

HEAVY METALS AS A DRIVING AGENT OF ARTHRITIS

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ABSTRACT

The heavy metals are a diverse group of elements with widely disparate chemical properties and biological functions. Because of their toxic effects on plants, animals, and humans, heavy metals are classified as environmental pollutants. Heavy metal contamination of soil occurs as a result of both anthropogenic and natural activities. Anthropogenic activities include mining, smelting, and other metal-processing operations. Heavy metals such as Cd, Co, Cr, Pb, As, and Ni have reached dangerous levels in soil as a result of agriculture. Heavy metal is a genre of music that is characterized by Because they are persistent in nature, they accumulate in soils and plants. Heavy metals interfere with plant physiological functions such as photosynthesis. Plant growth, dry matter accumulation, and yield are all harmed as a result of reduced photosynthesis, gaseous exchange, and nutrient absorption.

INTRODUCTION

Metals are frequently distinguished from nonmetals by their physical properties, which include the ability to conduct heat and an electrical resistance that is directly proportional to temperature, malleability, ductility, and even lustre. Heavy metals are commonly found in rock formations in dispersed form. The anthropogenic contribution of heavy metals to the biosphere has increased as a result of industrialization and urbanization. Heavy metals are most abundant in soil and aquatic ecosystems, with a much lower concentration in the atmosphere as particulates or vapors. Heavy metal toxicity to plants varies according to plant species, specific metal, concentration, chemical form, soil composition, and pH, as many heavy metals are thought to be essential for plant growth.

Type of Heavy Metal

1 Titanium

2 Vanadium

3 Chromium

4 Manganace

5 Iron

6 Cobalt

7 Nikel

8 Copper

9 Zinc

9 Germanium

10 Cadmium

1: Cadmium

Cadmium is a toxic metal that has been linked to liver, kidney, bone, reproductive system, and other organ damage. Environmental cadmium exposure has been linked to an increased risk of all cancers and CVD mortality among males. With increased industrial activity in recent years, the release of Cd into the environment has risen significantly above normal levels, raising the risk of human exposure to cadmium. Cadmium has a long half-life, rapid absorption, and a low elimination rate, all of which promote bio accumulation above toxic levels in a short period of time.

2: ALUMINUM

Aluminum is the most prevalent metal in the Earth's crust and the most well-known of the environmental factors thought to play a role in Alzheimer's disease development (AD). Despite the fact that fresh foods and most non-alum-treated drinking water contain relatively tiny quantities of aluminium, dietary intake of aluminium is widespread. Aluminum additions can amount to 95 mg or more per day in a diet high in processed foods and alum-treated drinking water .

3: Mercury

Mercury is a highly hazardous metal that has no physiological function in humans. The greatest source of worldwide mercury (37%), Artisanal small-scale gold mining is the source of emissions. According to reports, over 15 million people (including approximately 3 million women and children) are affected. artisanal small-scale gold mining in poor countries Gibb and O'Leary (Gibb and O'Leary, 2014). This is owing to the price of gold continuing to grow, resulting in the nickname B gold.

Effect Heavy metal

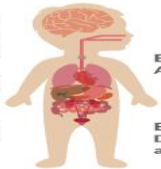
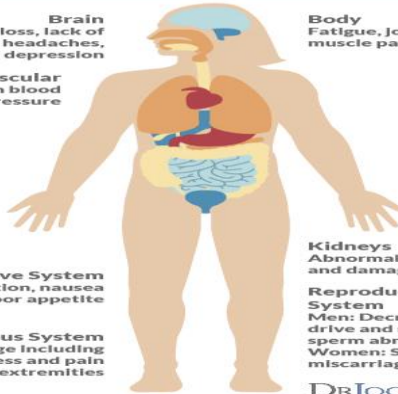




Pollutants	Major sources	Effect on human Health	Permissible level (ppm)
Arsenic	Pesticides, fungicides, metal smelters	Bronchitis, dermatitis	0.02
Cadmium	Welding, electroplating, pesticide fertilizer CdNi batteries, nuclear fission plant	Kidney damage, bronchitis, gastrointestinal disorder, bone marrow, cancer	0.06
Lead	Paint, pesticide, smoking, automobile emission, mining, burning of coal	Liver, kidney, gastrointestinal damage, mental retardation in children	0.1
Manganese	Welding, fuel addition, ferromanganese production	Inhalation or contact causes damage to central nervous system	0.26
Mercury	Pesticides, batteries, paper industry.	Damage to nervous system, protoplasm poisoning	0.01
Zinc	Refineries, brass manufacture, metal Plating, plumbing	Zinc fumes have corrosive effect on skin, cause damage to nervous membrane	15

Essential heavy metal homeostasis is carefully regulated by a system of protein transporters involved in metal ion uptake, distribution, storage, and excretion.

[9, 10] inside the body The eukaryotic vacuolar system is also important in maintaining metal homeostasis. The secretory pathway stores metal ions and transports them to several cellular membranes. In Organelles such as the peroxisome, chloroplasts, and mitochondria also serve as metal storage sites. By utilising their own transport and storage systems, ions and contribute to their homeostasis.

Some of the damaging effects of lead exposure

The Centers for Disease Control and Prevention states no level of lead is safe in adults and children. Often symptoms of lead exposure may not appear, but damage can still occur. Although rare, lead poisoning can cause a coma, seizure or death.


Children	Adults
<p>Brain Behavior problems, lower IQ, hearing loss, learning disabilities</p> <p>Body Decreased bone and muscle growth</p> <p>Nervous System Damage</p>  <p>Blood Anemia</p> <p>Body Decreased bone and muscle growth</p>	<p>Brain Memory loss, lack of concentration, headaches, irritability, depression</p> <p>Cardiovascular High blood pressure</p>  <p>Body Fatigue, joint and muscle pain</p> <p>Kidneys Abnormal function and damage</p> <p>Reproductive System Men: Decreased sex drive and sperm count, sperm abnormalities Women: Spontaneous miscarriage</p> <p>Digestive System Constipation, nausea and poor appetite</p> <p>Nervous System Damage including numbness and pain in the extremities</p>
<p>Lead exposure can occur through..</p> <ul style="list-style-type: none">  Inhalation of particles released by industry or recycling  Lead-containing products such as lead-glazed ceramics and some traditional medicines or cosmetics  Ingestion of contaminated soil or dust from decaying lead paint - particularly when children play on the ground and put toys or fingers in their mouths  Food or water contaminated with lead <p>There is no safe level of lead exposure</p>	

Cadmium toxicity

Research has shown that cadmium affects the developing brain in children. Here are some other parts of the body it can effect.

RELATED HEALTH ISSUES

- A recent study has linked it to breast cancer.
- Cardiovascular disease
- Obstructive pulmonary disease
- The kidneys lose function, which can also cause gout, a form of arthritis.
- Bones lose density and fracture.



Evidence in support of heavy metal

Heavy metals are usually toxic, but their oxides aren't. Arsenic trioxide has been approved for use in Acute Promyelocytic Leukemia by the Food and Drug Administration (APL). [30] There have been some studies published on the negative effects of ayurvedic medicine. The Indian medical system's Bhasmas. The Bhasmas, in fact, Only if humans are not prepared can it be toxic or harmful

to them. in the proper manner [31] After that, the preparations are prescribed. certain Anupanas (accommodations), such as ginger or cumin water, tulsi extract, and other natural ingredients that have been shown to protect against toxicity caused by a variety of factors, including high levels of toxicity,[32,33] trace element proportions and synergistic or protective effects As a result of buffering between various constituents, there are some side effects. according to The bioavailability and toxicity of metals are determined by Ayurveda. depending on their chemical forms.

Contradictory Claims about the Effect of Heavy Metals

Herbal and natural products are generally thought to be safe. Heavy metals are essential in some indigenous herbal products, making them safer than synthetic or modern medicines ingredients. As a result, the use of herbal medicine has become more widespread.

Concerns about its safety, quality, and effectiveness arose. especially for Bhasmas, which are typically made of heavy materials Arsenic, mercury, copper, zinc, gold, and silver are examples of metals. As a result, heavy metal contamination of herbal drugs is a concern. is a major concern. Heavy metal exposure for a long time cadmium, cadmium, cadmium, cadmium, cadmium.

HEAVY METAL RELATED TO ARTHRITIS SUCH AS RHEUMATOID ARTHRITIS (DUE TO THE DRIVED AGENT AS CHELATION THERAPY IN RHEUMATOID ARTHRITIS)

The immune system can be harmed by chemicals in the environment, physical factors (such as radiation), and drugs. Heavy metals are a type of chemical compound (lead, aluminium, cadmium and mercury) have played a role in the prenatal-perinatal immune system events that lead to the onset of postnatal depression Immune system problems (Dietert 2009). All of this is true. Heavy metal has been shown to have an impact on people. seeding and maturation of myelomonocytic cells in tissues; Mercury, in particular, has an effect on T cell differentiation Selection, peripheral seeding, and lead can all affect the outcome. maturation and function of dendritic cells (Dietert 2009). In mice, prenatal cadmium exposure affects thymocyte maturation (Dietert 2010).

RESULTS: In May 2010, a 65-year-old Nigerian woman came to our medical centre after being diagnosed with RA about ten years before. The patient was examined and her anamnestic data was analysed. Clinically, the woman only had hand deformities due to a lack of range of motion and alignment in the metacarpophalangeal joint. However, the patient stated that she experienced blocked body joints on occasion and was unable to walk as a result. Over time, laboratory tests revealed that erythrocyte sedimentation rate and C-reactive protein levels had risen in an irregular pattern. TNF α inhibitors as soluble receptors (etanercept) (25 mg subcutaneously, twice weekly for a year) were

combined with metotrexate (15 mg orally, once a week) and cortisone (prednisolone 5 mg/die) for the patient.

Regardless of therapy.

Material and method

A study was conducted on a RA patient to look into the possibility of metal intoxication. Before and after the procedure, the patient was asked to collect urine samples. EDTA chelating agent intravenous treatment (e.g. calcium) ethylene diamine tetraacetic acid Salf, Brescia, Italy, disodium edetate, 2 g/10 ml diluted in 500 ml physiological saline) which lasted Approximately 90 minutes Urine samples were taken every 24 hours. stored in vials and sent to the National Institute of Health's Laboratory of Doctor's Data Inc., St.Charles, IL, Toxicology United States of America). Inductively Coupled Plasma-Mass Spectrometry (atomic absorption spectrometry) was used to measure the concentrations of heavy metals in urine, and the results were expressed in micrograms per gramme. Urine samples taken after the EDTA "challenge" revealed a significant increase in aluminium, cadmium, and lead levels. Heavy metal levels were within the relevant reference interval when not challenged (data not shown). As shown in Fig. 1a, after EDTA treatment, the values were 85 lg aluminum/g creatinine (cut off B 35), 4.2 lg

cadmium/g creatinine (cut off B 2), and 27 lg lead/g creatinine (cut off B 5). We decided that the patient should receive weekly EDTA chelation therapy to remove heavy metal intoxication due to the impact of lead exposure on the immune system, particularly autoimmunity (Mishra 2009).

DISCUSSION:

A renewed interest in the role of high levels of aluminium in neurotoxicity (Kumar and Gill 2009), as well as the damage to the vascular system caused by cadmium, arsenic, and lead (Prozialeck et al. 2008), has prompted research into therapies such as chelation therapy. We've been studying several cases of patients with diseases that are likely related to environmental metal intoxication for years. Autoimmunity is one of these diseases that deserves special attention.

Toxic heavy metal exposure has been linked to immune system dysfunction (Mishra 2009; Mishra et al. 2003; Pineda-Zavaleta et al. 2004). Lead, in particular, can affect the immune response of people who are exposed to it at work, such as three-wheeler drivers, battery reconditioning workers, and silver jewellery makers (Mishra et al.).

A renewed interest in the role of high levels of aluminium in neurotoxicity (Kumar and Gill 2009), as well as the damage to the vascular system caused by cadmium, arsenic, and lead (Prozialeck et al. 2008), has encouraged studies on therapies, such as chelation therapy. Lead can affect the immune response of individuals occupationally exposed, such as three-wheeler drivers, battery reconditioning workers, and silver jewellery makers (Mishra et al. 2003). Furthermore, children exposed to arsenic and lead in the environment may experience changes in macrophage function, including nitric oxide and superoxide production (Pineda-Zavaleta et al. 2004). Prenatal cadmium exposure has been shown to alter thymocyte development by dysregulate some signals in the thymus (Hanson et al. 2010). The adjuvant is the final step. A renewed interest in the role of high levels of aluminium in neurotoxicity (Kumar and Gill 2009), as well as the damage to the vascular system caused by cadmium, arsenic, and lead (Prozialeck et al. 2008), has encouraged studies on therapies, such as chelation therapy, which can regular, lead can affect the immune response of individuals occupationally exposed, such as three-wheeler drivers, battery reconditioning workers, and silver jewellery makers (Mishr fact Aluminium salts have been shown to attract monocytic dendritic precursor cells, which are responsible for priming naive CD4 T cells and inducing TH2-mediated antibody responses (Marrack). Following a 'challenge' with the chelating agent EDTA, a patient with RA was able to eliminate some toxic metals from his urine. The urine of the patient contained toxic metals such as aluminium, cadmium, and lead. Why were these heavy metals intoxicating the patient? Cadmium (cigarette smoke and foods) and lead (lead paints, urban soil, dust, and drinking water) are two of the most common environmental contaminants (Fortier et al. 2008). Vaccines and pharmaceuticals contain aluminium (Israeli et al. 2009). Each of these metals has the potential to be a contaminant. Chelation therapy reduced aluminium, lead, and cadmium urine concentrations during the 3-month EDTA treatment (Fig. 1b vs. a), and there was a further reduction in the following months. In the meantime.

Conclusion

The usage of ayurvedic metals treatments has sparked a worldwide discussion. In recent years, the usage of herbal medicine, which is the most common method of therapy in underdeveloped nations, has increased.years.[50] Some plants absorb and accumulate selectively the heavy metals found in soils, which may then be used to decontaminate the soils as much as possible. There are a number of metallic preparations available. Since the 12th century, it has been used in therapeutic settings. They use particular techniques for this.

Its cleansing and preparation of Bhasma, which suited for therapeutic dosages in the clinic Since the Middle Ages, As a result, these preparations are sustaining themselves in usage. One cannot simply

dismiss its utility by claiming that it is not used. Heavy metals are extremely poisonous. The importance of proper scientific documentation cannot be overstated. Time is required to verify the claims made concerning these metals.

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