JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Demystifying effect of Medicated Enema (Basti-Chikitsa) from view point of Classics of Ayurved Samhita.

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Abstract: Basti Chikitsa or introduction of medicated enema per rectum is vastly employed line of treatment in Ayurveda. It is advocated in classics like "Charaka Samhita, Sushruta Samhita and all other Samhita's". It's an important way of introduction of medication, its highly effective too. Such a modality vastly employed to treat diseases which involve almost all the systems from GIT to Cerebral diseases, meaning any ailment in the body can be successfully treated. Though vastly used as a standard treatment modality, no effort has been done to find out how the medicated enema (Basti-Chikitsa) actually exerts its action. This research paper will finally unravel the actual way the medicated Enema (Basti-Chikitsa) actually exerts its action to free the patient of its ailment. This paper will comprehensively and finally establish the pharmaco-kinetics and dynamics of medicated enema (Basti-Chikitsa) in human body.

***Key-Words*: Medicated enema (Basti Chikitsa), Ayurveda, Charaka Samhita, Pharmaco-kinetics and Dynamics, Basti Netra (Nozzle used to introduce Medication), Vata, Pitta & kapha, Uttar Guda, Adhar Guda.**

Introduction: After elucidation of topic no doubt the action of *Basti* will be understood by all i.e. Students, staff, Faculty and researchers P.G and Ph.D. It will also help all clinicians to explain how medicated enema works to their patients and benefits of *Basti chikitsa*.

Objective: Objective of research paper is to explain the action of Basti-Chikitsa conclusively and establish once and for all the action of Medicated Enema (Basti-Chikitsa). After elucidation of topic no doubt the action of Basti-Chikitsa (Medicated Enema) will be understood by all i.e. Students, Faculty and researchers and therapists. It will also help all clinicians to explain how medicated enema works to their patients and benefits of Basti chikitsa. This paper explains the correct way of administering Medicated Enema (Basti Chikitsa) so that the efficacy can be repeated every time as nobody has previously demystified how Basti Chikitsa exactly works, the pharmacokinetics & dynamics of drug delivered. This drug delivery system is unique in the sense that drug in bulk can be administered, high degree of patient compliance is achieved. All the three vitiated dosha which manifest diseases can be treated with upmost ease.

Materials: Gold, Silver, bronze are the preferred metals manufacture nozzle. The size of nozzle will depend upon age of the patient from age one to adult patients. In ancient times, the netra was crafted from various materials, including gold, silver, copper, bronze, cow horns, animal bones, or bamboo. The choice of material often depended on the patient's age and health condition.

Childhood Development of Anal Canal Length

- **Neonates:** Average length is approximately 1.67 cm.
- **Infants (0-11 months):** Length increases to a mean of 2.2 cm.
- **Young Children (1-3 years):** The average is around 2.55 cm.
- **Older Children (4-7 years):** Length averages 3.17 cm.
- **Pre-adolescents (8-10 years):** The length is about 3.11 cm, with some studies showing up to 3.7 cm

The anal canal in adults is approximately 4–5 cm in length, extending from the rectum to the anal verge, with slightly longer posterior and anterior walls. More specifically, different definitions of its measurement exist, with the anatomic anal canal (dentate line to anal verge) averaging around 1-2 cm, while the surgical anal canal (anorectal ring to anal verge) averages about 4.2 cm

Karnikas (rings): The basti Netra is equipped with three rings or ridges called *karnikas* on its external surface. **First karnika:** Placed at a certain distance from the tip, it serves as a guide, marking the depth of insertion and it corresponds to inferior and middle haemorrhoidal veins
Second karnikas: second karnika Located at the middle of the nozzle corresponds to superior haemorrhoidal vein,
Third karnika is used to securely tie to the basti (the bag or bladder containing the medicinal substance) to the Netra.

Methods: There are two main types of medicated enema (*Anuwasan Basti & Niruha Basti)*. *Anuvasana Basti* is retention medicated enema and *Niruha Basti* is for evacuation. Before we actually explain material and methods, we need to understand the anatomy & vasculature which

is responsible for explaining exact action by virtue of which *Basti- Chikitsa* shows its action. To understand in a crystal-clear light vasculature of Anorectum is a must know.

It's pertinent to note that Anorectum is drained by three main veins.

1. Inferior haemorrhoidal vein,
2. Middle haemorrhoidal vein
3. Superior haemorrhoidal vein, which directly corresponds to *karnikas* adequately represented in following pictures:

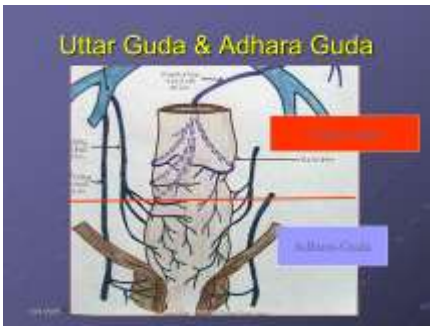

Figure 1:
Shows depiction of *Uttar Guda* & *Adhar Guda* as per *Charak Samhita* of all corresponds to haemorrhoidal veins

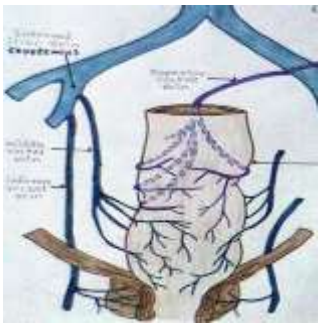

Figure 2:
Inferior & middle haemorrhoidal vein drains

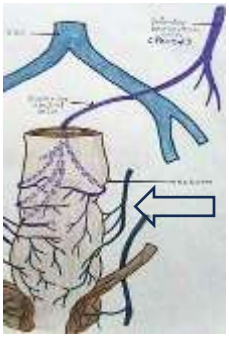

Figure 3:
Superior Haemorrhoidal Vein drains in hepato-portal circulation

What above three pictures depict, first figure *Charaka Samhita* clearly mentions *Uttar Guda* meaning upper anorectum and *Adhar Guda* meaning lower anorectum. Second figure explains veinous drainage of inferior & middle haemorrhoidal veins draining into internal iliac vein meaning it drains ultimately draining in inferior vena cava. Third Figure explains depicts that superior haemorrhoidal vein draining in inferior mesenteric vein which ultimately drains in portal circulation. Interpreting above depictions mean that the *Uttar Guda* sends drugs incorporated in medicated enema will go to first pass and it will go through first pass mechanism, while drugs incorporated Medicated Enema in *Adhar Guda* will enter the central circulation and will reach heart and will circulation all over body. That's why organ targeting becomes easier. By keeping this vasculature in mind, the *Vaidya* can treat the disease effectively replicating exact results from Medicated Enema (Basti-*Chikitsa)*. To render efficacy of Medicated Enema (*Basti-Chikitsa*), we look at the *Basti Netra* or the canula used to introduce *Basti Dravya* as described by *Acharya Charaka*. *Bastiiya Adhyaya* 3/7

Figure 4:
Canula upto First karnika; Reaching above inferior & middle hemorrhoidal vein

Figure 5:
Canula upto second karnika. Reaching upto Superior hemorrhoidal vein

Figure 6:
AP view these pictures are from actual dissection of cadaver.

These materials are advocated for introducing drugs via medicated enema.Not only materials *Acharya Charaka, Acharya Sushruta* & *Acharya Vagbhata* have described Basti Chikitsa from age 1 to adults' patients this directly coincides with length of anal canal. The length of the anal canal in an adult is generally considered to be approximately 4–5 cm, although some sources state it as 2.5 to 4 cm or 3 to 5 cm. This measurement is for the entire anal canal, which is the final part of the large intestine leading to the outside. All *Samhitas* explicitly describe age group and dimensions[1]. This directly coincides with length of anal canal in all age groups neonates to adults. The canula should have three karnika or minor elevations indicating the length of insertion. These indentations correspond to position of haemorrhoidal veins which is most astounding, questions can be asked how *Acharya Charaka* who in *Charaka Samhita* does not describe dissection of cadaver describes exact length of canula dimensions and length and describing position of elevation on *karnika.* Though the above canula shape is not exactly shaped as *Acharyas* have depicted but the length dimensions are exact for adult performed in a cadaver. The exact shape of Basti Netra can be compared with tail of a cow and size is as per age of the patient.

Table 1: Age: Basti Netra: Size of Basti Netra as per *Acharya Charaka*[1]

Age	Length of *Basti Netra*	Size of tip of *Basti Netra*
1-6 years	6 angula	Green gram
7-12 years	8 Fingers	Karvand fruit
13-20 years	12 Fingers	Sanay (Sonamukhi unripe seeds)

Table 2: Basti Netra according to *Acharya Sushruta*[2]

Age	Length of *basti netra*	Size of base of *basti Netra*	Size of tip of *basti netra*
1 year	6 Fingers	Size of Little Finger	Green gram
8 years	8 Fingers	Ring Finger	Black gram
16 years	10 Fingers	Middle finger	Green pea
25 years	12 Fingers	Base of thumb	Swollen green pea

If we study carefully there is minimal difference between Both the *Acharya's* but in my opinion*; Acharya Sushruta's* advice is more acceptable as he has actually dissected a cadaver so it's more practical and actually coincides with cadaveric dissection that I have carried out to understand vascular flow of anorectum.

Results & Discussion:

The aim of this research paper is to corelate ancient five-thousand-year science with modern addition of anatomy & pharmacology. The importance of Sneh (form of lipids) incorporated In *Niruha* & *Anuvasana basti* incorporate sneha (either Ghee or Oils) which play a very important role in diffusion of active constituent of basti Dravya across membrane or anal mucosa.

One must understand that

- Lipid soluble drugs are transported by simple or passive diffusion.
- They dissolve in lipid of cell membrane
- Highly lipid soluble are absorbed regardless of pH of medium.
- Lipids absorb slowly distributed slowly & have peak concentration still later.

This also Implies that incorporation of *Sneh* is of utmost importance for medicated enema (*Basti*). Secondly it also means that Niruha basti requires minimal amount of *sneha* just for minimal absorption. While *Anuvasana Basti* requires sneha in larger quantity, intended for retention of active constituent in *Basti Dravya.* As stated, earlier lipid is absorbed slowly and distributed even more slowly, *Acharyas* clearly understood this importance and used it selectively & selectively. This use of Medicated Enema (Basti-Chikitsa) was anatomically understood and vasculature was effectively used to treat systemic diseases and send drugs to portal circulation for which are used for treating ailments of liver. So, one modality is extremely important to treat all the possible ailments with effective organ targeting. This was achieved five thousand years when pharmacology was not written, pharmacodynamics and pharmacokinetics were not coined. Summing up, we need to critically understand that organ targeting is inherent part of Medicated Enema (*Basti Chikitsa)* which was never explained nor understood by *Ayurveda*. Secondly Importance of Sneha addition to *basti Dravya.* Thirdly the understanding of vascularity which is of utmost importance towards sends active constituents to either central circulation or portal circulation virtually allows medication to diseases like hemiplegia, CKD, PID, Cirrhosis of liver, infertility, IBS, Crohn's Disease. By just positioning the Basti-Netra at appropriate position according to age of patient, near inferior haemorrhoidal or middle haemorrhoidal vein for sending to central circulation or pushing nozzle higher to send drug to portal circulation will help in treating plethora of ailments and repeat the results of basti chikitsa during the regimen as suggested by *Samhitas.*

Discussion:

Acharya Charaka, Acharya Sushruta, Acharya Vagbhata in their respective Samhitas have given tremendous importance to Medicated Enema (*Basti-Chikitsa*), even describing this modality as half of all treatment modalities available. As discussed before there are basically two types of *Basti Chikitsa* a. *Anuvasana Basti* b. *Niruha Basti.* Duration of a classical *Basti* is eight to thirty days viz a viz Yoga basti, Kala basti, Karma basti. *Anuwasana Basti* is mainly meant to be retained and Niruha Basti is meant as evacuation *Basti.*

According to modern pharmacology and co-relating this knowledge we can draw sound inferences.

- Lipid soluble drugs are transported by simple or passive diffusion.
- They dissolve in lipid of cell membrane
- Highly lipid soluble are absorbed regardless of pH of medium.

Lipids absorb slowly distributed slowly & have peak concentration still later, which indicates that that action of Basti Chikitsa will be exerted for longer period of time thus helping is steady recovery.

Lipid bases improve enema drug absorption by enhancing solubility for lipophilic drugs, creating colloidal formations like micelles and vesicles that increase drug concentration at the absorption site, and protecting the drug from degradation by rectal enzymes. Additionally, lipid-based systems can improve mucosal adhesion and interact with intestinal enzymes and transporters, influencing absorption.

How Lipid Bases Enhance Absorption

Increased Solubility:
Lipids in the enema base can increase the solubility of lipophilic (fat-loving) drugs by dissolving them into lipid micelles or vesicles, which are then more readily absorbed across the rectal mucosa.

Protection from Degradation:
Lipids act as a protective barrier, shielding the drug from potential enzymatic degradation that could occur in the digestive tract, thereby improving the drug's stability and bioavailability.

Improved Mucosal Adhesion:
The lipid formulation can increase its adhesion to the rectal lining, prolonging contact time and allowing more drug to interact with and permeate the membrane.

Enhanced Permeability:
The lipids and their digestion products can alter the intrinsic permeability of the rectal membrane, potentially increasing absorption via paracellular (between cells) or transcellular (through cells) routes.

Interaction with Transport Pathways:
Lipids can influence the function of certain transport proteins, like P-glycoprotein (P-gp), which can affect how much drug is absorbed.

Lymphatic Targeting:
Certain lipid formulations, particularly those involving lipid nanoparticles, can be taken up by the lymphatic system, allowing the drug to bypass the liver's first-pass metabolism, which is a common pathway for oral drugs and can also influence rectal drug absorption.

Formation of Colloidal Structures:
The lipid base, along with bile salts from the body, forms mixed micelles and other colloidal systems that help solubilize the drug and facilitate its transport to the intestinal membrane for absorption.[3]

A drug needs to be lipid soluble to penetrate membranes unless there is an active transport system or it is so small that it can pass through the aqueous channels in the membrane. It's important to note that all Medicated Enemas (*Basti-Chikitsa*) incorporate *sneha* meaning oils or *Ghee* in the formulations hence lipids form a main vehicle for transportation of active drug using lipids as base for permeation in to membrane.

The combination of Vascular and lymphatic flow of anorectum insertion of canula to position near inferior and middle haemorrhoidal veins will bypass the portal circulation and majority will enter the central circulation thus enabling to treat by dissemination of drug by methods described in Ayurveda i.e. *Kedarkulya nyay* (the way a farm is watered by small canals supplying to each and every part of farm), *khalekapot nyay* (the birds pick up seeds kept in a storage as per their needs) and last being *Ksheer-Dadhi Nyay* which effectively means that there is complete transformation of drug/ nutrient and is cellular friendly for absorption. The first two should be seen as drugs sent into central circulation via inferior and middle haemorrhoidal veins, third can be interpreted as drug sent via portal circulation which is metabolised completely in liver via first pass.

Conclusion: The Medicated Enema (*Basti-Chikitsa*) is described as *Ardha Chikitsa* sometimes Purna chikitsa. The method of preparation of basti and the use of basti netra has been given utmost importance. Basti may be useful as well as may have a complication according to the use of basti netra and its method of preparation. Basti according to its ingredients may be used in varied circumstances, right from Shodhana to Brumhana. It is a mode of treatment which may be used for all types of treatments. This is the only treatment in the panchakarma which may be used in such varied and vast applications.

Further studies may be conducted to establish the importance of basti in the structural changes noted in the villi of the intestine and a functional MRI may be done during the administration of basti to establish the absorption of the enema into the intestine through the venous systems.

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