



EFFECT OF HEAVY METAL TOXICITY AND EXPOSURE ON HUMAN HEALTH

Dr. Mithilesh Kumar

Assistant Professor

Dept. of Zoology

M.L.S. College, Sarisab Pahi

Madhubani, Bihar

ABSTRACT:

The body has need for approximately 70 friendly trace element heavy metals, but there are another 12 poisonous heavy metals, such as lead, mercury, arsenic, cadmium, nicked, etc. that act as poisonous interference to the enzyme system and metabolism of the body. No matter how many good health supplements or procedures one takes heavy metal overload will be a detriment to the natural healing functions of the body. Heavy metals are taken into the body via inhalation, ingestion and skin absorption. Human exposure to heavy metals has risen dramatically in the last 30 years as a result of an exponential increase in the use of heavy metal in industrial processes and products. This paper focuses on exposure and toxicity of the two heavy metals such as mercury and arsenic on the Agency for toxic substances and Disease Registry (ATSDR) list.

Keywords: Heavy metal, exposure, Toxicity, Diseases

INTRODUCTION:

Metals, a major category of globally distributed pollutants, are natural elements that have been extracted from the earth and harnessed for human industry and products for millennia. Heavy metal overload in the walls of coronary arteries seems to decrease the levels of nitric oxide; a compound known as “Endothelial Relaxing Factor,” without this substance normal blood flow is impeded therefore increasing the risk of vascular blockages. It also overload in the adrenal glands reduce the production of hormones which cause early aging, stress, decreased sex drive and aggravation of menopausal symptoms.

Exposure to metals can occur through a variety of routes. Metals may be inhaled as dust or fume (tiny particulate matter). Some metals can be vaporized (e.g. mercury vapour in the manufacture of fluorescent lamps) and inhaled. They can also be ingested involuntarily through food and drink. The amount absorbed from the digestive tract can vary widely, depending on the chemical form of the metal and the age and nutritional status of the individual, primarily through the kidney and digestive tract, but metal tend to persist in some storage sites, like the liver, bones and kidney, for years or decades.

The toxicity of metals most commonly involves the brain and kidney and some metals such as arsenic are clearly capable of causing cancer. An individual with metal toxicity, even in high dose and acute typically has very general symptoms such as weakness or headache and building industries and in medical and dental services mercury dispersion through atmospheric deposition has increased markedly through waste incineration, ironically, the medical industry is one of the largest contributors to mercury pollution in this fashion.

TOXICITY OF MERCURY (Hg):

The acute toxicity of mercury varies significantly with the route of exposure. Inhalation of high concentration of mercury causes severe respiratory irritation, digestive disturbance and marked kidney damage. Repeated or prolonged exposure to mercury vapor is highly toxic to the central nervous system. Contrary to this paper focuses on exposure and toxicity of the two heavy metals such as mercury and arsenic on the Agency for Toxic Substances and Disease Registry (ATSDR) list.

EXPOSURE OF MERCURY (Hg-)

Mercury is the naturally occurring metal which has several forms like Hg^0 , Hg^{+1} and Hg^{+2} and is toxic to various degrees. It combines with other elements such as chlorine, sulphur or oxygen to form inorganic mercury compounds. Methylmercury and mercuric mercury are encountered in some chemical, metal processing electrical equipment, automotive. Some opinion expressed in the popular media, however evidence from well conducted studies is lacking that the small amount of mercury released from dental amalgams during chewing are capable of causing significant illnesses, such as multiple sclerosis, systemic lupus or chronic fatigue syndrome. Recent research has demonstrated that even at much lower level, mercury exposure to pregnant women through dietary intake of fish and whale meat, an important regional food staple, is associated with decrements in motor function, language, memory and neural transmission in their offspring.

EXPOSURE OF ARSENIC (As):

Arsenic is found in nature at low levels. It is mostly in compounds with oxygen, chlorine and sulphur (inorganic arsenic compounds). Arsenic in plants and animals combines with carbon and hydrogen (organic arsenic). Organic arsenic is usually less harmful than inorganic arsenic. Inorganic arsenic compounds are mainly used to preserve wood, to make insecticides, pesticides, herbicides, fungicides and antifouling

paints. In some areas of the world, arsenic is also a natural contaminated of wells. Deep water wells in parts of Taiwan and Chile are now well known to be contaminated with arsenic, giving rise to chronic manifestations of toxicity. Water form relatively shallow tube wells that were placed in the areas West Bengal and other parts of the subcontinent has been recently found to be heavily contaminated with arsenic.

TOXICITY OF ARSENIC (As):

The toxicity of an arsenic containing compound depends on its valence state i.e zerovalent, trivalent or pentavalent, the (III) is more toxic than As (v) and As (O) Once absorbed some accumulation in soft tissue organs such as the liver, spleen, kidneys and lungs but the major long-term storage site for arsenic in keration rich tissues such as skin, hair and nails.

Acute arsenic poisoning is in famous for its lethality, which stems from arsenic's destruction of the integrity of blood vessels and gastrointestinal tissue and its effect on the heart and brain. Chronic exposure to lower levels of arsenic results in somewhat unusual patters of skin hyper pigmentation, peripheral nerve damage, weakness in the hands and feet, diabetes and blood vessel damage even risk for developing a number of cancers like skin and liver. The currents standard for the allowable amount of argenic in drinking water 50 ug/L, is probably not adequate to sufficiently safeguard the general population from arsenic's cancer risk.

REFERENCES:

1. Col, M; Col, ci, Soran, A : Sayli, B,S. and Ozturk, S. (1991): Arsenic- related Bowen's disease, palmer keratosis and skin cancer. Environ. Health prospect. 107: 687- 689.
2. Grandjean, P; guldager B; Larsen, L.B : Jorgensen, P. J. and Homstrup P. 1997 Palcebo response in environmental disease J. Occup Environ. Med. 39 : 707- 714.

3. Moore, M, R, 1985 Influence of acid rain water plumb solvency Environ health perspect 63: 121- 126.
4. Murata K ; weihe, P, I Araki, S. Budlz, J. E. and Grandjean P. 1999 Evoked potentials in Faroese children prenatally exposed to methyl mercury Nenrotoxicol. Teratol 21; 471-472
5. Tsai S.M: Wang, T.N.: and Ko, Y, C: 1999. Morality for certain diseases in areas with high levels of arrenic in drinking water. Arch Environ. Health 43; 186- 193
6. Ward, N. I : and Savage, J. M. 1994 Metal dispersion and transportational ativities using food crops as bio-542monitors. Sci, Total Environ. 146 : 309-319

