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Conceptual study of *Dooshivisha* (Cumulative toxicity) w.r.t. Ancient classics and Modern science

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ABSTRACT

Ayurveda describes the vast turnover of beauty aid products. More and more new synthetic substances are introduced every day. Many of these are not adequately tested for safety, in particular for routes other than oral or parenteral. Increased incidence of skin conditions like eczema and contact dermatitis after using newer cosmetics suggest that this may be due to local toxic effects or toxic effects manifested on this phenomenon as *Dooshivisha*. They are relevant to the current way of life considering the prevalence of pollution, occupational hazards and extent of exposure to toxins in food and other articles used in daily life. Present generation is much more likely to consume junk foods-cold drinks, to have unhealthy travelling habits, working late nights, working with computers in A.C rooms. This is referred to by terms like *Hetusatya*, *Vegavarodha*, *Diwaswapa*, *Viparit Chesta*, *Virudhannasevana* which in turn hamper the normal physiology of human body. Same thing is mentioned in *Ayurvedic* texts also under the topic of *Pradnyaparadh* which is the basic cause for all diseases. This *Pradnyaparadha* is responsible to disturb the daily routine life and person has to face with the complaints of ill-health.

Key words: *Dooshivisha*, *Pradnyaparadha*, *Viruddha Ahara*, *Diwaswapa*.

INTRODUCTION

Now a days in this cosmetic and fashionable life style of human beings, every person running for money and willing to go ahead in each aspect of life. Present generation is much more likely to consume junk foods-cold drinks, to have unhealthy travelling habits, working late nights, working with computers in A.C rooms. This is referred to by terms like *Hetusatya*, *Vega Avarodha*, *Diwaswapa*, *Viparit Chesta*, *Viruddha*

Anna Sevana which in turn hamper the normal physiology of human body. Same thing is mentioned in *Ayurvedic* texts also under the topic of *Pradnyaparadh* which is the basic cause for all diseases. This *Pradnyaparadha* is responsible to disturb the daily routine life and person has to face with the complaints of ill-health.^[1]

The vast turnover of beauty aid products and cosmetics clearly reveals that every person is trying to look beautiful. More and more new synthetic substances are introduced every day. Many of these are not adequately tested for safety, in particular for routes other than oral or parenteral. Increased incidence of skin conditions like eczema and contact dermatitis after using newer cosmetics suggest that this may be due to local toxic effects or toxic effects manifested on skin. *Ayurveda* describes this phenomenon as *Dooshivisha*.

A part of *Sthawara*, *Jangama* or *Krutrimvisha*, which cannot be removed from the body but instead becomes less potent after digestion or the counter action of antidotes (*Prativisha*) stays in the body for a

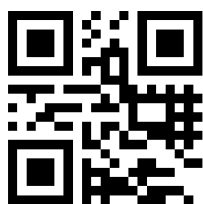
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long period and vitiating it slowly, is called *Dooshivisha*.^[2]

The poison which vitiates *Dhatus* because of factors such as *Desha*, *Kala*, food and sleeping during day time is called *Dooshivisha*.^[3] Favorable conditions can produce a variety of symptoms in a patient affected by *Dooshivisha*. The manifestations may be very wide from *Jwara to Kushta and Unmada* also. Among all the ill effects caused by *Dooshivisha*, *Kushta* is more common in the society and incidence of *Vicharchika* compared to other types is more.

OBJECTIVES

To study the concept of *Dooshivisha* (Cumulative toxicity) w.r.t. Ancient texts and Modern science.

REVIEW OF LITERATURE

The term *Dooshivisha* is a compound of two different words, '*Dooshi*' and '*Visha*'. '*Dooshi*' means denatured, attenuated, altered, latent, vitiating or something which influences the system in the long run. '*Visha*' means poison. The word *Dooshivisha* is derived from the word '*Doosh*' meaning polluting or defiling. It means which pollutes many times.^{[4][5]}

Any poison that is devoid of the natural ten properties of *Visha*, incapable of producing acute symptoms of poisoning can also be termed as *Dooshivisha*. According to *Dalhana*, retarded potency of all the ten qualities of *visha* is said to be responsible for the delayed action and cumulative toxicity on the body.^[6]

Arundatta the commentator of *Ashtanga hridaya* said that *Dooshivisha* is *Avibhavyamana* which meant that it is not traceable due to *Avarana by Kapha Dosha*. He also mentioned that *Varshagananubandhi* was due to its ability to remain in the system for years together.^[7]

Chakrapani defines *Dooshivisha* as '*Kalantara Prakopi Visham Doosivisham*' means it manifests the symptoms afterwards.^[8]

Because of the low potency of the poison, it usually won't cause sudden death. Because of the enveloping (*Avarana*) action by humor *Kapha*, this low potency poison is retained in the body for long

period without producing any grave or fatal symptoms.

Purvaroop of Dooshivisha

According to *Sushruta*, Prodrromal symptoms of *Dooshivisha* are as follows, Narcolepsy (Sleepiness), Feeling of heaviness of the body, Yawning, Laxity of joints, Horripilation, Body ache.^[9]

Roopa of Dooshivisha

According to *Sushruta*, Clinical symptoms of *Dooshivisha* are as follows, Dysentery or diarrhoea, complexion – altered, mouth - emit foul smell, olfactory and gustatory senses – impaired, suffer from unquenchable thirst, slurring and broken speech, vomiting, sorrow, sudden bouts of unconsciousness, symptoms of ascitis (*Dushyodara*).^[10]

Clinical features of Dooshivisha

According to *Sushruta*, clinical features of *Dooshivisha* are as follows, intoxication, fainting and discoloration, intermittent fever, oligospermia, urticaria, vomiting, epileptic attacks, increased thirst, Appearance of red patches all over the body, indigestion, diarrhoea, insanity, distension of the abdomen, Edema of the face and extremities, Skin disorders.^[11]

Symptoms according to site of Dooshivisha

- When retained in stomach (*Amashaya*) it produces the diseases due to derangement of humors *Kapha* and *Vata* i.e. unconsciousness, vomiting, diarrhea, giddiness, burning sensation, tremors, altered sensorium etc.
- When the *Dooshivisha* is located in the colon (*Pakwashaya*) it produces diseases of deranged *Vata* and *Pitta Dosha* such as burning sensation all over the body, fainting, diarrhea, tympanitis and anemia.^[12]

Classification of symptoms of Dooshivisha according to predominance of Dosha^[13]

Vitiation of each *Dosha* produces specific clinical features and these are described in *Charaka Samhita*. The predominance of *Dosha* in *Dooshivisha* can be ascertained by the respective symptoms.

Dosha	Symptoms
Vata	Chest pain (<i>Hrutpeeda</i>), belching (<i>Urdhwanila</i>), stiffness (<i>Stambha</i>), <i>Sirayama</i> , pain in the bones (<i>Asthiruk</i>), Joint pain (<i>Parvaruk</i>), binding pain (<i>Udveshtana</i>), Lassitude
Pitta	Sensory loss, warm expiration (<i>Ushna Nishwasa</i>), chest burn (<i>Hrutdaha</i>), bitter taste in the mouth (<i>Katukasyata</i>), edema (<i>Shopha</i>)
Kapha	Vomiting (<i>Chhardi</i>), anorexia (<i>Arochaka</i>), heart burn (<i>Hrillasa</i>), salivation (<i>Praseka</i>), heaviness of the body (<i>Gourava</i>), chillness (<i>Shaitya</i>), sweet taste (<i>Mukha Madhurya</i>)

Complications of Dooshivisha

Pyrexia, Diarrhea, Burning sensation, Fainting, Hiccough, Cardiac disorders, Distension of abdomen, Abdominal enlargement, Oligospermia, Insanity, Edema, Tremors.^[14]

Factors that aggravate Dooshivisha

Vulnerable habitat (*Dooshita Desha*), deranged seasons (*Kala*), toxic food (*Anna*) and daytime sleep (*Diwaswapna*) are factors that aggravate *Dooshivisha*. Existing *Dooshivisha* can aggravate in the presence of these factors.^[15]

Transformation of Visha into Dooshivisha

Sushrutacharya has mentioned how the *Visha* is converted into *Dooshivisha*; factors given below are responsible for the transformation.

1. **Jeernam Visham (Partly metabolized)** : It has got two aspects (A) When *Visha*, which is capable of producing acute ill effects, is kept for long time, some of them may lose their original properties, ultimately getting converted into less potent *Visha*, which is *Dooshivisha*. (B) Poison (*Visha*) whether inanimate (*Sthaavara*), animate (*Jangama*) or artificial (*Kritrima*) which is not completely eliminated from the body or partially

detoxified and being retained or accumulated in the body and localized at various sites of tissues producing cumulative effect is *Dooshivisha*. It can also be called chronic poisoning or latent poisoning. In the chronic poisoning symptoms develop insidiously and more gradually.

2. **Vishaghnoshadhibhi Abhihatam (inactivated by antitoxic drugs)**: It means partial detoxification by antidotes or antitoxic therapeutic agents resulting in partial metabolism of poison, which also retains some properties. Detoxification is a chemical process that occurs in body to convert toxic drug in to non-toxic drug to facilitate elimination from body through excretion.
3. **Exposure to Davagni**: Exposure to heat flame or fire etc. converts *Visha* in to latent poison (*Dooshivisha*). This is because certain properties of Poison (*Visha*) are altered by exposure of poisonous plant or animal or its toxin to heat and fire and this, in turn results in reduced potency of *Visha*.
4. **Exposure to Vata**: Cold wind dries up the water content of Poison (*Visha*) reducing its properties such as *Teekshna*, *Ushna* etc. thus transforming potent *Visha* in to less potent *Dooshivisha*. This is because of *Ambuyonitva*.
5. **Exposure to Aatapam**: Sunrays containing UV rays, infra red and x-radiations have got influence on the earth as solar terrestrial effects. Among those, UV rays are important because of its impact on the biological phenomenon. It disinfects air, water and other substances including even poisonous substances. *Vishadravyas* kept on exposure to sun; more detoxification takes place, which in turn reduces the potency of poison.
6. **Naturally Less Potent (Swabhavato Gunaviprahinam)**: Naturally all *Vishas* whether it is inanimate (*Sthavara*), animate (*Jangama*) or artificial (*Kritrima*) have all the classical ten properties (*Gunas*) like *Teekshna*, hot (*Ushna*), dry (*Ruksha*) etc. Presence of these *Gunas* can cause acute or sub acute poisoning. But if any one or

more of these properties (*Gunas*) are absent in a particular *Visha*, it can become *Dooshivisha* that is of low potency by nature.

At the same time, consumption of these will produce symptoms of *Dooshivisha* which flares up in the presence of aggravating factors. This may be due to the absence of quick spreading (*Vyavaayi*), *Vikasi* and fast acting (*Ashukari*) *Gunas*, which are more potent in acute poisoning.^[16]

Different opinions about *Dooshivisha*

According to *Charaka*:

Dooshivisha vitiates *Rakta Dhatu* and causes skin lesions such as *Kitibha* and *Kotha*. *Dooshivisha* vitiates the *Doshas* one by one and at last results in death. *Chakrapani's* comment on this verse was like this '*Kalantara Prakopee Visham Doodhivisham*', which meant that the poison, which got aggravated some time later was *Dooshivisha*. Even *Dooshivisha Keetas* were also considered as low potency poison (*Heena Visha*).^[17]

According to *Ashtanga Sangraha*:

Vagbhata also endorsed the view of Sage *Sushruta*. Only difference was in the line "*Pittashayasthe Anilapitta Rogi*" while others mentioned it as "*Pakwashayasthe*" but it seems that the reference *Pakwashayaste* is more suitable as it is the seat of *Vata* (*Vata Sthana*) and *Pitta Dosh* as contributory *Dosha* (*Anubhanda Dosha*).^[18]

According to *Madhava Nidana*:

Author has given same explanation as that of *Sushruta*. But *Madhukosha* commentary on *Madhava Nidana* gave some clarifications regarding *Dooshivisha*. Cold wind (*Sheetanila*), cloudy days (*Durdina*) were considered as aggravating factors of *Dooshivisha* as they aggravate *Kapha Dosh*, and *Dooshivisha* is covered (*Avrita*) by *Kapha*. Laxity of joints (*Vishlesha*) and *Romaharsha* are *Vata Kapha Lakshanas*. *Annamada* was considered as improperly metabolized tissue *Rasa* (*rasaajeerna*) by author *Gadadhara*. *Avipaka* was clarified as improper digestion (*Annasya Apaka*), '*Kshapayet Shukram Iti*

Shandyam Karoti' meant that *Dooshivisha* could cause impotence. '*Tamstan Vikaran Bahuprakaran*' was further clarified to be skin lesions such as *Visarpa*, *Visphota* etc.^[19]

According To *Bhavaprakasha*:

Author *Bhavamisra*, in his work *Bhavaprakasha* also gave similar explanation as of Sage *Sushruta*. The commentator clarified some of the points like '*Kaphavrutam*' as *Kaphena Mandeekrta Ushnadigunam*, which meant that the properties like hot (*Ushna*), permeability (*Sukshma*), dry (*Rooksha*) etc. *Gunas* are retarded by *Kapha*. *Varshaganubandhi*' meant *Kaphena Agnermandyaditwat Apakat Chirasthayi*'. It means, because of *Kapha Dosh* *Avarana*, defective digestion (*Agnimandya*) and defective metabolism (*Dhatwagni Mandya*) occur, which in turn leads to *Apakata* of *Dooshivisha* making it to stay for long time in the body without producing any signs and symptoms.^[20]

According To *Yogaratanakara*:

Author has also given different opinion regarding *Dooshivisha*. He mentions as *Kritrimam Visham Dwidam | Ekam Savisham Dooshivishasangnyakam Aparam Avisham Tadeva Garasangnyakam*|(Vishadhikara).

It meant that artificial poison (*Kritrima Visha*) is of two types, one is *Dooshivisha* formed by mixing toxic components (*Savisha Dravyas*) and another is *Garavisha* formed by non-toxic components (*Nirvisha Dravyas*).^[21]

Dooshivisha Modern Concept

Dooshivisha as a whole cannot be understood under a single heading. And it is yet to confirm that what factors can be considered under latent poison. To get satisfactory answers to all the practical difficulties it is essential to go through all the contemporary terms and scripts present in modern science. Here it is an attempt to put forward many modern terms which are close to concept of *Dooshivisha*.

1. Allergy or Hypersensitivity: Allergies (also known as 'hypeprsensitivities') are overreactions of the

immune system to substances that do not cause reactions in most people. Hypersensitivity refers to undesirable (damaging, discomfort - producing and sometimes fatal) reactions produced by the normal immune system. Hypersensitivity reactions can be divided into four types: Type-I, Type-II, Type-III and Type-IV, based on the mechanisms involved and time taken for the reaction. Frequently, a particular clinical condition (disease) may involve more than one type of reaction.

Type-I Hypersensitivity: It is also known as immediate or anaphylactic hypersensitivity. The reaction may involve skin (eczema and urticaria), eyes (conjunctivitis), and nasopharynx (rhinitis), and bronchopulmonary tissues (asthma).

Type-II Hypersensitivity: It is also known as cytotoxic hypersensitivity and may affect a variety of organs and tissues.

Type-III Hypersensitivity: It is also known as immune complex Hypersensitivity. The reaction may be general or may involve individual organs including skin, kidneys, lungs, blood vessels, joints or other organs.

Type-IV Hypersensitivity: It is also known as cell mediated or delayed type hypersensitivity. These allergic reactions occurs when an antigen interacts with antigen-specific lymphocytes that release inflammatory and toxic substances, which attract other white blood cells and results in tissue injury. Type-IV, delayed hypersensitivity reactions are most often skin reactions. Common examples include reactions to chemicals, metals and jewellery. They occur when an allergen interacts with specific T-lymphocytes.^[22]

2. Cumulative Toxicity: Any drug will cumulate in the body if the rate of administration is more than rate of elimination i.e. if a drug is excreted slowly and its repeated administration may build up enough high concentration in the body to produce toxicity. E.g. heavy metals, digoxin.

3. Delayed Toxicity: Predictable adverse drug reaction. E.g. hepatotoxicity is followed by methotrexate therapy.

4. Drug Interaction: Predictable adverse drug reaction. It occurs when two or more drugs are given simultaneously.

5. Intolerance: Appearance of characteristic toxic effects of a specific drug in an individual at therapeutic doses.

6. Carcinogenicity and Mutagenicity: Capacity of a drug to cause cancer and genetic defects resp. e.g. Tobacco.

7. Free Radicals: Free radicals are highly reactive unstable species that can interact with proteins, lipids and carbohydrates and are involved in cellular injury induced by a variety of chemical and biological effects. They are combination of oxygen with hydrogen - oxy radicals - and various other atomic and molecular varieties of oxygen (Reactive Oxygen Species- ROS). As a part of the life giving processes that create energy in every cell, free radicals are created as toxic waste.

8. Acute Toxicity: Acute toxicity occurs almost immediately (hours/day) after an exposure of that toxic drug. An acute exposure is usually a single dose or a series of doses received within 24 hour period. Death is a major concern in such cases. Non-lethal acute effects may also occur. e.g. convulsions and respiratory irritation.

9. Sub chronic Toxicity: Sub chronic toxicity results from repeated exposure for several weeks or months. This is a common human exposure pattern for some pharmaceuticals and environmental agents. E.g. Workplace exposure to lead over a period of several weeks can result in anemia.

10. Chronic Toxicity: Chronic toxicity represents cumulative damage to specific organ systems and takes many months or years to become a recognizable clinical disease. Damage due to sub clinical individual exposures may go unnoticed. With repeated exposures or long-term continuous

exposure, the damage from these sub clinical exposures slowly builds-up (cumulative damage) until the damage exceeds the threshold for chronic toxicity. Ultimately, the damage becomes so severe that the organ can no longer function normally and a variety of chronic toxic effects may result. Examples are:

- Liver Cirrhosis in alcohol addicted person who have ingested ethanol for several years.
- Chronic kidney disorder in workmen with several years of exposure to lead. Chronic bronchitis in long - term cigarette chain smokers.^[23]

DISCUSSION

Now a day's people are more prone to various kinds of *Visha*, including *Dooshivisha* in food as well as in environment. It is not mandatory that only direct intake of poisonous material lead to *Dooshivisha Lakshanas*. At present scenario polluted air, water, land, the increased exposure to electromagnetic radiations through cellular phones and computers, faulty food habits, stressful life style, unpleasant feelings, continuous usage of any particular medications and suppression of urges can act as cause for *Dooshivisha*.

CONCLUSION

The concept of Latent poison (*Dooshivisha*) is not clearly explained in many of *Ayurvedic* texts. Certain points need clarification like the topics that can be considered under the heading of Latent poison (*Dooshivisha*) or extent of latent poison. It is felt that this is the proper time to consider these factors and these should further be categorized separately under the heading of latent poison (*Dooshivisha*) for the better perception.

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