FISTULA IN ANO : AN ANORECTAL DISEASE

Dr Amit Kumar Singh

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Varanasi,B 32/16 A-Fla.2/1,Gopalkunj Nariya,Lanka,Varanasi,Mobile 9935784387
Allahabad,9/7B1,Liddle Road,Joerge Town,Mobile 9415340803
Jaunpur Post-Mai,Chakatari,Shukul Ki tari,Mobile 9415614090,9415284584

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In this context, I would like to acknowledge the blessing and unwavering support extended by my wife Dr pragya.

I thank all people who have directly or indirectly participated and helped me .

Dr. Amit Kumar Singh

Preface

The basic theme of the book is to provide up to date practice oriented information about the management of fistula in ano .

The out standing features of this hand book is to provide basic concept in simple language on various clinical problem faced by clinician while giving advice to the patient . It provide basic need , quick and effective guideline to clinicians for treatment of patient . In this book many complex areas are simplified to understand the basic concept .

I am sure all reader will like this book which provide quick and easy way of management of disease .

I
Introduction

A fistula is an abnormal communication between any two epithelial-lined surfaces. It is a latin word for a *reed, pipe or flute.* An 'anal' fistula is a track which communicates with the anal canal or rectum by means of an internal opening and usually is in continuity with one or more external openings in the perianal, perineal or ischiorectal areas.

From the earliest times of medical records, reference is made to fistula in ano. The disease is mentioned in "*The code of Hamurabi*", which is the oldest set of legal and medical rules in existence and was drawn up by the king of Babylon, who lived from 1948 BC until 1905 BC. Fistula in ano however has been explained in detail for the first time by *Sushruta* (1500-1000 BC). He described surgical and other minimally invasive techniques for the management of *Bhagandara* (fistula in ano).

Hippocrates (460- 356 BC), taking clue, realized that fistula in ano followed anorectal suppuration and the treatment required fistulectomy. This he achieved by the use of a linen aplinose ligature (seton) which was tightened daily until fistulectomy was achieved. If this method was not successful, he recommended that fistula should be "cut down as for as it passes".

As can be seen from the above historical review, Fistulostomy/ Fistulectomy is an ancient surgical procedure and the concept of laying open the track with the sacrifice of a part/ or complete sphincter muscles within the track has been practiced for at least 2000 years. In difficult cases or when surgery failed, they have fallen back on various other modes of treatment.

Though numerous techniques of surgery have been laid down, it is of great importance to note that all these procedures are associated with a dishonorable repute of causing recurrence of the disease and most importantly causing faecal incontinence. The treatments sometimes results in complications far severe than the disease itself.

From the reference of chakradatta, Rasatarangini, dicided to give the kshara sutra therapy a new life. First designed the Snuhi Kshara sutra, tried out this experimentally in animals and then on a small group of patients and found remarkable results. Later on *Dr. P J Deshapande*, *Dr. S N Pathak, Dr. K R Sharma* and others, adopted this in large number of patients and established the treatment as an affective, ambulatory and safer alternative treatment for patients with fistula in ano. They also established *kshara sutra* as a new drug delivery technique for the conditions like anal fistula.

Their are many type of kshara sutra like *Yavakshara sutra, Snuhi swarasa kshara sutra, Ghrita kumari kshara sutra* and many more new kshara sutra were tried out like, *Udumbara kshara sutra, Tankana, Aragvadhadi sutra* and *Guggulu sutra*.

But by applying these *kshar sutra* causing severe pain, burning sensation though the cutting rate is good so overcoming these disadvantages was of utmost importance to make the treatment widely popular and acceptable. In spite of the enviable rates of cutting, the severe pain and burning sensation caused during the treatment with held many patients from accepting this treatment whole heartedly.

Though each of the thread had good cutting rates and other preparational advantages, they too had certain important inherent disadvantages. The pain during kshar sutra application is due to the caustic effect of kshar, but presence of kshar is also essential as it causes debridement of unhealthy granulation tissue in the fistulous track..s

II
Ayurvedic Anatomy and Physiology

DEFINITION OF BHAGANDARA

The word Bhagandra contains two constituents.the first Bhaga and second is Daran which are derived from root Bhaj and Dri respectively. The Bhaga has different meanings as described by different authors.

- In Riguveda Bhaga is described among 12 Adityas.
- In Aitreya brahaman means Fortune and Prosperity
- The commentator of Madavnidan, Vijayrakshita and Srikanthadatta have told that three structure named Bhaga (vagina), Basti (urinary bladder)and Guda (anorectal region) called as Bhaga
- Bhavmishra has mentioned as synonym for Yoni (vagina) and Mehana (penis).

The second word Daran means splitting of a surface or a opening associated with pain.

All the three books of Brihatrayee has described the Bhagandra in its own way. Charaka more elaboratoly described about the nidan of Bhagander. He said that it is a very painful

pidika which occurs around the guda and the cause of it is krimi infestation, due to tissue injury from bone and trina ingestion in diet, excessive sexual indulgence, prahavan, utkutkashan and pristayan. When these pidika burst form the Bhagander[9]. Sushruta has differentiated the Bhagander pidika with the other pidika of the same region he said that pidika placed superficially and heals quickly while Bhagander pidika have just reverse of it

Vagabhatta elaborately described all the aspects of Bhagandar

- Bhagandar pidika appears only one or two fingers around the guda
- These are caused due the dusti of twaka and mamsa
- These pidika constantly discharge due to proximity to basti
- The vata, mutra, sakrit, shukra discharge from the external opening.

ANATOMICAL CONCEPT OF GUDA

It is very essential to have a knowledge of anatomical relation and structures of guda, because the disease Bhagander is mainly related with Guda. The systemic anatomical description of guda is not available in Ayurvedic literature. But we can get an idea about anatomical concept of Guda by taking into consideration of scattered in different texts.

EMBRYLOGICAL ASPECT OF GUDA

Embryologically Guda is supposed to be originated from matruja bhava of garbha. The Antra, Guda and Vasti of the foetus are formed from the best parts of blood and kapha, after being digested by pitta and vayu.

LOCATION OF GUDA

Charaka divided guda into two parts i.e. Uttara guda and Adhara Guda and classified it among one of the 15 kostangas. Chakrapani says that uttara guda is an organ in which purisha(faeces) is collected while Adhara guda is meant for the

excretion of faeces. Sushruta says it is attached to sthulantra (large intestine) and is one of the organ comes in relation with vasti.

EXTENT OF GUDA

Sushruta and Vaghatta have mentioned that length of guda is 4 and 1/2angula . The measurement of one angula approximately 2 cm, on this basis total length of the guda is 9 cm. It is well known that maximum length of anal canal is 4 cm. thus the extent of guda includes the anal canal and lower six cm of rectum which roughly gives the inferior Houston's Valve. Length of anorectum from the anal margin to the rectosigmoid junction is approximately 16.5 cm. Out of this 4 cm is the length of anal canal upper 7 ½ cm is rectum is included in large intestine by Sushruta. Hence this 4 ½ angulas length of guda exceeds the anal canal and fall short of rectosigmoid junction. It infers that guda includes anal canal and a part of rectum.

INTERNAL STRUCTURE OF GUDA

Sushruta described that interior of guda contaion three Valis. These are Pravahini, Visarjini and Samvarani. They are situated one above the other at a interval of 1½ angula. They are arranged spirally (sankhavarta nibha) and resembles the colour of palate of an elephant (gaja talu) .

S. No.	Guda Valis	Situation	Approximate Modern Term
1	Pravahini	Proximal	Middle Houston's Valve
2	Visarjini	Middle	Inferior Houston's Valve
3	Samvarani	Distal	Dentate line

Vagbhata has clarified further the position of these valis. He named proximal one as Pravahini then middle one is Visarjini and distal one is Samvarani. Gudosta (anal margin) is situated 1 angula away or distal to Samvarani . Pravahini situated most internally 1 ½ angula to Visarjani and Visarjani situated 1 ½ angula above the Samvarani.

Shushruta considered guda as a Sadyah--Pranahara Marma, means any injury to this organ results immediate death.

He also described it as a Mamsa Marma, which is attached to Sthula antra (large intestine) and through which vata and purisha is excreted out. He also considered the guda as a bahya srotas, means having opening to the exterior. Charaka and Vagbhata considered as one among the Dasa Pranayatana.

VASCULAR ASPECT OF GUDA

Sira (veins) represents as a carrier channels of vata, pitta , kapha, blood, lymph ,urine, faeces, semen and menstrual blood .Sushruta has stated that out of 34 sira which are found in the kostha 8 supply to guda, medra(penis) and the sroni(pelvis).

The dhamanis (arteries) taking a downward course carry apanavata, mutra(urine) purish(faeces) shukra(semen) and artva(menstrual blood) to the respective organs such as Pakwashaya(intestine) kati(waist), guda, vasti and Medra.

These all orgens are situated below the level of nabhi (umbilicus).The two dhamanis attached to the sthulantra perform excretion of the purisha.

PHYSIOLOGICAL CONCEPT OF GUDA

Guda is described as one of the pancha karmendriya and its function is to excrete the mala from the body. He also regards the guda and pakwashaya are seats of Apana vayu. The Apana vayu helps in expulsion of vata, mutra, purisha, shukra and garbha. In case,this vayu is vitiated in the diseases of vasti and guda said to occur.

In Ayurveda, the excretory, mechanism is described in lucid manner. According to Ganeshnathsen, the proximal vali i.e., Pravahini helps in compression and pushing the stool downwards. Visarjini, the second vali relaxes during this process and allows stool to pass down. The distal most vali, Samvarani, which expels the stool out and constricts immediately, so that the continuity of the stool cutout and falls down. This all these three valis and Apana vayu are solely responsible for the mechanism of defecation.

III

Ayurvedic Pathogenesis and Classification

Bhagandra is commonest disease occurred in anorectal region. sushruta, the father of surgery has described every details of the disease .He has described this disease as one of the mahagada i.e. very difficult to cure. He has given elaborative description of Aetiopathogenesis, Clinical presentation, complication management and various other aspects of Bhagandra.

Acharya Charaka has given reference of Bhagandra in Sotha Chikitsa chapter and he mentioned only nidana samprapti and chikitsa of Bhagandra. Madavkar and Bhavprakash have followed Sushruta in description and classification.

The causative factors of Bhagandara may be classified into two groups. They are:

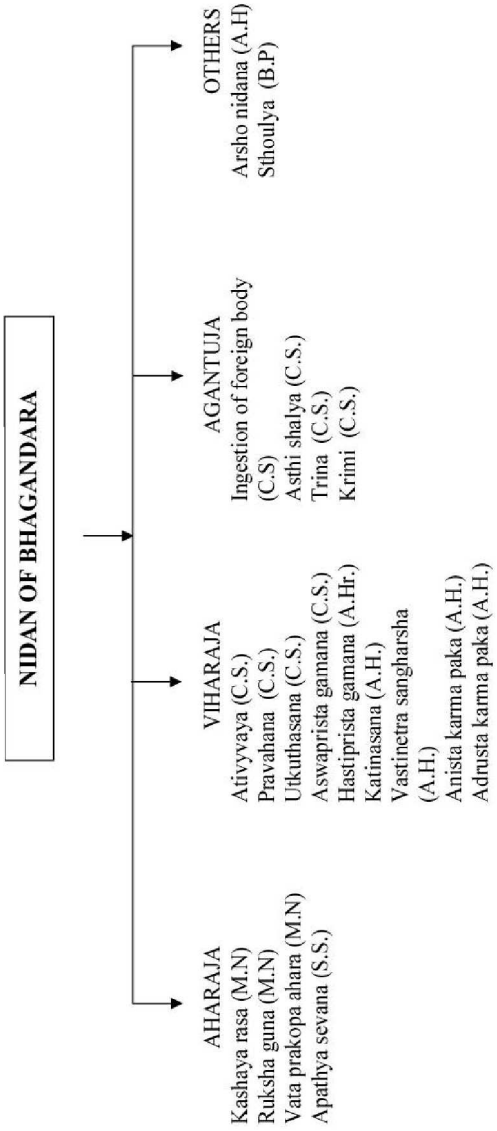
1. General causes
2. Specific Causes

1) General Causes

It has been mentioned by different authors in different ways. These causes are pertaining to all varieties of bhangandara.

2) Specific Causes

While in specific type of bhagandara has specific aetiological factors responsible for the provocation of respective dosha different authors have summarized the general causes of bhagandara as follows



SAMPRAPTI

Nidana	Mithyahar vihar, apathya sevana
Pradhana dosha	Vata
Anubanda dosha	Pitta kapha
Dushaya mamsa	Rkta
Adhisthana	Guda

Sushruta has described manifestation of any disease in 6 stages i.e**. Shatkriya Kala**. It may be prevent as well as treated according to its clinical manifestation. The pathogenesis of **Bhagandara** can be explained as follows .

PATHOGENESIS OF BHAGANDAR

1.	**SANCHAYA** **(Stage of Accumulation)**	Mithyahar vihar or Local trauma Accumulation of dosha at normal sites
		↓
2.	**PRAKOPA** **(Stage of Provacation)**	Dosha further aggravates Vata active and Pitta & Kapha passive Vilayana rupa vriddi Unmarga gamita
		↓
3.	**PRASARA** **(Stage of Propagation)**	Vitiated dosha migrate their own places Circulate throughout the body
		↓
4.	**STHANA SAMSHRAYA** **(Stage of Localization or Prodromal symptoms)**	Dosha lodged in Guda Mamsa Rakta dusti Katiruja, Kandu, Daha, Sopha
		↓ Ama
5.	**VYAKTI** **(Stage of Manifestation)**	Bhagandara Pidika → Pachyamana Nadivrana Bhaganadara → Pakwavasta
		↓
6.	**BHEDA** **(Stage of Complication)**	Communicated with different adjacent organs or multiplicity of tracks Discharge of flatus, faeces, urine and semen

CLASSIFICATION OF BHAGANDARA IN AYURVEDIC CLASSICS

S. No.	BHAGANDARA	S.S.	A.S.	A.H.	M.N.	S.S.	B.P.	Y.R.
1.	Shataponaka	+	+	+	+	+	+	+
2.	Ushtragreeva	+	+	+	+	+	+	+
3.	Parisravi	+	+	+	+	+	+	+
4.	Shambukavarta	+	+	+	+	+	+	+
5.	Unmargi	+	+	+	+	+	+	+
6.	Parikshepi	-	+	+	-	+	-	-
7.	Riju	-	+	+	-	+	-	-
8.	Arsho	-	+	+	-	+	-	-

Sushruta and **Vagbhata** from surgical point of view depending or opening or Bhagandara Nadi (fistulous track) the disease has been classified into two varieties.

(1) Arvachina - Antarmukhi (Blind External)

(2) Parachina - Bahirmukhi (Blind Internal)

ARVACHINA

In this, abscess located outside and track opens inside the Ano-rectal canal without external opening. It is called as **Antarmukhi** (Blind external)

PARACHINA

In this, cavity or abscess is situated inside and track apens outside without internal opening. That's why it is called as **Bahirmukhi** (Blind internal).

Bhavaprakash and **Yagaranakar** have followed the same views of **Madhava nidan.**

AETIOPATHOGENESIS OF DIFFERENT TYPES OF BHAGANDAR

1. SHATPONAKA BHAGANDER

Dalhana stated that **shatponaka** means an abscess which has multiple openings like a **Chalanika** (sieve) and is described

under shuka dosha as a disease. Thus fistulae and rectal sinuses which have got multiple small openings are preceded with perianal boils , no matter what course their track takes is called **Shataponaka** . **Goligher** describes such types of fistulae as follows "Multiple sinuses are often encountered and some times these are so numerous as to give the so called **Watering can appearance**".

COMPARATIVE STATEMENT OF SHATAPONAKA BHAGANKARA BY DIFFERENT AUTHORS,

Features	Sushruta	Vagbhata	Madhav
1. Dosha	Vata	Vata	Vata
2. Dusya	Rakta, mamsa	Rakta, mamsa	-
3. Sthana (site)	Within one or two angulas	Within two angula of guda	Within two angula of guda
4. Colour of pidika	Aruna	Shyav, Aruna	-
5. Character of pain	Prickling, cutting, beating, splitting, biting, whipping	Prickling, splitting, twitching	Severe pain
6. Character of discharge	Thin, frothy, clear, copious abundant	Thin, frothy, abundant	Frothy
7. Colour of discharge	-	-	Aruna
8. Other features	Multiple openings in later stage discharge of flatus, urine and semen	Multiple openings	Multiple openings in later stage, discharge of urine faeces and semen

2. USHTRAGREEVA BHAGANDARA

The word Ushtragreeva literally denotes a **Neck of Camel**.Accoriding to **Sushruta** , the pidika (boil or abscess) of this type is red, thin and raised like the neck of camel . If these pidika neglected without treatment it get suppurate and brusts

leads to Ushtragreeva Bhagander. The formation of long linear tracts may be compared as camel's neck. **Madhavakar** named it as **ushtra shirodhar Bhagandra**

Goligher has also recognized similar type of fistula and has described as follows – "in many long standing cases however the opening is situated is situated on the summit of little or red nodule due to exuberant granulation tisues".

COMPARATIVE STATEMENT OF USHTRAGREEVA BHAGANDARA BY DIFFERENT AUTHORS

Features	Sushruta	Vagbhata	Madhav
1. Dosha	Pitta	Pitta	Pitta
2. Anubanda dosa	Vata	-	-
3. Dushya	Rakta, mamsa	Rakta, mamsa	-
4. Colour of pidika	Within one or two angulas of guda	Within two angula of guda	Within two angula of guda
5. Colour of dipika	Rakta	Rajani	Rakta
6. Character of pidika	Thin, elevated Ushatragreevakara	Thin, small, warm, smoky and raised swelling	-
7. Character of pain	Ushna, chosha, burning pain like agni and kshara	-	-
8. Character of discharge	Warm offensive smell	-	Warm offensive smell
9. Other features	Tiny boil raised like neck of camel late on discharge of flatus, faeces, urine and semen	Fever, raised like neck of camel	Boil suppurates

3. PARISRAVI BHAGANDARA

The term parisravi has been used because of the continuous discharging nature of wound .**Sushruta** has describe that provocated vayu carries the vitiated kapha at the area of guda and results **Parisravi Bhagandara**. It may be classified

under tubercular fistulae and sinuses. Generally it is seem that their perianl boil takes long course to suppurate and burst , patients main complaints of itching and lubricous persistent discharge. Usually their track takes long horizontal or high rectal course.

COMPARATIVE STATEMENT OF PARISRAVI BHAGANDARA BY DIFFERENT AUTHORS

Features	Sushruta	Vagbhata	Madhav
1. Dosha	Kapha	Kapha	Kapha
2. Anubandha dosa	Vata	-	-
3. Dushya	Rakta, mamsa	Rakta, mamsa	-
4. Sthana (site)	Within one or two angulas of guda	Within two angula of guda	Guda
5. Colour of dipika	Suklabhasa	Pandu	Suklabhasa
6. Character of pidika	Sthira (firm)	Sthira, snigdha mahamula (deeply situated)	Kathina (hard)
7. Character of pain	Kandu (Itching)	Kandu (Itching)	Kandu, Manda vedana
8. Character of discharge	Pichila (Sticky) constant discharge	Pichila, profuse discharge	Thick discharge
9. Other features	Form boil, hard and indurated ulcer later on discharge of flatus, faeces, urine and semen	Firm, shiny and deep rooted	Hard boil

4. SHAMBUKAVARTA BHAGANDARA

The word **Shambukavata** literally means **"Ridges of a Conchshell"** suggest that pathway of track is curved and deeper one looks like ridges of **shanka**[43]. So it is called **Shambukavarta.** According to Sushruta, the pidika in Shambukavarta is large in size and elevates resembles a **padangusta** (Big toe) pramana .This type is due to vitiation of all three doshas.

Features	Sushruta	Vagbhata	Madhav
1. Dosha	Vata, Pitta, Kapha	Vata, Pitta, Kapha	Vata, Pitta, Kapha
2. Dushya	Rakta, mamsa	-	-
3. Sthana (site)	Within one or two angulas of guda	-	-
4. Colour of dipika	Colour of previous all three pidikas	-	Bahu varna (various colours)
5. Shape of pidika	Padangusta pramana	Padangusta pramana	Gosthanakara
6. Character of pain	Prickling, burning, itching	Severe pain	Severe pain
7. Character of discharge	Bahu varna srava (variegated colours)	-	Bahu varna srava (variegated colours)
8. Other features	Pain is like waves in Purna Nadi Shambukavarta	Line of track Shambukavarta, shula, daha, arochaka, jwara	Nadi is like Shambukavarta

5. UNMARGI BHAGANDARA

This type of bhagandara caused by tauma and there is no doshic involvement. Asthi shalya or any foreign substance ingested with food which on reaching guda cause trauma to develop bhagandara. In this media ,krimi(maggots) burrows the anal canal and rectum through these openings flatus, faeces, urine semen and krimi discharged.

It is an internal sinus caused by tearing of the mucous membrane of anal canal whether by bone piece or hard scabaloids of stool and the contact of infectious substance promotes the suppuration and thus help in sinus and fistulae formation.

COMPARATIVE STATEMENT OF UNMARGI BHAGANDARA BY DIFFERENT AUTHORS

Features	Sushruta	Vagbhata	Madhav
1. Cause	Asthi Shalya	Asthi Shalya	Asthi Shalya
2. Site	Guda	Guda	Guda
3. Number of openings	-	-	Multiple
4. Type of discharge	Vata, mutra, purisha, sukra, krimi	-do-	-do-

6. PARIKSHEPI BHAGANDRA

It originates from vitiated vata and pitta. It manifest tamra varna pidika with burning sensation and pain in the perianal region . The track is curved in this type. **Arundutta** and **Indu** states that the track of **Parikshepi Bhagandra** surrounds the Guda as the **trench surrounds the fort**. This seems to be a posterior horse–shoe ischiorectal fistulae.

7. RIJU BHAGANDRA

The vitiated vata and kapha produces the pidika , which later on suppurates and form a straight track in the perianal region. Because of its straight nature of track, it is called rjju Bhagandara. Fistulae arising from the anterior half of the anal canal are usually at right in nature can be compared as Riju bhagandara

8. ARSHO BHAGANDRA

It was originated from vitiated kapha and which reaching at the base of arsha, produces whitish shopha which causes burning and itching pain. This swelling suppurates quickly to discharge continuously and Arshomoola becomes wet. The tract is present at the base of arsha and mixed type of discharges from multiple openings of the wound.

One of the most common type of fistula arises from the chronic tissues. Formation of a large labours fleghy mass from

the anal papilla on the dentate line at the upper end of the fissure in later stages. Infection of the sentinel pile which develops at the lowar end the fissure at the anal verge may lead to the formation of a superficial fistul. This type of fistula can be compard as Arsho Bhagandara.

SADHYASADHYATA(Prognosis)

Bhagandra is diffuclt to treat as described in Astamahagada. All the authors have considered Shambukavarta (Tridoshaya) and Unmargi(agantuga) are Asadhya while remaining are Kricha Sadhya.

Bhagandaras which discharges flatus , faeces , urine. semen and krimi are incurable . We can infer that ano-rectal, recto-vginal, recto-urethral fistulas are incurable .Any tract of Bhagandara which cross pravahani vali and sevani(perineum) are also incurable

IV
Ayurvedic Management of Bhagandar

MANAGEMENT OF BHAGANDARA

1. GENERAL PRINCIPLES

Charaka just enumerated the main principales of management of bhagandra as followes

A) Virechana

B) Eshana

C) Pathana

D) Marga vissudi ot vrana Sudhana

E) Taila Daha

F) Chedan & Kshara sutra application

Acharya Shodal has described stage wise principal of management of Bhagandara

A. First stage

This is stage of Bhagandra pidika , when there is no suppuration ,In initial stages of inflammation, local blood supply enhances whish causes pain, swelling, hyperaemia, itching.

According to Ayurveda, **Raktmokshana** is helpful to reduce the disease and its symptoms.

B. Second Stage

It is the stage of suppuration or stage of formation of Bhagandar.in this stage one can perform excision of track followed by cauterization with kshara or agni.

Bhavaprakash and **Bhaishajya Ratnavali** have also advocated the surgical procedures followed by **kshara** or **Agnikarma** to do the chemical and thermal cauterization of the open wound.

2. MANAGEMENT

A) PREVENTIVE MEASURES

1. Nidana parivarjana

The etiological factors of Bhagandara must be avoided

2. Prevention of Suppuration of pidika(Boil)

All ancient Ayurvedic authors emphasized that pidika in the perianal region should not be neglected and should be treated accordingly, so that it cannot get suppurated.

(i) **Vagbhata** advised Dehasodhan, Raktamokshana and Parisheka during the stage of pidika to avoid suppuration.

(ii) **Sushruta** has mentioned eleven measures of sixty upakramas in vrana chikitsa for treatment of Bhagandara. They are

(a) **General measures-** Apatarpana, Abhyanga, Svedana, Pachana, Vasravana, Snehan, Sodhan

(b) **Local measures-** Alepa, Parisheka, Vimlapana,Upanaha.

B) CURATIVE MEASURES

(1) MEDICAL MANAGEMENT

It is advised in both Bhagandara pidika stage and after surgical excision of the fistula track. The aim of medical treatment in pidika stage to prevent the disease and its symptoms .In

children, every effort to be made to control the disease by medical management as agni karma , kshara karma and Sastra Karma are difficult to practice. Medical treatment consists of local and systemic management.

i) Local

a) **Management in Amavasta**- Follows the same principles of management of amasopha like Vimplapana , Avasechana , Upanaha, Patana, Sodhana, Ropana and Vaikrtapaha.

b) **Drugs which helps in purification of track after surgical excision**. Trikatu,Vacha, Hingu, Lavana and Dipyaka drugs along with Kanji, Kulatha mix in the form of a paste and apply on wound.

Kustha, Trivrit, Tila, Danti, Pippali, Rock Salt, Honey, Haridra, Triphala, Tuttha should apply on the wound.

c) **Drugs which help in healing of track**

- Paste prepared from Rasanjana, Haridra ,Manjista, Nimba, Trivrit And Danti can apply on the wound for healing.
- Trivrita,Tila , Nagadanti and Manijstha With milk and honey can apply in the form of paste.
- Ushana Anutaila irrigation nadi sweda and Awagaha Sweda by using decoction of vatahara drugs.

These measures provide lubrication of anal canal relieves pain, cleans the part and finally promotes healing.

ii) Systemic

a) Deepana and Pachana Drugs-Pippali, Pippalimula, Chavya, Chitrak,Vacha, Hingu, Ajamoda, Maricha etc.

b) Mridu Virechan Drugs- Aragvadha, Haritaki, Shunthi, Trivrit etc.

c) Krimighna Drugs- Vidhanga, Vacha, Palasha, Tulsi, Udumbar.

d) Shothahara Drugs- Guggulu,Yastimadhu, Triphala, Dashmula.

2. SURGICAL MANAGEMENT

It is divided in to 3 stages

A)	**Purva karma (Preoperative)**	-	Preparation of patient Position of patient Instruments
B)	**Pradhan karma (Operative)**	-	General Specific
C)	**Paschat karma (Post operative)**	-	General Specific

A) PURVA KARMA (Preoperative Measures)

i) Preparation of Patient:

Before the surgical procedure, the patient should be prepared with Snehana, Langhana and Virechana.

ii) Position of the Patient:

Patient should be made to lie down on a table and position as described same like Arshas(piles) i.e. more or less lithotomy position[86].

iii) Instruments:

Bhagandara yantra is almost similar to arsho yantra except in bhangandara yantra the area above the opening is closed so that the instrument appears semilunar. In males, the yantra should be four angulas in length and five angulas in circumference. But in the case of female, the yantra should be as much as the length of the palm of the patient and six angulas in circumference. This Bhagandara yantra and anal opening are lubricated by Ghrita. Then yantra is to be introduced into guda after instructing the patient to strain.

(B) Pradhana Karma (surgical procedures)

(i) General Surgical procedures in Bhagandara:

The patient should be lie on the table on Lithotomy position. Then anus should be lubricated and bhangandara track is examined to decide whether the bhangandara is parachina (blind external) or arvachina (blind internal).

In case of **Arvachina Bhagandara** , the eshani yantra (probe) is to be introduced into the external opening and whole track has to be excised from the root. But in case of **Parachina,** Bhagandra yantra is used into the anal canal and patient should be asked to strain. During straining, the eshani (probe) is introduced into the internal opening. Then the whole track has to be excised followed by cauterization with the help of kshara of agni. This is sushruta's technique same as **Fistulectomy.**

(ii) Specific surgical procedures to different types of bhagandara:

(1) Shataponaka bhagandara:

The specific feature of this bhagandara is multiple openings on the external surface of skin. It has been suggested that one track should be excised at once and after the previous wound has healed, the remaining tracks should be operated similarly. If multiple tracks are excised by single incision such wound causes **guda vidirana** i.e. cause injury to the rectal walls and sphincters and leads to impairment of Sphincteric function and may lead to leakage of flatus, faeces, urine.

Different incisions for shataponaka bhangandara

Both **Sushruta** and **Vagbhata** have described different types of incision, which can be applied according to the situation of tracks, relations with the anal sphincters etc.

Table

S. No.	Type of incision	Shape described in Ayurvedic text	Analogous
1.	LANGALAKA	Incision having two arms extending on either side	T-shaped
2.	ARDHA LANGALAKA	A similar incision with one arm	L-shaped
3.	SARVATOBHA-DRAKA	Incision surrounding the anal canal on all four sides	Circular
4.	GOTEERTHAKA	Incision resembling the shape of cow's khur	Semi-circular

2. Ushtragreeva bhagandara –

No specific incision is described but simple excision of the track followed by application of **Kshara** to remove the necrotic tissue**. Sushruta** had contraindicated the **Agni** for cauterization because agni may aggravates the pitta dosha.

3. Parisravi bhagandara-

In this type, first the track is located with probe, then it has to be excised and the wound should be cauterized with kshara or agni. Later the wound is washed with warm water and vasti of warm anutaila is given. The different incisions are described by sushruta according to nature of the track and patient

Table

S. No.	Type of Incision	Analogous
1.	Kharjura patraka	Branched incision like the shape of datepalm leaf.
2.	Chandrardha	Semi-lunar incision
3.	Chandra chakra	Circular like full moon
4.	Suchi mukha	Pin-pointed or inverted cone incision towards the anal margin
5.	Awangmukha	Same incision in opposite directions

4. Shambukavarta bhagandara-

It is considered as asadhya (incurable) for treatment because it is due to the vitiation of all the three doshas. Hence , only conservative measures were described.

5. Unmargi bhagandara-

It is described as asadhya, even though management has been described by both **Sushruta** and **Vagbhata.** It is caused due to injury from foreign body ,hence the principle of treatment is excision of track and removal of foreign body followed by cauterization with agni. Later **Krimihara** drugs are applied locally and also taken internally.

6. Parikshepi bhangandara-

Vagbhata has suggested that it has to be treated on the line of **Nadivrana** with **Kshara sutra**.

7. Riju bhagandara-

no specific treatment is described for this Bhagandara. Therefore, it can be treated same as the other simple types of Bhagandara.

8. Arsho Bhagandar-

It is the co-existence of **Arshas** along with **Bhagandara** so,arshas should be treated first before the treatment of bhagander

(C) PASCHAT KARMA

(i) General measures

Haranachandra described it as Pradhana karma Phalanuvritti Karma. It means all the measures adopted to achieve best results of Pradhana karma. So after Shastra karma, Bhagandara has to be treated according to Vrana

Swedana (Local Fomentation)

(a) Sthali sweda-

This is the modified form of nadi sweda. In this type, steam is passed through multiple holes.

(b) Nadi sweda-

It facilities to give fomentation by steam through a pipe.

(c) Droni awagaha sweda-

This is nothing but hot sitz bath in luke warm water or vatahara decoctions.

(d) Upanaha sweda-

A bolus is prepared from the meat of certain animals or plants. Then it is boiled to give swedan on affected part which helps in relieving the pain and vrana ropana.

(ii) Specific measures-

Sushruta and **Vagbhata** have mentioned certain specific measures of postoperative management for **Shataponaka, Ushtragreeva** and **Parisravi** bhagandara.

1. Shataponaka bhagandara-

- Fomentation should be performed with krishara and anupa mamsa (aquatic animal meat) to relieve the pain.
- Nadi sweda should be done with decoction prepared from **Bilwadigana** (Brihat Panchamula).
- Irrigation of the wound must be done with certain drugs like Mrdvika, Kanji, Wine, Sauviraka, Madhuka probably for their antiseptic and anti-inflammatory actions.
- Kustha, Salts, Vacha, Hingu and Ajamodha in equal quantities should be taken with Ghrita.

2. Ushtragreeva bhagandara-

- Application of paste of Sesamum seeds with Ghrita and bandage is advocated.
- Wound can be dealt same as with that of other Bhagandara wound.

3. Parisravi bhagandara

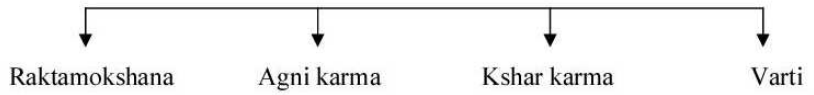
- Irrigation of the wound with warm **Anutaila** and application of ointments.

- **Parisheka** with decoctions of emetic drugs.
- **Poultices** and hot pastes mixed with cow's urine and alkalies should be applied.

(3) Parasurgical measures

The use of certain parasurgical measures are mentioned by different authors for both individual as well as an aid to surgical procedures. They are

Parasurgical



(i) Raktamokshana (blood letting)

All Ayurvedic authors have suggested **Raktamokshana** in the management of **Bhagandara pidika** to prevent suppuration and further progression of disease. The aim of **Blood letting** is to alleviate the vitiated dosha in **Amavasta.** Jalukavacharana is the most preferable method in bhagander.

(ii) Agni karma (thermal cauterization)

Agni karma is done by applying heated shalaka made up of different metals having suitable langth, thickness and shape, according to track. It is the application of heat to cauterize the track or to control the hemorrhage after surgical procedure in different types of Bhagander except in Ushtragreeva. It is also indicated to destroy the residual tracks.**Pratisarana** type of Agni karma is most preferable in Bhagander.

The aim of **Agni karma** may be to burn away necreosed and hard fibrous tissue which prevents the closing of the track. Once the fibrous tissue is burnt out, then it may be expected to develop healthy granulation tissue and wound heals without recurrence.

(iii) Kshara karma (chemical cauterization)

Kshara is also one variety of cauterization by using phytochemical substance. It can be used as an individual or an adjuvant to surgical measure. **Pratisaraniya kshara** which is in liquid form and especially indicated in **Bhagandara**. This may be acting as chemical cautery which burns out the fibrous track and then fresh healthy granulation tissue develop and wound heals without recurrence.

The kshara sutra acts by excision of track and at the same time by cauterization of the hard fibrous tissue around the track and also draining the track properly.

(iv) Varti (Medicated wick)

Sushruta has mentioned varti in bhagandara, chikitsa. That varti is prepared by mixing the powders of **Aragvadha, Haridra**, **Kala** (Aguru) with **Madhu** and **Ghrita.** It is used for sodhana and ropana of tracks.

Chakradutta also described another type of varti which is prepared by mixing **Snuhi** latex, **Kshara** and **Haridra** powder. This type of **Medicated varti** is inserted inside the **Bhagandara Gati.** It may act by cauterizing the fistulous tissue and draining the track.

V
Diet Indicated in Bhagandar

Bhagandra is commonest disease occurred in anorectal region. ushruta, the father of surgery has described every details of the disease .He has described this disease as one of the mahagada i.e. very difficult to cure. He has given elaborative description of Aetiopathogenesis, Clinical presentation, complication management and various other aspects of Bhagandra

Acharya Charaka has given reference of Bhagandra in Sotha Chikitsa chapter and he mentioned only nidana samprapti and chikitsa of Bhagandra. Madavkar and Bhavprakash have followed Sushruta in description and classification.

DIET INDICATED IN BHAGANDARA

Cereals	-	Shali rice
Pulses	-	Mudge
Vegetables	-	Patola, Shigru, Balamuli, Vatragra, Tikta varga
Oil	-	Tila taila, Sarsapa taila, Ghrita
Food preparation	-	Vilapee

Meat	-	Jangala mamsa
Others	-	Honey

APATHYA

1. Vyayam (Exercise)
2. Vyavaya (Intercourse)
3. Kopa (Anger)
4. Aswa Pristayana (Horse riding)
5. Guru Ahar (Heavy Diet)
6. Madya (Alcohol)
7. Vegavarodha (Retaining of urine, faeces, flatus etc.
8. Ajeerna (Indigestion)
9. Sahasa karma (Work more than ability)
10. Asatmya (Ahar, Vihar are not suitable to prakriti)

VI
Drug

HARIDRA

GANA

Charaka:

Kustaghna, Kandughna, Lekhaniya, Vishaghna, Tiktaskandha, Sirovirechana.

Sushruta:

Haridradi, Mustadi, ShleshmaSanshamana.

LATIN NAME

Curcuma longa Linn.

FAMILY

Zingiberaceae, Scitaminaceae

VERNACULAR NAMES

Sanskrit	:	Haridra, Kanchani, Nisha, Rajani, Varavarnini, Gauri, Yoshitapriya, Hattavilasini, Mangalya, Lakshmi.
Hindi	:	Haladi, Haradi.

English	:	Turmeric.
Bengali	:	Halud.
Gujarati	:	Haladara.
Malayam	:	Mannal
Tamil	:	Makhal
Telugu	:	Pasupu

VARIETIES

Bhavamishra has mentioned 4 varieties of Haridra

1) Haridra
2) Daruharidra
3) Karpura haridra
4) Vana Haridra

According to modern taxonomists

1) Curcuma longa
2) Curcuma aromatica
3) Curcuma amada

Among these Haridra, *Curcuma longa* is used in present study.

MORPHOLOGICAL CHARACTERS

Habit

Perennial herb 2-3 feet height with short stem.

Habitat

Cultivated in all states in India, particularly in Chennai, Bengal and Maharastra.

Root

Root stock tuberous, large, ovoid, creeping about 2.5 cm in diameter. Tubers 2.5-7.5 cm long, sessile, cylindrical, fragrant, pale, orange yellow from inside

Stem

Over ground pseudostem, erect and sub cyllindrical.

Leaves

Tufted leaves which are 1 ½ feet long.

Flowers

Flower stem is 4-6 inches which bears yellow flowers .

Rhizomes

Short and thick and constitute the turmeric of commerce

PARTS USED

Rhizome

DOSE

Juice: 10-20 Gms, *Powder*:1-3 Gms.

CHEMICAL CONSTITUENTS

Analytical values of Haridra are Moistures-13.1%, Proteins-6.3%, Fat-5.1%, Minerals-3.5%, Carbohydrate-69.4%, Fibre-2.6%,Vitamin A-50 i.u./gm. Essential oil obtained from dry rhizome has the following constants. Specific gravity -0.929, Refractive Index -1.50504, Ester value-3.2 , Acetyl value- 26.3

It contains Alpha-phellandrene, Sapinine, cineol,borneal, Zinziberone and Termerones. The crystalline coloring matter Cucurmin is a diferuloyl methane of the formula $C_{21} H_{20}$

PROPERTIES

Rasa	-	Tikta, Katu
Guna	-	Ruksha,Laghu
Virya	-	Ushna
Vipaka	-	Katu

KARMA

Vata kapha samaka, Varnya, Lekhana, Vishaghna, Krimighna

INDICATION

Kusta, Kandu, Krimi, Prameha, Aruchi, Pinasa , Vrana, Kamala, Pandu, Bhagandra.

USEFUL FORM

Rhizome

PHARMACOLOGICAL ACTIONS:

External

Extracted oil shows antibacterial action on *Staphylococcus aureus*, *Staphylococcus alubus* and *Bassilus hyphosus*. The antioxidant properties of curcuma powder are probably due to phenotic character of curcuma. Externally it acts as a Analgesic, Anti-inflammatory, Vrana-shodhana and Vrana ropana.

Internal

Gastrointestinal system	Chologogue, Appetiser, Sialogogue, Mild laxative
Cardiovascular system	Haematinic, Haemostatic.
Respiratory system	Decrease excessive secretion of mucous.
Urogenital system	Anti diuretic, removes anomalies of uterus and testis.
Nervous system	Analgesic activity.

THERAPEUTIC USES

External

1) It has anti-arthritic action.
2) A paste or decoction of Haridra is used for locally as well internally in skin diseases, leprosy and snake bite.
3) Haridra powder steam inhalation is used in common cold and upper respiratory tract infections.

Internal

1) Used in Jaundice with buttermilk.

2) Used in all types of Prameha with Amalaki.

3) Used in all Allergic conditions in the form of Haridra Khanda.

APAMARGA

GANA

Charaka:

Shirovirechan, krimighna,Vamnopaga

Sushruta:

Arkadigana

LATIN NAME

Achyranthus aspera Linn.

FAMILY

Amaranthaceae

VERNACULAR NAMES

Sanskrit	:	Pratykpuspa, Sikhari, Kharmanjari, Kinihi, Adhahsalya, Mayuraka.
Hindi	:	Chirchita, Chichrha, Latjira, Apamarga.
Bangali	:	Apang, Latjira, Apamarga.
Gujrati	:	Aghdo
Tamil	:	Najuriri
Telgu	:	Apamarga
English	:	Prickly caff powder

Flowers arranged all around the stalk

CHEMICAL COMPOSITION

The plant (whole herb) and seeds contain alkaline substance specially potash. Defatted seeds yield about Saponins (A & B), which have been identified as α-L-rhamno-pyranosyl (1-4), β-D-glucopyranosyl(1-4), β-glucopyranosyl (1→3), oleanolic acid and β galactopyranosyl ester of saponin.

PROPERTIES

Rasa	Katu, Tikta
Guna	Laghu, Ruksha, Tiksna
Veerya	Ushna
Vipaka	Katu
Karma	Vata, Kapha samak

USEFUL PART

Whole plant, Leaves, Spikes, Roots, Seeds.

DOSE

Fresh juice 5-10 ml, Decoction 10-15 ml, Seed powder 1-3 gms.

PHARMACOLOGICAL ACTION

External

Ash of this whole plant is hygroscopic in nature as well as analgesic when applied to wet intact surface and has powerful caustic effect when applied on the wound.

Internal

1) **G I System** – Appetiser, digestive, mild laxative and anthelmentic
2) **Cardiovascular system –** Cardiotonic
3) **Urogenital –** Moderate diuretic and prevents calculus formation, it renders alkaline reaction to urine
4) **Skin-** It stimulate the sweat glands and relieve itching

THERAPEUTIC USES

The plant posses various medicinal properties and useful as pungent, laxative, anti-dermatosis, wound healer, blood purifier, poison antidote, a cholagogue drug and also for other activities.

It is considered useful in dropsy, piles, boils, eruptions of skin and other diseases. The dried plant is given to children for

coliuc, and also as an astringent in gonorrhea. Plant is crused in water and boiled, and this solution is given in treating pneumonia.

The plant is used in the acute stage of coughs and rheumatism. The seeds and leaves are considered emetic and are useful in hydrophobia. The juice of leaves is given in dysentery and diarrhoea.

The ash of the whole plant (alkalis or kshara) is prepared by burning the herb and it contains potash in a large quantity and the same is used in treatment of coughs and asthma. The ash is mixed with sesamum oil (tila taila) and used externally over wounds, ulcers and on warts of penis(male genital) and also other parts of body. The ash of whole plant (Apamarga) is mixed and prepared with sesame oil (Apamarga kshara taila) and dropped into ears, as an effective remedy for ear complaints.

GUGGULU

GANA

Sushruta:

Elaadi gana

LATIN NAME

Commiphora mukul (Hook ex Stocks) Engl.

FAMILY

Burseraceae

VERNACULAR NAME

Sanskrit	:	Guggulu, Pura, Mahisaksha. Palanksha, Ulukhal, Kumbha, Devdoopa, Kaushiks.
Hindi	:	Guggulu,Guggula.
English	:	Indian bedellium
Sanskrit	:	Guggulu
Bangali	:	Guggul, Mukul
Gujarati	:	Gugara

Telegu : Maishakshi

VARIETIES

The raw drug Guggulu has been classically been grouped in five forms or categories based on colour and other characters viz.

	Jati (Kind)	**Varna (Colour)**	**Specific Indication(Utility)**
(a)	Mahishaksha	Krishna	Human
(b)	Mahanila	Nila	Vatarian
(c)	Kumuda	Kapisha	–do-
(d)	Padma	Rakta	–do-
(e)	Kanaka	Pita	Human

MORPHOLOGICAL CHARACTER

Shrubby, 1.2-1.3 meters high, young parts glandular, pubescent, branches knotty and crooked, divaricate usually ending in a sharp spine.

Leaves 1-3 folliolate, leaflets subsessile, rhomboid-ovate, serrate-toothed in the upper part.

Flowers in 2-5 fasciles, triangular, as long as the tube. Petals brownish red; broadly linear, nearly thrice the length of the calyx, reflexed at the apex.

Stamens 8-10, alternatively long and short, half the length of petals.

Ovary oblong-ovoid, attenuated into style.

Flowering and fruiting time - Post-rain to autumn season

DISTRIBUTION

It is found in Rajasthan, Kathiawar, Gujarat, Rajputana desert, Mysore, Deccan and other warm regions in India.

PERIOD FOR COLLECTION

Summer season, excess heat naturally excudes out the resin from incised barks. Amount of collection varies from plant to plant. Usually one plants yields about 1.5-2 lb of resin.

PROPERTIES

Rasa	Tikta, Katu, Madhur, Kasaya
Guna	Laghu, Tikshna, Snighna, Pichhila, Sukshma, Sara
Virya	Ushna
Vipaka	Katu
Prabhava	Tridoshahara

PARTS USED

Gum Guggulu (Niryas) of stem

CHEMICAL CONSTITUENTS

Guggulu is the oleo gum exudate from the tree obtained by incision of bark,Commercial product about 4.65% foreign organic matter, 1.45% aromatic essential oil 32.3% gum, 58% resin with mineral matter like ZiO2, MgO2,Al2O3 etc. Gum resin- It contains guggulusterons Z and E, guggulusteroids

Major component from essential oil of gum resin are Myrane and Dimyrane. Plant without leaves, flowers and fruits contains Myrical alcohol, b-sistosterol and fifteen amino acids.

Flowers contain Quercetin and its glycosides as major flavonoids components; other constituents being Ellagic and Pelagonidin glucoside.

PHAMACOLOGICAL ACTION AND USES

The drug has been used with the shilajatu, Gomutra, Madhu, Shyama along with cow's urine for effective control of Sthaulya roga.The drug is also effective in controlling inflammation and oedema. The drug is also used for wound healing as described in chikitsa kalpa. It alleviates all disorders of Meda, Kapha and Vata.

The gum is bitter, acrid, astringent, thermogenic, aromatic, expectorant, digestive, anthelmintic, anti-inflammatory, aphrodisiac, stimulant, nervine tonic, liver tonic, haematinic, diuretic, rejuvenating and general tonic and is useful in vitiated conditions of vata, gout, scrofula, sciatica, facial paralysis, hemiplegia, leprosy, leucoderma, halmenthiasis, dyspepsia, cough, asthma, bronchitis, hepatic disorder, otorrhoea, epilepsy, fever, strangury, haemorrhoids, dysmenorrheal, amenorrhea, wounds and ulcers, cardiac disorders, coronary thrombosis, anaemia, urinary calculas, diabetes, trichosis and skin disease.

RESEARCH REPORTS

Anti inflammatory and anti pyretic activities of *C. mukul* was evaluated by using extract of plant and it was found that it reduces pyrogen induced fever and inhibited inflammatory processes (N. Backhouse, A. Pinto et al. International Jour. of Pharmacognosy, 1998)

Its active constituents Guggulusterol-I, II and III is major component of Navakguggulu, it has a significant effect in rheumatoid arthritis. Hypolipidaemic effect was evaluated experimentally on estrogen induced hyperlipidaemia in chicks (J. Res. Indian Med.1974). It is an effective hypolipidaemic and hypocholestraemic activity (J. Res. Indian med.1976). It is found to be the inhibitor of platlet aggregation (Planta. Med., 1979). It also increases serum fibrolytic activity and decrease platelet adhesive index in human beings (Indian J. Med. Res., 1979). The drug has given a significant response in atherosclerotic disorders like coronary insufficiency (Rheumatism 1979). Its compound Guggulipid is found to be useful in heat disease, spondylitis (anti inflammatory activity) and in gout (East, Pharma, 1979).

VII
Kshar sutra application

The following equipment and instruments are usually required during application of Kshar varti.

1) Lithotomy Table
2) Spot Light
3) Dressing Trolley
4) Instrument Box
5) Usnodaka Awagaha Yantra
6) Nadi Sweda Yantra

1) Lithotomy table-

This table offers a comfortable position to the patients as well as provides an ideal position for the proper examination and application of Kshar sutra and Kshar varti.

2) Spot light-

A light source in the form of spot light focused over the anal and perianal region provided an illuminated, comfortable site for working.

3) Dressing Trolley

This trolley contains following instruments and materials

- Different drums with sterile cotton, gauze pieces, cutsheets etc.
- Instruments tray with different types of probes artery forceps, knife, scissors, various sizes of proctoscope ctc.
- Kshara sutra and Kshara varti tray
- Tray with sterile gloves of different size.
- Tray containing sterile syringe and plain rubber catheters.
- Bottles of anutail, Ropana Shashank (medicated ghee) and antiseptic lotions.
- Sterile lubricants containers.

4) Instruments box –

The following specially designed instruments are necessary during managements.

a) Curved, malleable copper probes with eye: Various assorted lengths.

b) Curved malleable alloy/copper probes with notch at the distal end and handle at the proximal end of various assorted length.

c) Non malleable curved steel probes: Various length.

d) Artery forceps - At least 2 pairs

e) Mosquito forceps - At least 2 pairs

f) Curved scissors - 2 pairs

g) Needle holder - 1

h) Proctoscope of various sizes

i) Disposable scalpel blades - As required

j) Forceps (Blunt) – 2

k) Chittle's forceps

5) Ushnodaka awagaha yantra

This contains an electric geyser and chair with warm water container and both connected by metal tube. These tube provide for the flow of hot water from geyser to chair. Patients are instructed to sit in the chair and to take hot sitz bath to alleviate pain and inflammation and it also helps in growing healthy granulation tissue.

6) Nadi Sweda Yantra

It consisted of steam chamber, a rubber tube and steam spreader. This was used for fomentation of the anal and perianal region. This helped to relieve pain, reduce inflammation and also helped in the maintenance of local hygiene.

EXAMINATION OF PATIENT:

Each case was thoroughly examined and investigated and findings were recorded in a detailed proforma designed in the department for patient of Fistula-in- ano.

(1) History of the patient:

History of the disease with respect to its onset, mode and duration, type of discharge, severity of pain, chronicity of the disease, bowel habit, associated diseases like tuberculosis, diabetes, colitis, urinary disease, cardiac disease etc., past treatments undertaken for the disease, number of surgeries and type of surgeries which the patients has undergone for the same disease, occupation, appetite, nutritional status, family history and his personal habits and addictions were recorded carefully.

(2) Systemic examination:

Each system was carefully examined before the patients was initiated into the treatments. Due importance was given to examine the digestive, cardiovascular, respiratory, nervous, genitourinary systems.

(3) Local examination:

It was done under following headings:

(a) **Inspection-** First patient was kept in lithotomy position on the lithotomy table. Then the condition of the Pereianal and scrotal skin, presence of induration, inflammation, colour of skin, quality and quantity of discharge, margins of external openings number of openings, the o'clock position, previous operated scars, the tone of the sphincter were observed.

(b) **Palpation-** For local temperature, tenderness, area of induration, fluctuation, consistency of pus etc. The fibrous cord like fistulous track, its direction and extent, presence of pus cavities etc. were also palpated.

(c) **Digital rectal examination** – it was done with gloved, lubricated index finger to examine the presence of any fissure, pile masses, malignancy, polyps, blind abscess cavities, hypertrophied anal papilla, tone of sphincter muscles, status of anorectal ring (in previously operated cases) and status of prostate(in males).

Special importance was laid down to identify the internal opening, its position - whether in the anterior or posterior quadrant, number of openings, distance from the anal verge, tenderness in the area etc.

(d) **Instrumentation-** This was an important examination which provided accurate information regarding the track, whether

- It was complete or not
- The extent of the track
- The direction of track
- Position of the internal opening
- Relation of the internal opening to the ano rectal ring
- Relation of the fistulous track with the levator muscles
- Branching of the track

- Whether the track had extended to the opposite side of the midline
- Relation if any, to the neighboring bones

(i) **Probing:** A straight or curved malleable metal probe was introduced through the external opening with care in the direction of least resistance towards the internal opening by guiding with the finger inside the rectum. Care was necessary in order to have the cooperation of the patients during examination and also to avoid the creation of false tracks.

(ii) **Proctoscopy:** It was done routinely to identify the presence or absence of pile masses, growths or ulcerations, condition or rectal mucosa, location of internal opening etc.

(iii) **Sigmoidoscopy:** It was done if necessary to rule out bowel pathologies.

(4) Investigations

Following investigations were carried out**:**

- **Haematological**: Hb%,Total Leucocytes count, Differantial Leucocyte count, Erythrocyte sedimentation rate,Fasting blood sugar, Post prandiol blood sugar. (Blood urea ,Serum Creatinine etc. if reuired)
- **Urine**: Routine and microscopy
- **Stool**: Ova & Cyst; occult blood
- **HIV**
- **Pus:** culture and sensitivity test
- **Tissue biopsy**: if necessary from the floor of the fistulous track.

Radiography:

- **Sinogram:** As and when required
- **Chest X-Ray**: As and when required

Others:

To exclude tubercular fistula in ano required investigations like Mantoux, ELISA etc. was carried out when it was found necessary.

PREPARATION OF THE PATIENT:

After selecting the patient for the threading they were explained the procedure in detail and then advised the following instructions

- Laxative, for regularizing movement of bowel
- Local part preparation and general hygiene.
- Enema before primary threading for evacuation of bowel.

PROCEDURE OF KSHARA SUTRA APPLICATION

Once prepared, the patient was asked to lie in lithotomy position comfortably. The perianal area was cleaned with an antiseptic solution. The patient was advised to flex his thighs over his abdomen and relax his thighs in order to relax the sphincter muscles. The sphincter muscles could be further relaxed by local nadi sweda.

Once the patient was comfortable and cooperative, gloved, lubricated index finger was inserted into the anal canal and the findings were rechecked. A suitable probe was selected and introduced into the external opening of the track and carfully advanced along the path of least resistance. The finger in the anal canal supported the advancement of the probe towards the internal opening. The probe was advanced, brought out of the internal opening and then carefully manipulated to come outside the anal canal. Initially a suitable length of plain thread was placed in the eye of the probe, and the probe pulled out in order to position the thread in the track. The two ends of the thread were tied loosely outside the anal orifice. This procedure is termed the “primary threading”.

CHANGING OF THREAD

Patients were instructed to take sitz bath twice daily from the time of primary threading till before change of threads. The change of threads was done at weekly interval. In control group the Kshara sutra was used to replace the plain thread in the Ist sitting and only Kshara sutra were used to replace the old ones. New Ksharasutra was tied to the lateral side of the knot(of old thread).Then an artery forceps is applied inner end to the same knot. The thread was cut between the clipped artery forceps and the knot. The artery forceps was gently pulled out along with the old thread such that the thread came out leaving behind the new Kshara sutra in the fistulous track. The old thread was cut and the ends of the new Kshara sutra were tied firmly outside the anal orifice. This procedure of change of the thread was done by "Rail-Road technique". A cotton soaked in anu taila was placed locally and T- Bandage applied.

At each changing of the thread, the length of the previously changed thread was measured and recorded in the proforma.This provided information regarding the amount of tissue already excised and the length of the track that still needs to be excised.

APPLICATION OF KSHAR VARTI WITH PLAIN THREAD

In patients of group B, plain thread was used instead of Kshar sutra to replace the old one. And after applying the plain thread a Kshar varti was used to keep into the fistulous track. Kshar varti was applied by pusing it gradually into the track through the external opening.

Patients was advised not to have sitz bath on the day the thread was changed, but asked to continue it from the next day till the day of subsequent change of thread.

Adjuvant Therapy:

All the patients were advised to go home and to do their routine works and were asked to follow this adjuvant treatment.

(1) **Analgesics**- Oral analgesics were advised to control the pain

(2) **Anutaila Vasti** - Patients were advised to take 3-5 ml of anutaila vasti with the help of syringe and rubber catheter No.10 before defecation, to regularize the bowel & relieve constipation.

(3) **Ushnodaka Awagaha (Hot sitz bath) -** Patients were advised to have hot sitz bath after defecation. It keeps wound clean as well as reduce pain and inflammation.

(4) **Ropana Shashanka (or) Jatighrita -** It was applied over the cut through wound daily after sitz bath to enhances the healing of wound.

(5) **Shigru guggulu or Triphala guggulu :** It was advised 1 tab TDS in order to reduce pain and inflammation.

(6) **Laxatives -** In order to promote easy evacuation of stools, Abhayarishta (30 ml BD), Triphala churna (5 gm HS) or Isabgol (5gm HS) were advised.

(7) **Ambulation of the patient -** Patients were allowed to do normal routine work but was advised against riding vehicles or sitting on hard surfaces for long periods of times.

(8) **Diet** - Nutritional light diet, green leafy vegetables and fruits.

(9) **Avoid -** Excessive use of coffee, tea and alcohol, spicy fried food, constipated diet, riding, cycling, prolonged sitting, excessive indulgence in coitus etc.

FOLLOW-UP

Once the track was completely excised or cut through, the patient was instructed to visit Ano-rectal clinic once every month for 3 months to recheck the status of the excised area or wound. Then onwards patient was advised to visit once in 3 months twice or thrice,for assessing the untoward effects of

treatment like faecal incontinence etc.(if present).For each follow-up visit, the patient is examined for any recurrence of disease or any associated lesion of the ano-rectum.

VIII
Modern Anatomy and Physiology

The fistula-in-ano is an abnormal communication between the anal canal and the perianal skin. It usually results from an anorectal abscess which burst spontaneously was opened inadequately. It is a disease for which operative procedures have been advocated and practiced by the surgeons at various times. Even the ancient texts in medical literature are full of various surgical measures employed at some time or the other for treating the disease.

THE RECTUM

In cases with a fairly long loop of sigmoid colon, which hangs down into the pelvis, the recto-sigmoid junction is marked by a distinct flexure, as the terminal sigmoid which is directed backwards and upwards, turns sharply downwards to follow the curve of the sacrum and become the rectum, but when the sigmoid colon is short such pronounced angulation may be short.

At first the rectum proceeds downwards, then downwards and forwards closely applied to the concavity of the sacrum and coccyx for 13-15cm. It ends 2-3cm in front of and below the tip

of coccyx by turning abruptly downwards and backwards and passing through the levator muscles to become the anal canal.

RELATIONS OF PELVIC PERITONEUM TO THE RECTUM

The relations of the pelvic peritoneum to the rectum are of considerable surgical importance. The upper third or so of the rectum has a complete peritoneal investment except for a thin strip posteriorly, where the peritoneum is reflected off it as the two leaves of the thick short mesorectum. As the rectum descends into the pelvis, the peritoneum sweeps off, not at the back, but at the sides of the rectum, so that the uncovered portion posteriorly becomes progressively wider until only the anterior aspect has a peritoneal coat. Finally this becomes reflected forwards as the bottom of the recto-vesical or recto-uterine pouch on the back of the seminal vesicles and bladder, or of the vagina and the uterus in the female, leaving the lower third or so of the rectum without any peritoneal covering. On the average the anterior peritoneal reflection lies about 8-9 cm from the perineal skin in the male and 5-8 cm in the female.

THE FASCIAL RELATIONS OF THE RECTUM

On either side of the rectum, below the pelvic peritoneum, between it and floor of the pelvis formed by the levator ani muscles, is a space filled with fibro fatty tissue, As a part of the pelvic fascia it connects the side wall of the pelvis with the rectum *(lateral ligaments of the rectum).* It is roughly triangular in shape with the base on the pelvic side wall and the apex joining the side of the rectum. Their division during rectal excision is followed by a variable amount of bleeding from the middle hemorrhoidal arteries which run in them.

The posterior aspect of the extra peritoneal rectum is loosely bound down to the front of the sacrum and coccyx by connective tissue which is easily separated by blunt dissection. The sacrum and coccyx are covered by a stronger fascia, a

thickened part of the parietal pelvic fascia and is known *as fascia of Waldeyar*.

Anteriorly, the extra peritoneal part of the rectum is also covered with a layer of visceral pelvic fascia, which extends from the anterior peritoneal reflection above to the superior fascia of the urogenital diaphragm *(Triangular ligament)* below, and laterally becomes continuous with the front of the lateral ligaments. It is a definite fascial layer, easily seen at operation for excision of the rectum, and known to surgeons as *Denonvillier's fascia*. It intervenes between the rectum behind and the prostate and seminal vesicles or vagina anteriorly but is adherent closely to the rectum, than to these structures.

OTHER RELATIONS OF THE RECTUM

Behind, outside the *fascia of Waldeyar*, the rectum is related to the sacrum and coccyx, the levator ani muscles, the left and sometimes also the right coccygeus muscle, the middle sacral vessels and the roots of the sacral plexus on either side. In front, the relations of the rectum are entirely visceral. In the male, the extra-peritoneal rectum is related from below upwards to the prostate, seminal vesicles, vas differentia, ureters and bladder wall. The intraperitoneal rectum is in contact with loops of small gut and possibly the sigmoid colon.

In the female, the extraperitoneal rectum lies immediately behind the posterior vaginal wall. The intraperitoneal rectum is related across the *pouch of Douglas* to the upper part of the vagina and the uterus, but occupying the pouch and separating it from these structures are frequently coils of small intestine, the ovaries, uterine tubes and the sigmoid colon.

Laterally, above the peritoneal reflection are viscera, mainly loops of small gut, uterine appendages and the sigmoid. Below the reflection it is separated from the side wall of the pelvis, the ureter and iliac vessels by the connective tissue and fascia of lateral ligament. At a still lower level, the levator ani muscle becomes a close lateral relation.

THE CURVES OF THE RECTUM

Anteroposterior curves

They are two in number

- The sacral flexure of the rectum follows the concavity of the sacrum and coccyx, and
- The perineal flexure of the rectum is the backward bend at the anorectal junction.

Lateral curves

Usually, there are three of them, both the uppermost and lowermost being convex to the right, the middle one convex to the left. The angulations of the bowel on the concave side of each of these curves are accentuated by infoldings of the mucosa known as *Houston's valves*. Thus there is an upper and lower valve on the left side and a middle valve on the right. The middle valve is also known as *Kohlrausch's fold*, is by far the most prominent. The part of the rectum lying below this valve has a wider lumen than the intraperitoneal part; this dilated lower portion is known as *ampulla of the rectum.*

THE ANAL CANAL

This short passage, though only 3 cm long. It is of the greatest surgical importance both because of its role in the mechanism of rectal continence and because it is prone to certain diseases.

In the normal living subject the anal canal is completely collapsed owing to the tonic contraction of the anal sphincters, and the anal orifice is represented by an anteroposterior slit in the anal skin.

Posteriorly, the canal is related to the coccyx with a certain amount of fibrous, fatty and muscular tissue intervening.

Laterally, there is the ischiorectal fossa on either side with its contained fat and the inferior hemorrhoidal vessels and nerves which cross it to enter the wall of the canal.

Anteriorly, in the male, the canal is related to the central point of perineum, the bulb of the urethra, and the posterior border of the urogenital diaphragm *(triangular ligament)* containing the membranous urethra. In the female the canal is related in front to the perineal body and to the lowest part of the posterior vaginal wall.

THE MUCOCUTANEOUS LINING

The lining of the anal canal consists of an upper mucosal and a lower cutaneous part, the junction of the two being marked by the line of the anal valves, about 2 cm from the anal orifice. This level is also sometimes referred to as the *Pectinate or Dentate line* because of the serrated fringe produced by the valves *(L. pectin = cock's comb, L-dentatus = toothed).* The pectinate line marks the junction of the post allantoic gut and the proctodeum. Above each valve is a pit or pocket known as *Anal Sinus, or crypt or sinus of Morgagni*. These sinuses may be of some surgical significance in that the foreign material may lodge in them with resulting infection. Above the Pectinate line, the mucosa is thrown into 8-14 longitudinal folds known as the rectal columns or *columns of Morgagni*, each adjacent two columns being connected below at the pectinate line by an anal valve. For 1cm or so above the line the mucosa is a deep purple color, but about the anorectal ring it changes to the pink color of rectal mucosa.

Below the Pectinate line, the anal canal is lined by modified skin devoid of hair and sebaceous and sweat glands.

ANAL INTERMUSCULAR GLANDS

It is often possible to demonstrate extensions of the anal mucosa through the substance of the wall of the anal canal; these are *anal glands or ducts*. There are apparently 4-8 of these glands in the normal anal canal. Each has a direct opening into the apex of the anal crypt and occasionally two glands open into the same crypt.

Traced outwards from its cryptal opening, the average gland has a short tubular portion in the submucosa. Some glands appear to be confined entirely to the submucosa, but with 2/3rd of them, one or more branches enter the internal sphincter, and with one half, branches cross this sphincter completely to reach the intersphincteric longitudinal layer, the general direction of extension of the glands is outward and down ward, but practically never upward above the level of the anal valves.

It is highly doubtful, whether the anal glands have any secretory function; they appear to be simply blind outgrowths of the anal crypts. Their surgical significance arises from the fact that they may provide an avenue of infection from the anal canal to the submucosa and intersphincteric spaces; they may also be the site of origin of an adenocarcinoma.

THE MUSCULATURE

The internal sphincter

Superiorly it is continuous with the circular muscle coat of the rectum, and inferiorly it ends with a well-defined rounded edge 6-8 mm above the level of the anal orifice and 12-8 mm below the level of the anal valves.

The muscle fibers are grouped into discreet elliptical bundles which in the upper part of the sphincter lie obliquely with their transverse axis running internally and downward. This obliquity becomes less progressively as the internal sphincter is traced downwards so that in lower part of the muscle, the bundles lie horizontally.

The external sphincter

It is seen to extend further downwards than the internal sphincter and the lowermost portion curves medially to occupy a position below and slightly lateral to the lower rounded edge of the internal sphincter and close to the skin of the anal orifice. It is divided into subcutaneous, superficial, and deep parts. But according to Goligher et al., it is said to be a single continuous

sheet of muscle. However the lowermost or the subcutaneous portion of it, which lies below the internal sphincter does differ from the rest in that it is traversed by a fan-shaped extension of the longitudinal muscle coat of the anal canal which is split into 8-12 discreet muscle bundles. At its upper end, the external sphincter fuses with the Puborectalis part of the levator ani muscle and it is quite impossible on histological section to say where one muscle ends and the other begins.

THE LONGITUDINAL MUSCLE FIBRES

The main layer of the longitudinal muscle fibers in the anal canal is seen to lie between the internal and external sphincters. Histologically, this layer consists of non-striped muscle fibers mixed with elastic tissue. Traced upwards it is continuous with the outer longitudinal muscle layer of the rectal wall and is joined by some striped fibers of the levator ani. Traced downwards it is seen to break up opposite the lower border of the internal sphincter into a number of septa which diverge fan wise and pass radially through the lowermost part of the external sphincter. Some of these diverging fibers are attached ultimately to the skin of the anal and perianal region from a point a little below the internal sphincter to well beyond the anal verge, while others lose themselves in the fat surrounding the lower part of the anal canal.

An additional layer of longitudinal fibers to which *Fine and Lawes* first drew attention, is the one that lies on the inner aspect of the internal sphincter under the anal mucosa and skin. They named it the *musculus submucosae ani*. It is composed of unstriped muscle fibers together with elastic connective tissue, and would appear to be derived from strands of the main intersphincteric longitudinal layer which make their way inward and downward between the bundles of the internal sphincter. Inferiorly few of them become continuous around the lower edge of the internal sphincter with the innermost fibers of the main intersphincteric longitudinal layer. But majority continue downward and outward superficial to the subcutaneous part of

the external sphincter, to be attached to the skin of the anus and the perianal region.

ATTACHMENTS OF THE EXTERNAL ANAL SPHINCTER

The external sphincter is an elliptical, cylindrical muscle which surrounds the anal orifice and traced upwards on the lateral sides, it becomes continuous with the puborectalis and pubococcygeus muscle. Posteriorly, the cylinder is attached at the lowermost level to the skin of the perianal region close to the midline. At a slightly higher level, the external sphincter fibers form anococcygeal raphe which runs backwards and is attached to the dorsal aspect of the coccyx.

Above this raphae, the external anal musculature is devoid of posterior attachment, but forms a loop of muscle, which extends up to the level at which the median raphae of the levator muscle inserts on to the front of the coccyx. Behind the anal canal, between the upper raphae of the levators and the lower one formed by the external sphincter, lays a space filled with fatty tissue-*reterosphincteric space of Courtney,* through which fistulous tracks sometimes pass. Anteriorly, many of the lower fibers of the external sphincter are inserted into the perianal skin in and near the midline. At a higher level, these fibers merge into the transverse perineal muscles by a process of decussation at the central point of the perineum or the perineal body.

Shafik has claimed that the musculature of the external sphincter is arranged essentially in a system of three loops, which he believes, facilitates the maintenance of continence.

THE LEVATOR ANI MUSCLES

The levator ani is a broad, thin muscle, attached peripherally to the inner sides of the pelvis and united medially with its fellow of the opposite side to form the greater part of the floor of the pelvic cavity. It consists of

1. The Iliococcygeus

This is a very thin muscle which arises from the ischial spine and posterior part of the pelvic fascia covering the obturator internus muscle. The fibers run downward, backward and medially and are inserted into the sides of the last two pieces of the sacrum and into the anococcygeal raphae.

2. The pubococcygeus

This arises from the back of the pubis and the anterior part of the obturator fascia and is directed almost horizontally backwards along the sides of the lower part of the rectum as a flat band to fuse with its fellow of the opposite side to constitute a broad fibrous band lying on the anococcygeal raphae. This band is continued up in front of the coccyx to be inserted into the anterior aspect of the first piece of the coccyx and the last segment of sacrum.

3. The puborectalis

It arises from the lower part of the back of the symphysis pubis and the superior fascia of the urogenital diaphragm, runs backward alongside the anorectal junction to join with its fellow immediately behind the bowel and forms a strong U-shaped loop which slings the rectum to the pubis.

THE ANO-RECTAL RING

The term was coined by *Milligan and Morgan* to denote the functionally important ring of muscle which surrounds the junction of rectum and anal canal. This is composed of the upper borders of the internal and external sphincters, which completely encircle the junction and on the posterior and lateral aspect, by the strong puborectalis sling. As a consequence, the ring is stronger posteriorly and laterally than it is anteriorly, and its definition on the posterior aspect is accentuated by the forward angulation of the bowel at this level.

Recognition of the anorectal ring is of paramount importance in the treatment of abscesses and fistula in the anal

region, for its complete division inevitably results in rectal incontinence, while its preservation, despite the sacrifice of all the rest of the sphincter musculature, at least ensures that there will be no gross lack of control, though minor degrees of incontinence may result.

HILTON'S WHITE LINE IN THE ANAL CANAL

Hilton defined this line with three characteristics- that it is easily recognizable, white and marks the interval between the external and internal anal sphincters.

TISSUE SPACES IN RELATION TO THE ANAL CANAL

1. The ischiorectal fossa

On either side of the anal canal and lower part of rectum, intervening between them and side wall of the pelvis, is a pyramid shaped space, the apex of which is above, where the levator muscle joins the fascia on obturator internus, the base below formed by the perianal skin.

1a. *The perianal space*

This contains finely lobulated fat similar to that found elsewhere in the superficial fascia of the body, and laterally it becomes continuous, with the subcutaneous fat of the buttocks.

Medially it extends to the lower part of the anal canal, lined by modified skin. This space contains the lower part of the external sphincter and external hemorrhoidal plexus. It is in the perianal space that anal haematomas and perianal abscesses form and subcutaneous and low anal fistulae traverse this space.

1b. *The ischiorectal space*

This comprises the upper 2/3^{rds} of the ischiorectal fossa, it is filled with coarsely lobulated fat, rather similar to that found in lipomas and is crossed by the inferior hemorrhoidal vessels and nerves. Anteriorly, the ischiorectal space has an important extension forward above the urogenital diaphragm, which is liable to become filled with pus in ischiorectal abscesses or high anal

fistula. Posteromedially the ischiorectal space connects, under cover of the anococcygeal raphae, through the *reterosphincteric space of Courtney*, with the opposite ischiorectal fossa, and this is an important avenue of extension of infection from the ischiorectal space.

2. The submucous space

This space lies between the internal sphincter and the mucocutaneous lining of the upper 2/3rd of the anal canal. Above it becomes continuous with the submucous layer of the rectum. It contains internal hemorrhoidal venous plexus and related terminal branches of the superior hemorrhoidal artery.

3. The pelvirectal or supralevator space

This term is applied to the potential space between the pelvic peritoneal floor and the levator ani muscles, partly on either side in the area occupied by the loose connective tissue of the lateral ligaments of the rectum and partly in front and behind the rectum.

4. The central space

Attention has been drawn to this space by *Shafik*. It is situated between the lower end of the longitudinal intersphincteric muscle and the subcutaneous external sphincter. It communicates externally with the ischiorectal fossa, inferiorly and internally with the perianal and submucous spaces and superiorly with the intersphincteric space.

5. The intersphincteric space

This space, lying between the internal and external sphincters, is considered to be important in the genesis of abscesses in the region of the anal canal, because the anal intermuscular glands terminate in this space.

BLOOD SUPPLY

The inferior mesenteric artery as it crosses the left common iliac artery close to the aorta; its name is arbitrarily changed to

the superior hemorrhoidal, which reaches the back of the upper end of the rectum opposite the third piece of the sacrum. Here it divides into two main branches, the right and left, though the level of bifurcation shows considerable individual variation. These branches descend on the rectal wall at first posteriorly, then inclining more towards the lateral aspect each one generally breaking up into smaller branches which penetrate the muscle coat to reach the submucosa, in which they proceed downward as straight vessels which run in the *columns of Morgagni* and terminate usually above the anal valves as a capillary plexus.

Of these vessels, the right branch divides into two major branches, which run down the right anterior and right posterior aspects of the rectum while the left branch continues undivided down the left lateral aspect. As the superior hemorrhoidal veins closely accompany the arteries, this arrangement of arterial branches is said by *Miles* to account for the occurrence, in cases of internal hemorrhoids, of two main piles on the right side, but only one on the left side. Additional blood supply to the rectum and anal canal are derived from two internal iliac arteries via the right and left middle and inferior hemorrhoidal arteries.

The middle hemorrhoidal arteries spring from the anterior divisions of the internal iliac arteries, proceed medially and forward in the lateral ligament to reach the rectal wall, where they anastomose with the branches of superior and inferior hemorrhoidal vessels. However, this arrangement is variable and the middle hemorrhoidal artery may be absent, double or treble on one or both sides.

The inferior hemorrhoidal artery is derived indirectly from the internal iliac arteries, through its internal pudendal branch. It runs medially and forwards, breaking up into branches, which penetrate the external and internal anal sphincters and reach the submucosa and subcutaneous tissue.

VEINS

The veins of the rectum comprise the superior hemorrhoidal which drains into inferior mesenteric and portal system, and the middle and inferior hemorrhoidal which enter the systemic venous circulation via the internal iliac vein. The superior hemorrhoidal venous plexus lies in the submucosa of the upper part of the anal canal and lower 2cm or so the rectum. The middle hemorrhoidal vein is relatively unimportant, but the inferior hemorrhoidal vein is of more significance, in that it drains the subcutaneous or external hemorrhoidal plexus of veins, which lies under the skin of the anal orifice and lower part of the anal canal. Probably this plexus has communications also with the submucous or internal hemorrhoidal plexuses. The veins of the portal system do not have valves and are therefore specially susceptible to back pressure.

LYMPHATICS OF THE RECTUM AND ANAL CANAL

These follow the blood vessels supplying this part of the intestine. Hence there are three main routes of drainage -

1. Upwards through the lymphatics and glands accompanying the superior hemorrhoidal and inferior mesenteric vessels to the aortic glands.
2. Laterally, along the middle hemorrhoidal vessels on either side to the internal iliac glands, on the side walls of the pelvis.
3. Downwards, through the pararectal glands on the back of the rectum and along lymphatic plexuses in the anal and perianal skin, the anal sphincters and ischiorectal fat to reach eventually the inguinal lymph glands or the glands along the internal iliac vessels.

Pathological investigations of the mode of extension of cancer show that the main direction of spread from any growths in any part of the rectum is upwards along the superior hemorrhoidal vessels. [12] Metastases have been demonstrated in

the internal iliac glands in some cases with growths in the extraperitoneal part of rectum. It is well known that metastasis occurs in the inguinal glands in cases of rectal or anal carcinoma only when the skin of the anal canal or perianal region is involved by the growth.

NERVE SUPPLY

The lower rectum and also the bladder and sexual organs in both the male and the female receive its sympathetic supply by the way of the presacral or hypogastric plexus.

Parasympathetic supply is derived from small twigs known as the *nervi erigentes* or sacral autonomics, which spring from the 2nd, 3rd and 4th sacral nerves on either side.

ANAL CANAL

Motor Innervation

The internal sphincter is supplied by the sympathetic and parasympathetic which presumably reaches the muscle by the same route as that followed to the lower rectum. The sympathetic is motor and the parasympathetic inhibitory to the sphincter.

The voluntarily contracting external sphincter has two sources of supply - the inferior hemorrhoidal branch of the internal pudendal and the perineal branch of the 4th sacral nerve. The levator ani muscles which are a part of the voluntary sphincter mechanism of the anus are supplied on their pelvic aspect by twigs from the 4th sacral nerve, and on their perineal aspect by the inferior hemorrhoidal or perineal branches of the pudendal nerve.

SENSORY INNERVATION

The normal cutaneous sensation which is felt in the skin of the perianal region and of the wall of the anal canal below the level of the anal valves is certainly conveyed by afferent fibers in the inferior hemorrhoidal nerves and it can be abolished by an inferior hemorrhoidal nerve block. The much less definite, dull, sensation experienced in the mucosa of the canal above the level

of the valves, in response to touching or pinching with forceps or injection of hemorrhoids, is possibly mediated by the parasympathetic nerves.

IX
Modern Pathogenesis and Classification

AETIOLOGY OF FISTULA-IN-ANO

Aetiology

Non specific

- Crypto glandular infection
- Legency of anorectal abscess
- Sequal of anorectal abcess
- Previous pyogenic abscess

Specific

- Tuberculosis
- Anal fissure
- Ulcerative colitis
- Crohn's disease
- Actinomycosis
- Lymphogranuloma Venerum
- Carcinoma (Colloid)
- Lymphoma
- Foreign body intrusion
- Pelvic inflammation
- Infectious dermatitides
- Trauma
- Radiation
- Immuno compromised
- state
- Leukemia
- Other rectal, obstetrical or gynecological operations

PATHOGENESIS OF FISTULA-IN-ANO EXPLAINED BY BUIE

I Stage
(Stage of infection)

- Infection of anal crypts
- Formation of primary opening of fistula
- Seating of oedematous crypts
- Spread of infection

↓

II Stage
(Stage of burrowing)

- Burrowing & fistulous track may proceed in any one or more than one direction
  - (a) Subcutaneous
  - (b) Submucous
  - (c) Through External Sphincter
  - (d) Through Internal Sphincter
  - (e) Between Ext. & Int. Sphincters
  - (f) Infection may go either superior or inferior to levator ani muscles

↓

III Stage
(Stage of Abscess formation)

- Abscess formation
- Appearance of clinical symptoms

Group I	Group II	
	Supralevator	Infralevator
Subcutaneous	Abscesses	Abscesses
Submucous	R. Pelvirectal	R. Ischioanal
	L. Pelvirectal	L. Ischioanal
	Retrorectal	

↓

IV Stage
(Stage of formation of secondary opening)

- Spontaneous abscess rupture or drained out surgically
- Opening either inside the rectum or external surface of the body

↓

FISTULA-IN-ANO

IDENTIFICATION OF INTERNAL OPENING:

(1) **Goodsall's rule** is very important to assess the internal opening although it is not invariably true. It is as follows:

Draw an imaginary transverse line through the central portion of the anus. An external opening anterior to this line indicate that tracks run directly to the internal opening in the same quadrant of anal canal. An external opening posterior to this line indicate that the tracks run curved course to internal opening in posterior midline.

An exception to this rule is an external opening situated beyond a radius of 3.5 cms from the anus in anterior to the imaginary line. In this case track usually curved and internal opening is situated posteriorly in the midline.

(2) A cord like thing may be palpable on digital examination beneath the skin between the secondary opening and anal wall.

(3) Pressure applied on perianal tissues around the track with the procotoscope in situ, a drop of pus may appear at internal opening.

(4) A flexible probe may be used through external opening to detect the internal opening.

CLASSIFICATION OF FISTULA-IN–ANO

A number of authors have made significant contributions to the study of classification of Fistula-in-ano is based on its anatomical landmarks.

Milligan Morgan's (1934) classification is relative to the anal sphincters and in particularly to the anorectal ring. **Ernest Mile** classified fistulae according to the arrangement of lymphatic plexuses around rectum and anus. Some call the former one as the **Vertical disposition** and the later one as the **Horizontal disposition**.

Eisenhammer stressed the importance of the intersphincter plane both in pathogenesis and spread of fistulae**.**

Stertzner's (1959) classification is based on the anatomical course of the fistulous track in relation to the internal and external sphincter and the levator ani muscles. This classification was modified by **Park** in 1979.

Over the years, many classifications of Fistula-in-ano have described. Some have been very simple but of no help in the treatment ,while others have used terms which have different connotations to different surgeons. The aim of any such classification should be to help the surgeon in the operative cure of the disease.

Park's classification of Fistula-in–ano gives an accurate description of the anatomical course of the fistulous tracks.

CLASSIFICATION OF FISTULA–IN-ANO BY DIFFERENT AUTHORS

Milligan's Morgan's and Goligher	Ernest Mile's	Melcheor, Goz and Cherisesco	Steltzner
1. Subcutaneous	1. Subcutaneous	1. Subcutaneous	1. Muscular
2. Submucous	2. Subsphincteric	2. Submucous	2. Transsphincteric
3. Low anal	3. Submuous	3. Ischiorectal	3. Extrasphincteric
4. High anal	4. Intermuscular		
5. Anorectal	5. Pararectal		
(a) Ischiorectal			
(b) Pelvirectal			

PARK'S CLASSIFICATION

Intersphincteric (45%)	Transsphincteric (30%)	Suprasphincteric (20%)	Extrasphincteric 5%)
1. Simple low track	1. Uncomplicated	1. Uncomplicated	1. Secondary to Anal fistula
2. High blind track	2. High blind track	2. High blind track	2. Secondary to Trauma
3. High track with rectal opening			3. Secondary to Anorectal disease
4. High fistula without perineal opening			4. Secondary to pelvic inflammation
5. Extrarectal extension			
6. Fistula from pelvic disease			

This knowledge acts as a guide to the operative treatments and one would, therefore, heartily endorse it.

COMPARISION OF CLASSIFICATIONS OF FISTULAE IN ANAL REGION

Milligan Morgan's (1934) and Goligher (1975)	Park's (1976)
Subcutaneous (5%)	Scarcely recognized
Low anal (75%)	Low intersphincteric
High anal (8%)	Transsphincteric
Anorectal (7%)	
Isciourectal or infralevator	Transsphincteric with high blind Infralevator extension
Pelvirectal or supralevator	Trans or suprasphincteric with blind supralevator extension.
	Extrasphincteric
Sub mucous (or high intermuscular) (5%)	High intersphincteric

PARK'S CLASSIFICATLON OF FISTULA-IN-ANO AND ITS MANAGEMENT

(1) INTERSPHINCTERIC FISTULEA

This type of fistula occurs between the external and internal sphincters. This is the commonest of all types and is the intermediary form which leads to most of the other kinds of fistula.

(a) Simple low track-

The primary abscess penetrates the internal sphincter at the dentate line and then runs downwards to the anal verge.

Treatment –

Eradication of the primary source of disease in the mid anal canal by division of the lower half of the internal sphincter. This treatment seldom gives rise to any disturbance of function.

(b) High blind track-

This kind, in addition to the downward extension, tracks proximally resulting in a fistula between the internal sphincter and the longitudinal muscle of the upper anal canal and the rectal wall itself.

Treatment –

Division of the internal sphincter for as high as the high blind track ascends. This procedure will unroof the infected anal gland as well as the blind extension. Failure to recognise this upward extension might be a cause for recurrence.

(c) High track with rectal opening –

This type is an extension of the previous variety with the fistula breaking back into the lower rectum. It should be noted that the whole of this track is intersphincteric and the tissue above it can usually be divided without risk. If the probe passes straight upward (parallel to anal canal), helps in making the diagnosis, but formation of fibrosis by previous operation may cause difficulty in diagnosis.

Treatment –

Complete excision of the track without risk of incontinence can be done.

(d) High track without a perineal opening-

The infection passes in the intersphincteric plane upward into the rectal wall and terminates as a blind track or reenters the gut through a high secondary opening. There is no downward extension to the anal margin and no external evidence of a fistula.

Treatment –

Simply laying the track open into the rectum with incision of the lower portion of the track in the mid anal canal because it contains the primary source of infection.

(e) Extra rectal extension-

Infection may spread upward in the intersphincteric plane to reach the true pelvic cavity. This type is usually encountered in the stage of an acute abscess.

Treatment –

Drainage is done into the rectum and whole of the internal sphincter is divided.

(f) Secondary to pelvic disease-

Fistula manifests itself in the perianal region but originates in the pelvis such as perforated diverticulitis or crohn's abscess. This fistula is not curable until and unless the abdominal source is eliminated.

Treatment –

No local treatment and only possible curettage of the fibrosed track should be done. As it is a false fistula, no division of muscle is indicated.

(2) TRANSSPHINCTERIC FISTULA

(a) Uncomplicated

In this variety, the track passes from the intersphincteric plane, through the external sphincter, into the ischiorectal fossa and to the skin.

Treatment-

Division of lowar portion of external sphincter muscles, fistulae crossing higher level should be treated by division of lower half of the internal sphincter but external sphincter should curetted only.

(b) With a high blind track-

The track crosses the external sphincter but then divides into an upper and lower arm. The lower arm extends to the perineal skin, the upper arm may reach the apex of the ischiorectal fossa or even pass through the levator ani muscles into the poelvis. On probing the track, the great danger is that the tip of the probe may pass through the rectal wall, thus creating an itrogenic extrasphincteric fistula. The height and extent of a secondary track is not paramount importance, provided that it has not ruptured into the rectum.

Treatment-

Laying open the primary track, after identifying and high extersions are provided with adequats drainage. The division of external sphincter depends on the level at which the track crosses the sphincter.

(3) Suprasphincteric fistulae

(a) Uncomplicated-

This type of fistula starts in the intersphincteric plane in the mid anal canal and then passes upward to point above the puborectalis. This track runs lateral over this muscles and downwards between the puborectalis and the levator ani muscle into the ischiorectal fossa involving the entire sphincter.

Treatment –

This fistula by a classic lay open technique would result in division of all the external sphincter and puborectalis muscle will cause the anal incontinence. This problem is treated by division of the lower half of the internal sphincter (to eradicate the anal gland of origin), creating adequate drainage of the secondary limb and dividing variable amounts (about half) of the external sphincter. The use of seton is encouraged.

(b) High bilind track-

Fortunately, it is a very rare variant of fistula, in addition to the above path, sends on extension into the supralevator compartment. There is a tendency for this variety to spread in a horseshoe fashion.

Treatment –

Similar to the uncomplicated suprasphincteric fistula. In case of bilateral supralevator abscess both should be drained.

(4) EXTRASPHINCTERIC

(a) Secondary to anal fistula –

A trasphincteric fistula with a high extension may burst spontaneously into the rectum. The fistula has two factors causing its perpetuations. First ,the focus of disease in the anal canal (i.e. the chronic infection of the anal gland in the intersphincteric plane) and second, the constant contamination of rectal opening by high interluminal pressures.

Treatment –

Elimination of focus of the disease and rectal contamination. The primary track in the anal canal must be eradicated by division of the lower half of the internal sphincter. The opening in the rectal wall is closed with interrupted nonabsorable sutures. Adequate drainage of the fistulous track must be performed.

(b) Secondary to Trauma-

A traumatic fistula may be produced by a foreign body either by penetrating the perineum and enter the rectum or swallowed foreign body (fish or chicken bone) passing through the rectal wall, levator muscles, ischiorectal fossa and reach the perineum.

Treatment-

It consists of removing the foreign body, establishing adequate drainage and performing a temporary colostomy to reduce the rectal pressure without cutting the sphincters.

(c) Secondary to Specific Anorectal Disease-

Chronic ulcerative colitis, crohn's disease and carcinoma often result in gross and bizarre fistulization .

Treatment-

Treat the primary disease itself, usually in the form of a proctectomy.

(d) Secondary to Pelvic Inflammation-

A pericolic abscess due to diverticulitis or crohn's disease may spread through the levator muscles and discharge into the perineum.

Symptoms –

The most frequent presenting complaints of patients with an anal fistula are swelling, pain and discharge. The former two symptoms usually are associated with abscess when the external or secondary opening has closed. Discharge may be from the external opening or may be reported by the patient as mucus or pus mixed with the stool. The majority of patients with fistula have an antecedent history of abscess.

X

Modern Diagnosis and Management

The fistula-in-ano is an abnormal communication between the anal canal and the perianal skin. It usually results from an anorectal abscess which burst spontaneously was opened inadequately. It is a disease for which operative procedures have been advocated and practiced by the surgeons at various times. Even the ancient texts in medical literature are full of various surgical measures employed at some time or the other for treating the disease.

PRINCIPLES OF MANAGEMENT OF FISTULA-IN- ANO

Management of fistula in ano is of 3 types

(1) NON SURGICAL MANAGEMENT-

It includes the injection of irritant chemicals into the fistulous track such as 4% silver nitrate, bismuth paste and combination of quinine and urethane. Because of high rate of

disadvantages like recurrence, inflammation and necrosis of the surrounding healthy tissue, it became unpopular.

(2) SURGICAL MANAGEMENT –

The only form of treatment of an anal fistula that affords any reliable prospect of cure is operation. Presence of a symptomatic fistula-in ano is an indication for operation, spontaneous healing of fistula in ano is very rare. Neglected fistulae may result in repeated abscesses and persistent drainage with its concomitant morbidity. Very rarely, malignancy may occur on long standing fistula. Therefore, operation should be recommended unless there are specific medical contraindications to anesthesia.

Goligher has described 4 main types of operation s for fistula-in- ano.

(1) Laying open the fistula and allowing the wound to heal by granulation.

(2) Laying open the fistula followed by immediate skin grafting.

(3) Laying open the fistula, excision of the fistulous track and primary suture.

(4) Conservative operation based on the acceptance of anal glandular infection as the prime cause of fistula in ano.

(5) Destruction of fistula track by co2 laser beam.

All the operative techniques, however can be grouped under two broad categories namely, **Fistulotomy** and **Fistulectomy.**

(i) Fistulotomy-

It includes of the track laying open followed by the curettage of underlying tissue. Recurrence occurs due to remnants of necrotic or fibrosed tissue.

(ii) Fistulectomy-

It involves the total excision of the track with surrounded unhealthy tissue. It causes very wide wound and leads to the formation of a tunnel and recurrence.

FISTULOTOMY VERSUS FISTULECTOMY-

In performing fistula surgery, our very strong preference is a fistulotomy over a fistulectomy. There are several reasons for this. First removal of the complete track and adjacent scar tissue will only result in appreciably larger wounds. Seconds, there is a greater separation of the ends of the sphincter which lead to a longer healing time and greater chance of incontinence.

Complications of surgery for anal fistula –

A long list of potential complications may ensue following operations for anal fistula. The usual complication is urinary retention in 25% cases. Apart from 5.4% of patients developed complications. These included hemorrhage, incontinence, acute external thrombosed piles, inadequate drainage and pocketing, faecal impaction, recurrent fistulae, rectovaginal fistulae, persistent sinus, bridging and stricture. However these complications can be reduced with great care and experience.

Special postoperative care:

1. The primary goals are sound healing from the depth of the wounds and prevention of contact and premature healing of opposing skin edges.
2. Patients are placed on a regular diet and administration of analgesics as needed.
3. Patients are advised to take hot sitz bath thrice in a day.
4. A bulk forming agent and oil emulsion lubricant should be given.
5. The bowel should be encouraged to move on third or fourth postoperative days.
6. Irrigation and dressing should be advised twice a day.

7. Active sphincter exercises are advised in cases where division of sphincter muscles were done.

(3) PARASURGICAL MANAGEMENT

It includes the application of ligature of silk or Indian rubber band, which facilitates the cutting at one end and healing from the base at another end. This was named as "**APOLINOSE"** by **Hippocrates**.

Rockey et al (1964) described the parasurgical technique and its advantages like protection of the sphincters, dissolution of fibrous track, proper drainage, ambulation of the patient, easy postoperative care with minimum hospitalization and complications.

Seton division

It was described by **Hippocrates** in the 5th century B.C. His concepts are still applicable today for the management of difficult fistula problems. It is certainly the simplest of the methods available for the treatment of extrasphincteric fistula and probably produces results comparable to the more esoteric approaches, at least with respect to cure rates.

When a track crosses the sphincter at a high level , it is more safer not to divide all the muscle beneath the track. Only a portion of the muscle is cut and a **Seton** is inserted. **Seton** materials vary. A non-absorbable silk or nylon are commonly used. Some surgeons prefer to use wire and twist it at intervals, thereby cutting through the muscle.

Park and Stitz (1976) have advocated the **Setons** are left in situ for 6-8 weeks, but may be left in place for several months if there is infections it can be removed without division of the contained muscle. **Henly** recommended on **elastic seton**, tightened at two or three weeks intervals until it transists the muscles. This slow division on scarring ensures preservation of sphincter function.

Advantages of Seton

(i) It provides way to internal opening and fistulous tract for staged operation.

(ii) It allows the surgeon to better delineate the amount of muscle beneath the fistulous track.

(iii) It prevents accumulation of pus in the track and allows for proper drainage.

(iv) It can be used to divide the sphincter gradually.

(v) It is specially indicated in anteriorly situated fistulae with no puborectalis muscle and occurring in women (Henlay1978).

(vi) When a seton is in place, the assessment of the relation ship between the internal opening and puborectalis muscle in easy.

(vii) **Gabriel (1963**) postulated that presence of a foreign body stimulates the inflammatory reaction producing more fibrosis to prevent retraction of sphincter after division.

(viii) It is especially helpful in dealing with high level fistulae, transsphincteric and suprasphincter fistula.

After seeing the adverse effects with the application of irritant chemicals, severe postoperative complications following the surgery over fistulous tracks, compelled the surgeons to discard the choice of operative management for fistula-in-ano.

EXAMINATION OF FISTULA IN ANO

Inspection

Inspection of the anal region will reveal any external opening or openings present, whilst a single opening is the most common, multiple sinuses are often encountered: and sometimes these are so numerous so as to give the "watering can" appearance.

Sometimes the opening may relatively be inconspicuous and only detected when pus is caused to escape by gentle palpation over some part of the surrounding skin.

In many long-standing cases however, the opening is situated on the summit of a little pink or red nodule of exuberant granulation tissue.

The perianal skin may show the scars of previous operations undertaken for fistula or for some other condition.

It may also be red, moist, thickened from secondary pruritis ani.

When it is pruritic the thickened folds of skin tend to obscure small external fistulous openings situated close to the anal verge so they may be easily overlooked unless specifically sought.

The change in the color of the perianal and the skin around the genitalia, the induration of these regions also help in identifying the probable course of the fistula.

A careful search should also be mode for a dorsal anal fissure which is often the cause of posterior fistulae.

The presence of sentinel tag also requires attention for inflammation of these tags also tends to subsequently lead to the causation of low level posterior commissural fistula in ano.

LIMITATIONS

Inspections is a prerequisite before commencing the treatment of fistula in ano. Though the location of the external opening, the induration, the color of skin of the perianal region may to a certain extent help in imparting a knowledge regarding the variety of the fistula, but it is highly impossible to diagnose and initiate treatment purely based on the inspectory findings. These findings can be only be contributory to the other important examination techniques which are going to be elaborated further.

PALPATION

The next step is a careful digital examination of the perianal region and the anal canal.

Palpation of the perianal regions may result in expression of pus, and this may give some indication of the probable position of the fistulous track relative to the external opening. But more reliable as a guide to the course of the track is the detection of an induration.

In simple direct fistulae (low anal or subcutaneous) the track generally can be felt as a distinct rod of induration extending in a straight line from the external opening to the anal verge. Bidigital examination with one finger in the anal canal and the other finger moving over the perianal regions helps in the appreciation of the presence of abscess cavities and the indurated tracts of fistula. Posterior horse shoe fisrtulae are however, usually impalpable in the perianal region because of their highest position relative to the anal canal. Palpation of the anal canal may detect an area of induration or an actual internal opening.

The track of a posterior horse-shoe fistulae, as it hugs the puborectalis sling, is easily felt as a thick, horizontal rod of induration on one or both sides and posteriorly at or just above the level of the ano rectal ring. It is more easily appreciated when unilateral.

With a double horse shoe fistula the symmetrical posterior and lateral induration might be mistaken by an inexperienced surgeon for an abnormally prominent firm, puborectalis sling.

In association with a posterior fistula of this kind an internal opening can frequently be detected. It is generally situated in the midline of the anal crypts but possibly up to even above the ano-rectal ring.

Induration due to a submucous tract or high intermuscular tract is easily detected and as well as extending down to the pectinate line normally, may reach some distance above the ano rectal ring. Such a tract may be present as an extension upwards in the submucosa or intersphincteric space of an ordinary low or highlevel anal fistula. It is obviously important in such cases to appreciate that the uppermost part of the induration up to and

above the ano rectal ring lies internal to the external sphincter and longitudinal muscle layer of the rectal wall and does not indicate the presence of an ano-rectal fistulae. It may be difficult to differentiate with confidence between submucous (or intermuscular) and extra induration.

PASSAGE OF A PROBE

With preliminary information by the history and inspection, the examination with a probe gives the probable course of fistulous track.

It is necessary to exercise at most gentleness during the instrumentation if pain and false passages are to be avoided. It is most to use a medium sized malleable probe (copper). The curvature can be made based on the necessity, mainly depending on the shape of the tract to be probed. Only if the external opening is very minute should it be necessary to employ fine lacrimal probes, or long curved needles which have been made blunt.

LIMITATIONS

Probing with improper probes or by amateur, over enthusiastic surgeons may result in the causation of new fistulous tracts rather than identifying the already present one.

It may act as a source of infection or may help in the ascent of already present infection.

Blind fistulae are rarely identified by probing.

Acutely angled tracts are rarely or never identified by probing.

Submucous or intermuscular tracts are also difficult to be identified by probing alone.

PROCTOSCOPY

Proctoscopy is of considerable value in a case of fistula.

First of all it may show an internal opening which was not been clearly demonstrated by palpation or passage of a probe.

This is often revealed by the escape of a bead of pus from it, its presence can be confirmed by inserting into it a fine probe, the terminal 1cm of which has been bent to a right angle with rest of the instrument.

The presence of a spot of reddish, loose unhealthy granulation tissue also indicates towards the presence of internal opening of a tract.

LIMITATIONS

Proctoscopy or examination using retractor is important fron the point of view of distinguishing the internal opening and identifying the presence of fissure bed or any other associated ano-rectal diseases. But it imparts only a limited knowledge regarding the variety of fistula in ano and its relation to the Sphincteric muscles.

RADIOLOGICAL EXAMINATION

Radiological examination of the fistulous track can be done after injection of lipiodol as a means of demonstrating its course. Radio opaque dyes like Hypaque (sodium diatrizoate) or urografin can also be use for the purpose of sonogram or fistulogram with good results.

The greatest advantage of this lies in the proper identification of the fistula. The dye is able to penetrate in the tract completely, thus giving a picture of the complete extent of the tract and its level of communication with the anal canal.

It also helps to visualize the presence of blind tracts in the opposite ischiorectal fossa especially in cases of horse shoe type of fistulae, where one of the tract is blind externally. It is of great advantage in identifying the supralevator extensions of the tracts which if not usually appear to be a simple uncomplicated type of low anal fistula.

Plain X-ray of the pelvic bones is another important investigation to be done compulsorily to rule out the involvement of the diseases of the neighboring bones in the causation of fistula

in ano. Fistula in ano may be secondary to diseases of these pelvic bones viz.,tuberculosis or osteomyelitis of these bones.

Tans-rectal Ultrasonography; Assessment by ultrasound in the form of anal and rectal ultrasound is also one of the important diagnostic tools available. This technique helps to define the internal opening and trhe presence of sepsis in the intersphincteric plane and sometimes in the deep postanal space. Additionally, defects in the sphiccters can be identified.

Anatomical definition is poor beyond the internal sphincter by anal ultrasound and MRI appears to be more informative.

Magnetic Resonance Imaging (MRI) is now regarded as the investigation of choice to define complex ano rectal sepsis and fistulae. It is claimed by Lunniss et al (1992,1994) to provide 100% accuracy in defining the presence of a fistula and the site of extensions and is 85% accurate in locating the anatomy of the primary track. It correctly identified sepsis without fistulae, scar tissue alone and blind tracks with no internal opening. MRI was also useful in defining horse shoe fistulae.

Colonoscopy also plays an important role in cases of fistula in ano secondary to bowel pathologies. Hence when a patients is suspected of suffering from some bowel pathology, it is mandatory to subject him to colonoscopy to establish the diagnosis and treat the primary disease rather than the fistula in ano.

Histopathological examination of the base of the fistulous track is also mandatory in order to rule out malignancy before the initiation of treatment for the fistula in ano.

TREATMENT

Treatment by injection of medicament into the fistula

As already pointed out, spontaneous healing of anal fistulae is such a remote possibility that in the ordinary practical

management of patients with fistulae, it maybe completely discounted.

Down the ages, however attempts have been made, often by quacks but sometimes by reputed surgeons, to stimulate natural healing by injection of various medicament into fistulous track.

As mentioned by Lockhart-Mummery, a method that was sometimes practiced in the latter part of the last century was the injection of a 3 or 4% solution of silver nitrate into the various fistulous openings by means of a syringe with a special long probe pointed needle.

Another preparation that was used for injection was a Bismuth paste (Bismuth subnitrate 1 part sterile soft paraffin two parts as recommended by Pennington. Bolnd, preferred a solution of quinine and urethane.

Though successes were claimed for this from of treatment, it is doubtful whether these presented anything more than a temporary esation of the discharge. In certain instances, moreover, the silver nitrate solution caused sloughing of the tissues and aggravated the condition.

Surgical treatment

The only form of treatment of an anal fistula that affords any reliable prospect of cure is operation.

It must be admitted however that fistula operation have an unenviable reputation for subsequent recurrence is common and impairment of anal continence is another unfortunate sequel encountered.

These factors are mentioned to emphasize that the operative treatment of anal fistulae is often far from simple and calls for both caution and boldness based on a wide experience of the disease in its various patterns and a confident appreciation of anal anatomy.

Main type of operation used for this condition:

1. Laying open the fistula and allowing the wound to heal by granulation
2. Laying open the fistula followed by immediate skin grafting
3. Laying open the fistula, excision of the fistulous track and primary suture
4. Conservative operation Based on the acceptance of Anal Glandular infection as the prime cause of fistulae in Ano.
5. Destruction of fistula track by carbon dioxide laser beam.

The use a seton

It is particularly for such patients with tracks traversing the sphincter musculature high in the anal canal or even just above the ano rectal ring, that the method of treatment with a Seton is favored by surgeons.

It is held to be specially indicated in dealing with these fistulae when situated in the anterior position, where is no Puborectalis ring or when occurring in women. There are three ways of application;

1. By this technique, a length of strong braided silk or as rubber band as preferred by is passed through the internal opening and round the sphincters below this level, or found their remaining upper portions, if there lower part have already been divided.
2. It is then tied tightly, or if or rubber, tightened gradually over a period of two or three weeks.

The object of this maneuver is to stimulate a fibrous reaction, which is supposed to fix the sphincter muscles at this point, so that when the ligature eventually cuts through (or is removed and the division of the sphincter muscles is completed by scissors or scalpel the cut ends are believed to be anchored by fibrous tissue and not able to retract.

3. In this variant of the method, a silk, Prolene or Nylon strand is similarly passed through the internal opening and then knotted as a loose loop around the sphincters.

The purpose of this loop is to serve as a marker when the patient is reexamined post operatively in a conscious state. The patient is asked to contract his sphincter and levator opening, marked by seton, lies above or below the ano-rectal ring.

If the track runs definitely below the ano-rectal ring, particularly on the posterior and lateral walls of the canal it can be laid open with a good prospect of, at worst only minimal impairment of continence.

But if it lies above the ano-rectal ring, laying it open will invariable be followed by a major degree of incontinence, which the patient may or may not able to minimize by careful regulation of his bowel habits.

The alternatives are either to adopt an expectant, non-operative attitude or to do a different sort of operation in which the sphincters are not divided but the internal opening in which the sphincters are not divided but the internal opening is exposed by a wide external incision or an attempt is made to suture is. With fistulous tracks immediately above the ano-rectal ring certainly, posteriorly or laterally, direct suture of the internal opening is technically difficult, but with internal openings a little higher in the rectum this method is more readily feasible.

4. A futher modification of the seton technique; First the outer part of the fistulouws track is laid open in the usual way down to the external sphincter muscle. Then on the anal canal side longitudinal rectangular strips of the mucosa and the internal sphincter are excised up to the internal fistulous opening along the lines indicated in the account of internal sphincterotomy. The lower third or half of fthe external sphincter in next divided in the same

sector of the anal canal, and a seton of nylon is passed through the internal opening and looped loosely around the remaining sphincter musculature below the level of the track (which may include the puborectalis as well as external sphincter, depending on the height of the internal sphincter).

This loop is left in situ not just for a week or two, but at least for three months, often longer.

This is done with the dual objects of acting as a drain preventing total closure of the external wound and of promoting the development of fibrosis to fix the muscles, so that, if it is eventually considered necessary to debride them up to the tracks, their cut ends may hopefully be unable to retract widely. Then the seton is removed, and remaining track then usually heals spontaneously.

DETAILED TECHNIQUE OF LAYING OPEN OPERATION

A. For subcutaneous or low- level anal fistulae

A Probe-pointed director is passed along the track into the lumen of the anal canal in a complete fistula such that its point projects against the skin or mucosa at the inner end in a blind fistula, possibly with the thickness of the internal sphincter intervening.

In the latter case, the end of the director can, with little force, generally be made to emerge through the muscle and lining, thus converting the sinus into a fistula. The track is now laid open through out its length by incision over the director. N the case of a low-level anal fistula, fibers of the lower part of internal and sometimes the external sphincter will be severed in the prcess.

The skin edges are retracted with tissue forceps and after careful homeostasis, the wound surface is closely inspected.

Using a sharp spoon the granulations are scrapped off the inner surface of the fistula, leaving the underlying pale tough fibrous base.

Some of the granulation tissue and snippets of the fibrous wall are sent for histological examination for evidence of a tuberculosis infection or Crohn's lesion, and possibly for guinea-pig inoculation.

The fibrous layer is not excised but is left is situ in the floor of the wound. The soft fatty tissues on either side of the track are palpated for nodules of induration that might indicate the presence of divided fistulous offshoots; any suspicious areas thus found are examined with a fine probe for an opening leading into a track.

The sides of the wounds are trimmed with scissors, removing skin and subcutaneous fat generously in order to leave a shallow concave raw area, more of less pear-shaped or conical with the apex usually entering the anal canal.

If the original fistula was blind at is inner end the apex of the wound does not actually reach into the canal it is an advantage to extend it to just within the anal orifice by removal of a small wedge of skin with scissors and possibly to snick the lower most fibers of the anal sphincter, otherwise, the fringe of skin between the anus and the wound is apt to become edematous and painful during the post operative period.

If oozing blood proves a difficulty, it maybe checked by pressing a gauze soaked in a 1/1000 solution of adrenaline hydrochloride on to the wound surface for 2-3 minutes.

The fibrous base is now followed forwards for another or two at least and occasionally even more when its extremity may lie above the urogenital diaphragm. This anterior extension is incised and the wound in relation to it approximately trimmed to prevent overhanging skin edges and fat.

Attention is next tuned to the probing that the track extends transversely through the retro-sphincteric space to the ischio-rectal fossa of the opposite side. A director passed along it is forced through the skin of that side and the overlying tissues are incised.

If no internal opening is found, it is probably wise-on the assumption that an anal glandular infection with resulting inter sphincteric abscess formation was possibly the primary etiological factor to force the director through the posterior wall of the canal from the main wound into the lumen at the level of the pectinate line, and to divide the tissues below it. Alternatively internal sphincterotomy can be performed on this sector of the canal.

For Pelvirectal fistula

Blind superiorly:

On exposure at opetration, the track of this type of fistula is found to extend through a hole in the levator ani.

The perforation in the muscle should be stretched by opening the blades of a pair of artery forceps in it or, if there is too much surrounding fibrosis, by incisions with scalpel. The upper loculus should then be carefully explored and gently curetted, portions of tissue being sent for histological section and guinea-pig inoculation.

With opening into rectum above levator

Apart from rectovaginal fistulae above the level of the anal sphincters, which may be regarded as essentially a form of ano-rectal fistula, these are fortunately very rare.

For high (Intermuscular) Subcutaneous fistula

The first essential in the treatment of a submucous fistula is for the surgeon to assure himself that it is in fact submucous or intermuscular and not extra rectal, for treatment of an ano-rectal fistula by incision through the rectal wall would be disastrous.

If the fistula is submucous it should be treated by laying it open into the lumen of the rectum and anal canal, this obviously

involves division of no muscle, or at most of the upper part of the internal sphincter and the circular muscle of disastrous.

A bivalve speculum is inserted and the opening of the fistula exposed at its usual site at or just above the pectinate line.

A director is then passed into the opening and along the track to its blind upper end and forced through the intact mucosa at this point. If the bridge of tussue overlying the director is simply divided with scalpel or diathermy fthere is apt to be considerable bleeding from cut edges.

Submucous or intermuscular fistulae are perhaps more often found as an extension of some other variety of rather than as an isolated lesion, and there treatment is therefore frequently only a part of the operation required.

Post operative care of the wound

It is difficult to overestimate the importance of adequate attention to the wound during the post-operative period. Neglect of this aspect of treatment may easily result in a recurrence of the fistula despite a well-performed operation.

The aim to be kept constantly in mind is sound healing by granulation from the depths of the wound and the prevention of contact and premature healing between the opposing skin edges and granulating walls.

Removal of initial dressing

In accordance with the routine for minor rectal cases, the bowels are moved on the morning of third postoperative period.

The dressings inserted at the time of the operation maybe left to separate at this event or at the subsequent irrigation with peroxide, but if the wound is of large size this maybe of a uncomfortable proceeding, for the gauze has usually become firmly adherent to the raw surfaces and does not easily separate even with peroxide. Thereafter irrigation and dressings are repeated morning and evening.

Periodic review of the wound in the theatre

It is sometimes difficult during the last few days to ensure that the dressings have been inserted to the highest point in the wound. Consequently, the uppermost part of the two sides of the wound may have fallen together and become adherent.

In addition, the surgeon may not have been quite certain at the conclusion of the operation that had in fact laid open every conceivable pocket of the track.

It is therefore a good plan to review all but the most superficial fistula wounds at the end of the first seven to ten postoperative days.

If pus is found to be accumulating at any point, these wells suggest the possibility of a pocket, there, for which a determined search should be made.

Is is also seen whether the wound is tending to fall together at any part and this can be corrected and wound reshaped

Passage of a finger as an anal dilator

As they heal, large fistula wounds lead to the production of a good deal of fibrous tissue and narrowing of the anal opening may occur.

It is essential to pass a finger occasionally to ensure that there is no stenosis; any incipient narrowing should be dealt with by regular daily passage of anal dilator until healing is complete, and probably for some weeks thereafter, to guard against subsequent cicatrical contraction.

Maintenance of continence

It maybe a week or so before the patient learns to use his remaining musculature to maximum advantage, of perhaps before the muscles regain their normal tone and contractile power after the stretching and trauma of operation.

There are thus apt to be occasional faecal leaks, esp. when the motions are liquids as after purgation in the early post operative period, and control of flatus may initially be imperfect.

Thereafter if the ano-rectal ring has ring been preserved, anal control becomes approximately normal, continued gross incontinence suggests an error of judgment in regard to the amount of muscle that was divided.

Time required for complete healing

The process of healing after fistula operations is designedly slow and takes four of five weeks even for a relatively low fistula, and up to 12-16 weeks for a really high double house-shoe lesion. The patient need not be detained in hospital for all this time.

Secondary skin grafting

Theirsch grafts applied to the granulating surface as soon as it has reached the level of the surrounding skin some times "take" even if only partially successful. They may expedite healing by 3-4 week in cases with very large wounds.

Unfortunately, the proportion of cases in which a reasonably satisfactory take is obtained is, in scarcely great enough, to warrant the discomforts associated with grafting this situation.

Laying open the fistula, followed by immediate skin grafting

In this operation, which was strongly championed by Hughes of Melbourne, the fistula is laid open exactly as in the classic operation with the same precautions to cauterize the wound and prevent overhanging skin edges. After careful haemostasis, theirsch grafts taken from the medial aspect of the thigh are applied to the raw surface, being stitched in position and finally affixed to the wound by a cotton wool pad.

When grafting is successful, its advantage is obvious it gives the patient a completely healed wound is 7-14 days him the inconvenience of repeated dressings.

As the fistula has been widely laid open before the grafts are applied, even if they do not take no harm results, for the wound is in a suitable condition for satisfactory healing by granulation to take place; survival of even a small part of the graft may expedite the latter process.

The main drawback of immediate grafting is the time and trouble involved in applying and fixing the grafts; which in a moderately large fistulous wound may amount to 2-3 hours.

Laying open of the fistula, excision of fistulous track and primary suture

This operation was recommended by Starr of Sydney, using sulphonamides or antibiotics for bowel antisepsis and systemically pre and post operatively.

The first operative step is to lay open the fistulous track by incision, skin and subcutaneous fat, however should not be excised but preserved to facilitate final closure of the wound.

To prepare the wound for primary suture it is necessary to excise the opened up fistulous track as far as possible and leave fresh wound surfaces free from granulating or fibrous tissue.

Suture implies the complete reconstitution of the wound from the depths using several layers of buried interrupted sutures of fine plain catgut as well as the surface sutures.

The deepest layer consists of several mattress sutures in the divided parts of the sphincter muscles; subsequent layers oppose the subcutaneous fat.

The wound is sealed by plastic spray. Post operatively the bowels are confined for five of six days, and then moved with one or two doses of cascara and liquid paraffin or an enema. The silk skin sutures are removed on the seventh day, the superficial catugut stitches, eventually separate spontaneously.

Conservative operation based on the acceptance of anal Glandular infection as the prime cause of fistula-in-ano

Parks suggested that it is insufficient merely to open up the intersphinceteric space by internal sphincterotomy.

In addition the lining of the lower half of the anal canal, together with the related portion of the internal sphincter is excised in order to the external sphincter, and if the track does not traverse the external sphincter, this and the skin overlying the outer part of the track are 'cored out' (or alternatively curetted) from its external opening as far as the external sphincter.

The same principles are applied in the treatment of fistulae that are blind internally.

Destruction of fistula track by carbon dioxide laser beam

It is interesting to contemplate the possibility of destroying anal fistula by means of a laser beam, but hard to feel confident that this could be done, because of the difficulty of shining the beam accurately, along a track that is often circuitous or irregular in its course.

But Slutzki et al [27] claim to have treated successfully fully two cases of anal fistula solely in this way. With the probe as a guide the beam from a Sharplan 791 surgical laser was directed at half strength (25 Watts) along the track.

On review at three and four months respectively, the fistulae in both the patients were completely healed.

Treatment of certain special types of fistula

Complete pelvirectal fistulae (extra sphincteric with internal opening)

Anal fistulae with track running transversely above the ano-rectal ring raise special problems in treatment if incontinence is to be avoided.

When the internal opening is clearly in the rectum, the fistula is quite unsuitable for treatment by either an orthodox

laying open operation or a seton technique, an alternative methods have to be considered.

It is important to determine, first of all whether the fistula originates in a diseased bowel above for example, in diverticulitis of the sigmoid or Crohn's disease of the large or small bowel because, if so, treatment should be directed primarily to intestinal condition and local treatment from below may not be required. Thus a bowel resectin or proctectomy maybe the appropriate measure. If however, the bowel is otherwise normal, apart from the internal rectal opening of the fistula, which under these circumstances has usually been produced by injudicious probing five courses are open to surgeon:

1. Expectant treatment

If the fistula is left entirely alone, it may give the patients relatively little trouble apart from a slight continuous or intermittent discharge. Occasionally, noisy escape of flatus maybe an embarrassment, but the complication that most often renders purely conservative management untenable is the development of recurrent abscess.

2. Establishment of a temporary colostomy

This maybe regarded as an extension of expectant treatment. It might be hoped that the resulting defunctioning of the ano-rectum would at lessen the risk of recurrent abscess.

3. Repair of the fistula-

If expectant manatgement proves irksome because of recurrent infection or chronic discharge, or if a proximal colostomy for a prolonged period fails to heal the fistula or is unacceptable to the patient, an attempt may be made to close the internal opening.

The initial steps of the actual repair are similar to those adopted in laying open an ordinary high anal or ischiorctal fistula, that is to say, the tissues are opened widely on the affected aspect or the aspect or the aspects of the anal canal. The sphincter muscles

maybe divided up to any subsidiary internal opening into the anal canal and it is very important to look most carefully for any such opening say at the pectinate line, for failure to find it will cause the operation to fail but the musculature of the upper part of the anal canal is scrupulously preserved.

The track leading to the gigh internal opening in the rectum proper is now followed up through the levator muscle, the latter being divided sufficiently to expose the hole in the rectal wall.

The latter then is closed by interrupted sutures inserted on the Lambert principle to secure good inversion of the edges.

The sides of the wound are now trimmed if this has not already been done to give access for the suture of the rectum – to leave a wound cavity of roughly conical shape.

Finally flat gauze dressings soaked in Milton are laid on the raw surfaces to the top of the wound and further gauze and wool are applied as required.

PROBLEMS IN THE MANAGEMENT OF FISTULA-IN-ANO

1. The important difficulty which is usually felt by the surgeons is the complete excision of track.
2. The most common problem experienced by the patient is a severe pain for a long period during dressing.
3. The dressing for a long period delay the healing rate.
4. Operative site is the potential space for infection by faeces.
5. The patient may experience complications followed by the surgery.
6. Hospitalization and non-ambulatory life for a long period which also cut off them from their families, profession and society along with mental tension and financial loss.
7. Inspite of all these problems the cure is not certain and there is every.

CAUSES OF RECURRENCE IN FISTULA-IN-ANO:

1. The commonest cause is failure to identify and treat the primary internal orifice.
2. Presence of causative infective anal gland in the inter sphincter space.
3. Failure to detect and treat lateral or upward extensions.
4. Failure to open the fistulous track for fear of causing incontinence.
5. Failure in excision of adequate anal wall surrounding the crypts.
6. Remnants of foreign body inside the track.
7. Deep seated pus-pockets are improperly curetted.
8. Improper and inadequate drainage of the abscess cavity.
9. Any fibrous tissue remains during surgical procedure.
10. The disease which is the primary cause of fistula, if untreated.
11. Presence of systemic disease without prompt therapy.
12. Exposure of the wound to the moisture which enhance the bacterial growth.
13. Presence of faecal impaction during postoperative time.

XI
Equipment and Instrument Required

REQUIRED EQUIPMENT AND INSTRUMENTS

The following equipment and instruments are usually required during application of Kshar varti.

1) Lithotomy Table
2) Spot Light
3) Dressing Trolley
4) Instrument Box
5) Usnodaka Awagaha Yantra
6) Nadi Sweda Yantra

1) Lithotomy table-

This table offers a comfortable position to the patients as well as provides an ideal position for the proper examination and application of Kshar sutra and Kshar varti.

2) Spot light-

A light source in the form of spot light focused over the anal and perianal region provided an illuminated, comfortable site for working.

3) Dressing Trolley

This trolley contains following instruments and materials

- Different drums with sterile cotton, gauze pieces, cutsheets etc.
- Instruments tray with different types of probes artery forceps, knife, scissors, various sizes of proctoscope ctc.
- Kshara sutra and Kshara varti tray
- Tray with sterile gloves of different size.
- Tray containing sterile syringe and plain rubber catheters.
- Bottles of anutail, Ropana Shashank (medicated ghee) and antiseptic lotions.
- Sterile lubricants containers.

4) Instruments box –

The following specially designed instruments are necessary during managements.

a) Curved, malleable copper probes with eye: Various assorted lengths.

b) Curved malleable alloy/copper probes with notch at the distal end and handle at the proximal end of various assorted length.

c) Non malleable curved steel probes: Various length.

d) Artery forceps - At least 2 pairs

e) Mosquito forceps - At least 2 pairs

f) Curved scissors - 2 pairs

g) Needle holder - 1

h) Proctoscope of various sizes

i) Disposable scalpel blades - As required

j) Forceps (Blunt) – 2

k) Chittle's forceps

5) Ushnodaka awagaha yantra

This contains an electric geyser and chair with warm water container and both connected by metal tube. These tube provide for the flow of hot water from geyser to chair. Patients are instructed to sit in the chair and to take hot sitz bath to alleviate pain and inflammation and it also helps in growing healthy granulation tissue.

6) Nadi Sweda Yantra

It consisted of steam chamber, a rubber tube and steam spreader. This was used for fomentation of the anal and perianal region. This helped to relieve pain, reduce inflammation and also helped in the maintenance of local hygiene.

EXAMINATION OF PATIENT:

Each case was thoroughly examined and investigated and findings were recorded in a detailed proforma designed in the department for patient of Fistula-in- ano.

(1) History of the patient:

History of the disease with respect to its onset, mode and duration, type of discharge, severity of pain, chronicity of the disease, bowel habit, associated diseases like tuberculosis, diabetes, colitis, urinary disease, cardiac disease etc., past treatments undertaken for the disease, number of surgeries and type of surgeries which the patients has undergone for the same disease, occupation, appetite, nutritional status, family history and his personal habits and addictions were recorded carefully.

(2) Systemic examination:

Each system was carefully examined before the patients was initiated into the treatments. Due importance was given to examine the digestive, cardiovascular, respiratory, nervous, genitourinary systems.

(3) Local examination:

It was done under following headings:

(a) Inspection-

First patient was kept in lithotomy position on the lithotomy table. Then the condition of the Pereianal and scrotal skin, presence of induration, inflammation, colour of skin, quality and quantity of discharge, margins of external openings number of openings, the o'clock position, previous operated scars, the tone of the sphincter were observed.

(b) Palpation-

For local temperature, tenderness, area of induration, fluctuation, consistency of pus etc. The fibrous cord like fistulous track, its direction and extent, presence of pus cavities etc. were also palpated.

(c) Digital rectal examination –

it was done with gloved, lubricated index finger to examine the presence of any fissure, pile masses, malignancy, polyps, blind abscess cavities, hypertrophied anal papilla, tone of sphincter muscles, status of anorectal ring (in previously operated cases) and status of prostate(in males).

Special importance was laid down to identify the internal opening, its position - whether in the anterior or posterior quadrant, number of openings, distance from the anal verge, tenderness in the area etc.

(d) Instrumentation

This was an important examination which provided accurate information regarding the track, whether

- It was complete or not
- The extent of the track
- The direction of track
- Position of the internal opening
- Relation of the internal opening to the ano rectal ring
- Relation of the fistulous track with the levator muscles

- Branching of the track
- Whether the track had extended to the opposite side of the midline
- Relation if any, to the neighboring bones

(i) Probing:

A straight or curved malleable metal probe was introduced through the external opening with care in the direction of least resistance towards the internal opening by guiding with the finger inside the rectum. Care was necessary in order to have the cooperation of the patients during examination and also to avoid the creation of false tracks.

(ii) Proctoscopy:

It was done routinely to identify the presence or absence of pile masses, growths or ulcerations, condition or rectal mucosa, location of internal opening etc.

(iii) Sigmoidoscopy:

It was done if necessary to rule out bowel pathologies.

(4) Investigations

Following investigations were carried out**:**

- **Haematological**: Hb%,Total Leucocytes count, Differantial Leucocyte count, Erythrocyte sedimentation rate,Fasting blood sugar, Post prandiol blood sugar. (Blood urea ,Serum Creatinine etc. if reuired)
- **Urine**: Routine and microscopy
- **Stool**: Ova & Cyst; occult blood
- **HIV**
- **Pus:** culture and sensitivity test
- **Tissue biopsy**: if necessary from the floor of the fistulous track.

Radiography:

- **Sinogram:** As and when required
- **Chest X-Ray**: As and when required

Others:

To exclude tubercular fistula in ano required investigations like Mantoux, ELISA etc. was carried out when it was found necessary.

PREPARATION OF THE PATIENT:

After selecting the patient for the threading they were explained the procedure in detail and then advised the following instructions

- Laxative, for regularizing movement of bowel
- Local part preparation and general hygiene.
- Enema before primary threading for evacuation of bowel.

PROCEDURE OF KSHARA SUTRA APPLICATION

Once prepared, the patient was asked to lie in lithotomy position comfortably. The perianal area was cleaned with an antiseptic solution. The patient was advised to flex his thighs over his abdomen and relax his thighs in order to relax the sphincter muscles. The sphincter muscles could be further relaxed by local nadi sweda.

Once the patient was comfortable and cooperative, gloved, lubricated index finger was inserted into the anal canal and the findings were rechecked. A suitable probe was selected and introduced into the external opening of the track and carfully advanced along the path of least resistance. The finger in the anal canal supported the advancement of the probe towards the internal opening. The probe was advanced, brought out of the internal opening and then carefully manipulated to come outside the anal canal. Initially a suitable length of plain thread was placed in the eye of the probe, and the probe pulled out in order to position the thread in the track. The two ends of the thread were tied loosely

outside the anal orifice. This procedure is termed the "primary threading".

CHANGING OF THREAD

Patients were instructed to take sitz bath twice daily from the time of primary threading till before change of threads. The change of threads was done at weekly interval. In control the Kshara sutra was used to replace the plain thread in the Ist sitting and only Kshara sutra were used to replace the old ones. New Ksharasutra was tied to the lateral side of the knot(of old thread).Then an artery forceps is applied inner end to the same knot. The thread was cut between the clipped artery forceps and the knot. The artery forceps was gently pulled out along with the old thread such that the thread came out leaving behind the new Kshara sutra in the fistulous track. The old thread was cut and the ends of the new Kshara sutra were tied firmly outside the anal orifice. This procedure of change of the thread was done by "Rail-Road technique". A cotton soaked in anu taila was placed locally and T- Bandage applied.

At each changing of the thread, the length of the previously changed thread was measured and recorded in the proforma.This provided information regarding the amount of tissue already excised and the length of the track that still needs to be excised.

Adjuvant Therapy:

All the patients were advised to go home and to do their routine works and were asked to follow this adjuvant treatment.

(1) Analgesics-

Oral analgesics were advised to control the pain

(2) Anutaila Vasti -

Patients were advised to take 3-5 ml of anutaila vasti with the help of syringe and rubber catheter No.10 before defecation, to regularize the bowel & relieve constipation.

(3) Ushnodaka Awagaha (Hot sitz bath) -

Patients were advised to have hot sitz bath after defecation. It keeps wound clean as well as reduce pain and inflammation.

(4) Ropana Shashanka (or) Jatighrita -

It was applied over the cut through wound daily after sitz bath to enhances the healing of wound.

(5) Shigru guggulu or Triphala guggulu :

It was advised 1 tab TDS in order to reduce pain and inflammation.

(6) Laxatives -

In order to promote easy evacuation of stools, Abhayarishta (30 ml BD), Triphala churna (5 gm HS) or Isabgol (5gm HS) were advised.

(7) Ambulation of the patient -

Patients were allowed to do normal routine work but was advised against riding vehicles or sitting on hard surfaces for long periods of times.

(8) Diet -

Nutritional light diet, green leafy vegetables and fruits.

(9) Avoid -

Excessive use of coffee, tea and alcohol, spicy fried food, constipated diet, riding, cycling, prolonged sitting, excessive indulgence in coitus etc.

FOLLOW-UP

Once the track was completely excised or cut through, the patient was instructed to visit Ano-rectal clinic once every month for 3 months to recheck the status of the excised area or wound. Then onwards patient was advised to visit once in 3 months twice or thrice,for assessing the untoward effects of treatment like faecal incontinence etc.(if present).For each follow-

up visit, the patient is examined for any recurrence of disease or any associated lesion of the ano-rectum.

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