

Less common toxic metals: Beryllium, Gadolinium, Titanium, Zirconium, Barium, Lithium, Silver, Platinum, Boron, and Silicon in the Applied Kinesiology Practice

Michael Lebowitz DC

Noah Lebowitz DC

Abstract

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Introduction

With the common use of vial testing in the Applied Kinesiology practice many practitioners have been doing extensive metal screening and finding less common metals causing a positive muscle testing response. Sources of these metals, symptoms of sensitivity and/or overexposure are explored and reported.

Toxic metals are very hard to evaluate in the AK and functional medicine practice. Various methods such as hair analysis, blood tests, urine tests (base and provocative), stool analysis, sweat analysis, etc. are utilized. All of these methods have their pros and cons. If the level of a particular metal is high on one of these tests does it mean the body burden is high and causing symptoms or might it mean the person is an efficient excretor of that particular metal, thus the high level in the sample? If the metal results fall within "normal limits" or below, is that a negative finding or perhaps the patient cannot excrete the metal efficiently? Is it possible the patient is sensitive to levels of the metal that are significantly below the high range of the test or not sensitive to higher than normal levels?

Some of these problems of interpretation can be better addressed when adding in muscle testing. Muscle testing when understood and performed properly (with proper provocation, hypertonic reactions etc.) can tell us if a patient has a positive neurological response to a certain metal though it cannot tell us body burden. Reactivity is perhaps the most important factor we are looking for in a patient as it tells us if the nervous system is adversely responding and thus the issue should be addressed.

About a year ago with the addition of what we felt was a more comprehensive metal testing kit we started finding more patients showing positive responses to metals like beryllium, gadolinium, zirconium, etc. This paper is an attempt to show where some of the exposures might be originating from as well as documented symptoms related to these exposures, present some data on how often these might be showing up in testing (data compiled from the practices of 4 different AK physicians), as well as looking at the role of metallothionein in metal detoxification and other treatment strategies.

BERYLLIUM

Sources: Because of beryllium's properties of being both strong as well as lightweight it is used in the manufacturing of cell phones, missiles, aircraft, dental materials. It is often alloyed with copper to make springs, gyroscopes, disc breaks, car windshields, used in nuclear reactors, cameras, and mirrors. Exposure downwind of manufacturing plants, nuclear plants, as well as from high trafficked areas can be a major source of exposure (1, 2).

Beryllium is classified as carcinogenic by the International Agency for Research on Cancer (1).

Dr. Lew Pepper, a medical researcher at Queens College Center for the Biology of Natural Systems in New York has found that beryllium sensitivity has a genetic component (most sensitive people have an immune system protein known as HLA-DP2) (3).

Most of the research on beryllium exposure deals with airborne exposure. More research needs to be done regarding oral (dental work) and transdermal exposure.

The agency for toxic substances and disease registry lists the following symptoms of beryllium exposure:

Persistent dry cough, shortness of breath especially in exertion, chest pains, night sweats, fatigue, small raised red bumps, rash, joint pain, and loss of appetite (4, 5).

A more specific blood test, the blood beryllium lymphocyte proliferation test (BeLPT), identifies beryllium sensitization, which may lead to chronic beryllium disease.

GADOLINIUM

Sources: Gadolinium is soluble in acid and dissolves slowly in water.

It is used in color TVs, microwaves, MRI contrast media (because of its magnetic properties), alloys of iron and chromium to improve resistance to high temperatures and oxidation. (6, 7)

Symptoms:

In rough order of frequency as reported in Survey of the Chronic Effects of Retained Gadolinium from Contrast MRIs, symptoms of exposure can include

- Pain – aching; burning, tingling, and/or prickling pain (paresthesia); deep bone pain. Typically in extremities or joints, and sometimes in the location where the MRI occurred, like the head.
- Brain fog
- Persistent Headache
- Dermal changes – like tight skin, lesions, hyperpigmentation. Most often in extremities.
- Muscle issues – twitching – small, local, rapid contractions and weakness
- Ocular problems – worsening vision, dry eyes, bloodshot eyes
- Ear, nose and throat – tinnitus, swallowing, and voice problems
- Low body temperature
- Hair loss
- Itchy skin
- Balance problems
- Swelling of extremities (edema) (8)

TITANIUM

Sources: Titanium resists corrosion and is particularly strong and lightweight. It's as strong as steel, but only 45 percent the weight. It is also twice as strong as aluminum, but only 60 percent heavier. Airliners (a Boeing aircraft is approx. 15% titanium), body piercings and medical equipment and sunscreen, bike frames, body implants (dental, joint, etc.), filler in pharmaceuticals and some vitamins/minerals, cosmetics, toothpaste, chewing gum, marshmallows, paints, and food additive (acts as a whitening agent) (9).

Symptoms: There are no restrictions on the use of titanium dioxide in food products. However, a new study on mice shows that titanium dioxide

particles may be very damaging to the intestines of those with certain inflammatory bowel diseases (10).

Researchers at the University of Zurich in Switzerland found that when intestinal cells absorb titanium dioxide particles, the intestinal mucosa of mice that had colitis became inflamed and damaged. The Swiss researchers have found that titanium dioxide nanoparticles, commonly found in toothpaste and many food products, can exacerbate this inflammatory reaction (11).

In addition, higher concentrations of titanium dioxide particles can be found in the blood of patients with ulcerative colitis (12). These particles can be absorbed from food under certain disease conditions.

Other symptoms of titanium toxicity/sensitivity include

- loosening of the implants (or implant failure)
- rash or hives
- sores and swelling in the soft tissues of the mouth
- chronic inflammation in the gums around the implant
- problems with wound healing
- chronic fatigue syndrome
- acne-like swelling or inflammation of the face
- muscle and joint aching
- neurological problems

ZIRCONIUM

Sources: Zirconium is malleable and easily forms stable compounds resistant to corrosion. Zirconium alloys can be found in pipes, fittings and heat exchangers (13)

Zirconium is also used in steel alloys, colored glazes, bricks, ceramics, abrasives, flashbulbs, lamp filaments, artificial gemstones and some deodorants, according to Minerals Education Coalition (14).

Other uses for zirconium include catalytic converters, furnace bricks, lab crucibles, surgical instruments, television glass, removing residual gases from vacuum tubes, and as a hardening agent in alloys such as steel (15). It is now also used as an alternative to titanium in dental implants.

Symptoms:

- Development of granulomas has been reported following application of zirconium-containing deodorants and dermatitis treatments to broken skin.

Ocular

- Eye irritation, lacrimation, blurred vision and conjunctivitis may occur.

. Hoarseness, dyspnea and, in severe cases, stridor due to laryngeal edema.

- Pulmonary edema has been reported after exposure to zirconium tetrachloride
- Pulmonary granulomas have been reported in workers chronically exposed to zirconium dusts (16)

Lithium

Sources: ceramics, glass, electrodes, alloyed with aluminum, glazes, ovenware, fireworks, rocket propellants, nuclear fusion, a component of some community drinking water and hot springs, pharmaceutical, nutritional supplement (17).

Symptoms: fatigue, tremors, diarrhea, muscle weakness, heightened reflexes, agitation, kidney stress, confusion, uncontrollable eye movements, frequent urination (18)

BARIUM

Barium is most known for its use in diagnostic x-ray studies of the gastrointestinal tract

Sources: rat poison, weighting agents in oil drilling fluids, contrast in various diagnostic x-rays, sparkplugs, pigment, glassmaking, fireworks (19).

Symptoms: vomiting, colic, diarrhea, tremors and paralysis, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. (19, 20).

SILVER

According to Jefferson National Linear Accelerator Lab silver is the best conducting metal of heat and electricity as well as best reflector of visible light (21). It is used in a myriad of sources including mirrors, coinage, jewelry, silverware, some textiles, batteries, the photographic process, wire, cloud seeding, etc. (22)

Symptoms: Even though silver can be antimicrobial it can have deleterious effects: permanent blue-grey discoloration to skin and/or eyes, liver and kidney damage, irritation of the eyes, skin, respiratory (bronchitis, emphysema), and intestinal tract. It also depletes glutathione levels (23).

PLATINUM

Sources: jewelry, catalytic converters in automobiles, pacemakers, metals (24)

Symptoms: irritation of the eyes & nose; cough, dyspnea, wheezing, & cyanosis; skin sensitization; & lymphocytosis, photophobia (25)

Boron

Sources: Boron is not considered a metal and is an essential nutrient at some levels but can become toxic with overexposure. Borax is a common mined form that many of us use in doing laundry as it acts as a whitening agent and anti-fungal. Also used as ant killer, in nuclear fission, rocket fuel ignitor, fireworks, flame retardant, food preservative, fiberglass and beach manufacturing (26, 27)

Symptoms: respiratory irritation, liver, kidney, CNS and GI damage, impaired ovulation, testicular atrophy (28)

SILICON

Sources: Silicon is considered a metalloid. It is found in computer chips, filler in supplements and medications, sand, glass, breast implants, bricks, ceramics, transistors, electronics, cooking molds, suntan and other skin care products (29).

Symptoms: chronic bronchitis, emphysema, bronchiectasis, and chronic airway obstruction, shortness of breath, chest pain, or a persistent cough, kidney disease, autoimmune diseases, RA, and more (30, 31, 32)

Testing Methods – Applied Kinesiology

Before testing the individuals we do a 5-10 second deep tissue kneading of their abdominal adipose tissue. Many metals and chemicals have been shown to be stored in adipose tissue, and by doing this before we started we found to increase the number of our positive findings substantially.

Take a vial of each metal individually and hold under the south pole of a magnet with the vial being over GV-20 or GV-27 on a person. We then use the pectoralis minor muscle on the patients right side of the body to test the individual. We make sure the muscle is adducted to the point it is over the

left side of the body when beginning the test. Testing with a strong indicator muscle other than the pectoralis minor results in many false negatives that are only found when testing with the right pectoralis minor.

Results- Testing prevalence

Fifty new patients were tested between two clinics, one in Phoenix AZ and the second in Tacoma WA between the dates of October 2018 and February 2019. The metals tested for were: Aluminum, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Copper, Gadolinium, Gold Iron, Lead, Lithium, Manganese, Mercury, Nickel, Platinum, Silicon, Silver, Sulfur, Tin, Titanium, Zinc, and Zirconium. These include the metals talked about above, in addition to more common heavy metals such as mercury and lead.

The average person showed a positive muscle testing response to 3.64 vials, with a range of 0 to 9 vials each. Lithium was the least common vial to test, with only 3 of 50 people responding (6%). Arsenic was the most common with 13 out of 50 people responding (26%). The results are below with how many times each metal was found:

Aluminum 4	Gadolinium 9	Platinum 8
Arsenic 13	Gold 9	Silicon 7
Barium 6	Iron 4	Silver 10
Beryllium 11	Lead 4	Sulfur 8
Boron 8	Lithium 3	Tin 8
Cadmium 10	Manganese 5	Titanium 9
Chromium 8	Mercury 9	Zinc 10
Copper 7	Nickel 7	Zirconium 5

Interpretation

A positive neurological response via AK to a vial of a metal (be it energetic, homeopathic, etc.) does not prove there is a high body burden but it is suggestive that it is worth looking into. As stated earlier, there are various labs that also may be suggestive but all have their own issues. If done properly, chelation of these substances using plant materials that are very safe is a reasonable course to pursue if you feel any of these are contributing to your patient's state of unwellness. In our clinics we pursue 2 routes- excretion/chelation using carbonized bamboo as well as encouraging the body to increase its' Metallothionein levels.

Exposure to heavy metals can cause many different health ailments including neuropathy, organ failure, cancer, fatigue, brain fog, etc. Clinically we have seen metal toxicity correlate with numbness and tingling sensations, drooling at night, outbursts of unprovoked anger or depression, balance issues, sensitivity to EMF's, gum and/or tooth pain. Some of the more common heavy metal exposures are copper, lead, mercury, aluminum, and arsenic. The most common ways to try and detoxify heavy metals is via chelation therapy or detoxification agents.

In addition to taking supplements that bind to heavy metals, ones body has its own way to detoxify itself of various heavy metals. One of the ways is through a protein called Metallothionein (MT).

Metallothionein has been shown to bind copper, mercury, silver, arsenic, etc (33). It has been shown to help protect against oxidative stress in addition to protecting against heavy metal toxicity (34). Studies have shown MT to bind to superoxide and hydroxyl radicals, as one of its ways to decrease oxidative stress (35). It also works by inhibiting NF-κB signaling (36). By increasing MT in the brain, mercury, among other metals, can be detoxified (37).

Decreased levels of MT have been thought to be a cause of oxidative stress, autism, depression, intestinal inflammation, reduced natural killer cells, and blood-brain barrier dysfunction. After Glutathione levels are used up, MT takes over the main job of heavy metal chelation. MT is a key part of maintaining adequate zinc levels in the body (38). Those with autism often have altered zinc to copper ratios, which is a key role of MT (39). "MTs are very important proteins in brain functioning mainly located in astrocytes which can protect neurons against excitotoxicity induced by experimental models of epileptic seizures or in damaged brain tissue as a result of focal cerebral ischemia through modulation of events such as inflammation, oxidative stress, and apoptosis (40)."

Reduced MT levels have been associated with Alzheimer's disease (41). Defective MT function has been shown to potentially contribute to cancer (42). MT levels have been shown to dramatically increase when the body comes under infection. In cases of children with sepsis, those having higher levels of MT have a much higher survival rate. With the binding ability of MT to zinc, MT is responsible for moving around zinc to where the body needs it during times of infection (43). By transporting zinc to certain areas of the body MT can assist in fighting candida and other microbial infections (44). Hops, Cordyceps, clove, watercress, pomegranate, and prune skin are several herbs that have been shown to increase MT levels in the body.

Treatment:

If a person tests positive to any of the above methods we would see if the inhibition is negated by Takesumi Supreme or MT Supreme. Takesumi Supreme is carbonized Bamboo and an excellent binder to help detox the body of toxic metals and other contaminants. MT Supreme is a mixture of Cordyceps, Hops, and Clove, which have all been shown to increase MT production, thus helping the body rid itself of toxic metals, including from the brain.

Conclusion:

Testing for heavy metals and other elements and metals is something that can be done fast and effectively using AK. Interpretation needs to be done carefully by the practitioner, but along with other clinic signs and symptoms can be a valuable piece of the puzzle in chronic patients. By being able to evaluate a person and design a proper treatment protocol, be it with binders and/or herbs to increase Metallothionein levels, can greatly help many people.

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