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Vitamin D, diet and immune response

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Aim: Sickle cell disease (SCD) is the most common of inherited blood disorder. Only about half of the people with homozygous HbS disease present with frequent and severe vaso-occlusive crises. Blood serum vitamin D/25[OH]D3 levels (BSVD) are chronically low in SCD populations, and vitamin D has been shown to inhibit inflammatory cytokine production and reduce SCD crisis triggers such as infections. We hypothesize that vitamin D status is a major mediator of SCD-related crises.

Methods: 102 medically diagnosed sickle cell disease patients were administered a health evaluation and dietary survey. Additionally a retrospective longitudinal study (RLS) was conducted utilizing four years (2009-2013) of de-identified medical record to evaluate BSVD levels and SCD-related hospitalizations of 300 SCD patients. ANOVA and Student's T-test was utilized to determine significance.

Results: The dietary study showed that SCD patients with BSVD >30ng/ml had 50% lower total SCD-related hospitalizations in a 12 month period. SCD patients in lowest BSVD tertile and self-reported to eat fish several times a week showed a 93% reduction in SCD-related hospitalizations as compared to the patients who self-reported to never eat fish. The RLS showed an 85% reduction in SCD-related hospitalizations (<1.5/year) in patients with BSVD >41ng/ml as compared to SCD patients with very low BSVD. The continued study of vitamin D deficiency, inflammatory and immune responses in SCD populations may yield a more detailed understanding of human health effects of long-term vitamin D deficiency in this medically vulnerable group and in populations with normal functioning genetic response elements.

Biography

Michael L McCaskill is currently an Assistant Professor in the Global Environmental Health Sciences at Tulane University School of Public Health and Tropical Medicine. He is toxicologist with research interests in environmental toxicology; xenobiotic-induced metabolic dysregulation of macro-nutrients, health disparities, nutrition and behavior based public health intervention. Currently his research laboratory is investigating the role environmental mediators such as diet and ethanol consumption, has on vitamin D metabolism and innate immune response.

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