

Syndrome of Allergy, Apraxia and Malabsorption: Characterization of a Neurodevelopmental Condition that Responds to Omega 3 and Vitamin E supplementation.

Morris CR, Geng L, Agin MC. Syndrome of Allergy, Apraxia and Malabsorption: Characterization of a Neurodevelopmental Condition that Responds to Omega 3 and Vitamin E supplementation. *Proceedings of the Annual Meeting of the Pediatric Academy Societies*, 2008.

BACKGROUND: Verbal apraxia (VA) is a neurologically-based motor planning speech disorder of unknown etiology common in autism spectrum disorders (ASD) that anecdotally responds to polyunsaturated fatty acid (PUFA) and Vitamin (vit) E supplementation. Vit E deficiency causes symptoms that overlap those of VA. PUFAs in the cell membrane are vulnerable to lipid peroxidation and early destruction if vit E is not readily available, potentially leading to neurological sequelae. Inflammation of the gastrointestinal tract and gluten sensitivity may contribute to malabsorption of nutrients such as vit E and carnitine, contributing to fatty acid metabolism dysfunction and neurological abnormalities.

OBJECTIVE: Characterize symptoms and metabolic anomalies of a subset of children with VA that may respond to nutritional interventions. Design/Methods: 181 children with VA (median age 4 yrs, > 20% ASD), were treated with vit E + PUFA. A celiac panel, fat soluble vitamins, and carnitine level was obtained in patients having blood analyzed.

RESULTS: A common clinical phenotype of male predominance (80%), GI symptoms, food allergy, sensory issues, low muscle tone and coordination difficulties emerged. 175 families (96%) anecdotally reported dramatic improvements in a number of areas including speech, imitation, coordination, eye contact, behavior, sensory issues and the development of pain sensation. Plasma vit E levels varied in children tested (low in 2, high in 4 and normal in 4), however pre-treatment levels did not reflect clinical response. Low carnitine (17/22), high antigliadin antibodies (14/17), gluten-sensitivity HLA alleles (7/7), zinc (2/2) and vit D deficiency (3/4) were common abnormalities. Fat malabsorption was identified in 5/7 boys screened by fecal fat studies.

CONCLUSIONS: We describe a new disease paradigm of abnormal vit E and fatty acid metabolism causing neurological dysfunction in VA that responds to a safe nutritional intervention. The association of carnitine deficiency, gluten sensitivity/food allergy and fat malabsorption with VA is a novel observation, suggesting that these children deserve a more comprehensive metabolic work-up than what is current standard practice. Appropriate screening may identify a subgroup of children with a previously unrecognized syndrome of allergy, apraxia, and malabsorption (SAAM) responsive to nutritional interventions in addition to traditional speech and occupational therapy. Controlled trials in apraxia and autism are warranted.

Impact of Vitamin E and Omega-3 Supplementation in Children with Verbal Apraxia.

Morris CR, Agin MC. Impact of Vitamin E and Omega-3 Supplementation in Children with Verbal Apraxia. *Proceedings of the Annual Meeting of the Pediatric Academy Societies*, 2007. Late Breaking Platform Session, #5570.8.

BACKGROUND: Verbal apraxia (VA) is a neurologically-based motor planning disorder of unknown etiology common in autism spectrum disorders (ASD) that anecdotally responds to omega 3 polyunsaturated fatty acid (PUFA) supplementation. Vitamin (vit) E deficiency causes symptoms that overlap those of VA. PUFAs in the cell membrane are vulnerable to lipid peroxidation and early destruction if vit E is not readily available, potentially leading to neurological sequelae. Inflammation of the gastrointestinal tract and gluten sensitivity may contribute to malabsorption of nutrients such as vit E and carnitine, contributing to fatty acid metabolism dysfunction and neurological abnormalities.

OBJECTIVE: Determine efficacy of vit E and PUFA supplementation in children with VA.

DESIGN/METHODS: 50 children diagnosed with VA were treated with vit E + PUFA. 10 of these children were known to have ASD. A celiac panel, fat soluble vitamins, and carnitine level was obtained in patients having blood analyzed.

RESULTS: Age ranged from 2-13 years, (majority < 5 yrs), and 38/50 were boys. A history of gastrointestinal symptoms, sensory integration dysfunction, low muscle tone and coordination difficulties (dyspraxia) was commonly reported. 48 families (96%) anecdotally reported dramatic improvements in a number of areas including speech, imitation, coordination, eye contact, behavior, sensory issues and the development of pain sensation. 2 children experienced new tearful or aggressive behavior within 3 days of initiating vit E (400 IU/d) without apparent benefits in speech, and therapy was withdraw within a week. No other adverse effects were reported. Plasma alpha tocopherol levels varied in children tested (low in 2, high in 4 and normal in 4), however pretreatment levels did not reflect clinical response. Low plasma carnitine was identified in 13/14 (93%) children. Antigliadin IgG antibodies were high in 9/11 (82%) children tested. 2 children reported vit D deficiency and early signs of rickets.

CONCLUSIONS: We describe a new disease paradigm of abnormal vit E and fatty acid metabolism causing neurological dysfunction in VA that responds to a safe nutritional intervention. The association of carnitine deficiency and gluten sensitivity with VA is a novel observation, suggesting that these children deserve a more comprehensive metabolic work-up than what is current standard practice. Larger controlled trials in apraxia and autism are warranted.