



Review Article

DRUG TOXICITY (AUSHADHA VYAPATA) IN AYURVEDASushanta Kumar Sahoo¹, Shailendra Singh², Ramesh Kumar Gupta^{3*}, Vijay Lakshmi⁴¹Associate Professor, Dept. of Kayachikitsa, Gangasheel Ayurvedic Medical College, Bareilly, (U.P.), India.²Lecturer, Department of Shalaky Tantra, Government Ayurvedic College, Pilibhit (U.P.), India.³Lecturer, Department of Rasa Shastra, Government Ayurvedic College, Varanasi (U.P.), India.⁴Lecturer, Department of Prasuti Tantra, Government Ayurvedic College, Varanasi (U.P.), India.

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ABSTRACT

In Ayurvedic view 'Aushadha Vyapata' means the complications of a drug or any extra actions of the drug / medicine in human body except the intended action. This can be correlated with the adverse drug reactions of the modern pharmacology which includes the side effects, untoward effects, toxic effects and idiosyncratic effects. Many questions are now being raised by the scientific and non-scientific community worldwide regarding the documentation of safety and efficacy of Ayurvedic Medicines. A couple of studies done in USA have raised very serious questions in this regards. Now a day the concept of pharmacovigilance has been started by WHO to monitor ADR (adverse drug reaction), report and record. Ancient Ayurvedic scholars were very much aware about the drug toxicity and keeping it in the mind they have described 'Aushadha vyapata' in their classics elaborately which reflect their concern about untoward effect of Ayurvedic drugs.

KEYWORDS: Aushadha Vyapata, Drug Toxicity, Pharmacovigilance, Safety.**INTRODUCTION**

The system of *Ayurveda* is different from other disciplines of life science due to its holistic approach and systematic documentations. Our treaties like Vedas are rich with the knowledge of human science. *Ayurveda* is said to be *Upaveda* of Atharvaveda. *Samhitas* like *Charaka*, *Sushruta* and *Vagbhat* are the richest sources of drugs and diseases. Eminent *Ayurvedic* scholars were very much aware about the effect of a medicine along with their side effect. *Acharya Charaka* has said that if proper procedural guidelines described in the text not being followed during preparation of a medicine then it may act as *Visha* (poison). In contrast a *Visha* (poison) may act as a medicine if purified properly and administered in proper dose. Besides this during the treatment process he has also given emphasis upon the availability of quality drugs and complete knowledge of the physician regarding all drugs including standard manufacturing procedures. Toxicity of mineral drugs was matter of concerned since the scholars of *Samhita* period. To ensure safety and efficacy of mineral drugs, various pharmacopeal processing techniques like *Sodhana*, *Bhawana*, *Marana*, *samskara* etc. were developed during post-*Samhita* period.

AUSHADHA VYAPATA IN AYURVEDA: Starting from *Charaka Samhita*, *Aushadha vyapata* is very well documented in many *Ayurvedic* literatures. Scholars have described many reasons behind the adverse drug reactions of a drug. Administration of drugs shows complication due to the following causes; such as¹

1. *Akala* (Inappropriate time)
2. *Alpa matra* (In less dose)
3. *Ati matra* (In excess dose)
4. *Purana* (Very old/expired medicine)
5. *Na Cha Bhavitam* (Improper triturated)
6. *Asamyaka Sanskrutam* (Improper purified /processed)

All the above points can be considered from two angles-pharmaceutical and therapeutical views.

1. Akala (Inappropriate time)

Here '*Kala*' indicates time of collection of the raw drugs and also the time of administration. According to *Ayurvedic* pharmacopeia, there is indication of different seasons (time) for different parts and herbal drugs for its collection. Because leaves, fruits, roots are full of their medicinal efficacy in some particular season. For example: Roots are to be collected in summer; bark,

rhizomes, milk in autumn; leaves in spring and fruits and flowers according to the season of their production². Besides these drugs having *Ushna virya* should be collected in *Adana kala* and *Sita virya* drugs in *Visharga kala*. That's why if drugs are not collected in the respective seasons (periods) the medicinal property may be altered and the medicines prepared from these may not show proper pharmaceutical actions.

From therapeutic point of view, if the prepared medicine is not taken at proper time and at proper intervals as mentioned in the texts, then complications or inadequate action of the drugs may be noticed. *Maharshi Sushruta* has described 10 periods of administration of medicine (*Aushadha sevana kala*) such as - *Abhakta*, *Adhobhakta*, *Madhyebhakta*, *Antarabhakta*, *Sabhakta*, *Samudga*, *Muhurmuhu*, *Sagrassa*, *Grasantara*³.

For example: In patients of *Apana vayu vikriti* the medicines should be taken before meals. In case of *Vyana vayu* and *Udana vayu* disorders medicines are advised to be taken after lunch and dinner respectively. In patients of diseases of *Kostha* and *Pitta*, medicines are advised to be consumed in the middle of food.

If *Hingwastaka Churna* is prescribed after food or in the middle of food, its potency is lost and it can't act upon the *Apana vayu* but may lead to other complications like foul belching. That's why it should be taken along with the first bite of food with ghee for diseases of *Agni* and *Vata Dosh*⁴.

2. Alpamatra (In less dose)

Most of the *Ayurvedic* medicines are polyherbo-mineral formulations. From pharmacological point of view during preparation of the medicines if the raw drugs are not taken in the proper quantity then desired action on body may not be obtained or the formulation may show unwanted actions. Therapeutically it indicates the proper dose of the drug best suited for the patient.

For example: In texts '*Triphala*' means *Haritaki*, *Vibhitaki* and *Aamalaki* in equal parts. Here *Haritaki*, *Vibhitaki* and *Aamalaki* powder should be taken without seeds in equal quantity. But some take it with seed or some mix the three and then grind it. In this condition the drug having more fibers gives more residues. Hence less powder (active principle) comes in to the mixture. That's why after grinding, the mixture does not contain all the individual drugs in equal proportion as mentioned in the texts. Hence the appropriate pharmaceutical action is not achieved. So the drugs should be grinded

separately and then mixed in indicated proportions.

In case of metal and mineral preparations quantity (*Matra*) is also equally important. For example "*Kajjali*" as mentioned in the texts, mercury will achieve the potency of curing diseases only when it is processed with sulphur⁵ in a ratio of 1:6. If it is processed with a ratio of 1:1, 1:2, or 1:3, *Kajjali* will be prepared but instead of curing a disease it will show harmful effects in body. Because such preparations contain free mercury molecules.

From therapeutic point of view if any medicine is taken in lesser dose, then its therapeutical action is decreased or may not be obtained. For example: *Chitrakadi vati*. It is given in a dose of 8-12 *ratti* for *Dipana* and *Pachana*. If it will be given in a dose of 2 *ratti* then no action may be seen. In case of medicines prepared from toxic drugs like *Vatsanabha* (Aconite), *Ahiphena* (Opium) etc., if taken in under dose for a prolonged period, the intended action is not achieved, rather the patient will develop drug dependency with that drug which is described as '*Oka Satmya*' in *ayurveda*.

3. Atimatra (In excess dose)

During the preparation of a compound drug if the individual drugs are not taken in the proportions as described in the texts, then the medicine may act deleteriously. e.g. *Sankha vati* is used for *Amlapitta*, *Shoola*, *Agnimandya*. It contains *Vatsanabha* (Aconite). If *Vatsanabha* is added in a proportion double or triple to that of prescribed quantity and taken internally, *Vatsanabha* shows its toxic effects in higher dose. Though aconite is purified properly and *Sankha vati* is taken in a proper dose but the unwanted actions of the drug is due to the double proportion of the *Vatsanabha*.

According to therapeutic point of view if any prepared medicine is taken in overdose, it may also show adverse effects. e. g. *Rasonadi vati*. It is indicated for *Ajirna* or *Udara Vikaras*. It is given in a dose of 4 *ratti* (500 mg) with warm water. If a patient takes in a dose of 8 *ratti* or 16 *ratti* or 2-3 tablets at one time, instead of acting as a digestive it will cause gastric upset. Because it contains *Lasuna*, *Shunthi*, *Pippali*, *Maricha* and *Hingu* which are having *Katu Rasa* and *Ushna Virya* Properties.

Like wise other drugs like *Sudha Gandhaka*, *Vishatinduka vati*, *Ramabana Rasa* (Contain *Vatsanabha* and *Jati phala*) and all other preparations containing toxic substances like

Vatsanabha (Aconite), *Ahiphena* (Opium), *Kupilu* (Strychnine) etc. should be used carefully.

4. **Puranam (Very old/expired medicine)**

Here "Purana" means the period after which the drugs lose their potency. From pharmaceutical point of view most of the raw drugs loss their potency after one year⁶. Hence raw drugs should be used for medicine preparation within one year of collection.

Likewise for prepared medicine there is also a date of expiry (*Saviryataavadhi*) For example: *Churna*- 2 months; *Gutika, Leha* - 1 year and there is no expiry of *Asava, Arishta, Rasaushadhi* and *Dhatu (Bhasma)*⁷. Besides this though all the preservative measures are taken, still then after certain time period, the raw drugs and also the prepared medicine lose their potency and their property is altered by the influence of time. The time factor plays an important role in drug reaction. For example: *Guduchi*, though it is properly dried, if kept for a long period, it reabsorbs moisture from the atmosphere and fungus and maggots grow easily in it. If such drug is taken as medicine or used for preparing *Kwath* for *Anupana*, then instead of a positive response, it will act as an endo-toxin resulting in allergic reactions.

Panchasakar Churna. It is used as a laxative, since the expiry period for *Choorna* as mentioned in the texts is 2 months, if it is taken after one year of manufacture, instead of laxative action, complications like flatus tympanitis may be seen.

5. **Na Cha Bhavitam (Improper triturated)**

All *Visha varga* and toxic metals are having narrow therapeutic margin. *Shodhana* (purification) of these drugs reduces the therapeutic index. The main aim of the *Bhavana* is to enhance the potency of a drug and to minimize the toxic properties of the drug. Hence in purification of toxic drugs and also in triturating the prepared medicine, if proper *Bhavana* (trituration) with suitable *Swarasa* or *Kwatha* indicated in the texts is not given, then the efficacy of the drug is reduced and adverse drug reactions may be seen.

For example: *Ahiphena* (Opium) is purified by giving *Bhavana* with "*Adraka Swarasa*" for 21 times. If the '*Bhavana*' process is not proper or incomplete, then the toxic effects of *Ahiphena* (opium) remain as such. If such opium taken internally in a higher dose, adverse effects like Constipation, Respiratory Depression, Hypotension etc. may be noticed.

Likewise *Gandhaka* (Sulphur), a very poisonous drug is profusely used in *Ayurvedic* medicines. Whatever *Rasaushadhis* are prepared,

all contain *Gandhaka* (sulphur). By proper '*Bhavana*' with appropriate *Kwatha, Swarasa* such hazardous drug is made to act as *Rasayan*. For example: *Gandhak Rasayan*. If proper *bhavana* (Cow milk-3 times, *Chaturjatak* - 8 times, *Guduchi Swarasa*-8 times *Triphala*-8 times, *Bhringaraj swarasa*-8 times, *Adrak swarasa*-8 time)⁸ is given, *Gandhaka* (Sulphur) acts as a *Rasayana* which is very useful in *Kustha Roga* (Skin Disorders). It may show many toxic effects if proper *Bhavana* is not given. Hence '*Bhavana*' plays an important role in minimizing the complications or toxic effects of drugs.

6. **Asamyaka Sanskrutam (Improper purified /processed)**

"*Sanskar*" means procuring the properties of other substances within oneself. This can be done by processing with water; fire, *soucha* (Maintenance of proper Hygiene), *manthan* (Rubbing with other substances), *desha* (Influence of Geographical distribution of the drug), *kala* (Influence of time/season), *vasan* (Utensils used for preparation and storage of medicines) and *bhavana* (Trituration) etc⁹. For example: In purification of *bhanga* (Cannabis leaves) the process *Prakshalana* is used i.e, the leaves are soaked in water, filtered and dried. The process should be continued till green colored water comes out of it. Then only toxic properties of *bhanga* is minimized. *Tankan* (Borax) by frying with heat it becomes light and the strong molecular bonds break down which makes it to be absorbed and assimilated easily.

Soucha: If, proper hygienic conditions are not maintained during preparation, preservation and also during taking medicine then adverse drug reactions are seen. For example : During preparation of *Vati, Ghrita* and *Tailas*, if water particle remains in the prepared medicine, then fungus can grow in it before it's expiry period which hampers the potency of the medicine and unwanted effects may be seen. Similarly Ghee preparations are advised to be taken with *Ushna Anupana* (in warm state). If *Ghee* preparations will be taken in cold stage, instead of *Agnideepan* or curing a disease, it will cause indigestion, foul belching etc.

Desha: means the geographical area of production of the raw drug and also the area where the patient commonly resides, weather *Anupa* or *Jangal*. It is described that drugs of a particular area is best suited to the patients of that area. That's why if the drugs produced in a *Anupa desha* is given to the patient of *Jangala desha*, then it's efficacy is decreased. Likewise certain drugs of particular area are more effective than the others. That's why specific drugs are to be collected from

their selective area of production For example: the herbs of Himalayan region are more potent than others.

'*Vasana*' means the container or the utensils used in preparation and packaging of the medicines. If acidic or alkali preparations will be kept in metallic containers then the property is changed. For example: *Aasava* & *Arishta* preparations are always kept in glass bottles instead of metallic containers. Hence the role of *Vasana* is very important.

From the above description it is clear that during preparation and dispensing the herbomineral drugs attention should be given for the above points, so that the efficacy of the drug can be enhanced and the adverse/toxic effects can be minimized.

DISCUSSION

It is clear that the effects and adverse effects of a drug depend upon a number of factors. Commonly people believe that Ayurvedic medicines have no side effects. But the above discussion shows that starting from the collection of the drugs till the final preparation and preservation of the prepared medicine, in every step precaution should be taken. Otherwise the potency of the drug is reduced. Besides this Ayurvedic formulations have less or almost no side effects because all the formulations are poly herbomineral compounds among which one counteract the toxic effects of the others. For example; The formulations containing '*Vatsanabha*' (*Aconitum ferox*) always contain '*Tankana*' (Borax). Because *Tankan* acts in minimizing the toxic effects of *Vatsanabha*. Besides this a single herbal drug contains a number of chemicals. It has been studied that almost all the herbal drugs contain the chemical that minimizes the toxic effects of other chemicals present in that drug. For example: *Sarpagandha* (*Rowlfia serpentina*) is used as a *Nidrajanana* or anti hypertensive drug. The active principle present in this drug is 'Reserpine'. When the isolated chemical Reserpine is given for a long time then side effect like suicidal tendency is observed, whereas the crude drug *Sarpagandha* is given in powder form, no such effects are observed. This proves how safe the herbal drugs are? Still then in case of heavy metals and minerals the toxic effects cannot be avoided. Mercury has Nephrotoxic and Hepatotoxic effects, likewise other metals also. But by proper purification and other procedures, the toxicity can be minimized.

CONCLUSION

It is said that any drug having effects must have side effects. That may be *Ayurvedic* or Modern. But by following the proper processes for purification, preparation and storage of the drugs as mentioned in the texts, these toxicity can be minimized. By undergoing through different *Sanskaras* (Pharmaceutical processes) transformation of good pharmacological action takes place, in other words *Samskara* effects the changes of the property of a drug

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