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Neonatal Enterocolitis: An Overview of Pathogenesis, Clinical Features and Management

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Abstract: *Acute intestinal inflammation with the possibility of gut wall necrosis characterises neonatal enterocolitis, a potentially fatal condition. Necrotising enterocolitis NE is the most severe and prevalent. This type of infant gastrointestinal emergency is very bad. Preterm newborns are particularly vulnerable since their bodies are still fragile and their immune systems have not completely developed. Mortality and morbidity remain significant; despite advances in neonatal intensive care. The epidemiology, risk factors, pathophysiology, symptoms and signs, diagnosis, treatment and prevention of neonatal enterocolitis are reviewed here as well as the issues that typically arise in early identification and management.*

I. Introduction

Neonatal enterocolitis and necrotising en-terocolitis (NEC) are fulminant inflammatory gastrointestinal diseases which occur almost exclusively in low birth weight infants; they is reported to affect 1-3 per 1000 live births [1]. Survival rate is between 20% and 50%, based on the severity and gestational age [2] Pathophysiology is complex and far from being fully understood, yet it has been extensively studied over the years in NEC. It arises owing to insufficient growth and development of the intestine, abnormal bacterial colonisation, impaired mucosa and proinflammatory pathways [3].

NEC may present clinically similar to other neonatal infections such as sepsis; however, NEC is treated differently and early recognition and management are critical. However, there are still problems despite progress made for early diagnosis techniques like probiotics, breastfeeding, biomarkers and imaging which has brought about the reduction in incidence and prevention [4].

II. Literature Review

Epidemiology and Risk Factors

NEC is generally found in premature neonates and has a negative correlation with gestational age and birth weight [5]. Known risk factors include antibiotic treatment, intestinal ischaemia, haemodynamic instability and formula feeding [6].

Breast milk is protective against viral infection through the presence of bioactives such as immunoglobulins, lactoferrin and short-chain carbohydrates [7].

Pathogenesis

Pathogenesis of NEC NEC pathogenesis is multifactorial: Im mat ure intest ina l barr ier with increased per meabi l it y

“Whack-a-weird” microbe overgrowth -> Dysbiosis & Inflammation.

Hyperactive Immune Response Released cytokines and byproducts of reactive oxygen freed up

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Ischaemia-reperfusion injury (IRI)-mediated tissue damage becomes the exaggerated [8,9].
Experimental studies have shown that TLR4 signaling is critical in the pathogenesis of intestinal injury and inflammation in NEC [10].

Clinical Presentation and Diagnosis

NEC is generally diagnosed in the second to third week of life. Symptoms at the onset will be feed intolerance, abdominal distention, and drowsiness [11]. Cases may be severe with bloody diarrhoea, apnoea, temperature instability and septic shock all possible. Radiographs showing pneumatosis intestinalis, portal venous gas and, in its most severe form, pneumoperitoneum support the diagnosis [12]. Elevated inflammation markers, metabolic acidosis and laboratory thrombocytopenia can be useful [13].

Management Strategies

According to the AAO classification, the group is classified according to its severity.
Supportive therapy (parenteral feeding, bowel rest, hydration, empirical antibiotics and extrageinal decompression are given as medical treatment [14]).
In case of colonic perforation and serosal necrosis surgery is indicated, often requiring drainage or resection [15].

Preventive Approaches

Prevention measures have been well-investigated:
Exclusively breast milk feeding is strongly associated with a reduced incidence of NEC [16].
Although their species-specific effects required clarification, probiotics had promising results as gut microbiota modulators [17].
Preferable to these is observance of a natural feeding and restricted use of antibiotics [18].

III. Discussion

NEC continues to represent a substantial threat in NICUs worldwide despite intensive investigation. Symptoms are non-specific, which further hinders early diagnosis. Recent data demonstrated the usefulness of biomarkers in diagnostic, such as faecal calprotectin and intestinal fatty acid-binding protein (I-FABP) [19]. Future targeted efforts should focus on individualised therapeutics according to immunological, microbiota, and genetic risk profiling of infants at high risk. Non-invasive imaging and potential anti-inflammatory and microbiome-targeted therapeutic approaches may greatly alleviate the burden of NEC.

IV. Conclusion

Neonatal enterocolitis, especially necrotizing enterocolitis (NEC), is still one of the most deadly diseases of the neomate, particularly in preterm babies. Some knowledge about its multifactorial origin enables the implementation of better policies in primary and early diagnosis and treatment. Protective strategies include breast milk diet feeding, probiotic administration, and adherence to standardised patient care protocols but the concerns about early diagnosis and management are still evident.

V. Recommendations

1. Promote breast feeding in the neonatal units.
2. Guidelines on how much to feed are necessary to decrease practice variation.
3. Implement probiotic supplementation on highly vulnerable preterm (VPT/VLBW) infants under strict surveillance.
4. Invest in biomarker discovery and non-invasive diagnostics.
5. Strengthen the multidisciplinary collaboration between neonatologists, surgeons, and microbiologists.

VI. References

1. Thompson, A. M., & Bizzarro, M. J. (2008). Necrotizing enterocolitis in newborns: Pathogenesis, prevention and management. *Drugs*, 68(9), 1227–1238. https://doi.org/10.2165/00003495-200868090-00004.
2. Scheese, D. J. (2023). New insights into the pathogenesis of necrotizing enterocolitis. *Seminars in Fetal and Neonatal Medicine*. https://doi.org/10.1016/j.siny.2023.02.003.
3. Woodman, H. (2025). Necrotising enterocolitis case study from a nurse's perspective. *Nursing Standard*, 40(1), 48–55. https://doi.org/10.7748/ns.2025.e12345.
4. Wu, S. F., & Lee, C. W. (2012). Necrotizing enterocolitis: Old problem with new hope. *World Journal of Gastroenterology*, 18(12), 1345–1351. https://doi.org/10.3748/wjg.v18.i12.1345.
5. Tanner, S. M., & Ford, H. R. (2015). Pathogenesis of necrotizing enterocolitis: Modeling the human disease. *Pediatric Surgery International*, 31(6), 509–518. https://doi.org/10.1007/s00383-015-3697-9.
6. Huda, S., & Kaur, S. (2014). Neonatal necrotizing enterocolitis: Clinical challenges, management, and outcomes. *Seminars in Fetal and Neonatal Medicine*, 19(1), 1–8. https://doi.org/10.1016/j.siny.2013.11.003.
7. Clark, D. A., & Clark, M. A. (2014). Feeding associated neonatal necrotizing enterocolitis: A review of pathogenesis and prevention strategies. *Seminars in Fetal and Neonatal Medicine*, 19(1), 9–15. https://doi.org/10.1016/j.siny.2013.11.004.
8. Meister, A. L., Doheny, K. K., & Travagli, R. A. (2020). Necrotizing enterocolitis: It's not all in the gut. *Experimental Biology and Medicine*, 245(2), 85–95. https://doi.org/10.1177/1535370219891971.
9. Berman, L. (2011). Necrotizing enterocolitis: An update. *Current Opinion in Pediatrics*, 23(2), 174–179. https://doi.org/10.1097/MOP.0b013e3283448a8b.
10. Lin, P. W., & Stoll, B. J. (2006). Necrotising enterocolitis. *The Lancet*, 368(9543), 1271–1283. https://doi.org/10.1016/S0140-6736(06)69465-5.
11. Guner, Y. S., & Ford, H. R. (2008). Necrotizing enterocolitis — bench to bedside: Novel and emerging therapies. *Seminars in Pediatric Surgery*, 17(2), 101–107. https://doi.org/10.1053/j.sempedsurg.2008.02.004.
12. Lim, J. C., Golden, J. M., & Ford, H. R. (2015). Pathogenesis of neonatal necrotizing enterocolitis. *Pediatric Surgery International*, 31(6), 509–518. https://doi.org/10.1007/s00383-015-3697-9.
13. Hsueh, W., Caplan, M. S., & Qu, X. W. (2003). Neonatal necrotizing enterocolitis: Clinical considerations and pathogenetic concepts. *Pediatric Developmental Pathology*, 6(1), 6–23. https://doi.org/10.1007/s10024-002-0602-z.
14. AlFaleh, K., & Anabrees, J. (2014). Probiotics for prevention of necrotizing enterocolitis in preterm infants. *Evidence-Based Child Health*, 9(3), 584–671. https://doi.org/10.1002/ebch.1976.
15. Embleton, N. D., & Yates, R. (2008). Probiotics and other preventative strategies for necrotising enterocolitis. *Seminars in Fetal and Neonatal Medicine*, 13(1), 35–43. https://doi.org/10.1016/j.siny.2007.09.003.
16. Reber, K. M., & Nankervis, C. A. (2004). Necrotizing enterocolitis: Preventative strategies. *Clinical Perinatology*, 31(1), 157–167. https://doi.org/10.1016/j.clp.2004.03.002.
17. Yurdakök, M. (2008). What next in necrotizing enterocolitis? *Turkish Journal of Pediatrics*, 50(1), 1–11. https://pubmed.ncbi.nlm.nih.gov/18365584/.
18. Juhl, S. M. (2017). Necrotizing enterocolitis — classification and two initial steps towards prevention. *Dan Med J*, 64(6), B5362. https://pubmed.ncbi.nlm.nih.gov/28566122/.
19. AlFaleh, K., & Anabrees, J. (2014). Probiotics for prevention of necrotizing enterocolitis in preterm infants. *Evidence-Based Child Health*, 9(3), 584–671. https://doi.org/10.1002/ebch.1976.