



ADVERSE HEALTH EFFECT DUE TO HEAVY METALS AND THEIR AYURVEDIC MANAGEMENT

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ABSTRACT

Excessive amount of heavy metals are very harmful for our body. Lead, arsenic, mercury, cadmium, copper and zinc are some common heavy metals. These are commonly found in soil, air and food. These are responsible for many neurological and skin diseases. Due to excessive industrial emission and excessive use of pesticides these heavy metals are contaminating water, air and soil. Lead is commonly found in paint & food container. Cigarette contains arsenic and cadmium. Some sea food like fish contains mercury, arsenic and

cadmium. So these are the commonest sources of heavy metals for human. Long exposure to these heavy metals acts as *Dushi visha* in our body & due to this human faces many dangerous diseases. Some heavy metals like lead, arsenic, mercury and copper are described in *Ayurveda* and their hazards in state of impurities. After purification heavy metals are used in ayurvedic formulations. *Shodhna chikitsa* is mentioned in *Ayurveda* for these heavy metal hazards like *vamna*, *virechna*, *raktmokshna* etc. Other than this various formulations of agada are also found.

KEYWORDS: Heavy metals, *Dushi visha*, *Shodhna chikitsa*, *Agada*.

INTRODUCTION

We can define heavy metals as those elements which have high relative density.^[1] All heavy metals are cumulative poison. Mostly the metal poisoning which occurs in chronic stage has a cumulative action.^[2] In *Ayurveda*, acharya sushrut described *dushi visha* because of poor

potency it does not kill the person quickly and remains in the body for many years covered by kapha.^[3] Adverse effect of these metals are gradually increasing because of environmental contamination.^[4] The acute poisoning of heavy metals is very rare. The most common poisoning which is increasing gradually is chronic type. In Ayurveda we can correlate chronic heavy metal poisoning with dushi visha. In definition of dushi visha acharya sushruta said the poison which collect gradually in fewer amounts in body and does not put any impact on present time but later on it acts as a poison and shows some adverse effect⁵. In below we described some heavy metals and their effect.

Arsenic

Arsenic is a heavy metal inorganic poison. Metallic arsenic is not poisonous as it is insoluble in water & cannot be absorbed from the gastrointestinal tract. But it's some compounds are toxic.^[6] Approx. 30 countries are affected from contamination of water by arsenic. 25 million in Bangladesh & 6 million people in west Bengal are affected with arsenic contaminated ground water.^[7] The natural source of arsenic is water, soil and some sea fish. Tobacco cigarettes & cigar also contain arsenic. Arsenious oxide is a toxic compound of arsenic. It is used in fruit sprays, weed killer, insecticides, flypapers & artificial flower. Copper arsenite is used as colouring agent for substances including confectionary. Acute arsenic poisoning resembles bacterial food poisoning.^[8] Arsenic poisoning clinically manifests in three forms. Acute fulminating, sabacute & chronic types. Nowadays chronic type of poisoning is very common. Due to chronic toxicity rain drop pigmentation, mee`s line, arsenic neuritis, alopecia occurs. In *Ayurveda Ras-aacharyas* define arsenic as *sankhiya or gauripashana*.^[9] First time it described in *sushrut samhita* as *dhatu visha*.^[10] If we use impure *gauripashana* (arsenic) which make wrong impact in our body, to reduce wrong impact of *gauripashana* the treatment for this is given in Ayurveda is following-

1. *Gau dugdh* (cow milk), *gau ghrit* (cow ghee) with *mishri* (white rock sugar).
2. *Tankan*(borax) aqueous solution
3. *Navneet* (butter) & *mishri* (white rock sugar) with *til churna* (sesame)
4. *Karvellak swaras* (bitter gourd juice).^[11]

Lead

Lead is the commonest of heavy metals as far as chronic poisoning is concerned. Lead is a cumulative poison, remains accumulated as phosphate and carbonate.^[12] Lead vapour is more dangerous than dust.^[13] Main lead sources from industry are lead mining, smelting and

refining, storage battery manufacture, welding and steel cutting, and printing.^[14] Following manifestation are being encountered in body on exposure to lead for a long period of time.

1. Facial pallor, anaemia, low platelet count.
2. Burtonian line, lead palsy, lead encephalopathy, cardio-renal manifestation
3. Sterility /infertility
4. General manifestation- weaknesses, anorexia, metallic taste in mouth, dyspepsia, foul breath etc.^[15]

In Ayurveda use of impure Naag(lead) causes prameh(diabetes), kamla(jaundice), switra(vitiligo), twak roga(skin disease), sandhivedna(joint pain), pakshaghat(paralysis), shoth(swelling), bhagandar(fistula in ano), aganimandh(poor digestion) & udar shool(abdominal pain).^[16] In Ayurveda diseases caused by Impure naag bhasma (lead & lead compounds) ingestion has the following treatment regime: - Intake of Swrna bhasma & haritaki churna with sharkra for 3 days^[17]

Mercury

Mercury is a liquid heavy metal and also inorganic irritant poison. It is available in inorganic, organic and metallic forms. Metallic form of mercury is non-toxic but its several inorganic compounds are toxic.^[18] Poisonous compounds of mercury are mercuric chloride, mercuric oxide, mercuric iodide, mercuric cyanide, mercuric nitrite, and mercuric sulphate. Acute exposure to elemental mercury vapour may produce bronchitis with fever, chills and dyspnoea.^[19] Chronic poisoning of mercury called hydragyrisms or mercurialism.^[20] Symptoms of chronic mercury poisoning found from use of dental amalgam^[21] Gold mining in some country found as a source of mercury exposure.^[22] Some common source of mercury from industry like manufacture of thermometer, barometer, mercury vapour lamp, explosive & fireworks^[23] level of mercury in the environment is increasing due to coal using power plant, paper industries and medical wastes.^[24] Due to chronic mercury exposure many diseases like mercurialentis, mercurial erethism, acrodynia (pink disease), and shaking palsy do occurs.^[25] In *ras shastra* mercury is defined as *parada*. There are different *doshas*(impurities) in parade such as *visha*, *vahni*, *mala*, *naaga*, *vanga*, *chhapalya*, *giri* and *ashagni*. *Visha dosha* of *parada* causes death, *naaga dosha* causes *vrana* (wound), *vanga dosha* causes *kustha* (skin diseases) etc.^[26] In treatment of impure parada (mercury) intake different preparation for different *doshas* are-

For *naag dosha* –*graha dhooma*, *ishtika churna*(brick powder), *haridra churna*(turmeric powder) and *oun*(wool). For *vanga dosha- indrayana*, *ankola* and *haridra churna*. For *agni dosha- chitraka moola churna* and *triphla churna* etc.^[27]

Copper

Copper is not poisonous in metallic state, but some of its salts are poisonous, e.g. copper sulphate (blue vitriol) & copper subacetate (verdigris)^[28] Its chronic toxicity occurs among workers using copper & its salts due to inhalation of copper dust and fumes. Copper welders may develop metal fume fever^[29] Chronic copper poisoning is also observed among those who consume contaminated food with verdigris obtain from dirty copper vessels for a long period.^[30] Main foods that have high amounts of copper are shell fish, nuts and seeds, soyabeans, legumes, wheats, coconut, avocado, chocolates, coffee, leafy greens. Earlier it was used to make utensils, jewellery and weapons.^[31] The symptoms complex of chronic poisoning is called by several names like hemochromatosis, bronzed diabetes, pigment cirrhosis.^[32] The presence of copper deposits in the tissues is called chalcosis. Chronic poisoning causes Wilson's disease.^[33] In *Ayurveda ras aacharya* described copper as *tamra* and also said about the effect which is occurred by intake of impure *tamra bhasm*. Such as *bhrama* (vertigo), *murcha*(syncope), *vidaah* (burning sensation), *sweda* (sweating), *kleda*, *vaanti*, *aruchi* (anorexia), *chita santaapa* (body fever).^[34] *Dhanyak swaras*(green coriander juice) with *mishri* (white rock sugar) for 3 days on intake of impure *tamra bhasma* also *Auguastya patra swarasha* and *mishri*.^[35]

Sodhana chikitsa

Sodhana chikitsa otherwisely known as panchakarma i.e like Vamana, Virechana, Raktamokshna etc followed with sansarjan karma and pathyapathya are very much useful in chronic diseases.

CONCLUSION

Metallic poisoning is very common now a days. Each and every substance has metals containing in it, on the other hand medicines has also a little amount of metals present in it. Sometimes people don't know about the adverse effect of these, so they consume it in extra dose which causes several diseases and may be fatal also. For outcome of this, our *acharyas* has given some powerful therapies and medicinal combinations with the help of which we can reduce the effect of metallic poison. As this metallic poisoning is mainly an occupational hazard so *Nidaana parivarjana* is first & main line of treatment. *Panchkarma (shodana*

chikitsa) is best treatment for chronic metallic poisoning (*dushi visha*). Description of some *agadas* are found in different Ayurvedic texts like *dushivisari agada*^[36] etc.

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