A reduction of necrotising enterocolitis at Groote Schuur Hospital nursery

Y Joolay, N R Rhoda, L Tooke, A R Horn, M C Harrison

Necrotising enterocolitis (NEC) is an gastro-intestinal emergency occurring almost solely in preterm, low birth weight infants. Mortality, morbidity and the complication rate are high. An increase in NEC at the Groote Schuur Hospital nursery in 2008 prompted a change of practice, resulting in a significant decrease in the condition.

S Afr Med J 2011;101:806.

To the Editor: Necrotising enterocolitis (NEC) is an acute gastrointestinal emergency occurring almost exclusively in preterm, low birth weight infants, and carrying a high mortality and morbidity in affected infants.[1] NEC was the cause of death in 10% of very-low-birth-weight deaths in a South African tertiary neonatal unit.[2] Infants who survive NEC are prone to complications including intestinal strictures, short bowel syndrome, repeated episodes of sepsis and prolonged hospital stays. An increase in NEC at the Groote Schuur Hospital (GSH) nursery in 2008 prompted a review and change of practice, resulting in a significant decrease of NEC.

Methods

Folders on all infants who developed NEC, defined as infants with Bell's Stage IIB or more, in the GSH nursery between 1 July 2007 and 30 July 2008 were reviewed retrospectively. A prospective database of infants diagnosed with NEC was then commenced on 1 January 2009 and completed on 31 December 2009. The results from these periods were compared. Data included birth weight, gestational age, type of feeds received, HIV exposure and outcomes. Permission to maintain a patient database was obtained from the UCT Health Sciences Research Ethics Committee.

Results

Admission totals for the Neonatal Unit during the periods compared were similar: 2 100 in the 2007/2008 period versus 2 140 in 2009. The mean birth weight of infants with NEC in 2008 was 1 344 g (range 705 - 2 940 g) compared with 1 035 g in 2009 (range 700 - 1 490 g). The number of patients with NEC was reduced from 52 cases (2.5% of total admissions) in 2007/2008 to 14 cases (0.6% of total admissions) in 2009. During both time periods, the babies who developed NEC were more likely to be formula-fed – 65% of cases in 2007/2008 and 71% in 2009.

Discussion

The exact aetiology of NEC is uncertain. It is almost certainly multifactorial in origin, including prematurity and infection. During the two time periods, the number of admissions remained similar, and patient overcrowding and understaffing persisted. Despite this NEC was reduced. We attribute this to changes in our practice during 2009. We adopted a 'minimal handling' approach and a more conservative approach to managing preterm infants that involved fewer investigative procedures including blood sampling, echocardiography and X-ray.

The treatment of patent ductus arteriosus (PDA) in preterm infants is increasingly controversial.[3] Therefore, we adopted a more conservative approach, resulting in much less investigation and treatment of PDA during 2009. Enteral ibuprofen, with which we were treating our infants, may also be associated with a higher rate of NEC.[4]

In a Cochrane Review, donor milk was associated with reduced risk of NEC compared with formula milk.[5] Our feeding strategies in 2009 included the earlier introduction of breastmilk feeds and substantially more donor breastmilk was available in 2009 than in 2008. HIV-positive mothers of preterm infants who had previously used formula feeding were re-counselled, and many provided their own breastmilk which was then pasteurised. This resulted in a substantial decrease in the use of parenteral nutrition and central catheters, both having risks.[6,7]

Practices in the milk preparation kitchen were also addressed. Powdered infant formula is prone to bacterial contamination, even when prepared in controlled environments.[8] We therefore introduced a sterile, ready-to-use infant formula, replacing the pre-preparation and storage of powdered infant formula. Handling, preparation and refrigeration of expressed breastmilk were addressed by optimising working surface areas and installing a new refrigerator.

We encouraged greater vigilance regarding hand-washing protocols and antibiotic guidelines. Antibiotics were stopped after 48 hours if sepsis was not clearly evident, thereby limiting their unnecessary use.

Conclusion

The changes instituted were low-cost. Although we do not attribute the decrease to one particular change in practice, we believe it supports the use of 'minimal handling', strict adherence to evidence-based practice, early introduction of exclusive breastmilk feeding, and the use of heat-treated mother's milk or heat-treated donor breastmilk for preterm infants.

The authors have no conflicting interests.

Neonatal Medicine, Groote Schuur Hospital and University of Cape Town

Y Joolay, MB ChB, FCPaed (SA), Cert Neonatology (SA)

N R Rhoda, MB ChB, FCPaed (SA), Cert Neonatology (SA)

L Tooke, MB ChB , FCPaed, MMed (Paeds), Cert Neonatology (SA)

A R Horn, MB ChB, DCH, FCPaed, Cert Neonatology

M C Harrison, MB ChB, MRCP (UK), FRCPCH (UK)

Corresponding author: *Y Joolay (yaseen.joolay@uct.ac.za)*

References

1. Taeusch HW, Ballard RA, Gleason CA. Avery's Diseases of the Newborn. 8th ed. Philadelphia: Elsevier Saunders, 2005:1123-1133.
2. Ballot DE, Chirwa TF, Cooper PA. Determinants of survival in very low birth weight neonates in a public sector hospital in Johannesburg. BMC Pediatr 2010;10:30.
3. Benitz WE. Treatment of persistent patent ductus arteriosus in preterm infants: time to accept the null hypothesis? J Perinatol 2010;30(4):241-252.
4. Gouyon JB, Kibleur Y. Efficacy and tolerability of enteral formulations of ibuprofen in the treatment of patent ductus arteriosus in preterm infants. Clin Ther 2010;32(10):1740-1748.
5. Quigley MA, Henderson G, Anthony MY, McGuire W. Formula milk versus donor breastmilk for feeding preterm or low birth weight infants. Cochrane Database Syst Rev 2007(4):CD002971.
6. Perlman SE, Saiman L, Larson EL. Risk factors for late-onset health care-associated bloodstream infections in patients in neonatal intensive care units. Am J Infect Control 2007;35(3):177-182.
7. Willis TC, Carter BA, Rogers SP, Hawthorne KM, Hicks PD, Abrams SA. High rates of mortality and morbidity occur in infants with parenteral nutrition-associated cholestasis. JPEN J Parenter Enteral Nutr 2010;34(1):32-37.
8. Marino LV, Goddard E, Whitelaw A, Workman L. Prevalence of bacterial contamination of powdered infant feeds in a hospital environment. S Afr Med J 2007;97(7):534-537.

Accepted 8 June 2011.