

Fat Malabsorption and Human Milk in Preterm Neonates



Importance of Fats for Preterm Neonates

- Long chain polyunsaturated fatty acids (LCPUFAs), including arachidonic acid (ARA) and docosahexaenoic acid (DHA) are important for normal health, growth, and development. DHA supplementation has been shown to improve visual outcomes and neurodevelopment, and may decrease morbidity from bronchopulmonary dysplasia, necrotizing enterocolitis, and retinopathy of prematurity.¹
- LCPUFAS also have potentially significant modulatory effects on developmental processes related to growth, body composition, immune and allergic responses, and the prevalence of nutrition-related chronic diseases.²
- LCPUFAs are increasingly transferred from mother to fetus late in pregnancy; therefore, infants that are preterm are at risk for deficiency.¹
- LCPUFAs are building blocks for brain and eye tissue while medium chain triglycerides (MCTs) are fats used strictly for rapid body energy.

Pancreatic Insufficiency Related to Prematurity

- Preterm infants have exocrine pancreatic insufficiency (EPI) due to prematurity, with bile salt and pancreatic lipase deficiencies leading to a malabsorptive state.^{3,4}
- This leads to an impaired absorption of total fat as well as specific fatty acids such as DHA and ARA. Losses of these LCPUFAs may reach rates of 20–30%.³
- These preterm infants require a source of lipase to help break down fats.
- Developmental EPI may contribute to reduced nutrient absorption and growth failure.⁴

Human Milk in NICU

- The optimal nutrition for the newborn is mother's own milk (MOM), where bile salt-stimulated lipase (BSSL) is available to help break down fats for absorption.²
- When MOM is not available or adequate, pasteurized donor human milk (PDHM) in preterm infants is recommended and commonly used.⁵
- While PDHM provides many nutritional benefits, pasteurization of PDHM inactivates maternal BSSL, which can lead to less efficient fat absorption and contribute to slower weight gain.^{2,6,7}
- Several studies have shown slower weight gain with PDHM, and the contributing factors could be lack of maternal BSSL with preterm infant EPI and PDHM that is not matched to the gestational age of the infant.^{2,6,7}

Use of Digestive Enzymes in Preterm Infants on PDHM

- It has been hypothesized that digestive enzyme supplementation may support fat absorption in preterm infants with growth faltering and exocrine pancreatic insufficiency. However, current available evidence does not support routine use of digestive enzyme supplementation in preterm infants. Digestive enzyme preparations formulated for oral administration can present practical challenges

when delivered via small-bore enteral tubes commonly used in preterm neonates. There is also limited guidance on optimum dosing regimens for pancreatic enzyme replacement therapy (PERT) in preterm infants.⁸

- Available studies evaluating digestive enzyme supplementation in preterm infants have yielded inconsistent results with respect to improvements in fat malabsorption and growth velocity, highlighting the need for additional research and alternate solutions.⁸



Key Takeaways

- Preterm infants require LCPUFAs for growth and development.
- Preterm infants have exocrine pancreatic insufficiency.
- MOM has bile salt-stimulated lipase whereas PDHM does not.
- Methods are needed to enhance fat absorption in preterm infants on PDHM.

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