilatation, mild ileus</td>
</tr>
<tr>
<td>IB</td>
<td>Suspected</td>
<td>Same as above</td>
<td>Grossly bloody stool</td>
<td>Same as above</td>
</tr>
<tr>
<td>IIA</td>
<td>Definite, Mildly III</td>
<td>Same as above</td>
<td>Same as above + absent bowel sounds, +/− abdominal tenderness</td>
<td>Intestinal dilatation, ileus, pneumatosis intestinalis</td>
</tr>
<tr>
<td>IIB</td>
<td>Definite, Moderately III</td>
<td>Above + mild metabolic acidosis and thrombocytopenia</td>
<td>Same as above + absent bowel sounds, definite tenderness +/− abdominal cellulitis or RLQ mass</td>
<td>Same as IIA, + ascites</td>
</tr>
<tr>
<td>IIIA</td>
<td>Advanced, Severely III, Intact Bowel</td>
<td>Same as IIB + hypotension, bradycardia, severe apnea, combined respiratory and metabolic acidosis, DIC, neutropenia</td>
<td>Same as above + signs of peritonitis, marked tenderness, and abdominal distension</td>
<td>Same as IIA, + ascites</td>
</tr>
<tr>
<td>IIIB</td>
<td>Advanced, Severely III, Perforated Bowel</td>
<td>Same as IIIA</td>
<td>Same as IIIA</td>
<td>Same as above + pneumoperitoneum</td>
</tr>
</tbody>
</table>

Duration of Antibiotic Therapy:
-- Monitor clinical signs (abdominal exam, blood in stool, hypotension), laboratory markers (WBC, acidosis, thrombocytopenia), radiographic findings (pneumatosis, dilated loops)
-- Usual duration 7 days for definite NEC, may extend for prolonged clinical illness, maximum duration 14 days (stop 3-5 days after resolution of clinical and radiographic signs)
-- Consider Fluconazole prophylaxis for preterm infants with NEC

Duration of Bowel Rest:
-- NPO for duration of antibiotic therapy
-- Duration of bowel rest may be longer than duration of antibiotic therapy depending on clinical assessment of patient's readiness to feed, as evaluated by Neonatology and Pediatric Surgery teams

These guidelines reflect consensus of Neonatology, Pediatric Surgery and Antimicrobial Stewardship services based on available evidence. Refer to Neonatal Dosing Guidelines for antibiotic doses. Approved by UCSF Pharmacy and Therapeutics Committee 06/2016, reviewed 05/14/2019,
Primary Content Owner: Rachel Wattier (Pediatric Antimicrobial Stewardship Program)