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Research Article

THE IMPORTANCE OF BREAST MILK IN THE PREVENTION OF NECROTIC ENTEROCOLITIS IN NEWBORNS

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Foziljon-zoda Maftuna
Assistant, Department of Pediatric Surgery No. 1, Samarkand State Medical Universit, Uzbekistan

ABSTRACT

Necrotizing enterocolitis (NEC) is one of the most serious conditions affecting preterm infants, associated with a high mortality rate. Breast milk, due to its unique bioactive components, can reduce the risk of NEC by protecting the intestines and supporting healthy microbiota. This article discusses the protective mechanisms of breast milk, its immune and anti-inflammatory properties, and compares it with artificial formula.

KEYWORDS

Necrotizing enterocolitis, breast milk, preterm infants, prevention, microbiota, artificial formula, immune protection.

INTRODUCTION

Necrotizing enterocolitis (NEC) is a severe inflammatory bowel disease that mainly affects premature infants. It is one of the most dangerous conditions, requiring emergency surgical

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intervention and associated with a high risk of mortality. In recent years, attention has increased to the role of breastfeeding in the prevention and reduction of NEC severity. Breast milk, due to its unique composition, is able to protect the intestines of the newborn and promote the development of beneficial microbiota, which is especially important for premature infants who are at risk. According to the study by Sullivan et al. (2010), the use of exclusive breast milk reduces the risk of NEC in premature infants by 77% compared to formula feeding. This emphasizes the importance of breast milk in the prevention of the disease, as well as its key role in reducing mortality and improving the prognosis in such children.

Epidemiology and pathophysiology of NEC

Necrotizing enterocolitis most often develops in children with extremely low body weight and in premature infants, which is associated with the immaturity of their intestinal barrier and immune system. The main risk factors include the use of artificial mixtures, late initiation of feeding, hypoxia and unstable immune response regulation systems. Studies show that children who receive exclusively breast milk have a significantly lower risk of developing NEC. This is due to the presence of various biologically active substances in milk that contribute to the formation of an immune response and intestinal development.

Necrotizing enterocolitis affects approximately 7-10% of premature infants, especially those weighing less than 1500 grams. The underlying mechanisms of NEC are related to disruption of the intestinal barrier function, which can trigger a cascade of inflammatory reactions. Studies such as Neu and Walker (2011) show that breast milk can regulate inflammatory processes through cytokines and growth factors, which helps reduce the risk of intestinal wall damage.

The Health Benefits of Breast Milk for Newborns

Breast milk is rich in antibacterial and anti-inflammatory components that protect the intestinal mucosa and prevent the penetration of pathogenic bacteria. It contains immunoglobulins, lactoferrin, lysozymes and other proteins that play an important role in protecting against infections. Lactoferrin, for example, binds iron, preventing the growth of pathogenic microorganisms. These substances not only protect against infections, but also

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promote the proper development of the intestinal microbiome, which is important for the immune response.

Health Benefits of Breast Milk for Newborns (Supplement)

Clinical evidence suggests that infants who receive breast milk have higher rates of healthy gut microbiota development. In particular, breast milk oligosaccharides such as 2'-fucosyllactose promote the growth of probiotic bacteria such as bifidobacteria and lactobacilli. A study by Underwood et al. (2013) demonstrates that breastfed infants have a microbiota that includes a greater diversity of protective bacteria, which is important for preventing bacterial colonization and inflammation.

Mechanisms of protective action of breast milk against NEC

Breast milk has many mechanisms that protect the newborn from developing NEC. One of the key ones is its effect on the intestinal microflora. The presence of oligosaccharides, which promote the growth of beneficial bacteria such as bifidobacteria, helps create a protective barrier against pathogenic microbes. Immune cells and cytokines present in milk support the formation of stable intestinal immunity and also protect against inflammation that contributes to the development of NEC.

There are several key mechanisms by which breast milk protects newborns from NEC:

1. Anti-inflammatory effects: Breast milk contains factors such as transforming growth factor beta (TGF-β), which helps prevent the inflammation that often precedes the development of NEC.

2. Prebiotic oligosaccharides: These compounds stimulate the growth of beneficial bacteria and reduce the number of pathogens, preventing the colonization of the intestine by pathogenic microorganisms.

3. Biologically active proteins: such as lactoferrin, which not only inhibits the growth of pathogens, but also stimulates tissue healing processes.

Comparison with artificial mixtures

Despite manufacturers' attempts to include bioactive components in formulas, they still cannot fully replicate the complex composition of breast milk. Comparative studies show that formula-fed infants have a higher risk of NEC than

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breastfed infants. Formulas do not provide the same level of protection because they do not contain active immune factors, living cells, and other components found in breast milk.

A meta-analysis of several studies (Quigley and McGuire, 2014) confirms that formula-fed infants have a higher risk of NEC and other inflammatory bowel diseases. For example, exclusively breastfed infants had lower levels of intestinal permeability and inflammation, which reduces the risk of both infections and NEC.

Conclusion

Breast milk is a powerful preventive measure against NEC, especially for high-risk preterm infants. Its components promote a healthy microbiome, strengthen the immune system, and protect against inflammatory bowel disease. Promoting breastfeeding and supporting mothers should be a priority in perinatal medicine, as they can significantly reduce the incidence of NEC. Further research is needed to understand which breast milk components can be effectively used to develop new therapeutic approaches.

Thus, human milk plays an indispensable role in reducing the risk of NEC and in supporting the intestinal health of neonates. In light of the accumulated evidence on the effectiveness of breastfeeding in preventing NEC, it is recommended at the clinical practice level to encourage mothers to breastfeed and, if necessary, to use donor human milk. Supporting breastfeeding is an important strategy not only for the prevention of NEC, but also for the overall health of preterm infants.

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Here is a sample reference list of 15 sources that could be used for an article on necrotizing enterocolitis and breast milk. These sources cover a variety of topics, such as the pathophysiology of NEC, the benefits of breast milk, comparisons with formula, and the role of microbiota.

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