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# A review on Lead Poisoning and its Ayurveda management prospective

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## ABSTRACT

Ayurvedic medicine is a traditional system of Medicine and originated from India. There is tremendous use of Ayurvedic medicines now increasing in many areas of the world for various elements in adults as well as children. This system uses of natural herbs - based medicines and minerals including Mercury (*Parad*), Sulphur (*Gandhak*), Arsenic, Lead, Copper and Gold are often added to formulations with proper *Shodhan* and *Maran* (Purifications) as these are the essential components within the human body. However, impurities in purification or excess quantity in medicine can exposure to lead poisoning and can damage the brain, kidneys and nervous and reproductive systems. Lead is a natural element that is determined in water and soil. Human exposure occurs primarily through diet, air, drinking water and ingestion of paint through droplets in air and sometime thorough medicine. Chronic exposure to lead can adversely affect neuro development, decrease fetal growth, and increase the risk for premature birth and miscarriage. However, lead poisoning can also happen from Lead-based paint and lead-contaminated dust in older buildings, Other sources include contaminated air, water and soil. According to Ayurveda, *Nidan Parivarjan*, *Samshodhan Chikitsa* (Purification procedure), Purgation or both able to excrete the *Dushi Visha* from human body by means of purification, *Vamana* ( Induced Emesis) *Virechana* (Induced Purgation) along with *Prativisha Chikitsa* is specially indicated for management of poison.

**Key words:** Lead poisoning, *Nidan Parivarjan*, *Samshodhan Chikitsa*, *Prativisha*.

## INTRODUCTION

Ayurveda is great heritage and the most widely practiced of the Indian traditional medicine systems, but there are others such as Siddha and Unani which are also used in the Indian subcontinent as a system of medicine.<sup>[1]</sup> Ayurveda has eight specialized

branches called as Ashtang Ayurveda. *Agadtantra* is one of them which deals with toxicology and medical jurisprudence. The term *Agadtantra* is given by Acharya Sushrut;<sup>[2]</sup> other terms like *Vishagara*, *Vairodhik Prashamana*, *Danshra Chikitsa* and *Janguli* are given by Acharya Charaka, Vagbhata and Kautilya respectively. Various drugs in Ayurveda are natural plant-based medicines and minerals including *Gandhak* (sulphur), arsenic, lead, *Tamra* (copper), *Suwarna* (gold), *Rajat* (Silver) are often added to formulations with scientific purifications (*Shodhan*) as these metals are essential components of vital molecules within the human body. Improper *Shodhana* procedure or improper use of such drugs and accidentally can also lead to the manifestation of poisonous signs & symptoms. *Visha* (any toxic drug) is a substance on administration disturbs all the functions of body and also effect on function of *Dosha*, *Dhatu*, *Mala* and makes them anomalous,

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which humiliate the health of human being resulting death or morbidity.

Ayurvedic medicines are generally prepared by the combination of various on herbs and minerals, *Ghrut* and *Tail*. Most of Ayurvedic practitioners usually make up their own medicines. They may use individual herbal extracts or a mixture of herbal extracts with vegetable, animal and mineral products and it is a basic principle of Ayurveda that anything can be used as a drug for treating any diseases.<sup>[3]</sup> The substantial metals inside Ayurvedic items are commonly not present as contaminants yet are included deliberately.<sup>[4]</sup> The concord of lead, copper, gold, iron, mercury, silver, tin and zinc are found in Ayurveda as fundamental for ordinary working of the human body and a significant segment of good wellbeing; likewise, a few items contain other overwhelming metals, for example, thallium and arsenic etc.<sup>[5]</sup> Heavy metals are present in the earth's coating in small amounts but there are used for making lots of tools like: mobile phones, plastics, cars and insecticides also. The biological effects of heavy metals have been known since ancient times.<sup>[6]</sup>

## OBJECTIVES

To study the concept of Lead Poisoning and its Ayurveda management prospective.

## MATERIALS AND METHODS

**Literary source:** Review of Lead Poisoning, *Visha Chikitsa*, Ayurveda management was reviewed from various Samhitas, review also done from Ayurveda textbooks, thesis and papers published in the international journals etc.

### Herbal drugs use status

Alternative medicines are being used by about 60 percent of the world's population. These medicines are not only used by the rural population for their primary health care in developing countries but are also used in developed countries where modern medicines dominate.<sup>[7]</sup>

A study data shows that approximately 40% of adults in the United States report using complementary and

alternative medicines.<sup>[8]</sup> Globally, estimates of complementary and alternative medicines uses are even higher, as per World Health Organization (WHO) finding approximately 70-80% of all people utilizing non-allopathic medicines, mainly of herbal sources, in their health care.<sup>[9]</sup> According to a report by confederation of Indian Industry (CII) and PricewaterhouseCoopers (PwC). The report said 77% of Indian households used Ayurvedic products in 2017, up from 69% in 2015.<sup>[10]</sup>

## DISCUSSION

### Concept of Shodhan

The various poisonous plants, metals are described in ancient treatise of Ayurveda are still being used widely in a number of diseases after processing with proper *Shodhana*. Ayurvedic physicians successfully employed these drugs after proper *Shodhana* to the patients for their illness. The concept of *Shodhana* was mentioned for the first time in Charaka Samhita in the context of Danti Dravanti Kalpadhyaya. Acharya Vagbhata also mentioned *Shodhana* of drugs of plant origin in detail as well metal purification. It is reported that Aconite (*Vatsanabha*) purified by cow urine is converted to cardiac stimulant, whereas raw Aconite is cardiac depressant. It is clearly mentioned in 'Bhava Prakasha' that the bad/toxic effects attributed to '*Ashodhita Vishas*' (unpurified poisonous substances) are minimized when these are used after being subjected to *Shodhana*. According to Ayurveda, *Shodhana* is not only the process of detoxification, but also a process of *Samskara* (potentiating the therapeutic efficacy) of such drugs. It also reduces the side effects.

### Lead Poisoning

Lead is a natural element that is determined in water and soil. Human exposure occurs primarily through diet, air, drinking water and ingestion of paint through droplets in air and sometime thorough medicine. Several Ayurvedic medications and that processing of heavy metals results in their being nontoxic for ingestion.<sup>[11]</sup> The process of detoxifying heavy metals i.e. *Shodhan* removing impurities and make it

observable in the body has been described in most of Treatise of Ayurveda like Rastargini, Rasratnawali, Charak Samhita, Rasratnasamuuchay etc. The process of *Shodhan* includes the use of heat, sesame oil, buttermilk, cow's urine, plants, tamarind and arsenic sulfide.<sup>[13]</sup> However, impurities in purification or excess quantity in medicine can exposure to lead poisoning and can damage the brain, kidneys and nervous and reproductive systems.<sup>[14]</sup> Lead may be entered into the body by inhalation, ingestion or by absorption from the skin or mucous surfaces. Ingestion is the most common route of exposure to lead for children.<sup>[15]</sup> Chronic exposure to lead can adversely affect neurodevelopment, decrease fetal growth and increase the risk for premature birth and miscarriage. Lead poisoning is also called 'plumbism'. This is because of the ill-effect of lead and lead-containing materials on various organs. Lead especially affects the nervous system and kidneys. Symptoms of lead poisoning are including abdominal pain, nausea, constipation, anorexia, fatigue, decreased libido, irritability, headache, myalgias, anxiety and neurologic dysfunction, motor peripheral neuropathy to encephalopathy. Severe colicky pain is felt in the abdomen. It is relieved by pressure and is associated with obstinate constipation known as dry belly ache, anorexia and metallic taste. However, lead poisoning can also happen from Lead-based paint and lead-contaminated dust in older buildings, Other sources include contaminated air, water and soil.<sup>[16]</sup> Exposure to lead through ingestion or inhalation can also occur from contaminated air, soil, water, food etc.<sup>[17]</sup>

In human body Lead is stored in the blood, bone and soft tissues including the brain, spleen, kidneys, liver and lungs. Like many other heavy metals, presence of additional levels of lead may leads to production of free radicals which subsequently causes oxidative damage of cellular components including DNA and cell membranes in the body.<sup>[18]</sup> In a study it was revealed that analysis of 193 Ayurvedic medications exposed the presence of heavy metals in ~20% of products analysed.<sup>[19]</sup> Lead entering through the respiratory and digestive systems get absorbed and distributed in

blood, bone and soft tissues. The half- life of lead in the blood is ~30 days in individuals with normal renal function and longer in individuals with renal insufficiency.<sup>[20]</sup>

#### Ayurveda management of lead poisoning

There are two types of poisons that have been described in the *Agadatantra*, the Natural poisons and the Artificial poisons. The natural poisons are classified as inanimate (*Sthaavara*) and animate (*Jangama*). Inanimate poisons or the *Sthavara* comprise of poisons that have plant origin and toxic minerals, metals or metal ores that are found inside the earth. The use of metals in traditional medicines is very often seen as matter of concern these days, especially the *Bhasma* preparations which are always under stringent observations for containing highly reactive inorganic elements such as lead, mercury, arsenic and others. If any *Bhasma* in medicine is not prepared properly or *Shodhana* procedure is not done properly, it acts as a poison. To indicate its toxic potential, *Ashtamahadoshas* (eight major ill effects) have been quoted in classics and due emphasis have been given to its *Shodhana* procedure. *Nagabhasma* (Lead) is used in various Ayurvedic preparations. If it is not prepared properly or *Shodhana* procedure is not done; it acts as a poison.

According to Ayurveda, *Nidana Parivarjan* i.e. to avoid exposure of lead contaminated food, medicine etc. is one of the ways to prevent its poisoning. Sometimes, history of other medication especially Ayurvedic and Siddha medicine taken by the patients reveals the history of lead poisoning, as it important to know the route cause for the *Hetu.*, so it is not only necessary to know the source of lead exposure but also to know the various factors which increases lead absorption for proper diagnosis as well as for treatment purpose. *Visha Chikitsa* describes the action of harmful elements on body functions and how it can destroy the body tissues. Specific antidotes for poisons were prescribed for nullifying its effects. Ancient texts such as Charaka Samhitha, Susruta Samhitha and Ashtanga Sangraha offer exhaustive information. Ayurveda described Chaturvimshati Upakrama



(Twenty-four modalities) by Acharya Charaka. *Samshodhan Chikitsa* by doing *Panchakarma* on body (Purification procedure), It includes *Vaman*, *Virechan*.<sup>[21]</sup> Purgation or both able to excrete the *Dushi Visha* from human body by means of purification, *Vaman* ( Induced Emesis) and *Virechan* (Induced Purgation) expelling the poison, toxin & vitiated *Dosha* from stomach through anal route.<sup>[22]</sup> *Prativisha Chikitsa* is specially indicated for management of poison in lead poisoning. *Raktamokshan* (Bloodletting), As air blows the fire, blood is the major media which blow up poison. Hence bloodletting eliminates the poison from blood and minimizes the manifestation of poison.<sup>[23]</sup> It can be done by *Pracchana* (multiple incision), *Shrungha* (horn like shape), *Jalouka* (leech therapy), *Alabu* or *Siravedha* (venesection). *Siravedha* is now commonly done. Some medicine like *Gandhahastiagad*, *Shirishpushpa Yoga*, *Madhu* (Honey), *Ghrita* (Ghee), *Dugdha* (Milk), *Gairika* (Red ochre), *Gomutra* etc. Acharya Sushruta have also described *Ajeyghritapana* and *Amrut Ghritapana* in *Hridayawaran Chikitsa*.<sup>[24]</sup> *Vishaghna Mahakashaya*, *Kalyanak Ghrita*, *Narayana Churna*, *Shilajatuvataka*, *Mrutasanjivana Agada* are described in *Sutrasthana* of Charaka Samhita for all type of *Visha Chikitsa*.

## CONCLUSION

Administration of any drug with improper *Shodhan* or improper use of any drugs as well as accidentally inhalation of lead results appearing poisonous signs & symptoms, it may be chronic or acute nature. Chronic exposure to lead can adversely affect neurodevelopment, decrease fetal growth and increase the risk for premature birth and miscarriage. As per Ayurveda, *Shodhana* is not only the process of detoxification, but also a process of *Samskara* (potentiating the therapeutic efficacy) of such drugs. Proper purified drugs are very less likely to harm however it should be used only indicated medically by the expert physician. In Ayurveda '*Visha Chikitsa*' *Upkrama* has been described in detail and given twenty-four procedure to eliminate the poison from body effectively.

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