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UTILITY OF RECTAL SUPPOSITORY IN PEDIATRIC PRACTICE: A MODERN PERSPECTIVE WITH AYURVEDIC INSIGHT INTO *GUDA VARTI*

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ABSTRACT

Children belong to vulnerable group of individuals. Since they attain maturity of tissues & organs at a later stage and have reduced immunity, anabolic activities of children vary compared to an adult. Due to these, prevalence of various systemic illnesses significantly in children is on a raise. In pediatric practice, drug delivery presents unique challenges due to anatomical, physiological and behavioral differences in children. Several routes of drug administration is being practiced globally, like oral, rectal, intravenous, intradermal, urethral routes. Among these rectal route is one of the underutilized and feasible mode in the realm of drug delivery. This route of administration incorporates absorption of a drug through blood vessels which exhibit desired therapeutic action by entering into systemic circulation. Rectal route serve as a valuable therapeutic modality in pediatric medicine, particularly in scenarios where oral administration is impractical. Ayurveda, the ancient Indian system of medicine, has long explained the rectal route through the concept of *Guda varti*. This article explores the clinical utility of rectal suppositories in pediatric care and reflects on the Ayurvedic precedent, offering a unique integrative perspective.

KEYWORDS: Suppository, Gudavarti, Pediatrics.

INTRODUCTION

In pediatric practice, drug administration can be challenging due to issues such as vomiting, poor cooperation, or impaired swallowing. Rectal suppositories provide an effective alternative, enabling systemic or local therapeutic action without relying on oral intake.

The word "Suppository" is derived from Latin word "supponere", which means "substitute".[1] Suppositories are medicated and readily meltable solid bodies of varied shapes and sizes suitable for introduction into body cavities.[2] They are suited particularly for producing local actions, but may also be used to produce systemic or mechanical effects. Major factors affecting the rectal absorption of drugs are anorectal physiology, suppository vehicle and the physiochemical properties of the drug. This medicament is incorporated into bases like cocoa butter (widely used), glycerinated gelatine or PEG which melts and dissolves into mucous secretions.[3] An ideal suppository base should be pharmacologically inert, non-toxic, and non-irritating, maintain compatibility with medications, and be easy to manufacture via molding or compression.[4]

Interestingly, rectal route of administration finds historical mention in *Ayurveda* as *Guda varti*, emphasizing its longstanding relevance.
Varti kalpana is derived from *Vati kalpana*, mentioned in *Ayurvedic* pharmaceutics.

SUPPOSITORY

Suppositories are solid forms intended for introduction into body cavities (usually rectal but also vaginal & urethral), where they melt, releasing the drug. The choice of suppository base or drug carrier can greatly influence the degree and rate of drug release. Rectal route of drug administration can also be indicated for drugs inactivated by gastrointestinal fluids when given orally or when oral route is precluded as in case of a vomiting or unconscious patient. When the drugs are administered rectally, it enters the systemic circulation bypassing the first pass hepatic metabolism, improving bioavailability of certain drugs. This is especially beneficial for anti-asthmatic, anti-rheumatic, antipyretics, anti-emetics, anticonvulsants and analgesics.[5]

Method of Preparation[6]

Methods of preparing suppositories are

• Moulding

• Compression

• Heat moulding / fusion

• Hand rolling & shaping

• Automatic machine moulding

The simplest and the oldest method of preparing a suppository are by hand. By rolling the well-blended suppository base containing the active ingredient into cylindrical rod of desired length and diameter, or into vaginal balls of intended weight. Starch or talc powder is spread on the rolling surface and hands to prevent the mass from adhering. Rod shaped suppositories are cut into portions to get one end pointed. This method is practical and economical for smaller number of suppositories.

Figure 1: Shapes of Suppositories.

Mode of Action[7]

A suppository will first dissolve in the liquid or melt on the mucous layer depending on whether it is hydrophilic or lipophilic. The osmotic properties of the dissolving vehicle cause water to be drawn to the rectum or vagina, and when the suppository melts and dissolves, the drugs it contains will diffuse out toward the mucosal epithelial surfaces. If the drug is water immiscible, it must first break free from the base of the suppository by the action of gravity or ambulation before it may begin to dissolve in liquid. The softening and dispersion of lipophilic melting suppositories are not dependent on the presence of fluid. The same method of medication administration is used in suppositories, which dissolve when heated.

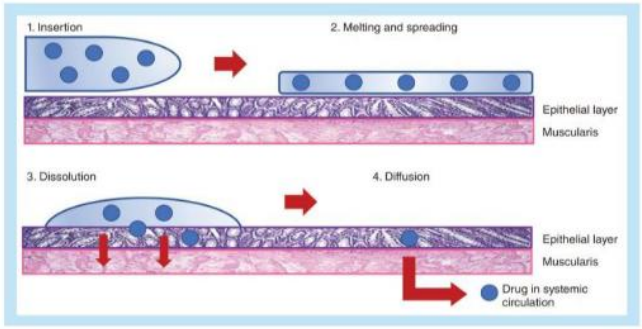

Figure 2: Mechanism of Action.

Indications in Pediatric practice

When oral administration is not feasible, such as in children with persistent vomiting, altered consciousness, dysphagia, or refusal of oral intake, alternative routes of drug administration are required to ensure safe and effective therapy.[8] For rapid systemic effect, the rectal route is preferred for emergency drug delivery, such as antipyretics (e.g., paracetamol suppositories) in fever and anticonvulsants (e.g., diazepam suppository or rectal gel) in febrile seizures or status epilepticus.[9]

For local action in the rectum, rectal preparations are used, such as laxatives (e.g., glycerin, bisacodyl) in constipation and local anti-hemorrhoidal or anti-inflammatory agents for rectal conditions.[10] In pre- or post-operative settings, rectal administration of analgesics or sedatives is useful when oral or intravenous routes are not suitable.[11] When drug degradation occurs in the upper gastrointestinal tract or due to the hepatic first-pass effect, rectal administration provides improved bioavailability for certain drugs compared to the oral route in children.[12]

Benefits[13]

Rectal drug administration offers several pharmacokinetic and clinical advantages. Drugs administered via this route are rapidly absorbed through the rectal mucous membrane, allowing efficient systemic delivery. It is a convenient alternative for medications that induce vomiting, irritate the gastrointestinal tract, or are degraded in the acidic environment of the stomach. Compared to the oral route, rectal administration provides a faster onset of action, as absorbed drugs partially bypass hepatic first-pass metabolism and enter the systemic circulation directly. This route is particularly suitable for unconscious, uncooperative patients, and those experiencing severe or persistent vomiting. Additionally, rectal administration can result in enhanced bioavailability compared to oral dosage forms. When formulated as

suppositories, it also allows for a prolonged duration of drug action, improving therapeutic effectiveness and compliance in selected clinical situations.

Challenges[14]

Challenges associated with rectal drug administration include parental reluctance or lack of awareness regarding its therapeutic benefits, as well as cultural taboos related to rectal use. Additionally, occasional local irritation or discomfort may occur, which can affect acceptance and compliance, particularly in pediatric patients.

GUDA VARTI IN AYURVEDA, A TRADITIONAL PARALLEL

Nirukthi[15]

वर्तते इति ।

Varti shaped, i.e, shape of wick in lamp (elongated with tapering ends). *Ayurveda* describes different types of *Varti* as *Guda varti, Netra varti, Dhuma varti, Yoni varti, Vrana varti.* The method of preparation of *varti* is similar to that of *vati,* however *varti* differs in size, shape, mode of action and therapeutic use. Its references can be seen in *Bruhathrayees, Vangasena, Sharangadhara, Yogaratnakara, Bhavaprakasha, Bhaishajyaratnavali, Rasa tarangini* etc.

Definition

The solid, medicated preparation, shaped for ready introduction into one of the orifices of the body other than the oral cavity (eg.: rectum, urethra, vagina etc.) is called as a *Varti*.

Based on the site of insertion & mode of action exerted, its been classified as

1. *Phala varti/ Guda varti*: Rectal suppository
2. *Yoni varti* : Vaginal suppository
3. *Shishna varti* : Urethral suppository
4. *Vrana varti* : Suppository for insertion into wounds
5. *Netra varti* : Suppository for application to eyes
6. *Nasa varti* : Nasal suppository
7. *Dhuma varti* : Medicated cigars.

Guda Varti is used in conditions such as *Vibandha* (Constipation), *Krimi* (Worm infestation), etc. *Guda Varti,* otherwise called as *Phala Varti,* is designed for insertion into the anus to facilitate the movement of *Apana Vayu* and the expulsion of *Mala* (fecal matter). It is used in conditions such as constipation, retention of enema and gastrointestinal disorders that

obstruct the movement of *Apana Vayu*, as well as to eliminate the accumulated *Mala* in the rectum.While mentioning the shape of *Varti*, *Kashyapa Samhitha* gives reference as *Yava* (cereal) like and *Bhava Prakasha* as the thickness equal to thumb. The diameter of *Guda Varti* is typically made equal to the size of the thumb.

Table 1: *Guda Varti* as mentioned in Brihatrayees.

Sl. No	Name of Varti	Reference
1.	*Shyamaphaladi varti*[16]	Charaka samhita
2.	*Pinyakadi varti*[17]	Charaka samhita
3.	*Krimighnadi varti*[17]	Charaka samhita
4.	*Pippalyadi varti*[17]	Charaka samhita
5.	*Anaha varti*[18]	Sushruta samhita
6.	*Nikumbhadi varti*[19]	Sushruta samhita

General mode of Administration[20]

Patient is asked to lie down in left lateral position. The anal verge is applied with ghee (as a lubricant) and the *Varti* immersed in ghee is slowly administered into the rectum. The patient is allowed to be in supine position until the urge of defecation begins. The drug may kick-start its action within 30 minutes of administration.

In *Ayurvedic* texts like *Sabdakosha*, ingredients such as *Syama (Krishna Trivrit), Madanaphala,* and *Jeemootha* are utilized for preparing *Phala Varti*. This formulation is known for its effectiveness in alleviating pain, expelling feces and relieving gas. Given that as the major ingredients are fruits, it ensures the desired results. Hence, the name *Phala Varti* is derived, signifying "pertaining to fruit" or "attainment of result."

Method of Preparation of Varti[21]

Pharamaceutically preparation of *varti* is similar to *vati*. Usually two methods are employed for the preparation of *varti*, they are *Paka* method & *Bhavana* method.

1. *Paka* Method

Guda or *sarkara* are taken in required quantity along with enough quantity of water. This is boiled together over mild fire till the *paka* of 2-3 thread consistency is achieved. Later after taking out vessel from fire, the fine powder of medicinal drugs which is prepared priorly is added little by little and stirred well to a homogeneous mixture. When the mixture attains appropriate consistency for preparing *varti*, *varti* of desired size are prepared which is then dried in shade and stored in air tight containers at suitable room temperature.

2. *Bhavana* Method

The required medicinal drugs as mentioned are seperately pounded and sieved to obtain the fine powder of all the drugs. They are mixed together and triturated along with the liquid mentioned in the preparation. When the mixture attains *Subhavita lakshana,* i.e, appropriate consistency of preparing *varti*, desired *varti* is prepared and is then dried in shade, stored in air tight containers at suitable room temperature. When no liquid media is specified, water can be taken into consideration. Other liquids which are commonly specified are honey, cow's milk, ghee, goat's milk, cow's urine etc.

Characteristics of ideal *varti*[22]

- *Varti* should be moulded to get a smooth surface.
- The colour & smell of *varti* depends on the drugs used.

Preservation of *Varti*

Varti can be kept in cotton and preserved in a glass container. If *Varti* is having volatile principles, then the container cap should be covered with wax paper to avoid escaping of volatile principles.

Shelf Life[23]

Shelf life of *Gutika / Varti* containing *Kashtoushadhi* (herbal drugs) alongwith *Rasa/ uparasa/ Bhasma/ Guggulu* (mineral drugs) is 5 years. That which contain only herbal drugs is 3 years and with only *rasa/uparasa/bhasma* (mineral drugs) can be stored upto 10 years.

DISCUSSION

Ayurvedic classics has mentioned different types of *Vartis* thousand years ago, with varied indications and routes of administration. Different references as in *Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Bhaishajya Ratnavali, Chakradatta,* and *Rasarathna Samucchaya,* have elaborated on the concept of *Varti Kalpana*. Although *Varti* references can be found in *Ayurvedic* classics it's unexplored and effective. Among them, *Bhaishajya Ratnavali* extensively describes various *Guda Varti* is prescribed for conditions such as *Udavarta, Atisara,* and *Arshas*. Similarly, *Chakradatta* provides detailed explanations regarding the use of *Guda Varti* in managing *Shula, Arshas*, and *Udavarta*. The mode of preparation of *Varti* is described in relation to its intended purpose and site of administration. In addition to the commonly practiced *Angusta pramana*, *Ayurvedic* texts also mention specific dimensions for certain *Vartis*—for instance, *Kanishta anguli pramana* (the size of

the little finger) in the case of *Aagaradhumadi Varti*. The variation in size of different *Guda Varti* appears to serve the purpose of regulating the *Tikshnata* (intensity) or Saumyata (mildness) of the medicament, facilitating the elimination of accumulated *doshas* in different stages, and ensuring suitability for both children and adults. *Guda varti*/Rectal suppository can be very well utilised in pediatric practices comparing to adult age group. In particular it finds effective in emergency situations like seizure episode, high grade fever, pain etc. when oral route of administration is impossible.The lower rectal region offers a broad absorptive surface that enables soluble substances to rapidly enter the venous circulation (byepasses the liver), thereby ensuring a quick onset of drug action. Moreover, its neutral pH helps in preserving the stability of administered drugs.

CONCLUSION

Varti is a derivative of *Vati*. Modern suppositories can be considered as refined adaptations of the ancient *Vartis* described by the *Acharyas*. Depending on the route of administration, variations in the length and diameter of the *Varti* are made, and their preparation is tailored according to the intended purpose and site of use. *Guda Varti* plays a role in facilitating *Apana Vayu anulomana*, thereby aiding the smooth expulsion of faeces. Rectal administration of drugs serves as a convenient alternative route, being safe, acceptable, and easy to administer. It offers advantages such as improved bioavailability, reduced wastage, targeted delivery with lower doses, and minimized systemic toxicity. Hence, recent pharmaceutical advancements can be employed to reshape *Varti* into suppository form, thereby enhancing its therapeutic potential. Further studies can be done by modifying the existing *Ayurvedic* formulations into *Guda vartis* which can be very well utilised in pediatric age groups avoiding the pallatability concerns.

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