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Pediatric patients have specific nutritional needs different than adult-designed products

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Parenteral nutrition (PN) is indicated when oral or enteral nutrition is not possible, insufficient, or contraindicated to correct or prevent nutritional deficiencies. The Case Report of Mohd Johari et al.[1] illustrated several key benefits of commercial multi-chamber bags (MCBs) in patients requiring home PN administration. These advantages include ease of administration, fewer line manipulations, reduced caregiver burden, and cost savings. The authors showed that PN switching administration from pharmacy compounded 2-in-1 binary admixtures with separate intravenous lipid emulsion to commercial MCBs improved safety and convenience by reducing the frequency of lipid syringe changes, lowering infection risk, and simplifying infusion with a single pump. They also showed that the transition to MCBs decreased consumable use and pump maintenance expenses, reducing annual costs by 52%.[1] These characteristics are important because PN is a vital therapy for many patients but also represents a significant burden for patients and their caregivers during home PN. Several authors have already confirmed the observations of Mohd Johari et al.[1] showing that the stability at room temperature and the long shelf life of MCBs offer more flexibility and quality of life than pharmacy-compounded PN bags that need to be stored in temperature-controlled refrigerators for up to one week.[2-4]

Beside these important considerations, the authors did not discuss the nutritional inadequacies of adult-designed MCBs in pediatric patients, which is a major limitation of these in pediatric patients, especially during long-term PN. Pediatric patients have different nutritional needs because of their growth requirements (i.e., statural growth, organ development, bone accretion, etc.).[5] Adult-designed MCBs are obviously not designed for pediatric patients, even if they often include an indication for children over two years of age and are sometimes used in pediatric patients.[3,6,7] The adult-designed MCBs do not allow to meet all the pediatric nutritional requirements, mainly because of low energy content, inadequate protein to energy ratio, low mineral content, low electrolyte content, low calcium to phosphorus ratio, and insufficient essential and semi-essential nutrient contents.[5,8-10] It explains why the PN regimens described in this case report showed poor growth and suboptimal nutrient intake intakes when referring to recent PN guidelines.[1,11,12] It suggests that enteral/oral supplements may be considered when using adult MBCs to compensate for any deficits, when possible and for limited periods, due to the inadequacies of current adults MCBs. In this case report, the calorie intakes from adult-designed MCBs can be considered appropriate but the amino acids intakes were much higher than recommended (~2 g/kg/d), varying between 3.0 and 3.75 g/kg/day. These

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high amino acid intakes implied that the total energy to amino acid ratio was close to 20 kcal per gram of amino acid while it is usually recommended to provide 30-40 kcal total energy per gram of amino acid.[8,13,14] This has probably impaired the amino acid utilization during PN and restricted the growth of lean body mass. The calcium intakes were also lower than recommended in the case report, between 0.12 and 0.19 mmol/kg/day, while recent guidelines recommend more than 0.25 mmol/kg/d, up to 0.5-2 mmol/kg/d.[8,11,12] The calcium to phosphorus ratio was around 0.2 mol/mol in the case report while recent guidelines recommend a ratio of 0.5 mol/mol or higher.[15]

Interestingly, the authors included in their references the publication of Colomb et al.[16] that discussed the new availability of pediatric-designed MCBs in 2013. Unfortunately, the authors did not discuss the opportunity and the potential use of such pediatric MCBs in their case report.[1] This might have been quite relevant for healthcare professionals who participate in multidisciplinary nutrition therapy teams and take care of pediatric patients requiring PN. Colomb et al.[16] discussed the use of two commercial pediatric-designed MCBs that allows to supply of 40-50 kcal per gram of amino acids and 0.35-0.5 mmol/kg/d of calcium when providing 2 g/kg/d of amino acids, with a 0.4-0.7 mol/mol calcium to phosphorus ratio.

The role and value of commercial MCB for providing safe and efficient PN in pediatric patients have been reviewed recently.[5] The authors acknowledged that PN practice remains a high-risk and challenging therapy in pediatric patients and highlighted that actual practice should be regularly audited for compliance with recommendations and good practices. As Mohd Johari et al.[1], they confirmed that recent guidelines recommend the use of standardized PN with validated stability data in pediatric patients to improve both safety and efficacy. Such practice may not only reduce the risk of suboptimal PN and poor growth, but also reduces the complexity of prescribing, preparing, and administering PN. The full manufacturing license of commercial MCBs offers safety advantages over unlicensed compounded PN because of high-quality manufacturing standards, validated compatibility/stability, and continued safety insurance while on-market because of worldwide pharmacovigilance.[5]

There are few pediatric-designed MCBs on the market and they are not available in every country yet. The current evidence showed they are easy to use, improve nutritional outcomes, reduce workload, and reduce costs. Nutritional improvement was not observed in the case report of Mohd Johari et al. because of using adult-designed MCBs. Therefore, the development and use of pediatric-designed MCBs represents an opportunity for improving PN practices in pediatric patients globally.[5]

Author contribution

The author declares contribution to the paper as follows: Draft manuscript preparation: TS; Review and approval of the final version of the article: TS. The author reviewed the results and approved the final version of the article.

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Conflict of interest

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