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Response to Letter to the Editor: (Micro)Nutrients as Therapy for MODS: Vitamin D and Others?

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In proceedings from the Eunice Kennedy Shriver National Institute of Child Health and Human Development Multiple Organ Dysfunction Syndrome (MODS) Workshop we discuss optimal macronutrient delivery with downstream maintenance of intestinal barrier functions and preserved intestinal microbiome diversity as promising therapies for pediatric MODS (1). The therapeutic opportunities for nutrients as a primary therapy for MODS is vast, and could be presented as its own conference. The focus of this conference was on optimal macronutrient delivery, which might then be a suitable platform for investigations to determine the influence of specific micronutrients and ‘pharmaco-nutrition’ on progression of organ dysfunction. In a letter to the editor, Dr. Suzuki and Dr. Berbel raise the intriguing question of universal vitamin D screening and supplementation during pediatric critical illness (2). In a recent systematic review of seven placebo-controlled, randomized clinical trials in adult ICU patients, vitamin D supplementation was associated with significantly lower mortality without adverse events, and the authors called for a large multi-center trial (3). While the preponderance of observational studies completed in pediatric critical illness demonstrate associations between severe vitamin D deficiency and more severe acute illness, some results are conflicting. McNally et.al., in 326 critically ill children, found that vitamin D deficiency was associated with increased length of stay and increased severity of illness (4). In contrast, Shah et.al., in 154 critically ill children with high prevalence of vitamin D deficiency, found no difference in mortality, length of stay, or severity of illness, but a decrease in acute respiratory distress syndrome in children with severe vitamin D deficiency when compared with critically ill children who were not deficient (5). Before making general recommendations, a meta-analysis or large epidemiological study examining the association between vitamin D deficiency status and pediatric outcomes is needed. Vitamin D deficiency is common during pediatric critical illness, but universal screening during pediatric critical illness would be indicated in the setting of proven benefit to supplementation or clear absence of harm. Supportive data exist for several micronutrients such as vitamin C, thiamine, and vitamin D, which present as deficiencies and offer potential targets to improve organ function (6–8). Micronutrient supplementation at high dose or replacement doses to treat identified deficiencies may become part of the armamentarium used in the ICU ‘toolkit’ in specific patient populations, but ongoing study is needed to determine the clinical utility of deficiency states and supplementation before universal screening is indicated in the ICU setting.

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