

## REVIEW ON CHEMICAL COMPOSITION OF APAMARGA KSHARASUTRA – AN UNIQUE THERAPY FOR FISTULA-IN-ANO

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### ABSTRACT

The parasurgical approach by application of kshara-sutra for the treatment of Ano-rectal diseases was first described in the Sushrut –samhita. The usefulness of the method still very relevant and is practiced by the Ayurvedic practitioners since long . In this article a scientific approach has been undertaken to evaluate the natural compounds present in the individual Ayurvedic plant ingredients used for the preparation of the Medicated thread (kshara –sutra). A good number of chemical present in the ksharasutra like Euphol, Neriifolin which are possess activities like anti inflammatory, antibacterial & antifungal, Water soluble ash of Apamarga (whole plant) contains Betaine & oleanolic acid. Pharmacologically rhizome of haridra possesses anti-inflammatory, antibacterial, antifungal, anti infective, analgesic and anti puritic effect is due to the presence of active constituents 1) Curcumin , 2) Caprylic acid, 3) d-Borneol, 4)  $\alpha$ -Phellandrene & 5) Cineol .

**Keywords:** kshara-sutra, Apamarga kshara, Snuhi latex, Haridra.

### Introduction:

Sushruta, the father of ancient Indian Surgery has paid great attention towards Bhagandar and dealt it systematically. Sushruta while dealing the management of the disease employed surgical, parasurgical measures and proclaimed that bhagandar is most difficult task for treatment<sup>1,2</sup>. After the period of Sushruta many modalities of treatment ,i.e., surgical and parasurgical<sup>4&5</sup>, set on therapy are being adopted by the surgeons of the world but today also bhagandar (Fistula in Ano) still remains a challenge even for a meticulous

and skillful surgeon. It is obvious from the data available from different sources, different operative technique are uncertain and the recurrence rate is (11 to 44)%. Apart from this ,the operative management has some adverse effect like incontinence of feces, loss of gluteal cushion and postoperative stenosis. The treatment of Bhagandar (Fistula in ano) by Kshara sutra is very simple ,easy and safe. The chances of recurrence are very much less i.e., 4% and in the hands of experienced surgeon it is very negligible. “Kshara –sutra” is a sanskrit word refers to corrosive or caustic and su-

tra means a thread. It is one among popular Ayurvedic treatment modality in the branch of Salyatantra. Kshara sutra was first mentioned by the “Father of Surgery” Sushruta in his text named SUSHRUT-SAMHITA for the treatment of Nadivrana (Ref.Su.Chi.17/29), Bhagandara (fistula-in-ano), Arbuda(excision of small benign tumour) etc<sup>1,12</sup>. Kshara sutra is an medicated thread which is one of the most successful amongst all the equipments available for the treatment of Fistula-in –ano and pionidal sinus. <sup>1,11&12</sup>.

#### **Mode of action of kshara sutra therapy:**

Application of ksharasutra in healing the fistulous track is an unique & effective para-surgical therapy. Professor P.J. Despandey considered that the technique served to achieve what he termed as chemical fistulectomy in contrast to the physical fistulectomy achieved by surgery (PG.despanndey1985). Among the three ingredients of the thread ,the latex of *E.nerrifolia* is well known in Ayurveda for its wound healing property,where as *Achyranthes aspera* kshar is considered necessary for ensuring the alkaline medium without which the thread is not at all effective. Curcuma longa powder is used as the last coating on the thread to aid in minimizing the severe local reaction due to the caustic action of the other two herbal ingredients.and also for its known anti-inflammatory and antibacterial effect.<sup>7,8,9&11</sup> The Ksharasutra treatment is an unique therapy for the management of fistula in ano.It is no doubt a treatment of relatively longer duration but the patient is ambulatory throughout the procedure and need not refrain from his daily routine work. Presumably the caustic action of the thread destroys the notorious cryptic gland completely which is supposed

to be the primary seat of the origin of fistula<sup>5,6,7&11</sup>.

#### **Materials used for ksharasutra preparation :**

- 1) Apamarga kshara (Latin name :*Achyramthus aspera*) pH value= 9.7-11.0

Whole plant of ‘Apamarga’ is to be collected and cut into pieces .After drying the plant is to be shade,it should be burnt in light fire. Ash is collected and is dissolved in six times of water. The solution , so formed ,is filtered with the help of percolator. Residual ash is again dissolved in four times of water and the same procedure is repeated at least twice in order to take away all the alkaline material from the ash. Ultimately, the ash remains as a neutral residue which should be thrown. The fluid is filtered 21 times(Su.Su.11/11) and finally, the kshara is obtained by evaporating the filtered solution<sup>1,2 &10</sup>

- 2) Snuhi Latex (Latin name:*Euphorbia neriifolia*) pH value = 5

It is collected by giving perpendicular incision the stem of ‘Snuhi’ plant. The secretion –milk is obtained from incision should be stored in a pot as the latex has the tendency to coagulate early,(One requires fresh latex every time).

- 3) Haridra powder (Latin name:*Curcuma longa*) pH value = 6.2

Dry rhizomes of ‘Haridra’ plant are cut into pieces and make them powder , then sieve the powder through a fine cloth and the fine powder should be kept in a clean jar for use.

**Method of preparation :** The standard kshara sutra is prepared by repeated coatings of snuhi ksheera (Latex of *Euphorbia Nerrifolia*), Apamarga kshara (ash of *Achyranthus aspera*) and Haridra powder over a surgical barbour linen thread no. 20. This thread is spread out lengthwise in hangers .

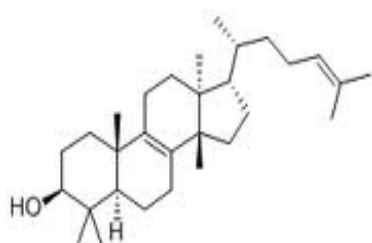
Each thread on the hanger is then smeared with snuhi latex with the help of gauze piece soaked in the latex. This wet hanger is transferred in kshara sutra cabinet. On the next day the dried threads are again smeared with snuhi latex, this process is repeated for 11 days. On the 12<sup>th</sup> day the thread is again smeared with snuhi latex and then in the wet condition, thread is spread over the Apamarga kshara powder. The thread is now allowed to dry in cabinet & the same procedure is repeated for seven times in seven days continuously<sup>1,2,&10</sup>. On 19<sup>th</sup> day the dried thread is smeared again with snuhi latex and in wet condition, haridra powder is to be coated over the thread & is repeated for three consecutive days. In this way, a thread has total 21 coatings of snuhi latex,<sup>7</sup>

coatings of Apamarga kshara and 3 coatings of Haridra powder<sup>1,2&10</sup>. After completion of 21 coatings each thread about 10-11 inches should cut away from the hangers and sealed in glass tube on polythene packs.

**Chemical composition:** - The medicinal plants which are used to prepare the Ksharasutra for the treatment of Fistula in ano are as follows:

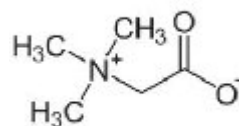
1. Latex of Snuhi (*Euphorbia nerifolia* Linn.)
2. Water soluble ash of Apamarga (*Achyramthus aspera* Linn.)
3. Rizome of Haridra (*Curcuma longa* Linn.)

The main chemical constituents which are responsible for the proteolytic action of Snuhi (Latex) 1) Euphol<sup>13</sup>, 2) Neriifolin<sup>14</sup> Water soluble ash of Apamarga (whole plant), the main constituents which take part for the preparation of kshara are 1) Betaine<sup>15</sup>, 2) oleanolic acid<sup>16</sup>



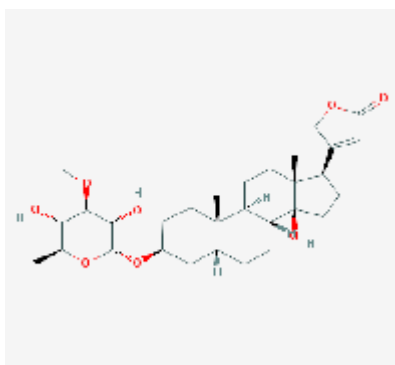
Euphol

Activity:- Anti inflammatory, Antibacterial, Antifungal



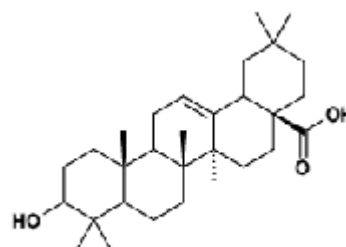
Betaine

Activity:- Basic substance used as kshara, Antibacterial and Antifungal



Neriifolin

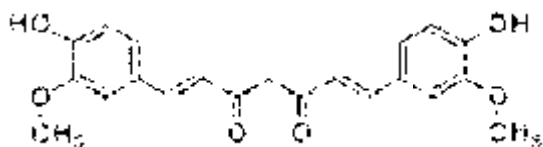
Activity:- Antibacterial, Antifungal, wound healing and immuno-modulatory



Oleanolic Acid

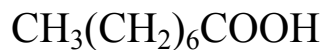
Activity:- Anti microbial and wound healing activity

In the modern scientific investigation different medicinal values like anti-inflammatory, antibacterial, antifungal, anti infective, analgesic and anti putitic effect of the rizome of Haridra has been established. The significant chemical compounds which are responsible for the above medicinal values are 1) Curcumin , 2) Caprylic acid, 3) d-Borneol, 4)  $\alpha$ -Phellandrene, 5) Cineol<sup>3,9,11</sup>



Curcumin  
m.p 183<sup>0</sup>C

Activity:- Anti inflammatory, Anti infective, Antibacterial, Antifungal and cytotoxic



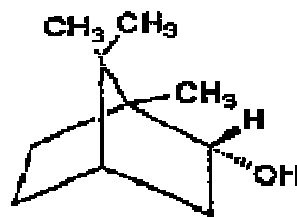
Caprylic acid

Oil, b.p 239.7<sup>0</sup>C

Activity:- Antifungal property

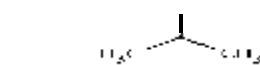
## CONCLUSION

From the above analysis it is evident that the usefulness of Flex thread (Ksharasutra) is due to the presence of chemical compounds present in the device and their therapeutic values i.e anti inflammatory, antifungal, antiseptic and antibacterial property. It is strongly believed that detailed information as presented in this text on the phytochemicals and their various pharmacological aspects gives a modern scientific



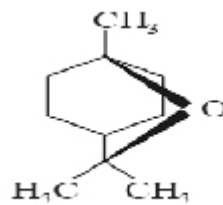
d-borneol  
m.p 208<sup>0</sup>C

Activity:- Pharmaceuetic aid (cooling effect), Topical analgesic & topical anti pruritic



alpha-phellandrene  
b.p (171-172)<sup>0</sup>C

Activity:- Absorbed through skin/may act as carrier of other useful chemical compounds to penetrate the skin.



Cineole  
b.p (176-177)<sup>0</sup>C

Activity:- Pharmaceuetic aid (cooling effect), topical analgesic & topical anti pruritic look about Flex thread used for the treatment of Ano-rectal diseases.

## REFERENCES-

1. Sushruta samhita: Chikitsa sthanam: Chapter 17: Shloakas 29-33, 5<sup>th</sup> ed (Motilal Banarasi Das, Varanasi, India) 1975; P.456
2. Despandey P.J. and Sharma. KR. Treatment of fistula in ano by a new technique, review and follow up of 200 cases, Am.J. Procto (1976); P.39

3. Quality Standards of Indian Medicinal Plants ,Indian Council of Medicinal Research, New Delhi 2010;vol.8,P.141-142
4. Golighar.J.Surgery of the anus,rectum and colon,5<sup>th</sup> ed(Baillier Tindal,London)1984; P181
5. Mishra.MC and kapur,BML, A new nonoperative approach to fistula in ano.Br.J.surg75,(1988) ;P.225
6. Sharma SK , Sarma KR and Singh K.Kshara Sutra Therapy in Fistula-in-Ano and other anorectal Diseases.New Delhi,National Ayurveda Academy.1995;P.14
7. PK.Das and BN dhawan,Eds(Indian National Science Academy New Delhi)1984; P. 131.
8. Zutshi,SK,Joshi SK and Bokadia MM,In vitro anti microbial efficiency of some essential oils,Indian j.MedRes64,(1976); P. 854
9. Rastogi RP and Dhawan BN. Research on medicinal plants at the CDRI Lucknow(India). Indian J.Med.Res 76,Supple(1982); P.27
10. SharmaPV, Dravyaguna Vignan, vol.2,4<sup>th</sup> ed (ChowkhambaSanskrit Sansthan, Varanasi) 1978; P.432
11. Kirtikar KR and Basu BD,Indian Medicinal plants,Second Edition,International Book distributors,Dehradun,1987;P. 2202-2206
12. Despande PJ,Sharma,KR,Sharma SK and Singh LM;Ambulatory treatment of fistula in ano, results in 400 cases Ind.J.Surg.1975;37:85-89
13. Anjaneyulu V, Row RL. The crystalline principles of Euphorbiaceae. N. The triterpenes from the stem and leaves of *Euphorbia neriifolia* Linn. *Current Sci.* 1965; 34: 608-609.
14. Veena Sharma1, Pracheta Janmeda, et al. A Review on *Euphorbia neriifolia* (Sehund) *Euphorbia neriifolia* (Sehund) üzerine bir inceleme, *Spatula DD.* 2011; 1(2):107-111
15. Vasudevamurthy MK, Lever M, George PM, et al. Betaine structure and the presence of hydroxyl groups alters the effects on DNA melting temperatures. *Biopolymers.* 2009 Jan;91(1):85-94. doi: 10.1002/bip.21085.
16. Zdzislaw Wojciechowski, Anna Jelonekiewicz-Konador, Marek Tomaszewski, et al. The structure of glycosides of oleanolic acid isolated from the roots of *Calendula officinalis*. *Phytochemistry*, 1971 May; 10 (5):1124

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