Letter to Editor

Dietary creatine intake and head circumference among very young U.S. children

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To the Editor,

Several small-scale interventional studies demonstrated an association between creatine supplementation and body composition in children with neurological diseases and cancer (1, 2). Recent population-based studies corroborated a strong link between food creatine and dual-energy X-ray absorptiometry-derived body composition indices or growth biomarkers in healthy children and adolescents aged 2-19 years (3, 4). However, a relationship between dietary creatine intake and body size has not been evaluated in very young children at the population level. In this report, we conducted a secondary analysis of a previously completed cross-sectional study (5), and determined an association between food creatine and body measures in 597 U.S children aged 0 to 2 years, using the 2017-2018 National Health and Nutrition Examination Survey database. Total grams of creatine consumed per day were computed using the average amount of creatine (*e.g.*, 0.20 g/kg for milk-based foods and 3.88 g/kg for meat-based sources) across all creatine-containing food sources.

Dietary creatine intake was positively correlated with head circumference (r = 0.184; P = 0.031) when controlling for age at screening, while no link was found between creatine consumption and recumbent length (r = - 0.003; P = 0.955) or body weight (r = 0.048; P = 0.317). A multiple regression analysis revealed a significant relationship between food creatine and head circumference (P < 0.001) when adjusting for the effects of selected dietary variables (*e.g.*, weight of food consumed, total caloric content, protein intake).

Our findings indicate a relationship between food creatine and head circumference as a surrogate biomarker of brain size in early childhood. The design of this cross-sectional report prevents any firm conclusions about the cause-and-effect relationship. Still, it could be hypothesized that more creatine available from food sources may positively affect brain growth in very young children. The importance of cerebral creatine accretion for optimal brain development has been confirmed in infants diagnosed with inherited creatine deficiency syndromes, where provision of supplemental creatine allows young children with these conditions to thrive (for a detailed review, see Ref. 6). In addition, very preterm birth could be associated with long-standing brain metabolite alterations (including creatine impairment) and neurodevelopment disorders (7), implying enough creatine (and an effective creatine kinase circuit) might be critical for brain viability in a newborn child (6). Further long-term pediatric studies should evaluate the role of dietary creatine in neurodevelopment.

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