

A Critical review on Pharmacodynamics of *Basti Chikitsa* and its action on Enteric Nervous System

Review Article

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Abstract

Ayurveda being an ancient science it has developed through many experiences and experiment in medicines. Panchakarma therapy is a very imperative and essential part of Ayurvedic treatment. Panchakarma (Vaman, Virechan, Nasya, Anuvasan & niruha) practices to get complete cure of disease, *Basti* is the main treatment as it possesses a wide spectrum of effects and is thought to be the *Ardhachikitsa* (50% of all treatment modality) in *Ayurveda*. Though *Basti* is given in the *Pakvashaya* (Rectum and Colon) its active ingredients i.e. "*Virya* of the *Basti*" spreads in the entire body to get desire action. *BastiVirya* may act through enteric nervous system (ENS). The gastrointestinal system has a network of nerve fibres, which is known as 'Enteric Nervous System (ENS). Similar to brain, ENS sends and receives impulses; record experiences and responds to various stimuli.

Key Words: *Basti*, Virya, Enema therapy, Enteric nervous system.

Introduction

Panchakarma therapy is a very imperative and essential part of Ayurvedic treatment. The effectiveness of Panchakarma therapy also depends on suitable application of different elimination procedures as well as on the proper preparations of various formulations required to complete the Panchkarma.

In *Panchkarma Chikitsa*, *Basti* is superior to other (*virechan, vaman*) *Shodhanas* (bio purification therapies). It increases *Shukra* (potency), *Oja* (vital energy) & *Agni* (digestive fire). This *Karma* of *Basti* is basically due to its *Shodhana* property that starts right from the *Pakvashaya* i.e. Colon. (1) *Basti* is a multidrug formulation that is given per rectum and reaches up to ileo-caecal junction and classical *Bastiputak* proved more efficacious than enema pot method and has more retention time in both *Asthapana* as well as *Anuvasana Basti*, thus absorption is more in classical method. (2) *Shodhana* is entity that is associated with the removal of *Mala* (morbid *Doshas*) from the body. There are various toxins accumulated in the body due to defective removal which can be considered as a part of *Mala* or morbid *Doshas*. (3)

Panchakarma itself is a composite and distinctive system of treatment, so its pharmaceutical preparations also possess some special characteristics.

Basti has the prime function of colon cleansing. The colon cleansing has the effect on whole body that can be compared to the *Srotoshodhana*. The rationale for colon cleansing is the concept of "auto-intoxication", the idea that food enters the intestine and rots. (4) *Basti* has two types *Niruh* or *Asthapan Basti* (decoction enema) and *Sneha* or *Anuvasan Basti* (oil enema). (5) *Niruha Basti* is a mixture of oil, honey, '*kwaatha*' (decoction) and '*Kalka*' (fine paste obtained after wet grinding of the plant material). These ingredients are immiscible with each other. A homogenous mixture is required for actual administration of '*Basti*'. Initially honey and rock salt are mixed together in the beginning followed by addition of oil. This mixture is then thoroughly mixed. The finely wet grinded paste of prescribed medicinal plants is then mixed in it. The mixture is then again mixed thoroughly. The prescribed liquids such as *kwaatha* (decoction) are then added to it and the mixture is subjected to thorough churning to produce a homogeneous mixture. (6) The mixture thus acquires a physical state of emulsion. An emulsion is a mixture of two or more immiscible (unblendable) liquids. One liquid (the dispersed phase) is dispersed in the other (the continuous phase).

Role of Honey:

It is recommended in the classics of Ayurveda that hot honey is harmful and never be taken. However in Charaka Samhita Kalpa Sthana, hot honey is indicated to prescribe for Vamana Karma. In Basti Kalpana also, honey along with hot decoction are administered into the body. It is considered as the best

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among the vehicles, as it contains various substances in it, which denotes its drug (potency of the drug) Carrying Capacity.(7) It has properties like 'Yogavaahitwa' by way of which it enhances the properties of substances with which it is processed.

Honey is a natural product with very complex chemical composition. It is composed primarily of fructose and glucose but also contains 4 to 5% fructooligosaccharides which serve as prebiotic agents. (8) It contains more than 180 substances, including amino acids, vitamins, minerals and enzymes.(9) Honey has stimulative effect on colonic probiotic bacteria. It is involved in formation as well as inactivation of carcinogens in the gut lumen and may be altered in a positive way by the presence of colonic probiotic bacteria. (10) Honey a natural emulsifying agent which may also be used to help stabilize the colloid, binding the liquids together. In cases where the emulsion is not successfully stabilized, components may separate again later on.(11) Antitoxic effect of honey catalyse that neutralizes hydrogen peroxide which is found extensively in mammalian tissues is continuously produced by numerous metabolic reactions in the organism, bacterial and viral infections, sharp changes of weather conditions, stress conditions, over fatigue etc.(12)

Role of Saindhava Lavana (rock salt):

Salt in general are having the properties like *Vishyandi*, *Sukshma*, *Tikshna* and *Vataghna*, it promotes the evacuation of bladder and rectum. (13) Owing to the *Sukshma* (micro or extremely small) property it helps the drug (potency of the drug) to reach in the micro channels, *Saindhava*(rock salt) mixed with honey is capable of liquefying the viscid *Kapha* and breaking it into minute particles for their easy elimination. Similarly it may liquefy the morbid *Doshasanghata* and breaks it into smaller particles by virtue of its *Ushna* and *Tikshna* property respectively and thus helps their elimination. Apart from this, *Saindhava*(rock salt) destroys the *Picchila*, *Bahula* and *Kashaya* properties of *Madhu* (honey), and makes close union with it to form a homogeneous mixture.(14) It also has *chhedan* (penetrative), *Vilayan* (Liquefaction of doshas) *Avidahi* (doesn't cause burning sensation) and *Tridoshaghna* property. It dissolves and expels *Dosha* from colon. Thus it helps in absorption and bio purification process of *Basti*. Continuous churning of honey and rock salt increase the homogeneity of the emulsion of *Basti* material and reduction in the size of particles with the duration of *BastiBhavana*.(15)

Role of Sneha (Lipids):

It includes *Ghrita*, *Taila* (oil), *Vasa*, *Majja* (bone marrow) and each one is having its specific properties accordingly it produces beneficial effects. *Sneha* in general is *Vatahara*, *Mrudukara*(produces softness in the channels and tissues, in turn helps for easy elimination of waste substances) and removes the obstruction the channels produced by the *Mala* i.e. *Malanam Vinihanti Sangam*.(16) Owing to the *Snigdha Guna*, it produces unctuousness in the body in turn

helps for easy elimination and by *Sukshma Guna* it helps the drug (potency of the drug) to reach into the micro channels. Apart from these functions, it protects the mucous membrane from the untoward effect of irritating drugs in the *Basti Dravya*.

In colon production of short-chain fatty acids (SCFA) is produce by abundant bacterial fauna. Colonocytes can take SCFA up efficiently and in part utilize them as nutritional sources. Both squamous stratified mucosa of rumen and columnar simple epithelium of intestine absorb readily SCFA. Passive diffusion of the unionized form across the cell membrane is currently admitted. In the lumen, the necessary protonation of SCFA anions could come first from the hydration of CO₂. (17) SCFAs might play a key role in the treatment of the metabolic syndrome, bowel disorders, and certain types of cancer. In clinical studies SCFA administration positively influenced the treatment of ulcerative colitis, Crohn's disease, and antibiotic-associated diarrhoea. (18)

Role of Kalka:

It serves the function of *Utkleshana* or *Doshaharana* or *Samshamana* depending upon its contents and is selected accordingly. It gives required thickness to the *Basti* material. Less quantity or absence of *Kalka* (paste of herbs) makes the *Basti Dravya* thin which comes out immediately after administration. Excess quantity of the *Kalka* (paste of herbs) makes the *Basti Dravya* thick and difficult for administration and may not come out within the expected time. *Kalka Dravya* acts as a catalyst agent which improves the potency of *Basti*.

Role of Kwatha (decoction of herbal drugs):

It is the *Drava Dravya* (liquid part), usually the *Kashaya* (decoction of herbal drugs) is used, but as per the need *Kshira* (milk), *Mamsarasa* (decoction of meat), *Amlakanji*, cow urine, *Dadhimastu* (curds water) etc. are also used in place of decoction of herbal drugs or for the preparation of *Kwatha* (decoction of herbal drugs) itself. The drugs used for the preparation of *Kalka* and *Kwatha* are selected on the basis of *Dosha*, *Dushya* and *Srotas* involved in the pathogenesis of the disease, hence they are the main constituents of the *Basti Dravya*.

Probable absorption of Basti:

The human colon has a nominal mucosal surface area of about 2000 cm² but in reality the total absorptive area is even greater because colonic crypt cells are capable of absorption as well as secretion. (19) Drug absorption is determined by the drug's physicochemical properties, formulation, and route of administration. In rectum drugs may cross cell membranes by passive diffusion, facilitated passive diffusion, active transport, or pinocytosis. Sometimes various globular proteins embedded in the matrix function as receptors and help transport molecules across the membrane. (20)

In clinical study on pharmacokinetic of *Basti* of *Triphala Tail Anuvasan* and *Triphala Niruha* in humans shows significant absorption of Gallic acid in blood

which is active ingredient of Triphala as compared to oral Group. On quantitative estimation of Gallic acid in all the samples of human *Anuvashana*, *Niruha* and Oral group, concentration of Gallic is found highest in *Anuvashana* group at 90 minutes after administering *Triphala Niruha Basti*.(21)

Discussion :

Pharmacodynamics of *Basti*:

Basti acts through its *Virya*. Active principles of the drug are generally considered as '*Virya*.'(22) Active principle is an ingredient of a drug that is actively involved in its therapeutic effect. *Nipata*(contact) and *Adhivasa* (inherent residing) are the two chief mode by which *Basti Virya* can affect the body as seen by the above mentioned explanation.

Action of *Bastivirya* by *Nipata*:

Basti administered in the *Pakvashaya* affects the whole body by its *Virya* similarly as the sun in the sky affects the *Bhurasa* (water) though it is far away.(23) This example shows Action of *Basti* is not only dependent upon absorption of the active principle but also it affects the body as soon as these active principles comes in contact with the *Pakvashaya* proving the action of *Bastivirya* by *Nipata*.

Action of *Bastivirya* by *Adhivasa*:

When *Basti* is administered in the *Pakvashaya*, its *Virya*(probably active principles) is taken up by *Samana Vayu* with the help of *Apana Vayu*. Then it reaches other *Vayus* also, and affects them by its action. It also keeps *Pitta* and *Kapha* in their proper places. It exerts its effect on *Bhutas* which are similar to that *Guna* of *Virya*. The transport of *Bastivirya* is by *Kedarikulya Nyaya* which makes it spread all over the body by virtue of different *Vayus*. This quotation supports the theory of absorption of *Basti* active principles i.e. phytochemicals of the *Basti* as the action is dependant upon *Gunas* which are the properties in *Dravya*.(24)

Action of *Basti* through enteric nervous system (ENS)

This action can be explained in modern parlance by the direct action of active principles of drug on receptors in the gastrointestinal tract related to the enteric nervous system. ENS (Enteric Nervous System) is substantial group of neurons, it is capable of Autonomous reflex without influence of central nervous system. More than 500 million neurons present in the ENS (Enteric Nervous System) so it's called "second brain".(25) There are so many similarities between CNS -ENS regarding cellular structure, neuropeptide secretion and specific functions and recent studies have shown that there is great influence of CNS and ENS on each other.(26)

Basti may act over the receptors of the ENS to stimulate the CNS causing secretion of required hormones or other chemicals. Hence the effect of *Basti* may also be associated with "Touch & Go Theory" causing activation of ENS receptors. It is recognised that the enteric nervous system has a unique ability to

mediate reflex activity independently of input from the brain or spinal cord.(27) This ability implies that the ENS contains sensory receptors, primary afferent neurones, interneuron's and motor neurones. The events that are controlled, at least in part, by the ENS are multiple and include motor activity, secretion, absorption, blood flow, and interaction with other organs such as the gall bladder or pancreas.(28) The extensive regulatory activities of the ENS are made possible by the presence and abundance of different types of neurones within the wall of the gastrointestinal tract. Morphological, electrophysiological, and pharmacological studies have revealed a substantial diversity of neurones within the ENS. (29) It produces a wide range of hormones and around 40 neurotransmitters of the same classes as those found in the brain. In fact, neurons in the gut are thought to generate as much dopamine as those in the head. Intriguingly, about 95 per cent of the serotonin present in the body at any time is in the ENS. Serotonin produced in the gut gets into the blood, where it is involved in repairing damaged cells in the liver and lungs. It is also important for normal development of the heart, as well as regulating bone density by inhibiting bone formation. (30)

Conclusion:

The composition of the enema (solid vs. liquid, nature of the suppository base) appears to be an important factor in the absorption process by determining the pattern of drug release. For a number of drugs the extent of rectal absorption has been reported to exceed oral values, which may reflect partial avoidance of hepatic first-pass metabolism after rectal delivery. ENS works in synergism with the CNS. Stimulation with *Basti* (either by chemo or mechano receptors) may lead to activation of concerned part of CNS which precipitates result accordingly.

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