Toxic Metals and Mental Health

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The term “heavy metals” refers to elements of specific weight characteristics. Toxic heavy metals are, unfortunately, present in our air, water, soil, and food supply as a byproduct of our industrialized society. In fact, contamination is so pervasive in our environment that it is no longer a question of whether one has been exposed to toxins, but rather the level of exposure. People who have acute toxicity from heavy metals – such as lead, mercury, arsenic, and cadmium – may exhibit obvious and classical symptoms of poisoning. But toxicity from chronic low-level exposure is much more insidious in its presentation. Chronic low-level exposure can lead to a wide array of problems, ranging from neuropsychiatric disturbances such as aggressive behavior, memory loss, depression, irritability, and learning deficits, to physical manifestations such as liver and kidney dysfunction, fatigue, infertility, gout, hypertension, headache, and candida (yeast) infections.

Even though efforts are under way to curb the output of toxins and heavy metals into the environment, the problem is far from being resolved. Today, even in the United States, thousands of tons of toxic industrial wastes, including heavy metals, are dumped into the environment every year. We are left with a legacy of years of industrial pollution and toxic substance use that haunts us to this day. Perhaps the two most widespread and significant heavy metal toxins are mercury and lead.

Lead

It is estimated that about 64 million homes in the United States still contain lead paint and that 5 to 15 million of these have been identified as "very hazardous" by the U.S. Department of Housing and Urban Development. According to the EPA, an estimated 1.7 million children are currently affected by lead toxicity in United States, and almost 900,000 of all children affected are under the age of six. This statistic is very important because the symptoms of lead poisoning in children are strikingly similar to several psychiatric "diseases" that are on the rise in the U.S. Children with high lead levels can exhibit lower IQ scores, learning disabilities, hyperactivity, aggressive or disruptive behavior, and difficulty maintaining attention. A child exhibiting this type of behavior today would likely be sent to a doctor's office, diagnosed with attention deficit disorder, and promptly started on Ritalin or other psychoactive drugs.

Children with high lead levels are much more likely to drop out of school, have reading disabilities, and exhibit criminal behavior. Herbert Needleman, M.D., a professor of psychiatry and pediatrics at the University of Pittsburgh, conducted a study of nearly 2,000 children in Boston. He found that girls with elevated levels of

lead were more likely to be dependent, to be poor at concentration, and to "display an inflexible and inappropriate approach to tasks," while boys were more likely to have difficulty with simple directions and sequences of directions. Dr. Needleman concluded: "…Our findings would appear to add to the weight of evidence that even a lower level of exposure to lead, or its correlates, place children at increased risk of difficulties in school."

It is important to note that childhood exposure to lead can result in adverse effects well into adulthood. A study by Stokes, et al, showed that a group of 281 young adults who had been exposed to lead as children showed significant adverse neurobehavioral effects 20 years after environmental exposure. While lead has been eliminated from the nation's gasoline supply, the major source of contamination is lead-based paint, which was composed of up to 50% lead. Flakes and microscopic dust from the paint continue to contaminant homes for many years, and can be released in larger amounts during renovations. Additional sources of lead include water pipes, pesticides, factory emissions, cosmetics, and some folk remedies.

In addition to being a cellular toxin, lead competes with calcium in the body, which can cause various malfunctions in calcium metabolism including a decrease in neurotransmitter (chemicals that relay messages along nerve cells) release and blockade of calcium channels. The central nervous system appears to be affected to the greatest degree by lead toxicity, and this can explain the many neuropsychiatric symptoms associated with exposure to this heavy metal.

Why are some people more susceptible to heavy metal toxicity than others? One must always remember that each individual has a unique physiology, and may have an inherently strong or weak detoxification system to handle heavy metal exposure. In addition, poor nutrition, such as iron or calcium deficiency, has been shown to exacerbate the symptoms of lead exposure.

Lead can be absorbed through the gastrointestinal tract and also inhaled as small particles. Chronic exposure to lead can result in significant accumulation in the brain, soft tissue, and bones. Lead that has accumulated in the skeleton can remain there for many years, releasing lead slowly back into the bloodstream over an extended period of time.

Neuropsychiatric symptoms of chronic lead exposure include:

1. Headaches
2. Poor memory
3. Inability to concentrate
4. Attention deficit
5. Aberrant behavior
6. Irritability
7. Temper Tantrums
8. Fearfulness
9. Insomnia
10. Lowered IQ
11. Difficulty with the reading, writing, language, visual and motor skills

Mercury

Mercury is considered by many to be even more toxic than lead. Although mercury is poorly absorbed from the gastrointestinal tract, mercury vapor is easily taken in through the lungs and readily passes into the brain. Once in the body, mercury also concentrates in the nerves, liver, and especially the kidneys. Mercury is a potent cellular toxin and is known to decrease neurotransmitter production, disrupt important processes within the nerve cells, and decrease important hormones such as thyroid and testosterone.

"Silver" amalgam fillings are the major source of inorganic (does not contain carbon) mercury exposure in humans, while seafood and fish constitute our largest exposure to organic mercury compounds. Amalgam fillings actually contain approximately 50% metallic mercury, and they continuously release mercury vapor during chewing, brushing, or when drinking hot beverages. Studies have shown that exhaled air of subjects with amalgam filling contains a significantly higher level of mercury than subjects without amalgams, and there appears to be a direct correlation to the number of amalgam fillings and the level of mercury found in both blood and urine.

Although the presence of higher levels of mercury in people with amalgam fillings is not in dispute, there continues to be an intense debate regarding the health effects of this finding. While groups such as the FDA and the American Dental Association steadfastly maintain that amalgam fillings are safe, a growing number of physicians and researchers are convinced that mercury from amalgam fillings poses a significant health hazard.

In addition to amalgam fillings, common sources of mercury include pesticides, laxatives, batteries, paper and pulp products manufacturing, drinking water, and paint products.

Neuropsychiatric symptoms associated with mercury toxicity include:

1. Insomnia
2. Nervousness
3. Hallucinations
4. Memory loss
5. Headache
6. Dizziness
7. Anxiety
8. Irritability
9. Drowsiness
10. Emotional instability
11. Depression
12. Poor cognitive function

Diagnosis

The diagnosis of heavy metal toxicity must take into account the exposure history, clinical signs and symptoms, and laboratory tests. While the CDC (Center for Disease Control) has steadily dropped the "allowable level" of lead in the blood over the last fifteen years, there remains a problem with using blood levels in the first

place. Blood levels may not accurately reflect the total body burden of toxic metals. High blood levels are usually only found in acute toxic metal exposure, or in people exposed to high levels of toxins over a long period of time. In chronic low level exposure, however, the blood levels may actually be low due to redistribution of the toxins throughout the body, while bone and other tissue levels remain high.

Hair analysis is another method of determining toxin exposure that is popular with many clinicians. Hair can be a good indicator of exposure because it grows slowly and incorporates toxic metals into its structure over a long period of time, and therefore may be a better measure of actual tissue levels. There are arguments over the accuracy of hair analysis due to the possibility of contamination from hair dyes, shampoo, and other factors. Nevertheless, hair analysis can be a valuable screening tool if the proper questions are asked and the proper steps are taken prior to its use.

A more accurate method for evaluating toxic metal burden is to do a urine challenge test with a "chelating" agent. Chelating agents bind to heavy metals throughout the body, and then are excreted in the urine, taking the heavy metals with them. In the urine challenge test, a chelating agent is administered and then urine is collected and analyzed to determine the amount and type of toxic metals that are excreted.

Treatment

The good news is that effective treatments are available for heavy metal toxicity. DMSA is an FDA-approved chelating agent that is particularly useful in cases of mercury exposure (it is also approved for lead toxicity in children), while EDTA is particularly useful for lead toxicity. It should be noted that both of these agents remove other toxic metals in addition to lead and mercury. There are many different protocols used for heavy metal detoxification, as well as other chelating agents, but that is beyond the scope of this article. For more information on detoxification protocols and testing, contact an alternative medicine physician familiar with these procedures.

Summary

Toxic heavy metals are found in the air we breathe, the food we eat, and the houses we live in. Toxic metal exposure can result in a wide array of common mental health disorders that can mimic many psychiatric "diseases" and thus lead to psychoactive prescription drug use or other unnecessary treatments. Unfortunately, the majority of clinicians dealing with patients who have mental health issues are unlikely to suspect heavy metal toxicity as a cause of their patient's problems due to a general lack of knowledge of this subject in the medical community. Unique biochemical, genetic, and nutritional factors can make certain people more susceptible to the effects of toxic heavy metals, thus each case must be handled on an individual basis. Fortunately, the number of practitioners trained in "functional" or "orthomolecular" medicine is on the rise, and these practitioners are very familiar with the diagnosis and treatment of problems associated with heavy metal toxicity.