



GUIDELINE

Necrotising Enterocolitis

Scope (Staff):	Nursing and Medical Staff
Scope (Area):	NICU KEMH, NICU PCH, NETS WA

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Aim

To provide guidance for the diagnosis and management of Necrotising Enterocolitis (NEC) in infants.

Background

Necrotising Enterocolitis (NEC) is an inflammatory condition of the gut characterised by gastro-intestinal and systemic signs and symptoms including feed intolerance, abdominal distension and tenderness, occult or gross blood and mucus per rectum, lethargy, temperature instability, apnoea and poor peripheral perfusion.

The following clinical stages are recognised:

Stage	Systemic Features	Abdominal Features	Radiological Features
1A: Suspected NEC	Temperature instability, apnoea, bradycardia	Increased gastric residuals, mild abdominal distension, occult blood in stool	Normal or intestinal dilatation, mild ileus
1B: Suspected NEC	Same as above	Grossly bloody stool	Same as above
2A: Definite NEC; Mildly III	Same as above	Same as stage 1 plus lack of bowel sounds, possible abdominal tenderness	Ileus, Pneumatosis intestinalis, intestinal dilatation
2B: Definite NEC; Moderately III	Same as Stage 1 plus mild metabolic acidosis, mild thrombocytopenia	2A plus peritonitis, definite abdominal tenderness, possible cellulitis, right lower quadrant mass	Same as above plus possible portal venous gas
3A: Advanced NEC; Severely III, Intact Bowel	Same as Stage 2B plus hypotension, severe apnoea and bradycardia, combined respiratory and metabolic acidosis, disseminated intravascular coagulation, and neutropenia	Same as above with marked tenderness and abdominal distension and erythema	Same as above plus definite ascites
3B: Advanced NEC; Severely III, Perforated Bowel	Same as Stage 3A	Same as Stage 3A	2B plus Pneumoperitoneum

Epidemiology

NEC is predominantly a disease of prematurity but can occur in full term infants also. NEC incidence at CAHS neonatal directorate is around 3.8% in extremely preterm infants born at <28 weeks gestation and about 2.5% in <32-week gestation. In comparison, the corresponding incidences in ANZNN are around 8% and 4% respectively.

Term infants: NEC is often secondary to a major predisposing event like fetal growth restriction, perinatal hypoxia, and congenital heart disease.

Physiology / Pathophysiology

NEC is thought to result from a complex interaction of initially a mucosal injury (ischemia, infections, intraluminal hyperosmolar solutions) and the host response to that injury (circulatory, immunologic, inflammatory). The commonest sites involved are the terminal ileum and ascending colon.

Clinical Presentation

A large systematic review reported that average age of onset of NEC was 16.7 days, but sometimes it can occur early. Suspect NEC in any immature or acutely unwell infant with:

- Feed intolerance, abdominal distension, bile-stained aspirates.
- Acidosis, thrombocytopenia.
- Abdominal tenderness, abdominal mass.
- Blood or mucus per rectum.

Differential diagnosis to be considered:

- Sepsis with ileus.
- Bowel obstruction.
- Volvulus with or without malrotation of intestines.
- Spontaneous intestinal perforation (SIP) is a distinct clinical entity that occurs especially in extremely low birth weight (ELBW) infants. In SIP, there is usually an isolated perforation in the terminal ileum with rest of the intestines being healthy. Preoperatively, it is difficult to differentiate SIP from perforated NEC. Some differentiating features are milder systemic illness, milder thrombocytopenia and absence of pneumatosis intestinalis on abdominal x ray.

Investigations

- Abdominal x-ray supine and left lateral shoot-through can reveal one or more of the following findings: pneumatosis intestinalis, i.e., gas in bowel wall, thickened bowel wall, intrahepatic gas, and free intraperitoneal air.
- Abdominal ultrasound including doppler studies. It can show decreased intestinal peristalsis, intestinal wall blood flow/ perfusion, intestinal wall gas, ascites and free peritoneal gas.
- Sepsis screen, FBC, coagulation studies, U&Es, blood gas.

Management of Confirmed NEC

- Stop enteral feeds. The duration of being nil orally is usually around 10 days (7-14 days) in infants with definite NEC (i.e. \geq stage2). For stage 1 NEC, the duration of being nil orally is shorter (around five days).
- Surgical consult.
- Intra-gastric tube to free drainage - minimum size 6, may need an 8FG.
- Monitor vital signs, blood pressure, peripheral circulation and fluid balance including urine output.
- Antibiotics - cover gram positive, negative organisms and anaerobic organisms (usually vancomycin plus gentamicin plus metronidazole). The other equally good regimen is Tazocin (Piperacillin plus tazobactam) plus vancomycin. In severe cases (based on clinician's judgement), meropenem may need to be used instead of Tazocin. Fungal prophylaxis using IV fluconazole needs to be considered. Usual duration of antibiotics is 10-14 days in definite NEC. Consult infectious disease specialists for optimising antibiotic therapy. For stage 1 NEC, the duration of antibiotics is shorter (around five days).
- Remove umbilical catheters if in situ.
- Intubation and mechanical ventilation if unstable.
- Correction of coagulopathy and/or thrombocytopenia.
- Commence pain scoring.
- Morphine infusion for pain relief if required.
- Parenteral nutrition - consider need for central line if there is a need for ongoing IV nutrition for greater than 5-7 days. Review daily on the ward round and document the decision in the progress notes.
- Regular abdominal x-rays looking for pneumoperitoneum; frequency depends on severity as judged by surgeons and neonatologists.
- Surgical management: Management decisions are made by the treating surgeon in collaboration with the neonatal team and the parents. Options include conservative management, insertion of a peritoneal drain, or performing a formal laparotomy in infants with definite NEC. Current evidence suggests that, for infants with NEC accompanied by gut perforation—or with severe surgical NEC even without perforation—laparotomy is probably superior to peritoneal drainage (Blakely 2021; Rath et al. 2025), although the strength of evidence remains moderate.
- For infants who are too clinically unstable to tolerate laparotomy, placement of a peritoneal drain can decompress the abdomen and improve physiological stability, allowing safer transfer to the surgical centre at Perth Children's Hospital. In some extremely preterm infants (e.g., <750 g) with isolated

spontaneous intestinal perforation (SIP), peritoneal drainage may serve as definitive management.

Withholding of probiotics: NEC is associated with leaky gut and increased risk of bacterial translocation. Hence, withhold probiotic supplementation during acute illness. Probiotics can be recommenced once the acute illness is over and enteral feeds are recommenced.

Prognosis

NEC can lead to significant short term as well as long term morbidities. The short-term morbidities are sepsis, prolonged TPN, stoma problems, intestinal strictures, and enteric fistula.

Resection of extensive sections of the gut may result in short bowel syndrome requiring long-term TPN. NEC also carries a high risk of long-term neurodevelopmental morbidity. Surgical NEC results in higher rate of mortality and long-term neurodevelopmental morbidity.

Prevention of NEC: Use of breast milk, pasteurized human donor milk, standardised feeding regimens, antibiotic stewardship and probiotic supplementation have been shown to reduce the risk of NEC in preterm infants. The risk of sepsis due to administered probiotics in preterm infants is extremely rare, and benefits far outweigh the risks.

Related CAHS internal policies, procedures and guidelines

[Fluid and Nutrition Requirements, and Enteral Feeding](#)


[Transfer of Preterm Infants with Intestinal Perforation/Necrotising Enterocolitis to Ward 3B PCH](#)

References and related external legislation, policies, and guidelines

1. Dominguez K and Moss L. Necrotizing Enterocolitis. Clinics in Perinatology, 2012, Volume 39, Issue 2, Pages 387-401.
2. Dermyshe E et al. Age of onset of necrotising enterocolitis (NEC) and focal intestinal perforation (FIP) in very preterm and low birthweight infants: a systematic review. BMJ Open. 2023 Jul 24;13(7):e070638.
3. Kinstlinger N, Fink A, Gordon S, et al. Is necrotizing enterocolitis the same disease in term and preterm infants? J Pediatr Surg 2021; 56:1370.
4. Elgendy MM, Othman HF, Heis F et al. Spontaneous intestinal perforation in premature infants: a national study. J Perinatol. 2021, May;41(5):1122-1128.

5. Blakely ML et al. Initial Laparotomy Versus Peritoneal Drainage in Extremely Low Birthweight Infants with Surgical Necrotizing Enterocolitis or Isolated Intestinal Perforation: A Multicenter Randomized Clinical Trial. *Ann Surg.* 2021 Oct 1;274(4):e370-e380.
6. Rath C, Samnakay N, Deshpande G, Sutyak K, Basani L, Fiander M, Simmer K, Rao S. Peritoneal drainage versus laparotomy as initial treatment for surgical necrotising enterocolitis or spontaneous intestinal perforation in preterm very low birth weight infants. *Cochrane Database Syst Rev.* 2025 Jun 24;6(6):CD006182.
7. Bhattacharjee I, Dolinger MT, Singh R et al. Ultrasound for the Early Detection and Diagnosis of Necrotizing Enterocolitis: A Scoping Review of Emerging Evidence. *Diagnostics (Basel).* 2025 Jul 23;15(15):1852.
8. Colarelli AM, Barbian ME, Denning PW. Prevention Strategies and Management of Necrotizing Enterocolitis. *Curr Treat Options Pediatr.* 2024 Sep;10(3):126-146.
9. Deshmukh M, Patole S. Prophylactic Probiotic Supplementation for Preterm Neonates-A Systematic Review and Meta-Analysis of Nonrandomized Studies. *Adv Nutr.* 2021 Jul 30;12(4):1411-1423.
10. Athalye-Jape G, Esvaran M, Patole S et al. Effect of single versus multistrain probiotic in extremely preterm infants: a randomised trial. *BMJ Open Gastroenterol.* 2022 Feb;9(1):e000811.
11. Sharif S et al. Probiotics to prevent necrotising enterocolitis in very preterm or very low birth weight infants. *Cochrane Database Syst Rev.* 2023 Jul 26;7(7):CD005496.
12. Kulkarni T, Majarikar S, Deshmukh M, Patole S et al. Probiotic sepsis in preterm neonates-a systematic review. *Eur J Pediatr.* 2022 Jun;181(6):2249-2262.
13. Feldman, K., Noel-MacDonnell, J. R., Pappas, L. B et al (2025). Incidence of probiotic sepsis and morbidity risk in premature infants: a meta-analysis. *Pediatric research*, 10.1038/s41390-025-04072-3.

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