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CHELATION AND HEAVY METAL DETOXIFICATION

SUMMARY: Heavy metal toxicity from chronic environmental exposure is often unrecognized because its symptoms are similar to many other health conditions: fatigue, nausea, insomnia, impaired mental function, nervousness, and even damage to vital organs. Although some heavy metals are part of a healthy diet (the trace elements iron, copper, manganese, and zinc), others (including arsenic, lead, mercury, cadmium, and aluminum) may become toxic when they accumulate in soft tissues after exposure through food, water, air, or absorption through the skin. Although arsenic and lead still lead the list of toxic heavy metals, potential mercury poisoning from fish such as tuna and swordfish, childhood immunizations, and dental fillings has caused increased concern. Chelating agents that bind to the heavy metals often are used to detoxify the body.

BACKGROUND: Although we've come a long way since the Romans drank from lead cups and delivered water to their citizens through lead pipes, metal toxicity still exists. Lead paint used in homes built before 1940 is still a major cause of pediatric heavy metal poisoning, and arsenic found in water supplies, paints, rat poisoning, fungicides, and wood preservatives is the most common cause of acute heavy metal poisoning in adults. Industrial exposure is the most typical route through which adults develop metal toxicity, while children often do so by eating dirt or paint chips. According to the U.S. Agency for Toxic Substances and Disease Registry, heavy metals included in the top 20 list of hazardous substances are arsenic, lead, mercury, and cadmium.

SYMPTOMS: Toxic metals disrupt cellular enzymes and displace essential minerals to interfere with normal organ system function. The range of symptoms includes memory loss, allergic reactions, high blood pressure, depression, mood swings, poor concentration, aggression, insomnia, chronic fatigue, language problems, and damage to lungs, kidneys, liver, and other vital organs. Long-term exposure may result in physical, muscular, and neurological symptoms similar to Alzheimer's disease, Parkinson's disease, and multiple sclerosis. Higher levels of heavy metals seem to appear in children with autistic symptoms.

DIAGNOSIS: A complete patient history (occupation, hobbies, home environment, recreational activities) and laboratory tests are necessary to diagnose heavy metal toxicity. Included may be blood tests, liver and renal function tests, urinalysis, fecal tests, x-rays, and hair and nail analysis. Chest and abdominal x-rays may be recommended in cases of respiratory and gastrointestinal symptoms.

TREATMENT: Chelation therapy often is used to treat heavy metal toxicity. Derived from the Greek word for "claw," chelation is the process of chemically binding metal ions and removing them from the tissue, to be filtered from the blood in the kidneys and eventually excreted in the

urine. Chelating agents may be administered orally, intramuscularly, or intravenously. Among common chelating agents are DMSA (dimercaptosuccinic acid), DMPS (dimercaptopropanesulfonate), and EDTA (ethylenediamine tetraacetic acid), the latter a manmade amino acid used since the 1940s for heavy metal poisoning. EDTA chelation removes metals and minerals from the blood, such as lead, iron, copper, and calcium, and is approved by the U.S. Food and Drug Administration (FDA) to treat lead poisoning and toxicity from other heavy metals. Chelation with EDTA has few side effects other than a burning sensation at the site where EDTA is intravenously delivered. Rare side effects can include fever, a sudden drop in blood pressure, abnormally low calcium levels in the blood, headache, nausea, vomiting, and bone marrow depression. Kidney failure has been reported but is rare.

CHELATION FOR CORONARY ARTERY DISEASE: A more controversial use of EDTA chelation is as a therapy for coronary artery disease. The National Center for Complementary and Alternative Medicine (NCCAM) and the National Heart, Lung, and Blood Institute (NHLBI), both part of the National Institutes of Health (NIH), have launched a Trial to Assess Chelation Therapy (TACT). The goal of TACT is to determine the safety and efficacy of EDTA chelation therapy for patients with coronary artery disease.

It has been suggested that EDTA chelation might clear blocked arteries by directly removing calcium found in fatty plaques. Other hypotheses propose that the process of chelation may stimulate the release of a hormone that causes calcium to be removed from the plaques or causes a decrease in cholesterol levels. EDTA chelation also may work by reducing the damaging effect of free radicals. These theories have not yet been well tested in scientific studies.

Case reports provide some evidence that EDTA chelation is effective for coronary artery disease. Approximately 12 published studies and five randomized controlled clinical trials reported a reduction in angina, although the sample size was small and conclusions were based on clinical observations or retrospective data. Alternative practitioners believe, however, that the use of chelation therapy for the prevention and treatment of circulatory diseases offers a viable alternative to high-risk surgical interventions.

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* These statements have not been evaluated by the FDA.