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DHATURA: A DRUG REVIEW

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ABSTRACT

Ayurveda is considered as one of the ancient health care systems. The *Atharva-veda* primarily deals with thorough *Ayurvedic* knowledge. *Agad Tantra* is one of the eight branches of *Ayurveda* dealing with identification of poison, types of poison from minerals, plant and animal kingdoms as well as artificial poisons prepared from poisonous drugs and their treatment. *Dhattura (Datura metel)* is one of the *Upavisha* mentioned in *Ayurveda*. The nature of *upavishas* is less toxic. But taken in more quantity causes drastic toxic effects on our body. Alkaloids including Scopolamine, Hyoscyamine, and atropine, which are extremely toxic but also useful in medicine, are present in the seeds and flowers of the *Dhatura* plant. It is a plant from the Solanaceae family that grows wildly and is used in many *Ayurvedic* formulations. The scientific field of Indian systems of medicine has benefited from the pharmacological properties of this plant, including analgesic, anti-inflammatory, anti-asthmatic, hypoglycemic, anti-rheumatoid, and wound healing activities. Inappropriate Dhatura dosages have a negative effect on the central nervous system, causing symptoms like hallucinations, dysphagia, dementia, delirium, confusion, and convulsions.

KEYWORDS: *Ayurveda, Agad, Dhatura, Upvisha*, Toxic.

INTRODUCTION

Ancient scholars of *Ayurveda* have classified poisonous drugs into two types i.e., *Sthavara* (plant origin) and *Jangama* (animal origin). *Sthavara Visha* is again classified into *Mahavisha*

and *Upavisha*.[1] Herbal medicine is an important part of both traditional and modern system of medicines.[2] According to *Ayurveda*, strong poisons are sometimes the best treatment if taken properly, with the proper *Shodhana* (Detoxification), dosage, and formulation. On the other hand, if an effective medicine isn't taken by the right person in the proper dosage, it could have adverse effects.[3] *Datura* is well known and commonly used drug for treating various ailments and it is an ingredient in most of the formulations in *Ayurveda* which is in practical use now. It is commonly known as 'devil's trumpet' and it was first described by Linnaeus in 1753. The main chemical composition of *Datura* is tropane alkaloids hyoscine, hyoscyamine and atropine alkaloids.[4] In *Ayurveda*, *Dhatura* is described as a useful remedy for various human ailments including asthma, cough, fever, inflammations, wound, edema, neuralgia, insanity, myalgia, hyperacidity, and dysmenorrhoea. *Dhatura* poisoning is common in India, the seeds being usually employed mainly as a stupefying poison prior to robbery, kidnapping and rape. It is also known as roadside poison. Accidental poisoning is commonly occurring when children and adults eat the raw fruit or seeds by mistake for some edible fruits or capsicum seeds. As this plant can have both therapeutic and toxic effects on people, so it is necessary to use it after appropriate knowledge.

Vernacular Names[5]

- English - *Dhatura*, Thorn apple, Jimson weed, Devil’s trumpet
- Hindi - *Dhatur, Dhatura, Dhaatura.*
- Bengali - *Dhatura*
- Gujarati - *Dhanturo, Dhaturo*
- Kannada - *Madkunika*
- Malyalam - *Unmana*
- Marathi - *Dhotra*
- Punjabi - *Dhatur*
- Tamil - *Utapatai*
- Telgue - *Unmmet, Dhaturam*

Synonyms: *Kantaka Phal, Doorta, Unmattaka, Kanakahvaya, Kharjughna, Ghantapuspa, Talphal, Tripuspa, Dhurta, Madana, Mhamohi, Matula, Shivpriya.*[6]

Classification

Ayurveda: *Upavisha,*[7] *Sthavara Vanaspatik Visha*

Modern medicine: under deliriant type of cerebral poison.[8]

Ayurvedic view of *Datura*

In *Charaka Samhitha Acharya Charaka* delineated *Datura* in the context of *visha chikitsa* and in *kushta chikitsa*, he used the term *kanaka* as a synonym for *Dattura*.[9]

Susrutacharya and *Vagbhatacharya* mentioned it as *Datura* in the context of *alarkavisha.*[10,11]

In *Haritha samhitha*, it has been mentioned in the context of *vataja netra roga chikitsa* as an ingredient in *anjanayoga.*[12]

While moving through *nighantu kala, Dhanvantari Nighantu and Sodhala Nighantu* have included this under *karaveeradi varga.*[13,14]

Madanapala nighantu quoted under *abhayadi varga.*[15]

Bhavamisra described it under *guduchyadi varga*.[16]

Types of *Dhatura*

There are two main varieties – Raja *datura* and Krishna *Datura* According to Raj Nighantu, there are 5 common varieties based on the colour of its flowers

- Shweta (white)
- Neel (blue)
- Krishan (black)
- Lohitta (red)
- Peeta (yellow)

Amongst the five above stated varieties, the Krishna (black) is the most poisonous.[17]

Botanical Description:[18] *Dhatura* is a messy smelling, erect, annual, freely branching herb that forms a shrub up to 60 to 150 cm (3 to 5 ft) tall.

Root: Cylindrical with lateral branches, brown coloured, rough splintery.

Stem: Dichotomously branched, cylindrical, blackish dark to purple colour, internode very short.

Leaf: 6 to 11 cm long, 2 to 8 cm broad, alternately arranged with pointed margin, dark green colour.

Flower: The flowers are trumpet or bell shaped.

Fruit: Capsule, Spherical with soft spines and contains 50 to 100light brown reniform seed.

Seed: Light brown, reniform, compressed, flattened, 0.4 to 0.5 cm long, and 0.4 cm wide, foveate, surface finely pitted, yellowish-brown colour and resembling chilly seeds.

Distribution: In India, *Dhatura* plants are abundant and grow wild throughout the country.

***Ayurvedic* properties of *Dhatura*[19]**

Rasa - Tikta, Katu

Guna -Laghu, Ruksha, Vyavayi, Vikasi

Veerya- Ushna

Vipaak- Katu

Prabhav- Madaka

Chemical constituents

- **Leaves** - Atropine, hyoscyamine and scopolamine, pyrrole derivatives
- **Seeds** - Hyoscyamine, daturanolone and fastusic acid and many other tropane alkaloids
- **Roots** - Hyoscyamine, apohyoscine, hyoscine, norhyoscine, meteloidine, cuscohygrine and tropine.
- **Flower** - Withanolide, wethametelins,
- **Fruits** - Triterpine, Daturanolone, daturadiol.[20]

Therapeutic Parts:[21] Root, fruit, seed, flower, leaves.

Mode of action

Its alkaloids exert both central as well as peripheral actions. Ingestion of small dose will stimulate the central nervous system causing excitement and restlessness as it firstly stimulates the higher centres then the motor centres and further lead to depression and paralysis of medulla, the respiration is first stimulated and then depressed and the heart centre is also stimulated. Since the process occurs systematically over the period of time, the vitals become unstable. With large dose it causes depression delirium coma and finally the loss of

life. Its peripheral effects are due to blockage of cholinergic fibres with resultant parasympathetic paralysis. Therefore, they inhibit secretion of sweat, saliva, mydriasis and stimulate the heart regulating centre.[22]

Medicinal dose[23]

- *Churna* - 50-100mg
- *Dravsatva* - 1-3 Drops
- *Dhatursura* - 2ml

Fatal dose

a) Seeds: 50-100

b) Alkaloids: 60mg (for adults), 4mg (for children)

Fatal period: 24 hrs

Clinical (Toxic) Features[24]

Summarized in the classic phrase: blind as a bat, hot as a hare, dry as a bone, red as a beet and mad as a hatter and full as a flask.

The important manifestation of *Dhatura* poisoning can be summarized as 11 Ds.

1. Dryness of mouth (dry as a bone).
2. Dysphagia.
3. Dysarthria.
4. Dilatation of cutaneous blood vessels (red as a beet).
5. Diplopia (blind as a bat).
6. Dry hot skin (hot as a hare).
7. Distention of urinary bladder (full as a flask).
8. Drunken gait.
9. Delirium (mad as a hatter).
10. Diminished bowel sounds.
11. Drowsiness.

Important formulations of *Dhatura*

- *Pralapantaka Rasa*
- *Unmaada Gajankush Rasa*
- *Granthishothnivarika Vartika*

- *Kanakasava*
- *Ekangavira Rasa*
- *Puspadhanva Rasa*
- *Tribhuvana Kirti Rasa*
- *Sri Jayamangala Rasa*
- *Laghu Vishagarbha Taila*
- *Vishatinduka Taila*
- *Dhattura Taila.*[25]

Treatment Principle[26]

- Monitoring of pulse.
- respiration and body temperature.
- Stomach washes by KMnO4 or 4 - 5% tannic acid.
- hysostigmine1-4 mg i.v./i.m. (repeated, if necessary, at intervals of 1-2 hrs.) 0r Neostigmine (2.5 mg i.v. every 3 hrs).
- Pilocarpine 5mg s.c.

***Ayurvedic* Antidote[27]**

- Cow milk with sugar.
- Juice of Vrintaka fruit in a dose of one pal.
- Karpasasthi Pushpa Kwath.
- Nimbu Swarasa.
- Jiraka.

Post- Mortem Appearance[28]

- Not characteristic.
- Dilated pupil.
- Sign of asphyxia.
- General signs of poisoning.
- Seeds or their fragments may be detected in the stomach and small intestines.
- It resists putrefaction and may be found even in a decomposed body.

Medico Legal Aspects / Circumstances of Poisoning

1. Accidental - cases occur among children by eating the seeds as edible fruit.

2. Suicidal - occasionally
3. Homicidal - generally not found
4. Road poison - it is used as the common stupefying agent for the purpose of robbery and rarely kidnapping. Also called as Rail Road Poison.
5. Occasionally used for criminal abortion.
6. Unintentional overdose from therapeutic dose may occur.
7. Scopolamine can be used as an alternative for Sodium amytal for narco test analysis
8. It is used as an adulterant in country liquor for enhancing feeling of euphorbia.
9. Sometimes used as an aphrodisiac and as a recreational hallucinogen.[29]

DISCUSSION AND CONCLUSION

Dhatura is believed to contain a variety of alkaloids, carbohydrates, fats, proteins, and tannins in different parts. *Dhatura* is mentioned as an effective remedy in *Ayurvedic* literature for a number of illnesses, including Asthma, *Jwara, Kustha, Alarka-visha, Amlapitta, and Krimi*. It can be administered orally as well as locally. *Dhatura* is one of the ingredients used in the formulation of many different *Ayurvedic* formulations, including *Tribhuvana Kirti Rasa, Sootshekhara Rasa, Kanakasava, and Mahavishagarbha Taila*. The plant shows an enormous variety of activities, including analgesic, anti-inflammatory, anti-cancer, anti-viral, anti-bacterial, antipyretic, anti-spasmodic, neurologic, and wound healing, according to numerous earlier studies conducted in the modern era. These activities may be attributed to the presence of various active components, including alkaloids, tannins, saponins, steroids, flavonoids, and glycosides. It has powerful deliriant and hallucinogenic properties.

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