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Progressive Review of *Varti Kalpana* w.s.r. to *Guda Varti* (Rectal Suppositories)

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ABSTRACT

The *Varti Kalpana* has play its own important role since prehistoric period. *Varti Kalpana* is derived from *Vati Kalpana* explained in *Ayurvedic* Pharmaceutics. *Varti* shape i.e. like wick of lamp (elongated with tapering ends) that is why it is called *Varti Kalpana*, medicated preparation, intended for ready to introduce into one of the cavity of the person's body other than oral cavity. These are intended for local application and helps in expelling the accumulated *Doshas*. *Ayurveda* describes *Netra Varti*, *Dhuma Varti*, *Guda Varti*, *Yoni Varti*, *Vrana Varti*. In our classical literatures, exclusive description of *Vartis* were found and they describe their distinctive method of preparation, specific size as well as administration and indication in disease. Suppositories are solid dosage form prepared by moulding or pressing to be inserted into body cavities such as the rectum, vagina and the urethra. *Guda Vartis* are intended for insertion into the rectum (*Guda*). Rectal route of drug administration incorporates absorption of a drug through vessels to exhibit desired therapeutic action. *Guda Varti* helps with *Apana Vayu Anulomana* by assisting in the easy elimination of *Sanchita Dosh* from the body. Various method of its preparation has been explained both in the classical literature and in contemporary science.

Key Words *Varti Kalpana*, *Guda Varti*, Suppository, Rectal drug delivery

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INTRODUCTION

Nirukti:

वर्तते इति ।

Varti shape i.e. like wick of lamp that is why it is called *Varti Kalpana*.¹

Varti Kalpana is a derivative of *Vati Kalpana*. The method of preparation is the same as *Vati*. However, *Varti* differs in shape, size and therapeutic use.

Varti Kalpana is mentioned by *Bruhatrayees* and almost all other *Ayurvedic* treaties viz.

Vangasena (12thAD), *Vrindamadhava* (12th AD), *Gaga Nigraha* (12th AD), *Sharangdhara* (14th AD), *Yogratnakara*(16th AD), *Bhavaprakasha*(16th AD), *Bhaishajya Ratnavali*(20th AD), *Rasa Tarangini*(20th AD) etc. They have introduced distinctive formulation of *Varti* along with the way or mode of its application in different diseased condition. When the *Gutika* or *Vati* is transformed into a long oval shape with tapered ends, it is called *Varti Kalpana*. This is commonly used for local administration through various routes such as

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Yoni (vagina), *Guda* (anus), *Nasa* (Nose), *Vrana* (wound) and *Netra* (eye). **Table 1** showing the specific size of *Varti* in the *Ayurvedic Samhita*. Depending on the specific route of administration of the drug, the length and diameter of the *Varti* are modified².

Suppositories are solid preparations made by moulding or pressing and intended for insertion into body orifices such as the rectum, vagina and urethra. Suppositories contain one or more active ingredients dispersed or dissolved in a suitable base, which may be soluble or dispersible in water or may melt and produce a local effect. Suppositories melt and exert local or systemic effects. They are used to deliver both systemic and local acting medications.

Rectal administration uses the rectum as a route of administration for drugs and other fluids that are absorbed by the rectal vessels. A drug administered rectally generally has a faster onset of action, higher bioavailability, shorter peak onset of action, and shorter duration of action than oral administration. Another advantage is that, compared to oral administration, there is less nausea and gastric irritation and the amount of drug is not lost through vomiting.³

OBSERVATION

Varti Kalpana

The literary review shows that there are different methods for preparation of *Varti Kalpana*. **Table 2** showing the different methods of preparation of *Varti*. These compounds have to be added with some specific or required liquid like *Aja Ksheera*,

Arka Ksheera, Honey, *Aja Mutra* etc. The selection of the mentioned media in different *Varti* also improves the therapeutic efficacy. **Table 3** showing the different liquid used for trituration (*Bhavna dravya*) for *Varti*.

Types of *Varti* depending upon its indication at particular site:

Gudavarti

These are intended for insertion into anus (*Guda*). The *Gudavarti* is commonly used to remove the *Suska purisa* and the congested *Vasti Dravya* in the *Guda* and to make *Vatanulomana*. These are also called *Phalavarti*.

Vranavarti

These are intended for insertion into wounds (*Vrana*) through *Vranchidra* for its healing. The purpose of their purification, drainage, cauterization (*Shodahna*, *Ropana*, *Vedanaharana* and *Dahakarma*). Indicated in *Naḍivrana*, *Sukshma mukha yukta vrana*, etc.

Yonivarti

This *varti* is inserted into the vagina (*Yoni*) to remove accumulated *Dosha* at the local site and to reduce vaginal discharge, foul odour and pain. *Yoni Varti* is used for uterine disorders like *Garbhasaya Shotha*, *Vrana*, *Sweta Pradara*, *Garbha Srava* etc.

Netravarti

These are intended for use on the eyes as *Anjana* after rubbing with water. In case of eye diseases like *Pothaki*, *Anjananamika*, *Avranasukra*, *Abhisyanda*, *Kacha*, *Timira*, *Naktandhyata* etc.

Dhumavarti

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These are meant for *Dhumpana*, indicated in case of upper respiratory diseases (*Galaroga*, *Mukharoga* etc)⁴.

Table 1 The specific size of *Varti* in the *Ayurvedic Samhita*

Type of <i>Varti</i>	Name of <i>Varti</i>	Size	Reference
<i>Yoni Varti</i>	<i>Pippalyadi varti</i> ⁵	<i>Pradeshini angulivat</i>	Ch.Chi.30/72
<i>Yoni Varti</i>	<i>Varti for Karnini Yonivyapada</i> ⁶	<i>Tarjini pramana</i>	Ch.Chi.30/109
<i>Guda Varti</i>	<i>Shyamaphaladi varti</i> ⁷	<i>Angushtha pramana</i>	Ch.Chi.26/12
<i>Guda Varti</i>	<i>Pippalyadi varti</i> ⁸	<i>Puspanetravat</i>	Ch.Si.9/58-61
<i>Vrana Varti</i>	<i>Shodhana varti</i> ⁹	<i>Sukshma to sthula as per size and depth of vrana</i>	Su.Su.36/13-15

Table 2 Different methods of preparation of *Varti* with examples

Type of <i>Varti</i>	Method of Preparation	Name of <i>Varti</i>	Reference
<i>Yoni Varti</i>	<i>Bhavana</i> method	<i>Arkadi Varti</i> ¹⁰	Ch.Chi.30/171
<i>Guda Varti</i>	<i>Paka</i> method	<i>Pippalyadi guda varti</i> ¹¹	Ch.Si.9/58-61
<i>Guda Varti</i>	With the help of jaggery (<i>Guda</i>)	<i>Shyamaphaldi varti</i> ¹²	Ch.Chi.26/12

Table 3 Different liquid used for trituration (*Bhavna dravya*) for *Varti*

Type of <i>Varti</i>	Name of <i>Varti</i>	<i>Bhavna Dravya</i>	Reference
<i>Netra Varti</i>	<i>Kamsyadi varti</i>	<i>Aja Ksheera</i> (Goat milk) ¹³	Su.U.18/103-104
<i>Yoni Varti</i>	<i>Shwetapradara varti</i>	Honey ¹⁴	Ch.Chi.30/119
<i>Yoni Varti</i>	<i>Arkadi varti</i>	<i>Arka Ksheera</i> ¹⁵	Ch.Chi.30/171
<i>Netra Varti</i>	<i>Naktamaladi varti</i>	<i>Aja Mutra</i> (Goat's urine) ¹⁶	Su.U.60/44

Guda Varti

घृताभ्याक्ता गुदे क्षेप्या श्लक्ष्ण स्वाङ्गुष्ठसन्निभा । मल- प्रवर्तिनी वर्तिः फलवर्तिश्च सा स्मृता ॥

(Sha. Sam. Ut. Kh. 7 / 15)

A wick like stick of the size of thumb. **Table 5** showing the specific sizes of *Guda Varti* described in the *Ayurvedic Samhitas*. When used the *Varti* first smeared over with ghee and introduced into the rectum.¹⁷

Guda Varti are inserted into the anus (*Guda*) to remove the accumulated *Mala*, it helps in *Apana Vayu Anulomana*, which easily expels the mala. *Guda Varti* is used in case of disturbance of GIT causing obstruction in the movement of *Apanavayu* and vitiating *Dosha* and excreting mala accumulated in the rectum also in case of

constipation and retention of enema. **Table 4** showing the different *Guda Vartis* mentioned in the *Ayurvedic Samhitas*.

Guda Varti – Method of preparation

Usually the *Varti* is prepared by two methods. **Table 6** showing the different methods of preparation of *Guda Varti*.

1. *Sagni*(with heating)

A thick syrup of (3-4 thread consistency) Jaggery is taken in equal proportion to the weight of all the ingredients. To this syrup, fine powder of the ingredients is added, stirred well to attain homogenous mixture and *Vartis* are prepared.

2. *Niragni* (without heating)

Fine powder of the ingredients are mixed together and levigate with specific liquid

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mentioned in the preparation and *Vartis* are made.¹⁸

Mode of administration of *Guda Varti*:

The patient must be asked to get into the left lateral position and breathe deeply while the

Varti is inserted. Before use, the *Varti* must be smeared with *Ghrita* and slowly inserted into the anus. The patient may remain in the supine position until the urge to defecate sets in.

Table 4 Different *Guda Vartis* mentioned in the *Ayurvedic Samhitas*

Sr. No.	Name	Indication	Reference
1.	<i>Shyamaphaldi Varti</i> ¹⁹	<i>Udavarta</i>	Ch.Chi.26/12
2.	<i>Pinyakadi Varti</i> ²⁰	<i>Udavarta</i>	Ch.Chi.26/13
3.	<i>Pippalyadi varti</i> ²¹	<i>Udavarta</i>	Ch.Chi.26/14
4.	<i>Samudrardraka Sarsapa maricha Varti</i> ²²	<i>Vata Varcha Nirodha</i>	Su.U.42/60
5.	<i>Phala Varti</i> ²³	<i>Udavarta of Vata Mutra Pureesha</i>	Su.Chi.14/12
6.	<i>Nikumbakampillakadi Varti</i> ²⁴	<i>Udavarta</i>	Su.U.55/53
7.	<i>Varti Dravya</i> ²⁵	<i>Arshas</i>	A.H.Chi.8/19-20
8.	<i>Arshogna Varti</i> ²⁶	<i>Arshas</i>	R.R.S. 15/86
9.	<i>Triktukadi Varti</i> ²⁷	<i>Udavarta</i>	Ca. Da. 29/8-9
10.	<i>Rathadi Varti</i> ²⁸	<i>Shula</i>	Ca. Da. 29/7
11.	<i>Ghosaphaladi Varti</i> ²⁹	<i>Arsha</i>	Ca. Da. 5/6
12.	<i>Tumbibijadi Varti</i> ³⁰	<i>Arsha</i>	Ca. Da. 5/8
13.	<i>Hingvadi Varti</i> ³¹	<i>Udavarta</i>	B.R.31/9
14.	<i>Phala Varti</i> ³²	<i>Udavarta</i>	B.R.31/10
15.	<i>Aagardhumadi Varti</i> ³³	<i>Udavarta</i>	B.R.31/15
16.	<i>Nirgundipatra Varti</i> ³⁴	<i>Udavarta</i>	B.R.31/15
17.	<i>Arshoghni Varti</i> ³⁵	<i>Arsha</i>	B.R.9/8
18.	<i>Katutumbibijadi Varti</i> ³⁶	<i>Arsha</i>	B.R.9/14
19.	<i>Kanaka muladi Varti</i> ³⁷	<i>Atisara</i>	B.R.7/109-110

Table 5 Specific sizes of *Guda Varti* described in the *Ayurvedic Samhitas*

Example	Size	Reference
<i>Shyamaphaldi Varti</i> ¹⁹	<i>Angushtha pramana</i>	Ch.Chi.26/12
<i>Pippalyadi Varti</i> ²¹	<i>Puspanetraval</i>	Ch.Chi.26/14
<i>Agaradhumadi Varti</i> ³³	<i>Kanishta anguli pramana</i>	B.R.31/15
<i>Kanaka muladi Varti</i> ³⁷	<i>Valla pramana</i>	B.R.7/109-110

Table 6 Different methods of preparation of *Guda Varti* with an example

Method of Preparation	Name of <i>Varti</i>	Reference
<i>Paka method</i>	<i>Pippalvadi Varti</i> ²¹	Ch.Chi.26/14
<i>With jaggery (Guda)</i>	<i>Shyamaphaladi Varti</i> ¹⁹	Ch.Chi.26/12
<i>Paka in Gomutra</i>	<i>Nikumbakampillakadi Varti</i> ²⁴	Su.U.55/53
<i>Bhavana in Tila taila</i>	<i>Aagaradhumadi Varti</i> ³³	B.R.31/15

Suppositories:

The term suppository have its origin in Latin and means “to place under”. Suppositories are specially shaped solid dosage forms of drugs that are inserted into body cavities other than the mouth. They may be inserted into the rectum, vagina, or urethra. These products are formulated

to contain one or more active ingredients that either melt or dissolve in the fluid of the body cavity after insertion to release the medicament that may be soluble or dispersible in water or melt at body temperature. Suppositories come in a variety of shapes, sizes and weights.

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Suppositories are used for any one of the three different purposes.

1. To produce local action
2. To produce systemic action
3. To produce mechanical action on the lower bowel and facilitate evacuation in the treatment of haemorrhoids, anal irritation, constipation etc.

Type of Suppositories

▪ Rectal Suppositories

These are intended for insertion into the rectum to exert their systemic action. They are tapered at one or both ends and usually weigh about 2 g. Rectal suppositories for children are smaller in size and weight than adult suppositories. They usually weigh about 1 g.

▪ Vaginal Suppositories

They are also called pessaries and are intended for insertion into the vagina. They are larger than rectal suppositories and weigh between 3 and 6 g or more. Vaginal suppositories may be conical, rod-shaped, or wedge-shaped. They are used exclusively for their local effect in the vagina.

▪ Urethral Suppositories

They are also known as, urethral bougies and are meant for introduction into the urethra. They are long, thin and cylindrical forms rounded on one end. Their weight varies from 2 to 4 g and length from 2 to 5 inch. They are very rare in use.

▪ Nasal Suppositories

They are also known as nasal bougies and are meant for introduction into the nasal cavity. They are similar in shape to urethral bougies. Their

weight is about 1 g and length 9-10 cm. They are always prepared with glycerogelatin base.

▪ Ear Cones

They are also known as aurinaria and are meant for introduction into the ear. They are very rarely used.

Suppository Bases

Suppositories are special solid dosage form of medicament they must retain shape, solidity and firmness during storage and administration but melt or dissolve in the cavity fluid when inserted into body cavity.

There are large number of bases used but theobroma oil, glycerogelatin base and polyethylene glycols fulfil the requirement of suppository base.

Type of Suppository bases

1. Oily bases

- Theobroma oil is yellowish white, butter like consistency and chocolate like order. It has a melting point of 30 to 35⁰ C.

- Emulsified Theobroma oil may be used as a base when large quantities of aqueous solutions are to be incorporated.

- Hydrogenated Oils i.e., hydrogenated edible oil, coconut oil, palm kernel oil, stearin and a mixture of oleic and stearic acids are recommended.

2. Water soluble and water miscible base

- Glycerogelatin base is a mixture of glycerin and water which is made stiff by the addition of gelatin

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- Soap Glycerin Suppositories the gelatin is replaced with either curd soap or sodium stearate

- Polyethylene Glycols having the molecular weight between 200 to 1000 are liquids and those with molecular weight higher than 1000 are wax like solids.

3. Emulsifying base

- These are synthetic bases and a number of proprietary bases of very good quality are available i.e., Massa Esterinum, Witepsol, Massuppoler.

Rectal Suppositories

These are meant for introduction into rectum for their systemic and local effect. They are generally made from theobroma oil and Polyethylene Glycols.

The rectal suppositories may be used for lubricating, soothing, antiseptic, local analgesic action or for astringents effect. There for they contain antiseptics, local anaesthetics, astringents and hormones. The rectal suppositories meant for systemic effect contain analgesics, antispasmodics, sedatives and tranquillizers.

Rectal Suppositories – General method of preparation

Suppositories are prepared by three processes:

(i) Hand rolling technique:

A mass is prepared by triturating any suitable grated base and active ingredients in a mortar. The mass is formed into a ball and then rolled into a uniform cylinder and cut into an

appropriate number of pieces, which are rolled at one end to obtain a conical shape.

(ii) Moulding (hot process or fusion method)

In this process, the suppository base is first melted and then the drug is dispersed or dissolved in the melted base. The mixture is removed from the heat and poured into the suppository mould.

(iii) Cold compression

This is a method of making suppositories from a mixed mass of grated suppository base and medicaments which is pressed into a special compression mould³⁸

Rectal drug delivery

According to the classics of Acharya *Sushruta*, the *Guda* (rectum) is connected to the *Sthulantra* (large intestine - descending colon) and measures four and a half fingers. In its three folds, at the intervals of one and a half fingers apart, four fingers wide, and all risen obliquely upto one finger - they are called *Pravahani*, *Visarjani* and *Samvarani*. They lie one above the other like the spiral of a conch shell and are similar in colour to the elephant's palate. *Gudaushtha* is raised one and a half barley from the hair end.³⁹

As per contemporary medicine, the rectum in humans comprises the last 12-19 cm of the colon, and the rectal epithelium consists of a single layer of columnar and goblets cells with a surface area of about 200-400 cm².

The veins of the rectum comprise the superior hemorrhoidal vein, which drains into the inferior

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mesenteric and portal systems, the middle and inferior hemorrhoidal veins, which enter the systemic venous circulation via the internal iliac veins. The inferior and middle hemorrhoidal veins bypass the liver and are not subject to first-pass metabolism. The rectal mucus is better able to tolerate various drug-induced irritations than the gastric mucosa. Therefore, the drug administered by suppository into the inferior and middle hemorrhoidal veins is rapidly and effectively absorbed.

Through the rectal route, the hepatic first-pass effect is avoided. About 2/3 of the first-pass metabolism is bypassed via the rectal route. The rectal venous drainage is 2/3 systemic and 1/3 hepatic. This means that the drug administered via the rectal route reaches the circulatory system rapidly, with significantly fewer changes and higher concentration.

It is assumed that at least 50-70% of a drug suitable for rectal administration is absorbed via the direct route mentioned above. The absorption surface area of the rectum ranges from 0.02 to 0.05 m², and a viscous rectal fluid distributed over the surface is evaluated to be equal to form 0.5 to 1.25 ml with a pH of approximately 7.5 and very low buffering capacity. Drug absorption during rectal administration is significant according to the pH distribution theory.⁴⁰

In cases of nausea and vomiting, oral ingestion of medications may induce vomiting, causing the drug to be regurgitated before it is absorbed.

Irritation of the stomach and small intestine associated with certain medications can be avoided. Another advantage is that there is less nausea and stomach irritation compared to oral ingestion, and the amount of drug is not lost through vomiting.

DISCUSSION

Varti Kalpana was popular since ancient times and contemporary suppositories are a little bit modification of this ancient formulation. A detail study of the *Varti* and suppository help us to draw parallel lines of similarities. In ancient and modern literature, similar forms and almost the same routes of administration are recommended for *Vartis*, with the exception of *Vrana Varti* and *Dhuma Varti*.

Charaka Samhita contributes mainly different *Yoni Varti* in *Yoni Vyapada* (gynaecological disease), *Guda Varti* is also mentioned for *Udavarta*. *Sushruta Samhita* adds another unique form of *Vrana Varti* to be used in *Vrana*, *Bhagndara* etc. *Astanga Hridaya* also advocates different type of *Vartis*.

Ancient literatures suggests *Varti* to be in the form of a wick and also mentioned particular shape and size where modern literatures suggest torpedo shape, conical, rod-shaped or wedge-shaped intentions serving the same purpose of easy insertion. Suppositories are elongated, smooth and have a uniform texture and appearance.

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The method of preparation of rectal suppository is very similar to that of *Guda Varti*. *Paka Vidhi* resembles the technique of fusion moulding technique and the method of pounding with the technique of hand rolling.

When prepared by moulding, the medicated mass, sufficiently liquefied by heating, is poured into suitable moulds. During cooling, the suppository solidifies. In certain cases, it is also possible to cold-mould by compression in a suitable press.

When Suppositories prepared by moulding, suppository base such as gelatinous mixtures consisting of gelatin, water and glycerol, hydrogenated vegetable oils, cocoa butter are usually employed.

It is common to use a suppository base in which the active ingredients does not dissolve in order to avoid problems associated with partition between the molten or softened base and the rectal liquid.

For a long time, the rectal route was used only for the administration of local anesthetics, asthma and nausea, remedies for hemorrhoids, vermifuges and laxatives, and bacterial infections. Today, the majority of natural and synthetic drugs are also administered in the form of suppositories to achieve a systemic effect.

CONCLUSION

Medicinal plants are huge repertory of numerous bioactive molecules. Considering all the factors

that favor the bioavailability of drugs through the rectal route, and taking into account the Ayurvedic principle, many preparations can be transformed as *Varti* and can be administered rectally to achieve the desired therapeutic result.

Therefore, recent advances can be used to convert *Varti* into suppositories and expand the horizon of therapeutic dosage forms.

Rectal administration is truly explored as a potential drug delivery system particularly for drug that either too irritating for the gut or more effective when not metabolized by the liver. Suppositories offer patients an option that is less invasive and less uncomfortable. In addition the controlled absorption enhancement into the pharmacokinetics and pharmacodynamics of the enhancer and the drug to be absorbed with plasma-concentration of time profile.

However, along with dosage form modification into suppository as well as pharmaceutical-analytical standardization, *in vivo* and *in vitro* studies are needed to revalidate a scientific database of the clinical effectiveness of all these *Varti* formulations.

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List of abbreviation:

Ch. – Caraka Samhita; Su.- Sushruta Samhita; su.- sutra sthana; Chi.-Chikitsa sthana; Si.- Siddhi sthana; U- Uttara; Sha. Sam – Sharangdhar samhita; A.H.- Astang Hridaya; R.R.S. – Rasa ratna samuchchya; Ca.Da.- Chakradatta; B.R. – Bhaisajyaratnavali

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