



**REVIEW ON THE ADVANCEMENTS IN DIFFERENT TYPES OF KSHARSUTRA AND
THEIR USES IN VARIOUS DISEASES**

¹*Fabiha Hussain Kazi, ²Ramesh Vanaji Ahire and ³Aparna Abhay Raut

¹PG Scholar, Department of Shalya Tantra Samanya S.S.A.M. Ayurvedic Medical College, Panchavati, Nashik.

²Associate Professor Shalya Tantra Department S.S.A.M. Ayurvedic Medical College, Panchavati, Nashik.

³H.O.D. and Professor of Shalya Tantra Department S.S.A.M. Ayurvedic Medical College, Panchavati, Nashik.

*Corresponding Author: Dr. Fabiha Hussain Kazi

PG Scholar, Department of Shalya Tantra Samanya S.S.A.M. Ayurvedic Medical College, Panchavati, Nashik.

Article Received on 21/11/2019

Article Revised on 11/12/2019

Article Accepted on 31/12/2019

ABSTRACT

Ksharsutra- an Ayurvedic para-surgical procedure refers to corrosive or caustic thread used in the treatment of various diseases like Nadvrana (Sinus), Bhagandara (Fistula-in-ano), Arsha (Hemorrhoids), etc. Chakrapani Dutta was the first person to mention the method of preparation of Ksharsutra with its indication in Bhagandara (Fistula-in-ano) and Arsha (Hemorrhoids). In the present era, Ksharsutra is used for various other diseases like excision of warts, excessive nipple, extra digits, small benign tumours etc. Kshar used in the formation of Ksharsutra has the properties like Tridoshaghna, Saumyata, Dahana, Pachana, Darana, Katuka, Ushna, Tikshna, Shodhana, Ropana, Lekhana, Shoshana, Stambhana, etc. which perform the work of incision, puncture and scarification to relieve derangements of the Tridosha and uniformly affects the diseased part to which they are applied. From traditional methods of Ksharsutra preparation, Snuhi ksheer and Apamarga Kshar are widely used but now the recent researches have proved that other medicated threads like Nimba Ksharsutra, Palash Ksharsutra, etc. have more beneficial effects than it. This review focuses on the advancements in the drugs used in preparing Ksharsutra and its application in various diseases in present era.

KEYWORDS: Ksharsutra- An ayurvedic para-surgical procedure, Kshar, Nimba Ksharsutra, Palash Ksharsutra, Bhagandara, Fistula-in-ano.

INTRODUCTION

Ayurveda 'the science of life' is based on the time tested observations and medical experiences. It has immense potential to evolve solution of many challenging and unresolved problems of medical world. The word Ayurveda is derived from AYU and VEDA in which AYU means life and VEDA means science or knowledge. Thus Ayurveda means the science of life. Acharya Charak defines 'That science is designated as Ayurveda which deals with advantage and disadvantage as well as happy and unhappy states of life along with what is good and bad for life, its measurement and the life itself.'^[1]

Shalya Tantra is one of the most important braches of Ayurveda which has its own authenticity, contributing to the modern medical technology of today and Sushruta samhita is the only available text in surgical practice, enriched with detailed basic surgical techniques. Shalya Tantra is that branch which deals with Shalya kriya, Shastra kriya and Yantra kriya. But along with these main functions of Shalya Tantra, there are other minor or para-surgical procedures which are being described in detail called as Anushastra Karma. Anushastra karma is

para-surgical procedures described in Ayurveda classical literatures apart from many surgical procedures, which are separate procedures from major Ashtavidha shastra karma. These include Kshar karma, Agnikarma, Jalaukavacharan, etc.

Ksharsutra or Alkaline medicated thread therapy is a minimal invasive Ayurvedic Para-surgical procedure and time tested Ayurvedic technique in the management of Anorectal disorders. Great Indian surgeon "Sushruta" narrated in his teachings the use of Kshar for the cure of Fistula-in-ano and other ano-rectal diseases. The work of Sushruta was compiled as Sushruta Samhita in the 5th century A.D. Acharya Chakrapani Datta (10th -11th century A.D.) and Acharya Bhavmishra (16th -18th century A.D.) have described in their classical Ayurvedic texts, the methods of preparation and treatment of fistula-in-ano by the use of Ksharsutra. It is being used for the successful treatment of Anorectal diseases since many years. It is a safe, sure and cost effective method of treatment for fistula-in-ano, haemorrhoids and other sinus diseases.

Acharya Chakradutta has given an idea about the preparation of Ksharsutra while its preparation and technique in Fistula-in-ano is standardized by the department of Shalyatantra, BHU. Standardization of Ksharsutra requires standardization in the process of preparation and the quality. From the traditional method of Ksharsutra preparation, Snuhi Ksheer and Apamarga Kshar are widely used.^[2] Now the recent researches prove that other medicated threads have more beneficial effects than it.

RATIONALE OF STUDY

Ksharsutra acts by “Herbal Chemical Cauterisation” and removes the disease from the body. Although the standard Apamarga Ksharsutra is used successfully in the management of fistula-in-ano, the problem in its preparation and use are worth noting. These problems have put necessity of further modifications in this thread. One of the essential components of this thread is Snuhi latex. This latex creates many problems during preparation of the thread. It coagulates if not used early. Collection becomes difficult in summer, so the preparation is only possible in limited seasons. Apamarga is also not available throughout the year. Another disadvantage is that there is a severe pain, inconvenience and discomfort felt by the patient during the application of the thread and creates problem in day to day activities. In few cases the intensity is so severe that the patient discontinues the treatment. To overcome these problems, several researches have been carried out. The researches are based on searching for the drugs having better actions and acceptability than that of Snuhi latex and Apamarga Kshar. These drugs should have good binding properties on thread with easy availability

in bulk, less irritant (sheeta virya), having vranashodhaka and vrana-ropaka properties, having anti-septic and anti-inflammatory activities and additional beneficial action.

CLASSICAL METHOD OF PREPARATION^[3]

The surgical linen thread of size 20 is spread throughout the length and breadth of the hanger of the specially designed cabinet known as the ksharsutra cabinet. The thread is smeared with latex, uniformly and carefully, all around the thread, with the help of clean gauze piece soaked with snuhi ksheera. After smearing all the threads on the hanger, the hanger is placed in the ksharsutra cabinet for drying. After 11 such coatings with Snuhi ksheera, 12th coating of snuhi ksheera is done and wet thread is then passed through a heap of finely powdered Apamarga Kshar immediately. After smearing all the threads with Kshar, the hanger is shaken gently allowing the excess particles of Kshar to fall down. This process is repeated till seven coatings of Snuhi ksheera and Apamarga Kshar is achieved, thus completing 18 coatings on the thread. The remaining 3 coatings are performed with snuhi ksheera and fine haridra powder as per the above procedure making a total of 21 coatings on the thread. Finally the ultraviolet lamp of the Ksharsutra cabinet is put on daily for about 20-30 minutes at 40⁰ C to maintain sterile atmosphere right from the 1st day of coating. The threads of a uniform length i.e. 30-32 cm are cut for packing. Further, the sealed Glass tubes/ air tight containers are kept in a cabinet and exposed to the ultraviolet radiations for sterilization. Each tube should finally be labeled giving details of the date of manufacture, date of sealing, batch number, etc.



Fig 1: Ksharsutra Cabinet.

PHYSICO-CHEMICAL CHARACTERS OF STANDARDIZED KSHARSUTRA^[3]



Length of thread: - 29-31 cm
 Weight of thread: - 0.9-1 gm
 Diameter/thickness: - 1.75 to 2.0 mm
 Tensile strength: - breaking load not less than 5 kg.
 Loss on drying at 105°C: - not more than 5%
 Water-soluble extractive: - not less than 85%
 Hexane-soluble extractive: - not less than 6%
 Sulphated Ash: - 80-82%
 pH (1% aqueous solution): - 9.3 to 10.5
 Total alkalies (carbonates): not less than 20% w/w. * Fig 2 : Prepared Ksharsutra

MODE OF ACTION^[4,5]

Many Clinical trials have been carried out in different institutes to evaluate the action of Kshara sutra in various disease conditions. The countries like Srilanka and Japan have also conducted many clinical trials and established the action of this thread. From the outcome of these various analytical studies, it can be postulated that in ksharsutra, linen thread supports the strength of ligation and weight of 21 coatings while Snuhi ksheer acts as a binding material for preserving all the properties of Kshar. Ksharsutra works by pressure effect made by the ligation which creates mechanical strangulation of blood vessels and tissues which causes the pressure necrosis of the body of any swelling. Kshar invades into the cells of lesion till engorged tissue destruction occurs by its Ksharana guna (corrosive properties). Snuhi latex is being proteolytic in nature, dissolves the tissue at its base. The action of turmeric powder provides the effect of bactericidal action with healing properties. All these three drugs do not contradict each other but rather supports their actions by equal and desirable effect.

Kshar sutra has the ability to perform incision with excision slowly by virtue of its controlled chemical cauterization. During cutting effect, there may be oozing of blood which is ceased by sclerosing effect of kshar by its protein coagulation property. Hence there is no chance of bleeding during the cutting of the mass. The chances of infection are least due to sustained action of anti-infective virtue of kshar. In case of bhagandara (fistula-in-ano), ksharsutra also acts as Seton to allow the proper drainage of pus and debridement of unhealthy tissue, thus, providing a cleaner base for wound healing with minimal scarring and without complications. Thus, researchers suggest that it is having the action of Excision, Scrapping, Draining, Penetrating, Debridement, Sclerosing, Healing, Bactericidal and Bacteriostatic.

DIFFERENT TYPES OF KSHARSUTRA

1. Nimba Ksharsutra
2. Guggulu Chitraka Ksharsutra
3. Palash Ksharsutra
4. Papaya sutra
5. Papaya-Tankan Ksharsutra
6. Udumber Kshar Sutra
7. Ghritakumari Ksharsutra
8. Yavakshara sutra
9. Gomutra Ksharsutra
10. Vata-Arka Ksharsutra

NIMBA KSHARSUTRA^[6]: In this thread, Nimba Kshar was used instead of the Apamarga Kshar while the method of preparation remains the same.

| Nimba Ksharsutra | |
|-------------------------------|-----------------|
| Ingredients | No. of Coatings |
| Snuhi ksheer | 11 |
| Snuhi ksheer + Nimba Kshar | 07 |
| Snuhi ksheer + Haridra Powder | 03 |
| Total Coatings | 21 |

GUGGULU CHITRAKA KSHARSUTRA^[7]: In this thread, Guggulu solution is used in place of Snuhi latex while Chitraka kshar is used instead of Apamarga kshar.

| Guggulu Chitraka Ksharsutra | |
|-----------------------------------|-----------------|
| Ingredients | No. of Coatings |
| Guggulu Solution | 11 |
| Guggulu solution + Chitraka Kshar | 07 |
| Guggulu solution + Haridra Powder | 03 |
| Total Coatings | 21 |

PALASH KSHARSUTRA^[8,9]: In this thread, Palash Kshar was used instead of the Apamarga Kshar while the method of preparation remains the same.

| Palash Ksharsutra | |
|-------------------------------|-----------------|
| Ingredients | No. of Coatings |
| Snuhi ksheer | 11 |
| Snuhi ksheer + Palash Kshar | 07 |
| Snuhi ksheer + Haridra Powder | 03 |
| Total Coatings | 21 |

PAPAYA SUTRA^[4]: In this thread, papaya fruit pulp is used as the binding agent, papaine powder (obtained by drying unripe fruit juice-active principle) instead of Kshar and Haridra powder is used. The method of preparation is different from the classical one. In this, at first 11 coatings is done with papaya fruit pulp and papaine powder and then 2 coatings of papaya fruit pulp and haridra powder, thus making a total of 13 coatings only.

| Papaya sutra | |
|------------------------------------|-----------------|
| Ingredients | No. of Coatings |
| Papaya fruit pulp + Papaine powder | 11 |
| Papaya fruit pulp + Haridra Powder | 02 |
| Total Coatings | 13 |

PAPAYA-TANKAN KSHARSUTRA^[10]: In this thread, Papaya fruit pulp is used in place of Snuhi latex while Tankan kshar is used instead of Apamarga kshar.

| Papaya-Tankan Ksharsutra | |
|------------------------------------|-----------------|
| Ingredients | No. of Coatings |
| Papaya fruit pulp | 11 |
| Papaya fruit pulp + Tankan Kshar | 07 |
| Papaya fruit pulp + Haridra Powder | 03 |
| Total Coatings | 21 |

UDUMBER KSHARSUTRA^[4]: In this thread, latex of udumber (ficus glomerulata) is used in the place of Snuhi ksheer.

| Udumber Ksharsutra | |
|--------------------------------|-----------------|
| Ingredients | No. of Coatings |
| Udumber latex | 11 |
| Udumber latex + Apamarga Kshar | 07 |
| Udumber latex + Haridra Powder | 03 |
| Total Coatings | 21 |

GHRITAKUMARI KSHARSUTRA^[4]: In this thread, ghritakumari pulp is used in place of the Snuhi latex.

| Ghritakumari Ksharsutra | |
|------------------------------------|-----------------|
| Ingredients | No. of Coatings |
| Ghritakumari pulp | 11 |
| Ghritakumari pulp + Apamarga Kshar | 07 |
| Ghritakumari pulp + Haridra Powder | 03 |
| Total Coatings | 21 |

YAVAKSHARASUTRA^[4]: In this thread, Yavakshar was used instead of the Apamarga Kshar.

| Yavaksharsutra | |
|-------------------------------|-----------------|
| Ingredients | No. of Coatings |
| Snuhi ksheer | 11 |
| Snuhi ksheer + Yavakshar | 07 |
| Snuhi ksheer + Haridra Powder | 03 |
| Total Coatings | 21 |

GOMUTRA KSHARSUTRA^[11]: In this thread, Gomutra Kshar was used instead of the Apamarga Kshar while the method of preparation remains the same.

| Gomutra Ksharsutra | |
|-------------------------------|-----------------|
| Ingredients | No. of Coatings |
| Snuhi ksheer | 11 |
| Snuhi ksheer + Gomutra Kshar | 07 |
| Snuhi ksheer + Haridra Powder | 03 |
| Total Coatings | 21 |

VATA-ARKA KSHARSUTRA^[12]: In this ksharsutra, the vataksheer is used as the binding agent and Arkakshar is used.

| Vata-Arka Ksharsutra | |
|-----------------------------|-----------------|
| Ingredients | No. of Coatings |
| Vataksheer | 11 |
| Vataksheer + Arka Kshar | 07 |
| Vataksheer + Haridra Powder | 03 |
| Total Coatings | 21 |

ADVANCEMENT IN THE USE OF KSHARSUTRA
Ksharsutra has been described in Sushrut Samhita under the management of Bhagandara but its use has advanced in today's world. Due to its different properties, now a days ksharsutras are used in the management of various other diseases like excision of warts, excessive nipple, extra digits, small benign tumours etc. Ksharsutra ligation shows excellent result in postaxial polydactyly. The finger starts necrosing within 24 hours and sloughs out in just 9 days with minimal scar formation.^[13] Similarly Ksharsutra ligation has extremely effective results in excision of warts and excessive nipple. Role of Ksharsutra has also been proved in Buerger's disease for not only excision of the gangrenous toes but also to minimize the pain and complications which usually patient faces during the Amputation surgery.^[14]

RESULT AND DISCUSSION

Nimba Ksharsutra^[6]: In Dhanvantari nighantu, it is described that Nimba has the property which help in suppuration of immature shotha and drain the suppurated Vrana which lead to cleaning of the cavity. Kandughana property of Nimba is also mentioned by the Acharyas. Kapha is responsible for the Kandu occurring at any site. Nimba is kapha pitta shamak. Thus it relieves itching each week after application of Nimba ksharsutra than the use of standard ksharsutra. Nimba kshar is also sheet in veerya, so it is able to resolve the burning sensation. Nimba is described as Krimighna and Vranaghna, so it inhibits the secondary infection of wound and reduces

pus discharge from the wound. Nimba Ksharsutra has a specific property of unsealing the concealed track thus reduces the possibility of recurrence of disease in future.

Guggulu-Chitraka Ksharsutra^[7]: Guggulu has the snigdha and picchila guna which relieves pain and acts as a local analgesic. Pain caused in a body is due to the Vatadosha. Acharya Charak has mentioned Guggulu as a best Vatahara drug. The burning sensation is caused due to inflammation by the release of Histamine. The anti-inflammatory effect of Guggulu and Chitrak may suppress the release of histamine, thus relieving burning sensation. Chitrak has antibacterial as well as anti-fungal property. It is easily available in bulk and solution is prepared very easily in alcohol or water. Pain and anxiety are very less during and after application due to its non-bleeding nature and analgesic action. Pain, discharge, indurations are reduced in early sittings in comparison to other threads. The Unit cutting time is 11.47 days/cm which is almost same as Apamarga Ksharsutra which is 10.95 days/cm¹⁵

Palash Ksharsutra^[8,9]: Palash is inherited with the property of Gudarojit, Krimihara and Vranahara. Preparation of Palash Ksharsutra is much easier and affordable than Apamarga Ksharsutra. The wound healing after cut through is faster (1-2 weeks) and there is a mark reduction of symptoms like pain, burning sensation, irritation, inflammation, local reaction etc. after application.

Papaya Sutra^[4]: Papaya is a good cleansing and healing drug. The main action of papaya is due to the papaine enzyme. Papaine contains strong proteolytic enzymes which lead to debridement of necrosed tissue very early after application. It facilitates early wound healing. It can be easily prepared in short time. Patient tolerance is also very good after application as compared to the Apamarga Ksharsutra. The only disadvantage of this thread is that the unit cutting time (UCT) is very less.

Papaya-Tankan Ksharsutra^[10]: The papaine enzyme in papaya acts as debriding agent, analgesic effect, anti-inflammatory, anti-microbial and anti-bacterial causing less irritant and less itching effect. While the Tankan works as local antiseptic. Local application on wound stops bleeding, due to its vasoconstriction action. Tankan does not absorb moisture so it dissolves very slowly so it is retained in the fistulous tract for longer time.

Udumber Ksharsutra^[4]: It is a sheet veerya drug and is used in dushtavrana. 11 coatings of udumber ksheer was made on the thread with a fresh latex at every coating. Udumber latex is easily available and the preparation is easy and requires less time. It is less irritant and does not produce much pain while its application. It has a smooth cutting quality and good healing effects. Patients show a good tolerance as compared to other ksharsutras. The sticking ability of the latex on thread was less causing

the knotting after application a little difficult. The unit cutting time was less in comparison to standard thread.

Ghritakumari Ksharsutra^[4]: The pulp possesses binding actions and local anaesthetic properties. It is not caustic as snuhi therefore it relieves the burning sensation. Ghritakumari is an easily available drug and its preservation is also easy. It has a good wound healing properties with no allergic reactions and good tolerance.

Yavaksharsutra^[4]: Yavakshara is well known for its scrapping property. According to the researches, it comprises of fibrolytic, hygroscopic and anti-inflammatory actions. Pain and agony is reduced during and after its application hence it is tolerated well. The unit cutting time is less than that of the standard thread.

Gomutra Ksharsutra^[11]: The total duration of treatment is reduced thus reducing the burden of the patient. Pain, burning sensation, itching, discharge and tenderness also reduces significantly. Post ligation complications are much reduced.

Vata-Arka Ksharsutra^[12]: The unit cutting time is 8.97 days/cm. There is no adverse reaction observed and there is a significant reduction in the signs and symptoms of the patients.

CONCLUSION

Several clinical trials have been conducted in different institutes and research laboratories for the evaluation and establishment of the actions of Ksharsutra and its drugs in India as well as in other countries like Srilanka and Japan. It is now a very popular and highly practiced treatment modality for the management of diseases like fistula-in-ano, haemorrhoids, pilonidal sinus, chronic fissure with sentinel tags, anal warts, papilloma, rectal polyps, neoplastic pedunculated growths, polydactyly etc. Sushruta Samhita has mentioned a number of drugs which can be used in the preparation of Kshar. Thus it is mandatory to make Ksharsutras by using different combinations of Kshar and binding materials to achieve the most potent combinations for the benefit of humanity.

ACKNOWLEDGEMENT

1. The Authors thank Dr. Milind Aware, Principal of Shree Saptashrunji Ayurveda Mahavidyalaya and Hospital, Nashik for providing the facilities for the research work.
2. The Authors thank Dr. Aparna Raut, Superintendent and Head of department of Shalya Tantra Samanya of Shree Saptashrunji Ayurveda Mahavidyalaya and Hospital, Nashik for their guidance and support.
3. The Authors also thank all the teaching faculties of department of Shalya Tantra for their guidance.

REFERENCES

1. Acharya Charaka, Charaka Samhita. Editor - Acharya Vidyadhar Shukla & Prof. Ravi Dutt

- Tripathi Edition-2013. Varanasi: Chaukhambha Sanskrit Pratishtan.
2. Acharya Sushruta, Sushruta samhita Chikitsasthana, Editor- Kaviraja Ambika Datta Shastry. Edition- Reprint, 2016 Varanasi: Chaukhambha Sanskrit Sansthan.
 3. Dwivedi Amarprakash P. ADR Ksharsutra kit: A breakthrough in the standardization of Ksharsutra. *Int. J. Res. Ayurveda Pharm*, 2013; 4(2): 304-306.
 4. Manju Rani, Riju Agarwal, K KSijjoria, Preparation of different types of Ksharasutra. *Int. J. Res. Ayurveda Pharm*, Mar-Apr 2016; 7(Suppl 2): 176-180. <http://dx.doi.org/10.7897/2277-4343.07281>
 5. Murali Krishna C, Gupta V, Bansal P, Kumar S, Sannd R, Narayana A, REVIEW ON PLANTS MAINLY USED FOR THE PREPARATION OF KSHAR SUTRA, *International Journal of Ayurvedic Medicine*, 2010; 1(1): 12-22.
 6. Baishya Namita et al: Efficacy of Nimba Ksharsutra in the management of Fistula-in-ano, *www.ijaar.in : IJAAR, MAR-APRIL 2018; III(VII): 1076-1083.*
 7. Gond Pushpa et al: Clinical evaluation of Guggulu Chitraka Ksharsutra in Fistula-in-ano, *www.iamj.in : IAMJ, July-Aug 2013; 1(4).*
 8. Sharma Shipra, Mahajan Roshi, Sharma Rekha, Raina Sorabh, Comparative study of Apamarga Ksharsutra and Palash Ksharsutra in the management of Bhagandara vis-à-vis Fistula-in-ano, *International Ayurvedic Medical Journal*, Apr-May 2018; 2(4). http://www.iaml.in/posts/images/upload/1131_1135.pdf
 9. Parmar Gaurav, ParmarMeena, Arya Chand Ramesh, Comparative clinical study of Palash Ksharsutra and Apamarga Ksharsutra in the management of Fistula-in-ano, *Int. J. Res. Ayurveda Pharma*, 2014; 5(3): 280-283. <http://dx.doi.org/10.7897/2277-4343.05357>
 10. Jaiswal Ashwani Kumar, Gupta Ajay Kumar, Jaiswal Ruchi. To evaluate the effect of Papaya-Tankan Kshar Sutra in Recurrent Pilonidal Sinus. *International Journal of Ayurveda and Pharma Research*, 2017; 5(2): 40-42.
 11. Dr. Manoj Kumar Yadav, Dr. Akhilesh Kumar Bhargava, Prof. H.K.Kushwah, A clinical evaluation of Gomutra Kshara coated sutra in the management of Bhagandara (Fistula-in-ano), *Innovare Journal of Ayurvedic Sciences*, 2013; 1(2).
 12. Ajay Kumar, Ajay Kumar Gupta, Pankaj Kumar Sharma, Tapish Maheshwari, Vivek Bhatt and Richa Sharma, Effect of Vata-Arka Ksharsutra in the management of Bhagandara, *International Journal of current innovation research*, April 2016; 2(04): 338-343. ISSN:2395-5775
 13. Amarprakash Dwivedi, OA01. 28. Management of post-axial polydactyly by ksharsutra- A minimally invasive Ayurvedic para surgical procedure, *Ancient science of life*, 32, Issue 2, (Suppl 1): 28.
 14. Dr. Shobha and Dr. Ajay Kumar Gupta, Role of Jalaukavacharana and Ksharsutra therapy in Buerger's Disease- A case study, *World Journal of Parmaceutical Research*, 7(18): 926-932, ISSN2277-7103.
 15. Shivalingappa J. Arakeri: A Comparative Study on the Efficacy of Guggulu Based Chitraka Ksharsutra and Apamarga Ksharsutra in the management of Bhagandara; *ayurpub*, III(4): 1026-1034.