



**PHARMACOKINETIC AND PHARMACODYNAMICS PERSPECTIVES OF  
PANCHKARMA W.S.R. TO THERAPIES INVOLVING ORAL AND NASAL ROUTE FOR  
DRUG ADMINISTRATION**

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**ABSTRACT**

Ayurveda the medical stream of classical Indian science elaborated various therapeutic and preventive approaches for the restoring of normal health condition. In this regard Ayurveda described some detoxification techniques also for preventing and curing various health ailments. *Panchkarma* is one such purifications method of Ayurveda which provides significant health benefits in many pathological conditions and also prevent invasion of disease causative factors. *Vamana*, *Virechana*, *Basti*, *Nasya* & *Raktamoksha* are some approaches of *Panchkarma* which performed for specific health benefits. *Panchkarma* facilitates transportation of drugs utilized in therapy and also boost normal physiological functioning of body. Each *Panchkarma* procedures acts through their own mechanism therefore it is prerequisite to understand pharmacokinetic and pharmacodynamics perspectives of *Panchkarma* therapy. Thus present article explored pharmacokinetic and pharmacodynamics considerations of some of the modalities of *Panchkarma*. It is expected that this article will help upcoming researchers of field to understand mode of action of therapy in better way.

**KEYWORDS:** *Ayurveda*, *Panchkarma*, *Pharmacokinetic*, *Pharmacodynamics*.

**INTRODUCTION**

The natural purification of body is very important for remaining away from diseased condition and Ayurveda science mentioned utility of *Panchakarma* for detoxifying whole body. *Panchakarma* mainly involves utilization of various process like; emesis, purgation, enema, administration of drugs through nasal route and bloodlettings, etc. for detoxification purposes.

*Panchkarma* helps to detoxify accumulated *Ama* which is responsible for many health ailments, this therapy normalizes circulatory process of body, imparts mental calmness, regularizes functioning of minute channels of body and improves metabolic activities therefore provides preventing and therapeutic health benefits. The specific purposes of *Panchakarma* therapies and their biological effects mentioned in **Table 1**.

**Table 1: *Panchakarma* Therapies, their Biological and Therapeutic Effects.**

S. No.	<i>Panchakarma</i> Therapy	Major Biological Effects	Therapeutic Role
1	<i>Vamana</i>	Eliminate <i>Kapha</i> & excess mucus	Relieves bronchitis & cure skin disease like psoriasis
2	<i>Virechana</i>	Elimination <i>Ama</i> from the intestines and pacifies <i>Pitta</i>	Cure jaundice, constipation and hemorrhoids
3	<i>Basti</i>	Relieves <i>Vata</i> and obstruction of <i>Srotas</i>	Helps if backaches, sciatica, urinary and reproductive disorders
4	<i>Nasya</i>	Removes excess humours from sinus & throat	Effective in sinusitis, migraine and facial paralysis
5	<i>Raktamokshna</i>	Purify blood and <i>Pitta</i>	Help in skin diseases and auto-immune disorders

*Panchkarma* treatment performed in three stages *Purvakarma*, *Pradhanakarma* and *Paschatkarma*. *Purvakarma* resembles pre-operative stage of therapy, *Pradhanakarma* means main purification measure and *Paschatkarma* means post procedural care.

Some *Panchkarma* therapies involving oral and nasal route for drug administration therefore the pharmacodynamics of such therapy greatly depends upon pharmacokinetic parameters, considering this fact as important aspect here we are presenting pharmacokinetic and pharmacodynamic consideration of *Vamana*, *Virechana* and *Nasya* since these therapies involves drug administration through oral or nasal route.

#### **Pharmacokinetic and Pharmacodynamics of *Purvakarma***

*Purvakarma* helps to clear deep rooted imbalances from the body, this procedure prepare body for main protocol and establish physical and psychological synchronization to achieve optimum benefits of therapy. *Purvakarma* make body compatible for rigorous *Panchkarma* treatment, for this purpose procedures like *Abhyantara Sanhapana*, *Bahya Snahana* and *Swedana* are recommended which soften the tissues and loosen morbid *Doshas*. *Purvakarma* allow movement of morbid *Doshas* and toxins towards the excretory end of body from where these morbid *Doshas* & toxins get removed. The massage and fomentation improves absorptions of drugs utilized in *Panchkarma* procedures.

#### **Pharmacokinetic and Pharmacodynamics of *Vamana Karma***

*Vamaka dravyas* facilitates migration of morbid *Doshas* towards *Kostha*, *Urdhavabhagha prabhava* of these drugs causes migration of morbid *Doshas* towards mouth from there these *Doshas* expelled out through the process of emesis.

*Vamaka dravyas* absorbed in blood and crosses blood brain barriers; that after these drugs stimulates vomiting center of brain resulting emesis. The *Usna*, *Sukshama*, *Tikshana*, *Vikasi*, *Vyavayi* and *Urdhavabhagha* actions of *Vamaka dravyas* contributed towards the emetic action. Drugs reach to *Hridaya* by virtue of *Prabhava* and *Virya*, then these drugs circulates through micro channels by virtue of their *Sukshma* and *Vyavayi* actions, that after these drugs causes *Dosha samghata Vishyandana* due to their *Ushana guna* and *Chhedana* actions break morbid *Doshas* & aggravated toxins, this facilitated by *Tikshana guna* of *Vamaka dravyas*, finally aggravated *Kapha* & *Pitta Dosha* along with other toxins expelled out from body.

*Vaman* is very useful in *Kaphaj vikara* since it eliminates morbid *Kapha Dosha*, helps in pathological condition like *Tamak Swas* since it clears respiratory passage and removes obstruction of minute channels.

The modern science also suggested uses of emetic therapy especially for many poisonous conditions. As per modern concept the emetic drugs acts through various ways including; by nervous reflexive activation, stimulation from brain centre and through chemoreceptor trigger zone (CTZ) impulses. The nervous impulses from intestinal tract and stomach cause reflexive activation which results vomiting. The stimulation of brain centre leads emesis through CNS system and Chemoreceptor Trigger Zone (CTZ) impulses induces vomiting through the centre located around medulla oblongata. This stimulation activates motor and autonomous nervous system.

#### **Pharmacokinetic and Pharmacodynamics of *Nasya***

The drug administered through Nasal route can exert their effects through vascular system and through nerve supply to the brain. *Nasya* drugs stimulate brain and affects regulation of endocrine and nervous system. The nasal administration of drugs regulates smooth and cardiac muscles secretions; affect heart rate through visceral activities, regulates hormone synthesis through endocrine and hypothalamus stimulation, exerts effects on olfaction and alter responses to odors. Respiratory regions possess epithelium covered with microvilli which offers large surface areas to facilitate drug absorption. The initial step involved drug absorption through nasal mucosa, moreover Paracellular mechanism and Transcellular process also affects drug absorption through nasal route. Paracellular mechanism is aqueous route of transport, however it is considered as slow route of transportation due to the passive process. The transcellular process involves transportation of drug by lipoidal route mainly facilitate transportation of lipophilic drugs. The above mentioned facts suggested reason of success of *Sneha nasya* in which olfactory mucosa exerts affinity for lipophilic drugs of *Sneha nasya*. The drug after absorption exerts effects by different ways including; passing through systemic circulation or by stimulating mucosal nerve endings.

There are various factors which affects pharmacokinetic of nasal drug i.e.; position of patients, lipophilicity and viscosity of *Nasya Dravyas*. Position should be in such way which helps transportation of medicine inside olfactory mucosa deeply. Lipophilic drugs absorbed easily through nasal mucosa however there is need to maintain lipophilic and hydrophilic balances. Similarly viscosity affects pharmacokinetic drugs through nasal mucosa, the high viscosity increases absorption of drug since drug remain in contact for more time due to the reduction in flow behavior.

#### **Pharmacokinetic and Pharmacodynamics of *Virechana***

*Virechana dravyas* mainly removed vitiated *Pitta Dosha* present in body through anal route. The *Virechana* drugs spreads inside the body and their *Ushna* property increases quantum of *Agni*, this leads migration of *Dosha* towards *Koshtha*. The *Tikshna* property of *Virechana*

drugs resulted *Chedana* (breaking down) of morbid *Doshas*, disintegrate *Sanghata* of *Dosha*. *Vyavayi Guna* of *Virechana* drugs facilitate spreading of drugs throughout whole body. *Vikasi Guna* helps in transportation even through minute channels. The vitiated *Doshas* and toxins moved and expelled out through the anal route due to the *Prithivi* and *Jala mahabhutas* predominance and *Adhobhaga hara Prabhava* of *Virechana* drugs.

The modern science also emphasizes therapeutic value of purgation and suggested many synthetic drugs to induce purgation. As per modern concept most of the purgatives increases water content of feces, offers osmotic action, retain water and electrolytes and increases colonic content volume so that it get expelled out easily. Some purgatives increase motility by acting on mesenteric plexuses. Moreover stimulant purgatives causes irritation to the intestinal mucosa thereby induces motor activity and bowel movement. Osmotic purgatives absorbed in GI tract, and exerts effect by retaining large amount of water which resulting incensement of intestinal bulk. This effect stimulates intestinal motor activities and facilitates bowel evacuation. Bulk purgatives like natural polysaccharides swell up after absorbing water inside the body; this causes stimulation of bowel for evacuation due to the mechanical distension.

#### Effect of *Paschat Karma*

*Paschat karma* performed after main procedure of *Panchakarma* treatments to normalize effects of vigorous *Panchakarma* procedure. Special diet regimen recommended to reestablishes digestive power, the suggested diet should possess properties to get absorbed easily and digestible, therefore liquid preparations or semisolid preparations recommended at initial stage of *Paschat karma*. The rejuvenation or *rasayana* therapy prescribed to nourishes tissues & restore immune system. The rest and avoidance of physical work suggested acquiring strength before performing any hard work. *Paschat karma* balances *Doshas*, stimulates *Agni* and normalizes circulatory process of body.

#### CONCLUSION

*Panchkarma* is purifications method of Ayurveda which gives health benefits in many pathological conditions and also acts as preventive therapy. *Vamana*, *Virechana*, *Basti*, *Nasya* & *Raktamoksha* are major approaches of *Panchkarma*. The *Nasya* involves drug administration through nasal route while in *Vamana* and *Virechana* drugs are administered through oral route. The *Nasya* can exert effects through vascular system and through nerve supply to the brain. *Nasya* drugs stimulate brain, alter endocrine and nervous system regulation and regulates smooth muscles secretions thus depicted therapeutic values in diseases like; sinusitis, migraine and facial paralysis. *Vamaka dravyas* in *Vamana* facilitates emesis to remove aggravated *Kapha Dosha*. *Vamaka dravyas* allow migration of morbid *Doshas* towards *Kostha* and *Urdhvaabhaga prabhava* of these drugs causes

migration towards mouth from there these *Doshas* get expelled out through the process of emesis. This therapy helps in diseases mainly arises due to the *Kapha Dosha* like; cough, cold, asthma and congestion. Similarly *Virechana Karma* helps to removes toxins from anal route; *Virechana dravyas* clears vitiated *Pitta Dosha* from the body. The *Virechana* drugs spreads by virtue of their *Ushna* property and increases quantum of *Agni*, causes migration of *Dosha* towards *Koshtha* from there these toxins expelled out due to the *Prithivi* and *Jala mahabhutas* predominance of *Virechana* drugs. The massage and fomentation leads abortions of drugs utilized in *Panchkarma* procedures.

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