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EDITORIAL

Implementing guidelines for enteral nutrition of preterm neonates during intensive care and in later infancy

Implementando diretrizes para nutrição enteral de neonatos prematuros durante a terapia intensiva e na infância posterior

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Providing critically ill neonates with adequate nutrient intake is often impossible. This is due to the constraints on fluid intake, metabolic imbalances, inability to utilize the enteral route due to intestinal dysmotility, and risk of complications such as necrotizing enterocolitis. Consequently, postnatal or extrauterine growth restriction (EUGR) occurs frequently, manifesting as weight loss beyond that caused by the normal extracellular volume contraction which must occur during the transition from fetal to extrauterine life. While it is impossible to partition the direct effects of nutritional deficits versus confounding variables associated with preterm birth, mitigating nutritional deficiencies likely plays a role in improving outcomes related to morbidities such as EUGR, anemia, osteopenia of prematurity, retinopathy of prematurity, bronchopulmonary dysplasia, necrotizing enterocolitis, and neurodevelopmental deficits[1-3].

The potential for nutritional management to affect postnatal growth and subsequent outcomes can be discerned from observational studies of variation in postnatal growth rates and in the resulting incidence of EUGR at NICU discharge across Europe. When defining EUGR as discharge weight < 10th percentile, the incidence of EUGR was highest in Portugal, ranging between 43% (using Intergrowth charts as a reference) and 60% (based on Fenton charts)[2]. Adjusting for differences in average birth weight at term and other country-specific confounders diminished the observed variation to a minor degree, leaving substantial unexplained variation in postnatal growth between countries. These variations present an opportunity for research and collaborative clinical quality improvement (QI) efforts to optimize postnatal nutrition.

Whether relying on QI or research approaches, it is essential to develop and implement standardized interventions. Protocolizing feeding processes not only enables effective implementation, but it also improves growth[4] and decreases the risk of necrotizing enterocolitis[1]. The Portuguese guidelines for enteral nutrition in preterm neonates reported in this issue[5,6] are a fundamental element to enable such improvement. Used in conjunction with the previously published guidelines for parenteral nutrition[7,8], and standardized postnatal growth monitoring[9,10], these recommendations should allow for improved nutritional status during the acute stage of postnatal transition, as well as the convalescent stages preceding discharge from NICU. The guidelines underscore the importance of mother's own milk (MOM) as the optimal base for infant feeding, including preterm infants. However, MOM is frequently inadequate to meet the nutritional needs of the preterm neonate. Additionally, preterm birth presents unique challenges and subsequent decreased provision of MOM[11]. A framework for

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establishing NICU systems which promote and optimize the provision of MOM, with close nutritional monitoring and individualized supplementation that takes into account the infant's body composition, acute versus convalescent disease states[12], and MOM supply over time is essential to optimize enteral nutrition in preterm neonates. The complexity of nutritional optimization under these conditions benefits from the expertise and dedicated time availability of a dietitian.

Whereas dedicated dietitians who integrate the neonatal nutrition care team help optimize feeding in the NICU, their nutritional assessments and plans are foundational for post-discharge feeding of preterm infants that attempts to correct and prevent nutritional deficits. Post-discharge feeding is addressed separately in Part II of the recommendations[6], a strategically wise choice which makes these guidelines more likely to be used by pediatricians practicing in the community. Nutritional management in a decentralized outpatient setting is much more difficult to standardize than during NICU care. Consequently, post-discharge nutrition and growth of preterm neonates have received limited research and QI efforts.

Maximizing adoption of these nutritional guidelines is essential to optimize population health outcomes. In inpatient settings, implementation of the guidelines can be further enabled by integration into electronic records or prescribing systems, automated calculation of nutritional intakes and development of a nutritional monitoring dashboard to facilitate the task of neonatal dietitians -where available- or of neonatologists or other neonatal care providers. In the ambulatory setting, it is unlikely that practicing pediatricians will immediately learn and adopt the new guidelines through continuing education, and uniformly change their established practices. Absent neonatal dietitians, clarity and simplicity are important features underlying the usability of the guidelines by pediatricians. To this end, simplified guidelines, reminders, and possibly tools that can be integrated into electronic health record systems are needed to facilitate guideline use and achieve buy-in from practicing pediatricians.

The family is an essential element of the infant's nutritional support team, not only in committing to providing mother's milk, but also in helping to bridge the transition from inpatient care of the preterm "feeder and grower" to the still-evolving ambulatory feeding strategies. Informed parents can advocate for continuity of nutritional plans set in NICU in preparation for discharge, and they may be capable of asking "the right questions" when pediatricians make recommendations for routine infant feeding practices which may not be based on current evidence. To that end, it would be useful to have family educational tools that highlight key nutritional guidelines in lay persons' language, and which can be used by dietitians or other providers of a customized nutritional prescription plan in preparation for discharge. Using such a tool to communicate the nutritional plan to the pediatrician can reinforce continued use of the guidelines during infancy.

The combination of parenteral and enteral nutritional guidelines during NICU care, simple post-discharge recommendations, and systems for effective implementation of these guidelines, which utilize the family to help ensure continuity across care settings, has the potential to minimize the incidence, severity, and consequences of postnatal micronutrient deficiency and/or malnutrition, growth restriction and their consequences in neonates born preterm.

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