

Reducing Incidence of Necrotizing Enterocolitis

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KEYWORDS

- Necrotizing enterocolitis • Quality improvement • Feeding guidelines • Antibiotics
- Probiotics • Transfusion • Anemia • Human milk

KEY POINTS

- Own mother's milk (OMM) is associated with reduced odds of necrotizing enterocolitis (NEC) in observational studies, and quality improvement (QI) efforts to increase OMM have been successful at decreasing NEC.
- Donor milk (DM) has also been associated with NEC reduction when OMM is unavailable, although DM has not been associated with other health benefits as seen with OMM feedings in preterm infants.
- Institution of standardized feeding guidelines has been associated with reduced NEC rates, although the optimal rates of advancement and fortification are uncertain. Prolonged periods of nothing by mouth are associated with increased rates and severity of NEC and thus enteral feedings should be instituted soon after birth.
- Acid antagonists and prolonged empiric antibiotics in the setting of negative cultures are associated with increased odds of NEC, and both should be minimized or avoided if possible.
- Probiotics have been associated with reduced NEC in some, but not all, studies. Meta-analyses demonstrate reduction in NEC. At present, however, there remains controversy about probiotics due to concerns regarding quality and reliability of available products.
- Anemia and blood transfusions have been linked to NEC. Controversy remains regarding these relationships and best practices regarding enteral feeding during blood transfusions.

INTRODUCTION

Despite the many years of investigation into NEC,¹ the pathophysiology remains uncertain. This uncertainty poses several challenges to QI efforts to prevent this significant complication. The current consensus is that NEC is a multifactorial disease that occurs when multiple risk factors and/or stressors overlap, leading to profound

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inflammation and intestinal injury (Fig. 1).²⁻⁴ Diagnosis of this multifactorial disease remains primarily dependent on clinical features that vary significantly due to the multiple predisposing conditions. This heterogeneity complicates efforts to identify broad strategies for NEC prevention as a part of QI efforts. A clinically based classification system (Table 1) has been proposed as one strategy to increase understanding of the multiple etiologies underlying NEC, which could potentially lead to novel insights and/or interventions for NEC prevention.⁴ In addition to the challenge provided by differences in clinical features and predisposing factors, another difficulty in identifying strategies to reduce NEC relates to the timing of presentation varying with gestational age (GA). NEC has a later onset in the most immature infants with a central peak at approximately 29 weeks' to 32 weeks' postmenstrual age (PMA).⁵ Furthermore, the low incidence of NEC (approximately 5% in very-low-birth-weight [VLBW] infants)⁶ has led to difficulty in identifying those infants at the highest risk who might benefit from targeted prevention strategies.

Even with these limitations and obstacles, the incidence of NEC has gradually been decreasing over the past 10 years, in part due to QI initiatives directed at preventing

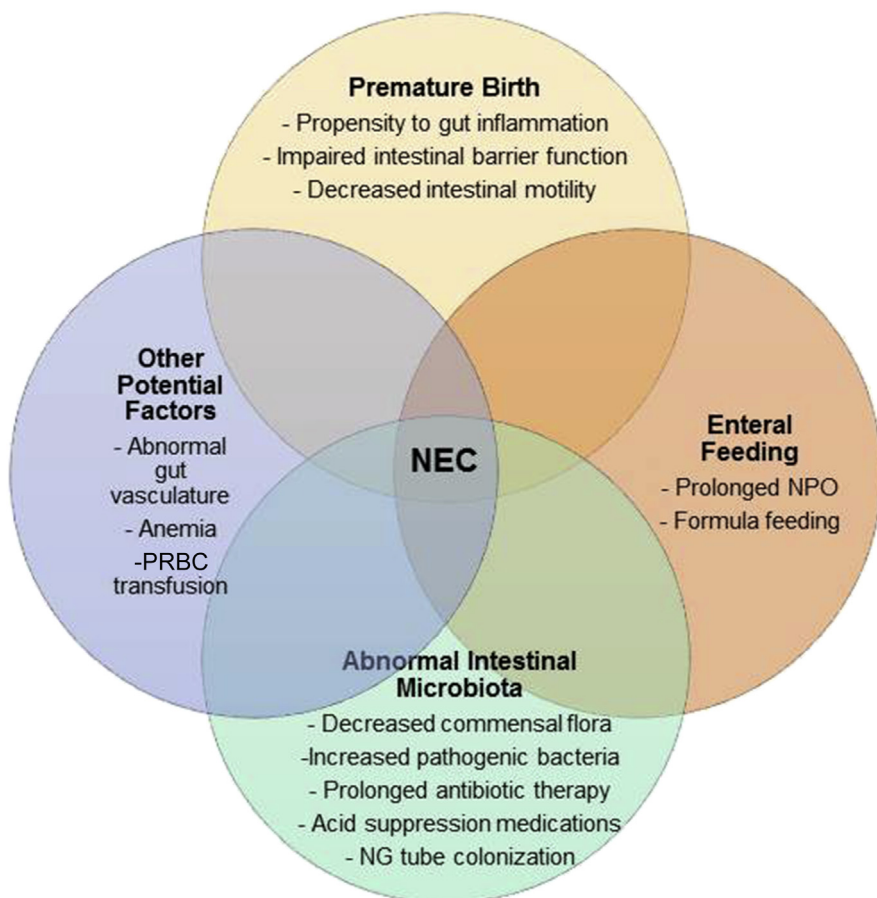


Fig. 1. Multifactorial nature of NEC. (Adapted from Patel RM, Denning PW. Intestinal micro-
biota and its relationship with necrotizing enterocolitis. *Pediatr Res* 2015;78(3):233; with
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