TRACE ELEMENTS

NEWS UPDATES

JANUARY – FEBRUARY 2013

Case Of The Green Tongue

In some of my past lectures I have presented "The Case of The Green Tongue." This particular case involved a young child whose tongue was found to have a dark green discoloration. The child was also suffering from multiple health symptoms and recurring infections. The mother had an HTMA performed and the results found very high levels of vanadium. Excess vanadium is known to produce this particular type of discoloration on the tongue. Upon further investigation it was found that the child's bedroom was located just above the furnace located in the basement below. Apparently, the furnace was not vented properly and as a result, the products of combustion were entering the child's bedroom. It should be noted that one source of vanadium is from petrochemical combustion. Of course it is very fortunate that the source of vanadium was found in this case, but more importantly, it led to modification of the furnace that reduced exposure to deadly carbon monoxide. Subsequent nutritional therapy and reduced exposure from this source eventually resolved the tongue discoloration and amelioration of other health issues.

In the following case reported in The Lancet, a seventy year old male was admitted into the hospital with pain in his hip, as well as additional neurological symptoms. What was found, was a fistula on his thigh that exuded a blackish fluid, and a green staining of his tongue. It was determined that a hip replacement implant performed six years earlier was improperly fitted and had actually broken through the ceramic insert lining the acetabular cavity. It was noted that the prosthesis was markedly corroded and tests revealed elevated vanadium in the blood and urine, as well as aluminum. After revision of the hip prosthesis, a three month follow-up revealed a reduction in vanadium, aluminum and titanium levels, along with a reduction of the green staining of the tongue and improvement in neuropathy symptoms. Moretti, B, et el. Peripheral Neuropathy After Hip Replacement Failure: Is Vanadium The Culprit? Lancet, Vol.379 2012.

Comment: The value of physical examination cannot be over-emphasized. In the first case I discussed, one of our astute clients who attended one of my seminars remembered the relationship that I described between excess vanadium and its physical manifestation. This led to the suspicion of excess vanadium accumulation that led to the discovery of the source and ultimately prevented a potentially serious issue with carbon monoxide poisoning, perhaps saving a life. Excess of other heavy metals as well as nutrient minerals often present with physical findings. Plumbism for example, can cause a lead line along the gums, Mee's lines on the fingernails indicate excess arsenic. Mercury, copper, iron nickel and silver can present various skin manifestations, such as; discoloration, rashes, hives, etc.

Hair and Nail Mineral Patterns in Children With Autism

Minerals and nutrition in general are important for central nervous system (CNS) function and development. Therefore, it stands to reason that this study was performed to assess the levels of the trace and toxic elements in children diagnosed with autism. The study was also done to determine if the level of elements could be correlated with the severity of autism. The study included forty-five children who were graded for three groups, high functioning autistic group (HFA), medium functioning autism (MFA) and low functioning autism (LFA) and compared to a group of healthy children. Results showed the level of copper in the hair and nails of the autistic group were significantly elevated compared to the age and sex-matched controls. Copper was

significantly more elevated in the LFA compared to the other grades and was also correlated with the degree of severity. The LFA group also was found to have significantly lower zinc levels compared with normal controls. They also found lower levels of magnesium and selenium in the hair of the autistic children compared to the healthy control group. In addition, lead and mercury levels were also found to be high. The LFA group had higher levels of lead and mercury compared to the HFA group as well as lower concentrations of magnesium and selenium. Priya, MDL, Greeth, A. Level of trace Elements (Copper, Zinc, Magnesium and Selenium) and Toxic Elements (Lead and Mercury in the Hair and Nail of Children with Autism. Biol.trace Elem. Res. 142, 2, 2011.

Comment: This is an interesting study, even with its limitation of analyzing only a few elements. In drawing data from our own recent TEI database of fifty children diagnosed with autism, as a group we noted similar findings. Our study consisted of forty-three males and seven female children ranging in ages three to eleven years. These subjects however, were not classified into low, medium or a high functioning group, so our test subjects should be considered to likely represent all three functioning levels of autism. Our findings here at TEI however, did correlate well with the above study. The average HTMA copper levels were one-hundred and fifty-three percent above normal and zinc was fifty-five percent of normal. Average selenium values were sixty-two percent of normal, while magnesium levels were forty-seven percent. Lead and cadmium levels were not significantly elevated, but mercury was one-hundred and forty-five percent above normal and aluminum one-hundred and twenty-six percent above normal. Further, a significant imbalance between sodium and potassium was noted. Sodium was optimum but potassium was two-hundred and sixty-five percent of normal. The mineral pattern of the autistic group as a whole revealed a sympathetic mineral pattern. We should note that I am only presenting the general statistical pattern, which does not take into consideration individual variations of HTMA mineral patterns.

Excess Hair Mineral Accumulation, Oxidative Stress And Parkinsonism

Certain nutritive minerals in excess, as well as heavy metals are known to contribute to increased oxidative stress leading to neurological manifestations. Komatsu and colleagues reported their study of hair tissue mineral levels of manganese, iron, lead, cadmium and aluminum concentrations in a group of Mongolian people and the influence of these metals contributing to oxidative stress and Parkinson's disease-like symptoms that are prevalent in Mongolia. The study included two-hundred and ninety-nine subjects from several areas of Mongolia along with a healthy control group. Urinary 8-hydroxy-2'-deoxyguanosine (8-OHdG) was measured to evaluate oxidative stress. Results showed that Mongolian subjects particularly those with Parkinsonism and arthritis had high accumulation of manganese, iron, lead, cadmium and aluminum in the hair compared to the controls. It was reported that the urinary 8-OHdG also correlated with the hair mineral results. Komatsu, F, et. al. A High Accumulation of Hair Minerals in Mongolian People: 2(nd) Report; Influence of Manganese, Iron, Lead, Cadmium and Aluminum to Oxidative Stress, Parkinsonism and Arthritis. Curr. Aging Sci. 1, 2011.

Comment: We have often noted hair mineral patterns of patients suffering from Parkinson's, ALS and other neurological conditions having elevations of a number of the minerals mentioned in this study. However, it is important to review the interrelationships of the minerals, i.e. ratios when evaluating patients with these conditions. The absolute levels of the minerals may not always be found to be in excess or in deficiency, but imbalances between the minerals can still contribute to increased oxidative stress and neurological manifestations. Hair mineral analysis can serve as an important adjunctive test in evaluating patients with neurological symptoms.

Magnesium and Stroke

Prospective studies were carried out on the effect of magnesium intake and stroke incidence. It was found that dietary magnesium intake was inversely associated with an increase in ischemic stroke. Low magnesium intake has been associated with a number of risk factors including, hypertension, diabetes, metabolic syndrome, insulin resistance, blood lipid peroxidation, arrhythmia, inflammation, clotting and reduced vascular contractility. Magnesium supplementation may play a significant role in the prevention of ischemic stroke by impacting receptor blockades, glutamate release, antagonism of calcium influx, preventing ATP depletion and increasing cerebral vasodilation. Larsson, SC, et al. Dietary Magnesium Intake and Risk of Stroke: A Meta-Analysis of Prospective Studies. Am.J.Clin.Nutr. 95,2, 2012. Song, Y, Liu, S. Magnesium For Cardiovascular Health: Time For Intervention. Am.J.Clin.Nutr. 95,2, 2012.

Comment: Magnesium status has long been recognized to be associated with cardiac arrhythmia, coronary artery disease, hypertension, insulin and glucose regulation. Seelig, also noted that the stress response is enhanced when a magnesium deficiency is present, which can contribute to stress-related conditions, such as gastrointestinal and cardiovascular disturbances, arthritis, or emotional disturbances. The enhanced stress response may also aggravate other conditions such as arthritis and blood sugar disorders. Seelig, MS: Consequence of Magnesium Deficiency on the Enhancement of Stress Reactions: Prevention and Therapeutic Implications (A Review). J.Am.Col.Nutr. 13, 5, 1994.

In reviewing HTMA samples submitted to TEI that had been diagnosed with past strokes, we found that the male and female occurrence was quite similar. Of six-hundred cases, three-hundred and forty were females and two-hundred and sixty were males. Male stroke cases had a median magnesium level of 3.3 milligrams percent, approximately forty-seven percent of normal. Female median magnesium was 5.1 milligrams percent, or eight and one-half percent below normal. Both groups had calcium-to-magnesium ratios above eleven to one, indicating a relative and, or absolute magnesium deficit. This type of mineral relationship can lead to abnormal calcium transport, increasing susceptibility toward stroke. Even though serum magnesium is the most widely used test to determine magnesium deficiency, it does not represent total magnesium status or the intracellular magnesium pool. HTMA can be a tool not only to evaluate total magnesium status, but also the interrelationship between the calcium-to-magnesium ratio.