



PHARMACOKINETICS OF ANUPANA: A REVIEW ARTICLE

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ARTICLE INFO

Article History:

Received 27th April, 2017

Received in revised form 14th May, 2017

Accepted 8th June, 2017

Published online 28th July, 2017

Key words:

anupana, aharavihara, ayurvedic chikitsa

ABSTRACT

Ayurveda is a science of dealing with the ailments and various diseases in the most natural and acceptable form to mankind. For this it offers many ahara vihara i.e. dietstyle regimes, seasonal regimes and daily routines. Anupana is also one of the integral part of ayurvedic regimes. It acts as a synergistic with the drug to be administered. But in today's era due to the lack of research trials and standardisation in the field of ayurveda this concept have not been recognised and applied even by the ayurvedic practitioners as well as compared to the strict treatment protocols followed by the contemporary sciences. Hence there is an obvious requirement for the understanding of this concept from the available facts and literature from the mother science as well as modern concepts that are available to us today. In this paper a study is done to reconstruct the concept of anupana on the basis of modern pharmacological concepts so as to promote its inculcation in therapeutic methods and to be followed as a strict protocol to increase the therapeutic effectiveness of ayurvedic chikitsa.

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INTRODUCTION

Ayurveda, the ancient science of life, gives us the most detailed information on different diets and lifestyles to be followed in different situations, to acquire maximum health benefits. *Ayurveda* states in detail, the specific diet and lifestyles to be followed during different seasons, under different climatic conditions, for different age groups and people of different *deha* and *manasa prakriti* and for different diseases etc. In *ayurvedic* line of treatment, *anupana* is essential without which the treatment is incomplete. *Anupana* given with medicine is responsible factor for minimising the dose of drug and to promote synergistic effect. The possible toxic or untowards effects caused by some formulations can be subdued; by the influence of *anupana*. *Anupana* has an eloquent role in widening the scope of therapeutic effectiveness of *ayurvedic* formulations.

The word ANUPANA is derived out of two words ; (ANU + PANA) Anu - The word "Anu" is an "avyaya" and "upasarga vishesha". The word *anu* indicates the meanings like *asyaathaha*, *pashchaat*, *sadrushyam*, *lakshanam*, *bhaagaha*, *heenaha*, *sahaarthaha*, *aayaamaha*, *sameepam* and *paripaatee*¹. The different English meanings of the word "ANU" are after, afterwards there upon, again, further, behind, then, next, along, alongside, lengthwise, over, through, to, towards, at, according to, in order, near to, under, subordinate to, with, along with and connected with etc.

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Pana - Panam is "Kleeba" *linga* i.e., "napumsaka" *linga* which is derived out of "paa" *dhatu* and "lyut" *pratyaya*. Different English meanings of the word *Pana* are drinking, quaffing, kissing, drinking spirituous liquors, a drinking vessel, sharpening and protection.² The one which is consumed along with or after the *Bheshaja* (medicine) is *Anupana*. So the term *Anupana* is formed by "anu" *upasarga* "paa" *dhatu* added by the suffix "Lyut" *pratyaya*.³

The dictionary meanings of *Anupana* are "a drink taken with or after medicine, a fluid vehicle in medicine".

Definitions of anupana as per ayurvedacharya

1. *Dalhana* commentary on *Susruta Samhita* has written as "Anupana is the liquid consumed immediately after food or along with it"⁴. *Chakrapani* commentary on *Caraka Samhita*

2. "In the context of administration of medicinal recipes or food, *Anupana* stands for the vehicles which mean liquids are mixed with medicine or food"⁵.

3. As per *Vagbhatacharya* "Anupana is the media which can be given either before or after or along with drug or diet."⁶

4. *Dravyaguna Vigyanam* Part 1 "Consumption of the medicine and food are *anu Saha Pashchat* (along and after) taken liquids known as *Anupana*".⁵ According to *Raja Nighantu*

5. "Anupana is a part of medicine which is in liquid form. *Anupana* should be administered after intake of medicine with some gap of time. *Yogratnakara* has described as below

6. "If medicine is given by the intelligent physicians for curing particular disease along with *anupana* it will cure that specific disease definitely by the strength of *anupana*.⁷ *Rasa Tarangini* the latest *Rasa Grantha* has mentioned *Anupana* as below

7. "Sahapana which is the liquid form taken along with main drug and which can facilitates easy disintegration, absorption and uniform distribution of medicine all over the body hence that liquid form is called as *anupana*.

8. According to *Vacaspatyam* "The liquid media which is opposite to *ahara* (food) and similar to the *dhatu*s (body tissues) is known as *anupana* and it is a part of the main medicine. It may be either taken along with or soon after the main medicine.

9. As per *Adhmalla* commentary on *Sarangdhara Anupana* has defined as the vehicle used after administration of the main drug.

Lakshana

Anupana should possess the properties opposite to those of the *ahara*, but at the same time should not contradict the qualities of the *dhatu*s.

Synonyms

The different terms implying the meanings of *Anupana* have been mentioned in different contexts and these synonyms of *Anupana*, are tabulated below:

Anupana - Means the one which is consumed along with or after the *bhesaja*.

Vahana - Means the one which carries.

Sahayogi - Means the one which brings together.

Maadhyama - Means the one which acts as media or the one which is taken in the middle.

Anutarsha - Means the one which is beneficial in thirst.

Anupeya - Means the one thing which is taken along with or after food.

Anupaneeya - Means the one which is taken along with food.

Oushadhanga peya - Means the *peya* which is used along with medicine.

Matra

Matra or dose is the amount of a substance to be taken. Proper dose should be followed

to get beneficial effects. The *matra* of *Anupana* for different *doshas* are not mentioned

in any of the *brihatrayee* but mentioned in later *granthas*. The *matra* that is mentioned

in *Sarangadhara Samhita* is like *vataja* should take 3 *palas*, *pittaja* should take 2 *palas* and *kaphaja* should take 1 *palas*¹⁰.

Anupana kala

Anupana kala and *oushadha sevana kala* influences the body both at physiological and pathological level. The time of administration depends upon the variations of *Doshas* at different times in a day. As mentioned in the definition of *Anupana*, it is clear that *Anupana* is to be taken after or along with *bhojana* or *oushadha*. Some other references says it can be taken before food also. The *Anupana* can be administered in delay i.e., by surpassing the actual time of administration. It can be given in the night.

Importance of anupana in chikitsa

The concept of *anupana* for drugs can be traced from the references of *Sarangdhara* and the commentator on his work

Adhamalla. Afterwards *Lolambarajiya* etc., texts have mentioned different *anupanas*. *Sarangdhara* quoted about the quantity of *anupana* for *Churnas*, *Avaleha*, *gutika*, *Kalka* according to the disease as follows:

Vata Roga- 3 *pala*(120 ml)

Pitta Roga- 2 *pala*(80 ml)

Kapha Roga-1 *pala*(40 ml)

Anupana or the adjuvant for food or medicine has its relevance and importance in *Ayurveda chikitsa*.¹¹ An *acharya* has said that as the oil spreads in the water, the medicine also gets spread by the effect of *Anupana*. When the medicine is administered with appropriate *Anupana*, the effect of drug gets enhanced.¹² ¹³ A reference has been given in *Adhamalla teeka* about that the distribution of drug throughout the body occurs within no time with the aid of *anupana*. It has been said here that the drug will be reaching all the parts of the body by two effects of *anupana* firstly *anupana bala* or strength of the vehicle and *anupana sakti* or potency of the vehicle. If water is not consumed after food, then the food becomes dry and produces different ailments in the body. At the same time, consumption of proper *Anupana* after food does proper digestion even if the quantity of food consumed is excess in quantity and quality (*Guru, Adhika matra yukta anna*). By the help of *Anupana* the properties of the *Oushadha* (medicine) will increase and helps to cure the disease.¹⁴

DISCUSSION

¹⁵The plausible English equivalents for the *anupana* are "vehiculum" or "adjuvans". The term vehicle is derived from the latin word 'Vehiculum' means that "which carries". It is a substance used as a medium for the administration of medicine as syrup in liquid preparations. The term adjuvant is also derived from 'Adjuvans' in latin meaning that "to aid". It is that which assists or a drug added to a prescription to hasten or increase the action of a principal ingredient. It can also be called as a synergist. So in western system of medicine, the terms which can be taken to understand the concepts of *Anupana* are Vehicle, Adjuvant, Synergist and Carrier through which the actions like drug absorption, drug companion, drug interaction, drug delivery and bioavailability of the drug will be effected. So the pharmacokinetics or the biomechanism of *anupana* drugs can be justified by some of the below mentioned points.¹⁶ Pharmacokinetic considerations are determined by the routes of administration, dose, latency of onset, time of peak action, duration of action-frequency of administration of a drug and many others.

Route Of Administration:¹⁷ The *ayurvedic* drugs are mostly used orally. As per modern medicine, bio-availability of intravenously administered drug is 100% and the *ayurvedic* drugs given orally are expecting systemic circulation. hence their bio-availability is definitely less than 100% .

Acceptability And Palatability: Most of the time the *ayurvedic* drug is administered along with a vehicle material like honey, sugar, jaggery, ghee, milk, warm water, expressed juice of some medicinal herbs like tulasi, ardaka etc. These vehicles have broad based purpose. Firstly they provide a medium of administration with acceptability and palatability. Secondly they help to protect the local mucosa of the oral cavity and upper part of GIT from the roughage effect of the crude natural drug.

Most of the *anupana* materials help in the absorption of the main drug and many of them have additional therapeutic effect. This is why in *ayurvedic* practice sometimes the same drug is used for treatment of different diseases with different *anupanas* e.g *Narayana Churna*. Thus the concept of *anupana* is an unique approach of *ayurvedic material medica*.

Anupanas are more important while administering a strong medication like mineral and metallic preparations i.e *rasoushadhis*. Honey, warm water, milk, ghrita and fresh juice of various herbs are the common *anupana* materials. An *anupana* is a half medicine is more nearer to food and probably acts more through its *rasa*(taste) and *gunas* physical properties than the *virya*, *vipaka* or *prabhava*.

Absorption of Drug: A) Cell Membrane Barrier: Absorption is the movement of drug from its site of administration into the circulation. It depends on various factors like aqueous solubility, concentration, area of absorbing surface, vascularity of the absorbing surface and its route of administration and *ayurvedic* drugs are mostly used orally. The effective barrier to orally administered drugs is the epithelial lining of the gastrointestinal tract which is lipoidal. All pharmacokinetic processes involve transport of the drug across biological membranes and biological membranes is a bilayer of phospholipid and cholesterol molecules and those drugs which are lipid soluble travels more easily across cells. Nonionised lipid soluble drugs are readily absorbed from stomach as well as intestine at rates proportional to their lipid: water partition coefficient. Mostly drugs are transported across the membranes by passive diffusion. The rate of lipid soluble drugs is more as compared to water e.g *narayana churna* is given with *takra* as *anupana* in *udararoga* which is fatty in nature.¹⁸ A study has been done which shows that says that the *takra* is composed of lipids in it.

Ph of Drugs: Acidic drugs are predominantly unionised in the acid gastric juice and are absorbed from stomach while alkaline drugs are largely ionised and are absorbed only on reaching the small intestine. However even for acidic drugs absorption from stomach is slower because the mucosa is thick, covered with mucus and the surface area is small. Thus faster gastric emptying accelerates drug absorption in general. In terms of pH it is said that a drug becomes more lipid soluble in a solution which has the same pH as that of the drug.¹⁹ Thus increases the solubility of the drugs because a study has been done that whether the drugs are *ushna* or *sheeta virya* they are weakly or strongly acidic in nature. So if we take an example of *narayana churna* in *gulma roga* it is given with *badarambu* so both of these are acidic in nature.

Particle Size of Drugs: Other than the *Bhasma* and liquid preparations in most of the dosage forms of *ayurvedic* drugs particle size are not so fine viz. *Vati*, *Guggulu*, *Churna*, *kalka*. Absorption of coarse powder is less than absorption of fine powder because the dissolution is a surface phenomenon therefore particle size of the drug in solid dosage form governs rate of dissolution and in turn rate of absorption.

Filtration: It is the passage of drugs through aqueous pores in the membrane or through paracellular spaces. Lipid insoluble drugs across the biological membranes if their molecular size is smaller than the diameter of the pores.^{20,21} It has been found in some studies that the dissolution with liquid or in other terms *anupana* decreases the particle size of the molecules of

drug, facilitates its transport and hence increases the bioavailability of drugs

Bioavailability: It is lower for lower ingestion because firstly the drug may be incompletely absorbed and secondly the absorbed drug may undergo first pass metabolism in intestinal wall or liver or be excreted in bile. Hence absorption is directly proportional to bioavailability.

Intensity of Response: It is related to the concentration of the drug at the site of action which in turn is dependent on its pharmacokinetic properties. All these factors are increased due to mixing of *anupana* with the drug because solubility increases the concentration of drug and lower particle size resulting from dissolution also increases the area of absorption of drug which ultimately increases the absorption of drug and governs the distribution of drug in the body.

CONCLUSION

Anupana is a beautiful ingrained concept of *ayurveda* and plays a major role in potentiating the action of *ayurvedic* drugs through pharmacokinetics and pharmacodynamics as well as improvement of *Aushadha Bala* and *Rogi Bala*. With the help of several *anupana* drugs the same yoga can be used in various drugs. Other than this it has many beneficial effects like acceptability, palatability, prevents anticorrosive actions of *rasaushadhis* etc. So *anupana* should be inclusive under the strict protocol regime of *ayurvedic* therapeutic interventions by the *ayurvedic* physicians.

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How to cite this article:

Nitin Sharma and Neha Udainiya (2017) ' Pharmacokinetics of Anupana: A Review Article', *International Journal of Current Advanced Research*, 06(07), pp. 4701-4704. DOI: <http://dx.doi.org/10.24327/ijcar.2017.4704.0561>
