

## Dual dilemma: Necrotizing enterocolitis and congenital heart disease in infants

Sir,

Despite the sporadic nature of necrotizing enterocolitis (NEC), which has an incidence of 3%–5% in both term and premature infants<sup>[1]</sup> and 3.3%–11% in infants with congenital heart disease (CHD),<sup>[2]</sup> the high incidence of morbidity and mortality<sup>[2]</sup> and the dearth of large-scale research on NEC in infants with CHD make this a noteworthy topic. NEC is characterized by severe intestinal inflammation and necrosis, leading to various complications. Classical NEC, which affects preterm infants, and cardiac NEC (cNEC), which affects neonates with underlying CHD, are the two types of NEC.<sup>[2]</sup> cNEC differs vastly from classical NEC in terms of its timing and features at presentation. While classical NEC most commonly affects the ileum, the colon is more often impacted in cases of cNEC.<sup>[1]</sup> A study reported that neonates with cNEC are usually of greater gestational age and birthweight than those with classical NEC.<sup>[1]</sup> At-term newborns with CHD have been noted to develop NEC at an earlier age than preterm babies with classical NEC. However, preterm newborns with duct-dependent cardiac lesions related-cNEC are diagnosed at a later age than term infants with the same diagnosis.<sup>[1]</sup>

Although the exact pathology of classical NEC is unknown, many scientists believe that it is primarily due to the destruction of intestinal epithelial cells by pathogenic bacteria and the subsequent microvasculature damage caused by the attachment of white blood cells and platelets to the inner lining of blood vessels.<sup>[3]</sup> On the other hand, cNEC is thought to be due to hypoperfusion and ischemia of the bowel. The low perfusion pressure of the bowel is caused by the comparatively lower diastolic pressure in cNEC patients.<sup>[3]</sup> A frequent characteristic observed in many cNEC infants is retrograde diastolic flow in the abdominal aorta.<sup>[1]</sup> According to Gong *et al.*, 16% of neonates with CHD develop NEC, with 65% of these infants having ductal-dependent hypoplastic left heart syndrome.<sup>[2]</sup>

Despite their association with a decreased incidence of NEC and mortality in infants with CHD, a National Pediatric Cardiology Quality Improvement Collaborative survey found that more than half of centers do not use standardized feeding protocols (SFPs).<sup>[4]</sup> SFPs recommend early preoperative feeding for its benefits in gastrointestinal maturation. Once colostrum has been administered, fresh mother's milk is prioritized.<sup>[5]</sup> Delayed enteral feeding should only be considered in situations of low cardiac output, such as in neonates

with duct-dependent cardiac lesions or during treatment with extracorporeal membrane oxygenation.<sup>[5]</sup> Many successful SFPs involve a phase of small-volume feedings (10–20 mL/kg/d) lasting from 2 to 5 days, typically starting by 72 h of age.

Enteral feeding may contribute to the development of NEC in neonates with CHD, resulting in institutional variation in feeding strategies.<sup>[4]</sup> Nordenström *et al.* found that enteral feeding had a protective effect on infants, with only 0.9% suffering from NEC postoperatively.<sup>[6]</sup> However, a contradicting study revealed that 82.2% of infantile NEC cases occurred in the postoperative period, with 27 of 45 patients contracting NEC after the initiation of enteral feedings.<sup>[7]</sup> Due to intestinal hypoperfusion, large enteral feedings are avoided in neonates with CHD. However, keeping a baby NPO before surgery can result in villous atrophy.<sup>[1]</sup> Gephart *et al.* mentioned that a clinical trial in their study which demonstrated that rapid advancement without trophic feeds resulted in a higher incidence of NEC than a trophic feeding period.<sup>[5]</sup> A recent study reported that more than 88% of infants receiving breast milk were noted to be safeguarded against NEC, especially after cardiac surgery.<sup>[6]</sup> As such, preoperative feeding with mother's milk<sup>[8]</sup> and modest trophic feeds of 20–30 mL/kg/d<sup>[1]</sup> have been discovered to reduce the risk of NEC.

In conclusion, neonates with CHD are susceptible to NEC both before and after surgical correction. However, with proper care, they are likely to recover quickly.

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### Conflicts of interest

There are no conflicts of interest.

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