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Adequate nutrition can improve the outcome of premature infants

A nutrição adequada pode melhorar o prognóstico dos neonatos prematuros

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This issue of RBTI is brought about by an article by Freitas et al.[1] that presents an overview of nutrition therapy in very low birth weight preterm neonates, with a special focus on its protective effects against sepsis and necrotizing enterocolitis. This is a timely article, as, notwithstanding the remarkable scientific progress, much in this field remains to be determined.

In the past, old concepts, including the notion that nutrition during the first days of life could be harmful and that any developmental delay would be free of consequences, has led to inadequate nutrition. It is currently clear that deficient nutrition during such a critical period in early life both increases the short-term morbidity and entails lifelong consequences.[2,3] With regard to neurocognitive development, more severe damage occurs when nutrition deficiencies impact the early days of neonatal period, a time when feedings are advanced slowly and gradually. A direct relationship between the nutrition supply and prognosis was first described by Stephens et al. who showed an association between an increased protein-energy intake during the first week of life and improved neuromotor development scores in 18-month-old children.[3] This association strengthens the concept that parenteral nutrition should be started as soon as possible, preferably within the first hours after birth; this has been shown to be both safe and effective.[4]

In 2005, the European Society for Pediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) issued pediatric nutrition therapy guidelines;[5] these enteral nutrition recommendations were reviewed and updated in 2010.[6] However, we do know that these recommendations for the first weeks of life are not adhered to, in part due to the reticence to adhere to new protocols. A 1 kg body weight premature infant has non-protein energy reserves of 110 kcal.[7] Without exogenous supplementation, such reserves allow survival from starvation for only up to four days, and this will be even shorter in the settings of hypermetabolism, such as during sepsis and respiratory failure. Therefore, as deficient neonatal nutrition (especially during the first days of life) is acknowledged to affect prognosis decisively, the literature-expressed opinion that a premature birth should be attended to by neonatal intensive care unit (ICU) teams as a nutritional emergency is fully justified.[8]

Although there is a consensus that the aim of nutrition therapy is to achieve growth similar to fetal growth rates, the current knowledge on the actual nutritional needs of premature infants is fragmented and unable to answer to some relevant questions. Most of the studies involved stable premature infants, and little is known about the metabolic particulars and the impact of some diseases on the nutritional requirements.[9] Ziegler has

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identified an insufficient protein intake as an important cause of restricted growth.[10] A protein intake of 4 to 4.5 g/kg/day in neonates of up to 1,000 g and 3.5 to 4 g/kg/day for infants between 1,000 and 1,800 g is estimated to fulfill most of the needs of premature infants.[7] Conversely, during acute metabolic stress, the risks and consequences of overfeeding (e.g., hyperglycemia, hypokalemia, hypophosphatemia, liver injury) should not be disregarded.[11] In relation to immunoprotective effects, doubts regarding the use of adjuvant measures, such as selenium and probiotic administration, to prevent and treat neonatal sepsis should be clarified by ongoing studies.

Within this context, the information regarding proven practical measures allows the highlighting of those that should be part of neonatal ICU routines. Among them, the use of human milk, which, in addition to other obvious advantages, reduces the risk of necrotizing enterocolitis[12] and sepsis[13] and allows the premature infant to tolerate earlier full enteral nutrition.[14] Furthermore, the use of standardized protocols reduces the time to achieve full enteral nutrition without increasing morbidity and may reduce the incidence of late sepsis.[15] Frequent metabolic and nutrition monitoring by a multidisciplinary nutrition therapy team is another measure that is able to improve nutritional outcomes in children admitted to neonatal ICUs.

The flow of new knowledge shows that there is increasing attention to the nutrition of newborns, which is now considered as a determinant of adult health. There is strong evidence that epigenetic mechanisms, which are triggered by nutrition during early development, may affect both physiological and metabolic processes and increase the susceptibility to chronic diseases during the lifetime of the individual.[16,17] Therefore, the vulnerability of the premature infant and the negative impacts that inadequate neonatal nutrition can have on this child's later life should be taken into consideration, as it is crucial to have a better understanding of the developmental and nutritional needs that foster a healthy and productive adult life. Hopefully, new knowledge from experimental, clinical and epidemiological research will have a beneficial impact on future clinical practice and public health policies.

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