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Innovative Approaches in Fistula-In-Ano Management: Evaluating the Role of Fistula Brush - A Case Study

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ABSTRACT

Introduction: Fistula in ano is one of the most common anorectal diseases. The prevalence is greater in men than women, with the rate of 12.3 cases per 100,000 and 5.6 cases per 100,000, respectively. In Ayurvedic Science *Ksharasutra* ligation is one of the most popular treatment modality for *Bhagandara*. *Ksharasutra* is indeed a well-known treatment in Ayurveda, particularly for managing conditions like pilonidal sinus and anal fistulas. However, it does have some limitations. Hence, an innovative technique is adopted by introducing a new *Yantra* i.e., Fistula brush in the field of *Shalya Tantra* for minimizing the unit cutting time in fistulous tract. **Methodology:** The fistulous tract was curetted using the fistula brush in 4-5 strokes followed by primary threading with barbour thread. Follow up thread change was done after curetting the tract using fistula brush until the tract was cut through. (under local anaesthesia). **Result:** The intervention results indicated a marked improvement in both subjective and objective parameters, demonstrating the intervention's effectiveness in enhancing patient outcomes. **Discussion:** The treatment of anal fistula through curettage of the tract using a fistula brush has been demonstrated to be a cost-effective and accessible method. This technique facilitates the removal of unhealthy granulation tissue while ensuring adequate drainage with the use of a drainage seton, thereby promoting the formation of healthy granulation tissue. Ultimately, this process encourages fibrosis of the tract and minimizes the risk of sphincter damage. Mechanical debridement plays a pivotal role throughout the stages of wound healing by promoting a clean, healthy wound environment. By alleviating symptoms associated with each stage - such as pain, burning sensation, discharge and local tenderness - it ultimately enhances the healing process and improves patient comfort.

Key words: *Fistula brush, Yantra, drainage seton, mechanical debridement, Bhagandara, Ksharasutra.*

INTRODUCTION

Fistula in ano is an inflammatory tract with external opening in the perianal skin and internal opening in the rectum or anal canal.[1] *Sushruta Samhita* is the only authentic text in surgical practice, describing detailed surgical techniques and parasurgical measures. Current surgical parlance has made enormous progress in branches like neurosurgery and microscopic surgeries. But certain diseases seem to mock the progress achieved. One such irregularity of mankind is the disease of Anorectal region. Regarding management of diseases it has been opined that there are many diseases which are difficult to manage by conservative treatment alone. Among them *Bhagandara* is one such grave disease, for which it has been included in *Aṣta Mahāgada* by *Acharya Sushruta*.[2] Present mechanical modern life style is pushing the rise of prevalent rate of this disease. Today *Bhagandara* can be correlated with Fistula in ano.[3] *Bhagandara* is one of the most common anorectal diseases in the field of surgery. It is very difficult to manage even with modern surgical technique due to its multifold variation of presentation, high recurrence rate and sometimes serious post-operative complications like fecal incontinence, recurrent sepsis etc.[4] *Ksharasutra*

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treatment has its own limitations associated with the procurement of drugs, preparing Sutra and prolonged procedure with more no. of sittings. Also, the main complaints stated by the patients are pain, burning sensation and discomfort. Hence, An innovative technique is adopted by introducing a new Yantra i.e, Fistula brush in the field of *Shalya Tantra* for minimizing the unit cutting time in fistulous tract. The Fistula Brush[5] a Proctological instrument (available in varied sizes and length) for probing, cleaning and debridement of anorectal fistulas. The Fistula Brush simultaneously performs the action of probing as well as curettage of the fistulous tract which helps in delineating the tact as well as debridement of the tract thereby promoting its effective obliteration.

CASE REPORT

Patient name: XYZ

Age/ Gender: 53yrs/Female

Occupation: home maker

Socioeconomic status: upper middle class

MR no.: 248670

Chief complaints

A 53-year-old female patient presented to the *Shalya Tantra* outpatient department with complaints of pain, swelling and pus discharge in the perianal region for the past four days. Surgical management was advised and hence the patient had been admitted to our hospital for treatment.

Clinical findings

On Inspection:

No discoloration

Swelling (+) from 7-9 'O' clock in the perianal region

Discharge (-)

Sentinel tag (-)

Fissure (-)

On Palpation (DRE):

Sphincter tone (N)

Tenderness (++) at 9 O clock position

Discharge - mild at 7 'O' clock region from the external opening approximately 2cms away from the anal verge

Pit - felt at 9 'O' clock internally

On Proctoscopic examination:

Anal mucosa - normal

Internal opening - seen at 9 'O' clock

Investigations:

Hemogram: Total leukocyte count, Hb%, ESR, BT, CT

Blood sugar: FBS, PPBS

Renal function test: Blood urea, serum creatinine

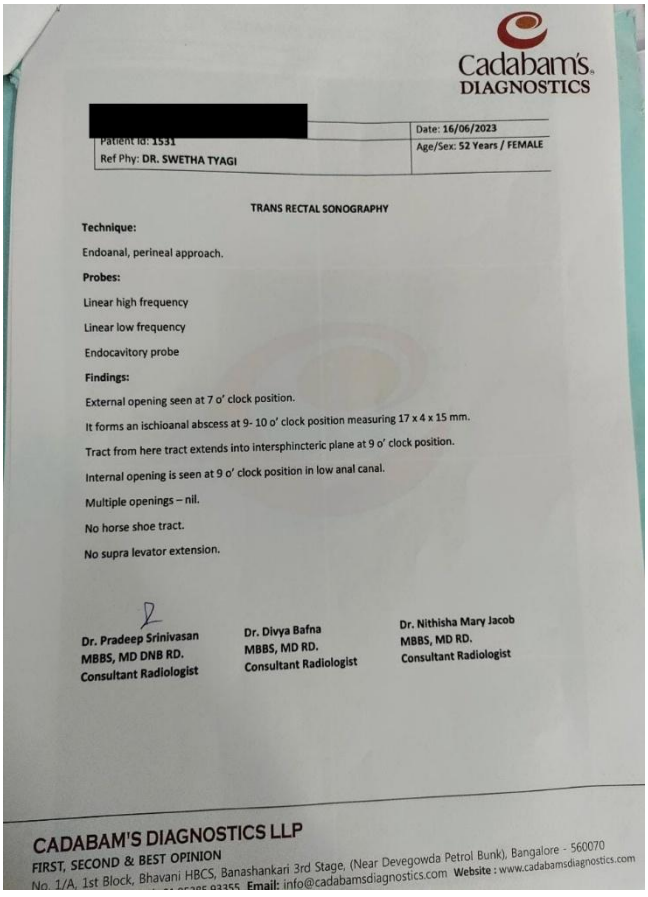
Liver function test: Serum bilirubin, SGPT, SGOT

Urinalysis

HIV 1&2, HBsAg.

(all the above mentioned tests were found to be in normal limits and serology was negative)

TRUS scan


Cadabam's DIAGNOSTICS

[redacted]
Patient Id: 1531
Ref Phy: DR. SWETHA TYAGI
Date: 16/06/2023
Age/Sex: 52 Years / FEMALE

TRANS RECTAL SONOGRAPHY

Technique:
Endoanal, perineal approach.
Probes:
Linear high frequency
Linear low frequency
Endocavitory probe
Findings:
External opening seen at 7 o' clock position.
It forms an ischioanal abscess at 9- 10 o' clock position measuring 17 x 4 x 15 mm.
Tract from here tract extends into intersphincteric plane at 9 o' clock position.
Internal opening is seen at 9 o' clock position in low anal canal.
Multiple openings – nil.
No horse shoe tract.
No supra levator extension.

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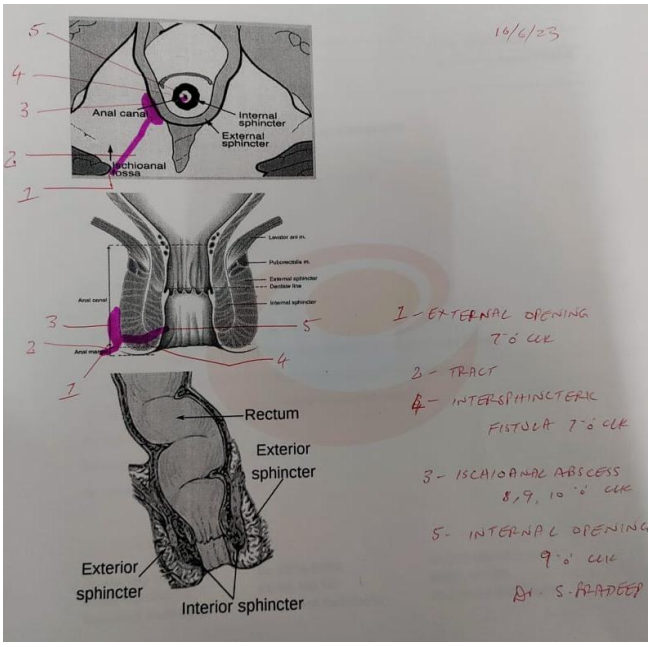

Figure 1 & 2: TRUS report

Materials and Methods

- Barbour surgical linen thread No. 20
- Fistula brush (It is a blunt surgical instrument utilized for the exploration and assessment of the fistulous tract. Its primary purpose is to delineate the course of the fistula, identify internal openings, and evaluate the surrounding tissue for any pathological changes, such as abscess formation).

Purva Karma

- Well informed written consent was taken prior to the procedure.
- Inj. Xylocaine Sensitivity test dose (SC) and Inj. Tetanus Toxoid 0.5ml (IM) was given prior to procedure.
- Perianal part preparation was done.
- Bowel preparation was done prior to procedure.
- Sterile Fistula brush was taken

Pradhana Karma

- The patient was taken into lithotomy position.
- Under aseptic precaution painting and draping was done to the perianal region.
- Local anaesthesia (LOX 2% with adrenaline) was infiltrated.
- Probing was done through the 7 'O' clock external opening and the tract was identified.
- The tract was then curetted using the fistula brush in 4-5 strokes, followed by Primary threading done using barbour thread to the tract.
- Drainage window was created at the external opening.
- Haemostasis achieved and sterile anal packing was done.

Paschat Karma

- Tab. *Gandhaka Rasayana* 2 BD A/F * 3weeks
- Tab. *Triphala Guggulu* 2 BD B/F * 3weeks
- Sitz bath with *Panchavalkala Qwatha* liquid twice daily
- Cleaning and dressing with *Panchavalkala Qwatha* liquid twice daily. Changing the drainage seton by rail road method, on every 7th day.

Follow up - On every 7th day, after curetting the tract using the Fistula brush, barbour thread was changed, until the tract is cut through.

Assessment on weekly basis

Pre-operatively (17/06/2023)

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Operatively (17/06/2023)

Week 1- 24/06/2023

Week 2- 4/07/2023

Week 3-11/07/2023

Table 1: Showing the Assessment of Subjective parameter – using VAS scale

Assessment	Day 0	Day 7	Day 14	Day 21
1. Pain[6]	3	2	1	1
2. Burning sensation[7]	2	2	1	0

Scores: 3 - Severe, 2 - Moderate, 1 - Mild, 0 - Nil

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Table 2: Showing the Assessment - Objective parameters

Assessment	Day 0	Day 7	Day 14	Day 21
1. Unit cutting time[8]	3cms	2.5cms	1.4cms	0.3cms
2. Discharge[9]	2	2	1	0
3. Length of the tract[10]	3	3	2	1
4. Local tenderness[10]	3	2	1	0

Discharge: 3 - profuse, 2 - moderate, 1 - mild, 0 - nil

Length of the tract: 0 - No tract, 1 - Up to 1 cm, 2 - 1.1cm - 2cm, 3 - 2.1cm - 3cm, 4 - 3.1cm - 4cm, 5 - 4.1cm - 5cm, 6 - More than 5cm

Local tenderness: 0 - No tenderness, 1 - Tenderness to palpation, 2 - Tenderness with grimace and/ or flinch to palpation, 3 - Tenderness with withdrawal (+ "jump sign").

RESULTS

The assessment of both subjective and objective parameters demonstrated the effectiveness of the intervention over the treatment period. Subjectively, pain significantly reduced from severe to mild, and burning sensation decreased from moderate to nil by Day 21. Objectively, all assessed parameters showed marked improvement. The unit cutting time and the length of the tract decreased significantly, reflecting enhanced procedural efficiency. Discharge diminished to nil by Day 21 and local tenderness exhibited significant reduction, further confirming the intervention's efficacy in promoting healing and minimizing symptoms. Overall, these results highlight the comprehensive benefits of the treatment in improving patient quality of life.

DISCUSSION

Fistula-in-ano is a common anorectal condition characterized by an abnormal connection between the anal canal and the perianal skin. The management of this condition often requires a multifaceted approach, particularly in complex cases.

Despite surgical advances, fistula-in-ano remains a difficult condition to manage and there is no consensus regarding the optimal surgical treatment.

In our classics *Acharya Sushruta* has mentioned that *Bhagandhara* becomes *Shastra Sadhya Vyadi* when the *Bhagandhara Pidaka* opens up. He has advocated *Ekadashopakramas* for *Bhagandhara Pidaka* and *Shastra Karma* for the *Bhagandhara* when the *Pidaka* bursts open.[11]

Owing to the complexity of sphincters involved in the disease fistula and fear of incontinence, *Shodhana* & *Ksharasutra* methods are suggested by acharyas in *Nadivrana Chikitsa Adhyaya*.[12]

The *Ksharasutra* possess *Chedana*, *Bhedana* & *Lekhana* properties which allows chemical curettage & healing of the tract simultaneously.[13] However, causes great deal of discomfort & is less convenient to patient during the course of treatment due to repetitive change of threads and foreign body sensation in some patients. Additionally, the preparation of the sutra is also laborious and time consuming as the drugs required such as *Snuhi Ksheera* to make the sutra are harder to collect and apply. It also requires skill to change the *Ksharasutra* and chances of losing the tract are more when performed by beginners.

One effective strategy involves the use of a fistula brush followed by the placement of a drainage seton. This article explores the mechanisms and clinical rationale behind this combined approach.

Hence the need of an innovative method to do *Shodhana* of the tract by the same principles of *Eshana*, *Lekhana* & *Shodhana,* an instrument was deviced in the form of the modified *Shalaka Yantra* - The Fistula brush along with a drainage seton.

Fistula brush exhibits an equivalent action as that of *Ksharasutra* with the exception of mechanical debridement[14] - a controlled action, thereby curetting only unhealthy granulation tissue from the tract and the patency of the tract is maintained by the drainage seton which can also be changed easily with the help of eye present on the fistula brush, moreover it is convenient to use for the surgeon & also results in

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minimal or no discomfort during the course of treatment.

Probable Mechanism of fistula brush

Pain and local tenderness

Mechanical debridement activates wound healing cascades, including the upregulation of growth factors such as vascular endothelial growth factor (VEGF) and transforming growth factor-beta (TGF-β). These factors facilitate angiogenesis and tissue regeneration while simultaneously promoting a shift from a pro-inflammatory to an anti-inflammatory stage.[15]

Burning sensation

It can improve perfusion in the affected area by removing obstructions to blood flow. Enhanced perfusion increases the delivery of oxygen and nutrients, facilitating the migration of immune cells. The influx of macrophages and neutrophils aids in the clearance of inflammatory mediators and enhances the release of anti-inflammatory cytokines, such as interleukin-10 (IL-10),[16] which can alleviate the burning sensation.

Discharge

It effectively excises devitalized tissue and exudate, which can harbor inflammatory cytokines and pathogens. The reduction of necrotic material decreases the burden of pro-inflammatory mediators, such as interleukin-1 (IL-1) and tumor necrosis factor-alpha (TNF-α), thus diminishing the inflammatory response[17] that contributes to excessive discharge on the day of thread change.

Length of the tract and Unit cutting time

Following the debridement of the fistulous tract with a fistula brush, unhealthy granulation tissue and pus are effectively removed. This process is facilitated by the use of a drainage seton, which aids in proper drainage. Consequently, the tract is left with a cleaner base, promoting more efficient wound healing.

Factors such as length and branching of the track, presence of infection, drainage efficacy, follow up and monitoring, the skills and experience of the Surgeon, the cutting techniques employed, and the tools used can contribute to variations in cutting times.

CONCLUSION

In conclusion, The Fistula Brush is an innovative device utilized for the mechanical debridement of fistulous tracts, significantly enhancing the management of fistula-in-ano. Its mechanism operates through several key processes that contribute to symptom alleviation and improved healing outcomes, by effectively reducing the pain, burning sensations, and discharge while potentially decreasing the length of the fistulous tract. This method combines traditional principles with modern techniques, offering a comprehensive approach to the management of fistula-in-ano.

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