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A REVIEW ON STHAVARA VISHA (POISONOUS PLANTS) CONCERNING THEIR EFFECT ON URDHWAJATRU INDRIYAS

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ABSTRACT

Agada Tantra (Ayurvedic toxicology) is the 6th branch of Ashtanga Ayurveda. It deals with poison, i.e., its identification, types of poison from minerals, plants and animals, and its treatment. The knowledge of vegetable, metals and mineral poisons, known as Sthavara Visha Vijnaniya, was revealed by the venerable Dhanvantari in Ayurveda. This topic is elaborately explained in Agada Tantra by Acharya Sushruta in a separate chapter. Acharya Charaka and Vaghbhata also provided valuable explanations on the same topic in detail. The specific impact of Vishas on different body parts has not been thoroughly studied. Even in modern science, the toxicology branch mainly focuses on the general effects of these poisons. However, a detailed analysis of Sthavara Visha has been conducted to explore the effects of poisonous plants on the Urdhwajatru Indriyas as the branch Shalakya Tantra in Ayurveda deals with the major 4 sense organs among five. This study aims to provide a better understanding of the potential risks these plants pose to the sense organs above the clavicle and simplify the process of diagnosis and treatment.

KEYWORDS: Sthavara Visha, Poisonous Plants, Urdhwajatru Indriyas.

INTRODUCTION

Poison, as per modern science, is a substance capable of causing illness or death when introduced or absorbed into a living organism. When a substance enters the body, it can cause

the vitiation of healthy Dhatus or kill a healthy person, which is called Visha in Ayurveda.[1] The term Visha is derived from causing Vishada, which means depression or sadness even for Devatas.[2] As per Acharya Charaka, Visha is a substance that possesses ten specific properties, produces seven to eight vegas (stages), originates from Jalamahabhuta, and acts like Agnimahabhuta. It can be found in both animate and inanimate substances. To treat it, 24 special Upakramas (modalities) should be used.[3]

According to the explanation in Ayurveda, the spread of Visha through the bodily tissues (dhatus) is not uniform. The seven dhatus are contained in Ashayas, which are surrounded by membranes called Kala. To spread through the tissues, the poison breaks the membranes and enters the tissue, creating a Vega each time it traverses a membrane. When Visha enters the body, it passes through different Dhatus and causes different stages/ Visha Vega.[4] The literal meaning of Vega is impulse, speed, velocity, circulation, effect etc. So, the meaning of Visha Vega is impulse or circulation or effect of the poison. Depending on these Vegas, various signs and symptoms manifest in the body. All sciences generally describe these clinical features. This article explores the impact of toxic plants principally on the sensory organs above the collarbone, providing insights for medical professionals, particularly Shalakya practitioners, to diagnose and treat poisonous effects above the supraclavicular region.

MATERIALS AND METHODS

The databases searched for the current review were classical Ayurvedic textbooks, Textbooks of Forensic medicine and Toxicology, systematic reviews in Ayurveda, and Google Scholar; by consulting existing bibliographies.

Poisonous Plants with their Effect on Urdhwajatru Indriyas as per Ayurveda

Sthavara Visha Adhisthana (seats of plant poisons)

Ayurveda describes the poisonous plants based on the location of Visha in a plant. According to Acharyas, there are ten seats or receptacles for Sthavara Visha in general, which are roots, leaves, fruits, flowers, bark, sap, gum/resin, latex, tubers/rhizomes, and Dhatus (minerals, metals, etc.).[5] In Ayurveda, there are fifty-five kinds of Sthavara Visha[6] (vegetable and mineral poisons).

The 55 Stavara Visha with its Adhisthana[7] (seats) is:

Sl No.	Visha Adhisthanas	Sthavara Visha
1.	08- Moola Visha (poisonous root)	Klitaka, Asvamara, Gunja, Sugandha, Gargaraka, Karaghata, Vidyutsikha and Vijaya
2.	05- Patra Visha (poisonous leaves)	Visapatrika, Lamba, Varadaru, Karambha and Mahakarambha (s.k.2/)
3.	12- Phala Visha (poisonous fruits)	Kumudvati, Venuka, Karambha, Mahakarambha, Karkotaka, Renuka, Khadyotaka, Charmari, Ibhagandha, Sarpaghati, Nandana, and Sarapaka.
4.	05- Pushpa Visha (poisonous flowers)	Vetra, Kadamba, Vallija, Karambha and Mahakarambha,
5.	07- poisonous by their Tvak (bark), Sara (sap) Niryasa (gum/resin)	Antrapachaka, Kartariya, Sauriyaka, Karaghata, Karambha, Nandana and Naracaka.
6.	03- Kshira Visha- (poisonous latex/milk)	Kumudaghni, Snuhi, and Jaalakṣirini
7.	02- Dhatu Visha (mineral poisons)	Phenashma (arsenic) and Haratala (orpiment).
8.	13- Kandha Visha (poisonous tubers/ rhizomes)	Kalakuta, Vatsanabha, Sarsapa, Palaka, Kardamaka, Vairataka, Mustaka, Shṛingiviṣa, Prapundarika, Mulaka, Halahala, Mahaviṣa and Karkataka

Visha Lakshana as per Visha Adhisthana

Clinical features caused by Stavara Visha are explained in Ayurveda through its Adhishana. The Visha Lakshana in general as per Adhishtana includes:

Sl No.	Visha Adhisthana	Visha Lakshanas (Clinical features)
1.	Moola Visha (poisonous root)	voluntary stretching of the body (Udvestana), delirium, and delusion.[8]
2.	Patra Visha (poisonous leaves)	more yawning, stretching of the body and dyspnoea.[9]
3.	Phala Visha (poisonous fruits)	swelling of the scrotum, feeling of burning sensation inside the body and aversion to food.[10]
4.	Pushpa Visha (poisonous flowers)	vomiting, flatulence and delusion.[11]
5.	Tvak (bark), Sara (sap) Niryasa (gum/resin)	bad odour in the mouth, roughness, headache, flow of Kapha and feeling of heaviness, the thickness of the tongue.[12]
6.	Kshira Visha- (poisonous latex/milk)	the appearance of froth in the mouth, diarrhoea, feeling of heaviness, and thickness of the tongue.[13]
7.	Dhatu Visha (mineral poisons)	pain in the heart, fainting, feeling of burning sensation in the palate.[14]
These types of poisons are known to cause death after a certain period. (Prayena kaalaghadini).[15]		

As per Ayurvedic texts, the Root/Rhizome poisons are extremely potent. The ones that cause Urdwajatru Lakshanas are particularly emphasised here. Vatsanabha causes stiffness in the neck and yellowish eyes.[16] Palaka causes weakness in the neck and obstructed speech.[17] Kardama causes excessive salivation and yellowish eyes.[18] Vairaṭaka can lead to diseases of the head.[19] Pundarika causes redness in the eyes.[20] Finally, Karkataka causes the person to grind their teeth abnormally.[21]

All thirteen potent root poisons are dangerous and should be understood by their ten qualities (when administered by enemies). Visha from any source - Sthavara, Jangama, or Krtrima (artificial) - has ten qualities that can lead to quick fatality.[22] Rukṣa (dry), Uṣṇa (hot in potency), Tiksna (penetrating), sukṣhma (entering into minute pores), Aashu (quick acting), Vyavayi (spreading all over the body) Vikasi (debilitating the tissues) Visada (non-unctuous), Laghu (light) and Apaki (indigestible) are the ten Gunas (properties/qualities) of Visa.[23]

Visha Vega (Stage-wise features)[24]

When consumed, Sthavara Visha has different effects that occur in stages (A total of seven stages are explained in Ayurveda). This document explains only the stages that produce features in Urdwajatru. In the Prathma vega- first stage, the tongue becomes immobile and turns blue. In the second stage, there is a burning sensation and pain in the throat; In the third stage, when the poison enters the stomach, it causes dryness in the palate, and the eyes may turn discoloured or green with swelling. In the fourth stage, the poison reaches the large intestine, causing a severe feeling of heaviness in the head. In the fifth stage, there will be more elimination of Kapha.

Poisonous Plants with their Effect on Urdhwajatru Indriyas as per Modern Science

Poisonous Parts of Plant[25]

Sl No:	Poisonous Parts of Plant	Examples
1.	All parts of the plant are poisonous	Nerium odorum, Cerbera thevetia, Calatropis
2.	Leaves	Tobacco, Conium maculatum (hemlock), Curare, Digitalis
3.	Fruits	Capsicum annum, Strychnous nux vomica, Colocynth
4.	Seed	Abrus, Castor, Croton, Datura, Semicarpus anacardium
5.	Stem/bark	Cinchona bark, Plumbago rosea
6.	Root	Aconite, Plumbago, Colocynth

Toxic Principle in Plant: Toxic substances in plants may present in the form of**,** Toxalbumin (phytotoxin)**,** Alkaloids**,** Glycosides**,** Resins**,** Irritant juices**,** Acrid oils**,** Amino acids and Plant acids. Examples are given in the table with its active principles:[26]

Sl No.	Toxic substance	Active principles in plants
1.	Toxalbumin	Abrin, Ricin, Crotin
2.	Alkaloids	Atropine, Strychnine, Aconitine, Nicotine, Curarine, Ergotamine
3.	Glycosides	Nerin, Thevetin, Cerebrin, Digoxin, Calotropin
4.	Resins	Cannabinol
5.	Juice/oils	Semicarpol
6.	Plant acids	Oxalic acid, Malic acid

A. Organic Irritants and their Effect on Urdhwajatru Indriyas[27]

1. ABRUS

Botanical name:	Abrus precatorius
Common name:	Rati, Gunja, jequirity
Toxic Part of Plant:	Seed, Root and Leaves
Toxic Principle:	Abrin (Present in seed and is toxalbumin Abrin is similar to viper snake venom)
Clinical Features:	Ocular exposure: Causes redness, chemosis, swelling and conjunctivitis
Fatal Dose:	▪ 1 to 2 crushed seeds ▪ 90 to 120 mg of abrin
Fatal period:	3 to 5 days

2. CASTOR

Botanical name:	Ricinus communis
Common name:	Castor, arandi
Toxic Part of Plant:	All parts of the plant but seeds are more toxic
Toxic Principle:	Ricin (toxalbumin)
Clinical Features:	The pulp of the seed contains allergenic glycoprotein, which may cause conjunctivitis in allergic individuals
Fatal Dose:	▪ 5 to 10 seed ▪ 1 mg/kg body weight for Ricin
Fatal period:	2 to a few days

3. CAPSICUM

Botanical name:	Two varieties are noted: 1. Capsicum annum: less hot 2. Capsicum frutescenes: hotter than C. annum
Common name:	Chilli, red pepper, mirch
Toxic Part of Plant:	Fruit and seed
Toxic Principle:	Capsaicin, Capsicin
Clinical Features:	Ocular exposure causes pain, lacrimation, conjunctivitis, and blepharospasm

4. CALOTROPIS

Botanical name:	Calotropis plants are of two varieties: 1. Calotropis gigantea has purple colour flowers 2. Calotropis procera -has white colour flowers
Common name:	Madar, Akdo
Toxic Part of Plant:	All parts are toxic
Toxic Principle:	Calotoxin, Calotropin (glycoside), Calactin, Uscharin
Clinical Features:	Ocular exposure: Causes Irritation, lacrimation, conjunctivitis Ingestion: Causes Acrid bitter taste, Burning pain in the mouth, and Stomatitis

5. MARKING NUT

Botanical name:	Semicarpus anacardium
Common name:	Marking nut, bhilawa, biba
Toxic Part of Plant:	Nut
Toxic Principle:	Semecarpol Bhilawanol
Clinical Features:	Blister formation in and around the oral cavity
Fatal Dose:	▪ 5 to 8 seeds (nut) ▪ 10 gm of marking nut juice
Fatal period:	o 24 hours

6. ERGOT

Ergot is dried sclerotia of the fungus Clavices purpurea. The fungus infests certain grains such as rye, maize, barley, wheat, oats, etc. The fungus at grains germinates into hyphae, which penetrate deep into the grains and harden into a purplish structure called sclerotium, which elaborates several ergot alkaloids.

Alkaloids of Ergot: Ergotamine, Ergotoxin, Ergometrine, Dihydroergotamine

Clinical Features: Acute Poisoning causes Bleeding from the nose and Chronic poisoning (Ergotism) causes Headache and Miosis.

B. Cardiac Poisons and their Effect on Urdhwajatru Indriyas[28]

1. TOBACCO

Botanical name:	Tobacco (tambakhu) is prepared from cured leaves of Nicotina tabacum
Toxic Part of Plant:	Tobacco leaves
Active Principle:	Nicotine, Nornicotine Dried leaves contain 1 to 8 per cent of nicotine. Nicotine is a colourless, volatile, bitter and hygroscopic liquid.
Clinical Features:	Acute Poisoning causes Headache, Blurred vision and Salivation. Chronic Poisoning (nicotine addiction) causes amblyopia. Complications include Tobacco amblyopia.

Fatal Dose:	▪ 40 to 60 mg of nicotine ▪ 15 to 30 gm of crude tobacco
Fatal period:	5 to 15 minutes

2. YELLOW OLEANDER

Botanical name:	Cerbera thevetia
Common name:	yellow oleander, pila Kaner, exile
Toxic Part of Plant:	All parts but seeds, roots are more toxic
Toxic Principle:	Thevetin, Thevetoxin, Cerberin
Clinical Features:	Numbness in mouth and tongue, Headache
Fatal Dose:	▪ 8 to 10 seeds ▪ 15 to 20 gm of root ▪ 5 to 10 leaves
Fatal period:	2 to 3 hours if powdered root taken

3. ACONITE

Botanical name:	Aconitum napellus European variety Aconitum columbianumAmerican variety Aconitum ferox Indian variety
Common name:	Mitha Zahar, bish, bikh, monk's hood
Toxic Part of Plant:	Root (more toxic), Seeds and Foliage
Toxic Principle:	Aconitine, Mesoaconitine, Hypoaconitine, Pseudoaconitine, Ind-aconitine, Bikh-aconitine, Aconine
Clinical Features:	Salivation, Tingling and numbness in mouth and lips, Blurring of vision, hippus, mydriasis, xanthopsia
Fatal Dose:	▪ 1 to 2 gm of root ▪ 3 to 5 mg of aconitine
Fatal period:	2 to 6 hours

C. Somniferous Poisons and their effect on Urdhwajatru Indriyas[29]

1. OPIUM

Botanical Name and Toxic Part of Plant:	Opium (afim) is the dried extract of the poppy plant (Papaver somniferum)
Common name:	Afim
Toxic Principle:	Opium contains alkaloids, which are divided into two groups: 1. Phenanthrene group: (has narcotic properties) a. Morphine b. Codeine c. Thebaine (non-analgesic). 2. Benzoisoquinoline group: (has mild analgesic but no narcotic properties) a. Papaverine b. Noscapine (narcotine).
Clinical Features:	2nd stage of Poisoning (Stage of stupor) causes Headache and miosis also Miosis is one of the classic triads for opioid poisoning and is due to para-sympathetic stimulation (of the Edinger-Westphal nucleus). However, once the brain develops

	anoxic insult, there may be mydriasis
Fatal Dose:	Crude opium- 500 mg Morphine- 200 mg Heroin - 50 mg Pethidine 1 gm
Fatal period:	6 12 hours

D. Deliriant Poisons and their Effect on Urdhwajatru Indriyas[30]

1. DATURA

Botanical name:	Datura metel L.
Common name:	Thorn apple, Jimson seed
Toxic Part of Plant:	All parts are toxic but seeds are more toxic
Active Principle:	Hyoscine (scopolamine), Hyoscyamine and Atropine. Together referred to as belladonna alkaloids
Clinical Features:	Dryness of mouth, Bitter taste, Difficulty in talking, Dysphagia, Dilated pupils, Diplopia, and Difficulty in vision (Blurring of vision)
Fatal Dose:	▪ 50 to 100 seeds ▪ 10 to 100 mg of atropine
Fatal period:	24 hours

2. CANNABIS

Botanical name:	Cannabis sativa or Cannabis indica
Common name:	Indian hemp
Preparations of Cannabis:	The various preparations of Cannabis sativa, which is used, are as follows: 1. Bhang: also called sidhi, patti, sabji. Bhang is made from dried leaves of plants pressed into cakes. 2. Ganja: is derived from flowering tops. 3. Charas: also known as hashish or hash and is derived from resinous exudates of plant 4. Majun: a sweet prepared with any of the above preparations added 5. Marijuana: this term is used in America and many texts consider it synonymous with ganja. It is prepared from the leaves and flowering tops of the plant.
Active Principle:	Cannabinol, Cannabidiol, and Several isomers of tetrahydrocannabinol. The isomer responsible for most of the characteristic effects of cannabis is 1-49- tetrahydrocannabinol
Clinical Features:	Size of objects and distance is distorted, Changes in perception of colour and shape, and Dry mouth
Fatal Dose:	Charas 2 gm/kg body weight Ganja 8 gm/kg body weight Bhang 10 gm/kg body weight
Fatal period:	about 12 hours

3. COCAINE

Features:	Cocaine is an alkaloid derived from the plant Erythroxylon coca. It is produced as a salt (cocaine hydrochloride) or as an alkaloid known as freebase or crack.
Clinical Features:	Auditory or visual hallucinations, Mydriasis, Blindness due to occlusion of the retinal artery as a consequence of vasoconstriction
Fatal Dose:	▪ Oral 50 mg ▪ Mucosal 100 mg
Fatal period:	A few minutes few hours

E. Spinal Poisons and their Effect on Urdhwajatru Indriyas[31]

1. STRYCHNINE

Botanical name:	Strychnos nux vomica
Common name:	Kuchila, dog buttons
Toxic Part of Plant:	Leaves, Fruits and seed, Root and stem, Bark
Toxic Principle:	▪ Seed contains two active principles namely: Strychnine and Brucine ▪ Root, stem, bark and leaves contain: Brucine (a toxic principle) and Lagonin (a glycoside) Strychnine is an odourless white crystalline prism that melts at 275 to 285°C with decomposition. It is very bitter and more powerful than brucine
Clinical Features:	Bitter taste in the mouth, Increased difficulty in swallowing and there may be frothing at the mouth and pupils are dilated (With crushed seeds, symptoms begin to appear within 15 to 30 minutes).
Fatal Dose:	Seeds 1 to 2 crushed seeds Strychnine 50 to 100 mg
Fatal period:	1 to 2 hours

F. Peripheral Nerve Poisons and their Effect on Urdhwajatru Indriyas[32]

1. CURARE

Common features:	Curare is found in various species of strychnous plants and chondrodendron tomentosum plants.
Active Principle:	Curarine
Clinical Features:	Headache, Mydriasis, and Blurring of vision
Fatal Dose:	30 to 60 mg
Fatal period:	1 to 2 hours

2. CONIUM MACULATUM

Botanical name:	Conium maculatum
Common name:	Poison hemlock, Socrates poison, common hemlock, spotted hemlock
Toxic Part of Plant:	all parts of the plant
Toxic Principle:	Coniine (alkaloid) Gamma-coniceine (alkaloid)

Clinical Features:	Salivation and Mydriasis
Fatal Dose:	60 mg of coniine
Fatal period:	1 to 3 hours

CONCLUSION

The substance which causes vitiation of the Rasadi dhatus, in turn hampering the health or life of a person is termed as Visha (Poison). According to Ayurveda, there are two main types of poisons: natural poison and artificial poison. The natural poison is further classified into Sthavara Visha and Jangama Visha, while the artificial poison is known as Garavisha. Sthavara Visha, which refers to inanimate poison, includes poisons that come from plants and toxic minerals, metals, or metal ores that are found in their natural form on the earth. A poisonous plant is defined as a plant that when touched or ingested in sufficient quantity can be harmful or fatal to an organism or any plant capable of evoking a toxic and/or fatal reaction. With this comprehensive review of Stavara Visha, an attempt has been made to Discover the impact of poisonous plants on the Urdhwajatru Indriyas. This will help to gain a deeper understanding of the potential dangers these plants pose especially on sense organs above the clavicle and will ease the diagnosis and treatment process.

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