Clinical Practice Guideline: **Hair Mineral Analysis – Nutritional Management**

Date of Implementation: **May 17, 2007**

Product: **Specialty**

GUIDELINES

American Specialty Health – Specialty (ASH) considers Hair Mineral Analysis for Nutritional Management to be unproven.

Patients must be informed verbally and in writing of the nature of any procedure or treatment technique that is considered experimental/investigational or unproven, poses a significant health and safety risk, and/or is scientifically implausible. If the patient decides to receive such services, they must sign a Member Billing Acknowledgment Form (for Medicare use Advance Beneficiary Notice of Non-Coverage form) indicating they understand they are assuming financial responsibility for any service-related fees. Further, the patient must sign an attestation indicating that they understand what is known and unknown about, and the possible risks associated with such techniques prior to receiving these services. All procedures, including those considered here, must be documented in the medical record. Finally, prior to using experimental/investigational or unproven procedures, those that pose a significant health and safety risk, and/or those considered scientifically implausible, it is incumbent on the practitioner to confirm that their professional liability insurance covers the use of these techniques or procedures in the event of an adverse outcome.

DESCRIPTION/BACKGROUND

Hair mineral analysis is the process of taking a sample of a person's hair, generally from the neck area, and sending it to a laboratory for analysis. The hair is then cut and put through a battery of chemical tests to determine levels of elements in the hair. It has been used to determine heavy metal levels such as mercury and lead, as well as to analyze mineral levels in the body for nutritional and healing purposes. Proponents of hair mineral analysis contend that individuals can learn about their metabolic rate, stage of stress, immune system, and adrenal activity.

Hair mineral analysis has been performed in the U.S. for the past three decades. It reached its height of popularity in the 1980's when hair analysis was used for purposes ranging from metal screening to personality testing. This technique today is used by healthcare practitioners to test various health states, including nutritional status.

EVIDENCE REVIEW

A review of the literature noted 2 case series studies presented in the Journal of the American Medical Association (JAMA), both of which found hair mineral analysis to be problematic and not effective. Barrett (1985) sent hair samples to 13 laboratories for testing and received nearly 13 different results. He concluded that hair analysis was unscientific and not clinically useful. Seidel et al. (2001) reevaluated hair mineral analysis for reliability and effectiveness. They sent hair samples to 6 laboratories for testing and had very similar results to Barrett in that there was no consistency between the reports from the tests. Authors recommended health care practitioners refrain from using hair mineral analysis to assess nutritional status or environmental exposures. Steindel and Howanitz (2001) point out that while hair can contain levels of heavy metals the best way of testing for this type of toxicity is a urine test.

Shin et al. (2015) studied children 6-15 years old with diagnoses of ADHD and an equivalent number of control subjects by testing hair mineral analysis for manganese. Manganese levels were significantly higher in the children who had been diagnosed with ADHD. In a meta-analysis of 8 studies using hair analysis, 375 subjects with attention-deficit/hyperactivity disorder and 382 controls, the pooled effect size showed that hair zinc levels in the subjects with ADHD were not statistically different from control subjects (Ghoreishy et al., 2021).

Yasuda and Tsutsui (2013) studied heavy metal and mineral levels in the hair in infants; Deficiencies of zinc and magnesium or high levels of metals such as aluminum, cadmium and lead may cause epigenetic changes affecting the neurologic development of autistic children. Zhang et al. (2021) conducted a meta-analysis that included 22 articles, a total of 1,014 children with autism spectrum disorders, and 999 non-autistic controls. Authors noted that children with autism showed higher levels overall of barium, mercury, lithium, and lead. Levels of mercury, lithium, lead, and selenium were higher in the hair of children with autism. Levels of zinc in the hair of children with autism were lower than the control group children. There were significant differences in copper in the hair and blood tests between children with and without autism.

Grabeklis et al. (2019) evaluated the levels of hair minerals and trace elements in 1- and 2-year-old children with Down’s Syndrome compared with controls. The children with Down’s syndrome demonstrated significantly higher levels of magnesium, iodine, zinc, lead, mercury, phosphorus, chromium, and selenium.

Park et al. (2013) showed lower bone mineral density and low calcium intake in women with high hair calcium levels.

Wessels et al. (2021) conducted a randomized, controlled study including testing on 457 children before and after zinc supplementation. Although zinc in fingernails showed some evidence of responding to the supplementation, zinc levels in hair samples did not. The authors reported that the use of zinc in hair as a biomarker was not supported. Two studies of 54 total participants in a meta-analysis that reported on hair concentrations of zinc demonstrated a significant positive effect after a fortification program. However, both studies were deemed of low quality rendering the results uncertain (Tsang et al., 2021).

Park et al. (2009) used hair mineral analysis to study the relationship of metabolic syndrome to mineral levels. Study results noted that levels of calcium, magnesium, and copper were significantly lower, and sodium, potassium and mercury levels were higher in people with metabolic syndrome. Participants with the highest levels of mercury were at significantly higher risk of metabolic syndrome than those with lower levels. Kim and Song (2014) and Choi et al. (2014) each studied the relationship of metabolic syndrome and insulin resistance to mineral levels in the hair. Chromium and selenium levels in the hair of viscerally obese adults were inversely associated with insulin resistance; Copper levels in the hair were positively associated with insulin resistance. Lee et al. (2020) investigated the concentrations of hair minerals in metabolically healthy obese and metabolically unhealthy obese participant groups and found no significant difference between the two groups. Hair iron and cobalt levels were negatively correlated with blood pressure levels and higher zinc concentrations were correlated with lower systolic blood pressure levels.

Ramazani et al. (2024) performed a systematic review and meta-analysis of children with autism spectrum disorder and controls without the disorder looking for levels of cadmium and mercury in blood, hair, and urine. There were no significant differences in cadmium or mercury levels in hair, blood or urine between the affected children and the control subjects.

Vroegindeweij et al. (2024) completed a randomized cross-over trial to study cortisol levels in patients with Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) and Q-Fever Fatigue Syndrome (QFS) compared to healthy controls. Blood cortisol levels are known to be lowered in spot testing of blood, urine and saliva in patients with ME/CFS and QFS, but the authors wished to test hair samples to see if long-term cortisol levels were also lowered. It was confirmed using hair analysis that chronic lowering of cortisol levels occurs in patients with ME/CFS and QFS.

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