Journal of Cardiovascular Disease Research

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

EFFICACY OF SETON IN THE MANAGEMENT OF HIGH FISTULA-IN-ANO – A PROSPECTIVE STUDY

Dr. Ramani Ranjan Mund[1], Dr. Santosh Kumar Patro[2], Dr. M Siva Rama Krishna[3], Dr. Saurav Das[4]

[1]Associate Professor, Department of General Surgery, MKCG Medical College, Berhampur, Odisha, India

[2]Assistant Professor, Department of General Surgery, MKCG Medical College, Berhampur, Odisha, India

[3]Senior Resident, Department of General Surgery, MKCG Medical College, Berhampur, Odisha, India

[4]Junior Resident, Department of General Surgery, MKCG Medical College, Berhampur, Odisha, India

Corresponding Author: Dr. Saurav Das, Junior Resident, Department of General Surgery, MKCG Medical College, Berhampur, Odisha, India (Email – sdas581@gmail.com , Mob - 8763187361)

ABSTRACT

BACKGROUND:

Fistula-in-ano is a commonly encountered surgical problem with high prevalence. Because of anal sphincter involvement, the treatment of high fistula poses a high risk for impairment of continence as well as recurrence. Due to absence of a standard technique for the treatment of high fistula-in-ano, treatment must be navigated by surgeon's experience and judgement.

AIMS AND OBJECTIVES:

Patients of high fistula-in-ano to be managed with seton application alone or in combination with fistulectomy and recurrence rate, incontinence rate and other post-operative complications to be determined after completion of treatment and follow-up period.

METHODOLOGY:

40 patients of high fistula-in-ano who were admitted to the Department of General Surgery of MKCG Medical College and Hospital, Berhampur from August 2020 to July 2022, underwent fistulogram and MRI and further treated surgically with seton usage(combined fistulectomy with seton or cutting seton alone) and followed-up till 6 months.

RESULTS AND CONCLUSION:

Overall recurrence rate involving both procedures was 7.5%. Overall incontinence encountered while treating high fistula-in-ano with seton during follow-up was 7.5% for minor incontinence and 2.5% for major incontinence. a high proportion of high fistula-in-ano was seen in the present audit compared to previous studies. Despite this, a satisfactory outcome was achieved in the vast majority with a relatively low rate of incontinence and recurrence with seton usage in high fistulas. However further studies and randomised control

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

trials are required to compare between seton and other newer modalities to evolve the best possible treatment to manage high fistula-in-ano, which causes long-term morbidity to the patients both preoperatively as well as postoperatively.

KEYWORDS : HIGH FISTULA, SETON, INCONTINENCE, RECURRENCE

INTRODUCTION

Fistula-in-ano is a commonly encountered surgical problem with prevalence 1.04-2.32/10,000 population[1]. It has a male predominance and afflicts the people in the third, fourth, and fifth decade of life[2]. Anal fistula may be found in association with a variety of specific conditions like Crohn's Disease, tuberculosis, malignancy of anorectum, HIV, radiation exposure, lymphogranuloma venereum, foreign body etc. but most are non-specific and in this group infection of an anal gland in the intersphincteric plane may be the initiating pathology[2]. Infection process starts in the anal gland, progressing into the muscular wall of anal sphincters to cause an anorectal abscess. Following surgical or spontaneous drainage of abscess in the perianal skin, a granulation tissue lined track is left behind in 50% cases giving rise to chronic fistula[3].

Classification of fistula in ano as described by Parks is based on location of its tract in relation to the anal sphincter (Intersphincteric, Transsphincteric which may be Low or High with more than 30% external sphincter involvement, Suprasphincteric & Extrasphincteric). The term complex fistula in ano is a modification of the Park's classification.

Complex fistula-in-ano includes :-

- Track crossing > 30% of external sphincter
- Anterior fistula in female
- Fistula with multiple tracks
- Recurrent fistula
- Patient having preexisting incontinence
- Local irradiation
- Inflammatory bowel disease
- Anorectal tumor[4]

Because of anal sphincter involvement, the treatment of complex fistula poses a high risk for impairment of continence.[5,6] Due to absence of a standard technique for the treatment of complex fistula-in-ano, treatment must be navigated by surgeon's experience and judgement. The surgeon has to keep in mind the tradeoff between the extent of sphincter division, post-operative healing rate and functional loss.[5]

Most of the fistula-in-ano has been conventionally treated either by fistulotomy or fistulectomy, which have been proven to be effective,[7] However setons are commonly used only for high or complex fistula in order to prevent recurrence and incontinence.[8]

Seton is any string like material which, when tied through the fistulous tract leads to an inflammatory reaction which promotes fibrosis that fixes and prevents retraction of the sphincter continuity when it is divided. Thus, it maintains sphincter continuity during cutting process.[9]

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

Seton is typically made from a large silk, silastic vessel marker or rubber band, linen, polypropylene, nylon, cable tie so forth.[9] The reported incontinence and recurrence rate ranges from 0% to 62% and from 0% to 16% respectively with different materials used as seton[10]

Complex fistula with features of local sepsis may require procedures to control sepsis and facilitate healing by tying seton loosely for drainage purpose in the first stage and the fistulotomy is performed as a second stage procedure two to three months later after resolution of local sepsis.

AIMS AND OBJECTIVES:-

This prospective study will be done on the patients from diagnosis till complete follow up:

- Patients having high fistula in ano to be identified
- Patients to be managed with seton application alone or in combination with fistulectomy
- Recurrence rate, incontinence rate and other post-operative complications to be determined after completion of treatment
- Results between both treatment modality to be compared in terms of recurrence rate, incontinence rate and other post-operative complications.
- Efficacy of seton in high fistula-in-ano management

STUDY DESIGN

Prospective study

STUDY POPULATION (MATERIALS)

This study was conducted in the Department of General Surgery, M.K.C.G. Medical College and Hospital, Berhampur, from August 2020 to July 2022 including 6 months of follow up period after obtaining the institutional ethical committee clearance and informed written consent from patients.

INCLUSION CRITERIA:

Patients with high fistula-in-ano (fistulous tract encompassing > 30% of external sphincter) including supra-sphincteric fistula and complex fistula, that is recurrent fistula, fistula with secondary tracks, anterior fistula in females.

EXCLUSION CRITERIA:

- Patients with simple fistula-in-ano that is subcutaneous fistula, intersphincteric fistula and low transsphincteric fistula
- Patients with existing pre-operative incontinence, loss of follow-up and fistulas secondary to inflammatory bowel disease, tuberculosis and malignancies , ASA IV excluded.

SAMPLE SIZE

Sample size was calculated using the following formula :-

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

Sample size = $\frac{Z^2 \times P \times (1-P)}{d^2}$

Where , Z = 1.96 (Standard deviation at 95% Confidence Interval)

P = Expected Prevalence Percentage from population

d = 0.10 (Expected margin of error)

Based on the number of patients admitted to the Dept. of General Surgery, M.K.C.G Medical College and Hospital, Berhampur with a confirmed diagnosis of fistula-in-ano fitting the inclusion criteria and underwent surgery, the time frame dictates the estimated sample size to be around 20 cases per annum. So, the sample size encountered during the study period was 40 cases.

METHODS

All included patients were subjected preoperatively to the following: medical history (personal, present illness, past history, and family history); physical examination (general and local - inspection, palpation, percussion, auscultation, per-rectal examination and proctoscopy). Inspection of the anus revealed the external opening and if there is a scar from previous surgery. The position of the external opening is informative. If it lies at 2-3 cm from the anus, the fistula is likely to be trans-sphincteric, supra-sphincteric or extra-sphincteric.

Palpation of the skin between the external opening and the anal canal with a lubricated finger revealed induration because of the underlying track. It was possible to determine its direction whether anterior or posterior, thus indicating the likely site of the internal opening. Digital examination also identified the internal opening and the presence of secondary tracks. Detailed observation given later.

Preoperative investigations (complete blood count, ALT, AST, urea, creatinine, blood sugar, PT, and serum albumin); and radiological investigations such as abdominal ultrasonography to exclude any intra-abdominal copathology, ECG, and digital x-ray chest in case of previous history of smoking, bronchial asthma, COPD or clinical signs of chest troubles. All patients subjected to XRAY fistulogram and MR fistulogram. MRI helped in classifying into high and low fistula-in-ano. All patients with complex fistula-in- ano and recurrent fistulas were evaluated for associated inflammatory bowel disease, intestinal tuberculosis, anorectal tumor, HIV. Informed consent was then taken from each patient who fit the inclusion criteria following ethical and legal research guidelines at MKCG Medical College and Hospital.

After appropriate anaesthesia, patient put in lithotomy position, rectum and anal canal re-examined. The fistulous tract gently probed with a small, blunt-tipped, metallic probe. The internal opening of the tract is identified. The portion of the tract outside the sphincter opened and curetted. Skin and anoderm overlying the fistulous tract incised. Seton (Silk 0) was then tied over itself on the sphincter. Operating field checked for fresh bleeding and sterile anal pack given.

All the patients were treated with post-operative intravenous antibiotic for 3 days, followed by oral antibiotics, sitz bath from first post-operative day, analgesic if pain, stool

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

bulking agents and good perianal hygiene. Retightening of the cutting seton done every alternate day starting after 48 hours postoperatively which results in fibrosis and gradual division of the sphincter, thus eliminating the fistula while maintaining continuity of the sphincter.

The patients were informed in detail about the presence of the seton prosthesis, and warned about the possible serous discharge and associated pain while tightening the seton that would continue until the seton dropped, and the wound healed.

All the patients were followed up for six months and clinically assessed for incontinence as per Park's classification for incontinence. Patients were followed up to check for persistence or recurrence of local sepsis.

The surgical technique was evaluated on the basis of the following parameters: age and sex distribution, obesity (BMI), incontinence rate and recurrence rate. The follow-up data were obtained during return visits for 6 months after the operation, or when the patient had a complaint.

In my study, out of 40 patients , 31(77.5%) patients underwent combined procedure of fistulectomy of the lateral portion of the tract followed by insertion of cutting seton in the medial portion of the tract encircling the external sphincter. Rest 9(22.5%) patients were treated with cutting seton alone.

All the results were analysed and tabulated according to age, sex, surgical procedures and their complications.

TABLE 1: GRADING OF INCONTINENCE ACCORDING TO PARKS[11]

GRADE 1	FULLY INCONTINENT
GRADE 2	INCONTINENCE TO GAS
GRADE 3	INCONTINENCE TO LIQUID STOOL
GRADE 4	INCONTINENCE TO SOLID STOOL

RESULTS

A) AGE DISTRIBUTION OF STUDY POPULATION

Out of 40 patients of high fistula-in-ano included in my stud, the maximum incidence was in the age group 41-50 years(%) and the minimum incidence was in the age group < 30 years(%). The oldest patient was a male of 64 years and the youngest patient was a male of 28 years.

TABLE 2: AGE DISTRIBUTION OF HIGH FISTULA-IN-ANO (N=40)

AGE(YEARS)	NO. OF PATIENTS	PERCENTAGE(%)
<30	2	5
31-40	11	27.5
41-50	17	42.5
51-60	7	17.5
>60	3	7.5
TOTAL	40	100

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

B) SEX DISTRIBUTION OF STUDY POPULATION

Out of 40 patients, 8 patients were female and 32 patients were male. The male:female ratio was 4:1

TABLE 3: SEX DISTRIBUTION OF THE PATIENTS (N=40) OF HIGH FISTULA-IN-ANO

SEX	NO. OF PATIENTS	PERCENTAGE(%)	MALE:FEMALE
MALE	31	80	4:1
FEMALE	9	20	
TOTAL	40	100	

C) DISTRIBUTION OF SYMPTOMS AMONG THE STUDY POPULATION

All the patients were complaining of soiling. 26 patients out of total 40 patients were complaining of perianal pain. 10 patients were having pruritis ani

TABLE 4: SYMPTOMATIC DISTRIBUTION OF PATIENTS(N=40)

SYMPTOMS	NO. OF PATIENTS	PERCENTAGE(%)
SOILING	40	100
PERIANAL PAIN	26	65
PRURITIS ANI	13	32.5

D) DISTRIBUTION OF THE PATIENTS WITH HIGH FISTULA-IN-ANO ACCORDING TO HISTORY

Out of 40 patients, 9 patients have recurrent fistula while the rest 31 patients presented for the first time who haven't had previous surgery before. Out of 31 patients, 2 female patients presented with anterior fistula

TABLE 5: PRIMARY VS RECURRENT FISTULA DISTRIBUTION(N=40)

HISTORY	NO. OF PATIENTS	PERCENTAGE(%)
RECURRENT FISTULA	9	22.5
PRIMARY FISTULA	31	77.5
TOTAL	40	100

E) IDENTIFICATION OF INTERNAL OPENING BY DRE AND XRAY FISTULOGRAM VS INTRA-OP FINDINGS

To detect an internal opening, DRE and X-RAY fistulogram corroborates with the intra-operative surgical findings in 24(60.0%) and 31(77.5%) patients respectively. 14 patients and 7 patients where internal opening were not identified by DRE and fistulogram respectively ,

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

were identified during surgery. In 2 patients, the internal opening was not identified even during surgery.

TABLE 6: EFFICACY OF DRE AND XRAY FISTULOGRAM (INTERNAL OPENING) (N=40)

		Surgical Exploration	
		Identified(%)	Not Identified(%)
DRE	Identified	24(60)	
	Not Identified	14(35)	2(5)
Fistulogram	Identified	31(77.5)	
	Not Identified	7(17.5)	2(5)

F) IDENTIFICATION OF SECONDARY TRACTS BY DRE AND XRAY FISTULOGRAM VS MRI AND SURGICAL FINDINGS

12(30%) patients were diagnosed with secondary tracks with MRI and during surgery intra-operatively. In judging the presence of a secondary extension, DRE corresponds with MRI and surgery in 5(41.67%) patients whereas XRAY fistulogram corresponds with MRI and surgery in 3(25.0%) patients. 7(58.33%) patients found to have secondary extensions during MRI and surgery were missed in DRE. 9(75%) patients with secondary extensions were missed in XRAY fistulogram.

TABLE 7: EFFICACY OF DRE AND XRAY FISTULOGRAM (SECONDARY TRACKS) (N=40)

		Surgical Exploration and MRI	
		Identified(%)	Total
DRE	Identified	5(41.67)	12
	Not Identified	7(58.33)	
Xray Fistulogram	Identified	6(50)	12
	Not Identified	6(50)	

G) DISTRIBUTION OF PRIMARY TRACKS IN THE PATIENTS OF HIGH FISTULA-IN-ANO

Out of 40 patients, 31(77.5%) patients had high trans-sphincteric fistula-in-ano and 9(22.5%) patients had supra-sphincteric fistulas.

TABLE 8: TYPE OF PRIMARY TRACK (N=40)

PRIMARY TRACK	NO. OF PATIENTS	PERCENTAGE
HIGH TRANS-SPHINCTERIC	31	77.5
SUPRA-SPHINCTERIC	9	22.5
TOTAL	40	100

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

H) SURGICAL PROCEDURES UNDERTAKEN ON THE PATIENTS OF HIGH FISTULA-IN-ANO

Out of 40 patients of high fistula-in-ano, 31(77.5%) patients underwent combined procedure of fistulectomy of the lateral portion of the tract followed by insertion of cutting seton in the medial portion of the tract encircling the external sphincter.

Rest 9 patients (22.5%) were treated with cutting seton alone encircling the complete fistulous tract without fistulectomy.

TABLE 9: TYPE OF SURGERY(N=40)

Name of procedure	No. of patients	Percentage
Combined fistulectomy followed by seton	31	77.5
Cutting seton alone	9	22.5
Total	40	100

Fig 1:

Procedure of combined fistulectomy of the lateral part of the tract followed by seton application through the medial part of the track.

Fig. 2: Procedure of application of seton application alone through the fistulous track

I) SURGERY FOR HIGH FISTULA-IN-ANO BASED ON CLASSIFICATION ACCORDING TO PRIMARY TRACK

HIGH TRANS-SPHINCTERIC FISTULA (HIGH TSF)

25 patients of high trans-sphincteric fistula were treated by excision of the lateral portion of the fistulous tract and application of seton encircling the medial portion and sphincter complex as cutting seton. 6 patients were treated by cutting seton alone of which 4 had secondary extensions.

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

SUPRA-SPHINCTERIC FISTULA (SSF)

6 patients of supra-sphincteric fistula were treated by the combined procedure of fistulectomy followed by application of cutting seton. 3 patients were found to have secondary extensions and were treated with cutting seton alone.

TABLE 10: SURGERY BASED ON ANATOMY OF PRIMARY TRACK (N=40)

Name of Surgery	High TSF	SSF	TOTAL
Combined fistulectomy with cutting seton	25	6	31
Cutting seton alone	6	3	9
Total	31	9	40

J) INCIDENCE OF RECURRENCE AMONG BOTH SURGERY GROUPS

After surgery, all the patients were followed up for 6 months. Of the patients treated with combined fistulectomy followed by cutting seton, 2 patients (6.45%) had recurrence within 6 months. 1 patient (11.11%) of the cutting seton alone group had recurrence. Total recurrence rate with using cutting seton for treatment of high fistula-in-ano was 3(7.5%).

TABLE 11: INCIDENCE OF RECURRENCE(N=40)

Name of Surgery	No. of patients	No. of recurrence	Percentage
Combined fistulectomy with cutting seton	31	2	6.45
Cutting seton alone	9	1	11.11
Total	40	3	7.5

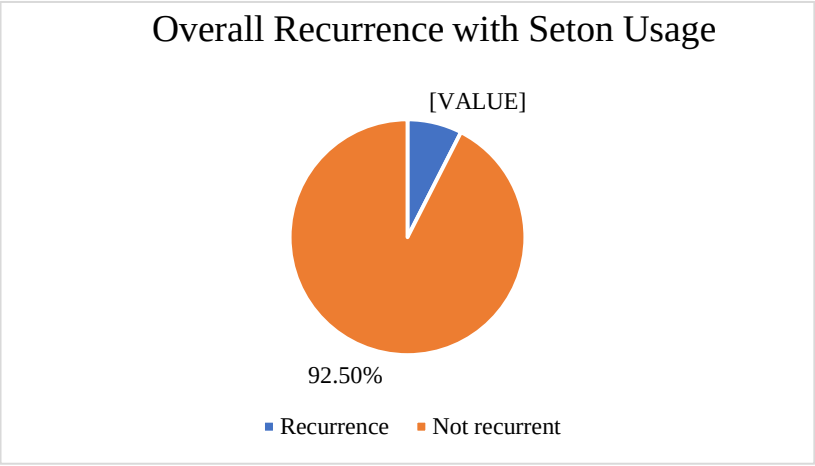

Fig. 3: Overall recurrence with seton usage in high fistula-in-ano.

K) INCIDENCE OF INCONTINENCE IN BOTH SURGERY GROUPS

All the patients were followed up for 6 months for major incontinence (i.e. incontinence to solid stool) as well minor incontinence (i.e. incontinence to liquid or gas). Out of the 31

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

patients who underwent combined fistulectomy followed by cutting seton , 2 patients(6.45%) developed minor incontinence and 1 patient(3.22%) developed major incontinence. Out of 9 patients who had cutting seton procedure done alone, only 1 patient(11.11%) developed minor incontinence. The overall incontinence rate for cutting seton usage for high fistula-in-ano was 7.5%(3 patients) for minor incontinence and 2.5%(1 patient) for major incontinence.

TABLE 12: INCIDENCE OF INCONTINENCE (N=40)

Surgery	Minor incontinence	Percentage	Major incontinence	Percentage
Combined fistulectomy with cutting seton	2(out of 31)	6.45	1(out of 31)	3.22
Cutting seton alone	1(out of 9)	11.11	0(out of 9)	0
Total	3(out of 40)	7.5	1(out of 40)	2.5

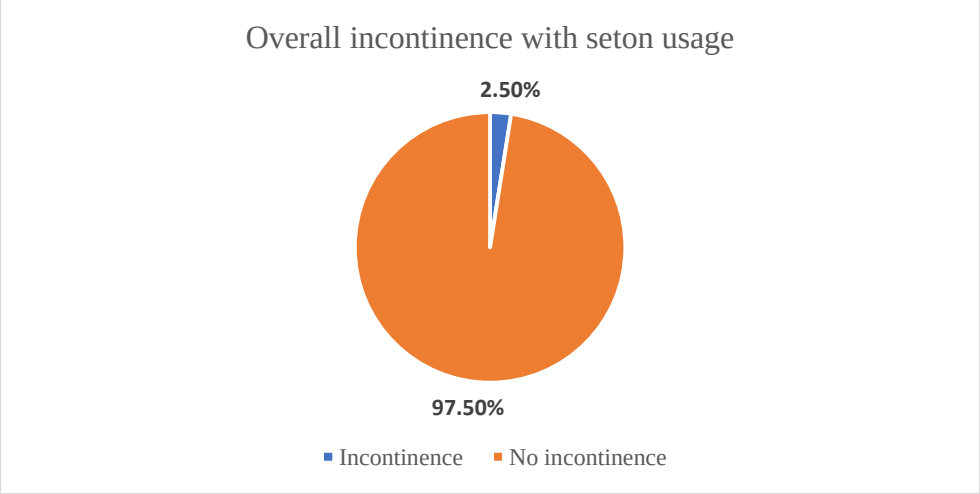

Fig. 4: Overall incontinence with seton usage in treatment of high fistula-in-ano.

DISCUSSION

Anal fistulas are associated with considerable discomfort and morbidity. It is unclear with factors affect the outcome of the surgical treatment of anal fistulas. Low fistula-in-ano are more likely to heal with less morbidity than high fistula-in-ano.

Some authors describe less favourable results in patients with recurrent fistulas after surgical treatment. The present study was undertaken to know the incidence of high fistula-in-ano in different age groups and sex, to evaluate the etiology of high fistula-in-ano, to observe the variation in clinical, radiological and surgical findings. The study also shows the effectiveness of seton application in terms of recurrence and incontinence.

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

ASPECTS OF DIAGNOSIS AND CLASSIFICATION

To diagnose an anal fistula is usually simple through clinical examination, but to correctly classify and determine the anatomy of the fistula requires more skill and often requires adjunctive diagnostic methods. Examination under anaesthesia (EUA) has long been considered the gold standard for correct assessment of anal fistula and thus the basis for decisions on therapy. This is now questioned and MRI is regarded by many as equal to, or surpassing, examination under anaesthesia. EUS and MRI are both valuable imaging techniques for anal fistula and may add important information about the position of the internal opening, and especially the existence and position of any secondary tracks and extensions.

In the present study, we used clinical examination (digital rectal examination), XRAY fistulogram , MRI and finally examination under anaesthesia.

Digital rectal examination remains to be an important examination, however Eckhardt and coworkers have shown its sensitivity and specifity in assessing anal sphincter competence is only 63 and 57 percentage, even when performed by an experienced proctologist.[12]

Buchanan et al[13] compared the accuracy of digital rectal examination, anal endosonography and MRI in the preoperative assessment of anal fistula. 108 patients with anal fistula were studied prospectively by nine experienced clinicians of more than 9 years consultant practice and 10 senior registrars trained by the consultants. A significant linear trend ($p < 0.001$) was noticed in the proportion of fistula tracks correctly classified with each modality. Clinical examination correctly identified the anatomy of the fistula in 66 (61%), endosonography in 87 (81%) and MRI in 97 (90%). A similar result was found for the correct anatomical classification of abscess ($p < 0.001$), horseshoe extension ($p = 0.003$) and the internal opening ($p < 0.001$).

In a retrospective study, Kujipers and coworkers showed that fistulography accurately predicted the location of the internal opening in only 28% of all patients. The investigation was false-negative and false-positive respectively in 64 and 8 percent of the cases.[14] In a comparison with operative findings fistulography was unreliable with only 16% concordance and also 12% false positive findings of high extensions and rectal openings (Kujipers and Schulpen 1985).[14]

Ahlback and coworkers utilized a specially manufactured balloon-catheter to demarcate the upper and lower boundary of the canal. Using this catheter, they were able to localize the internal opening correctly in 72% of their patients.[15] In this study, the result was false-negative and false-positive respectively in 10 and 18 %. Weisman conducted a retrospective study in 27 patients. According to this author, fistulography resulted in a correct classification of the fistula in 89% of the cases.[16]

In this study, in 60% of patients (24) , digital rectal examination (DRE) corresponds with MRI and surgical findings with respect to identification of the internal opening and tracing the primary fistulous tract. Xray Fistulogram correctly corroborated in 31(77.5%) cases. In 2 patients, internal opening could not be identified even during surgery. In judging the presence of a secondary track , DRE was successful in 5 cases (41.67%) and Xray Fistulogram successfully corresponded in 6 cases (50%).

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

Comparing with the study of Buchanan et al[13] where anatomy was correctly identified in 61% of patients by clinical examination, this study had similar results of 60% in identifying the primary track by DRE and 77.5% by Xray Fistulogram. Decreased identification of anatomy by clinical examination could be attributed to the fact that this study included 9 patients of recurrent fistula (22.5%) where scar of previous surgery made it difficult to delineate the regional anatomy.

ASPECTS OF SURGICAL TREATMENT

The aim of anal fistula surgery is to eradicate perianal sepsis and achieve healing of the fistula, while preserving anal continence. The dilemma is that the more radical the surgery, the greater is the risk of subsequent anal incontinence. Surgical techniques such as fistulotomy or laying open and cutting seton treatment have good results for healing without recurrence of the fistula, but continence disturbances increase with increasing height of the fistula. In order to minimise sphincter damage, the use of fistulotomy is now often restricted to subcutaneous and other very low fistulas.

Some studies summarised below in the following table have undertaken seton as treatment option in the treatment of high fistula-in-ano.

TABLE 13: RESULTS IN PUBLISHED STUDIES OF CUTTING SETON AS TREATMENT FOR ANAL FISTULA[17]

Author	Year	N	Classification	Seton material	Time to cut through week (range)	Recurrence/ Persistence (%)	Minor incontinence (%)	Major incontinence (%)	Follow-up
McCourtney and Finlay[18]	1996	22	1 inter 16 trans 5 supra	No 1/0 Silk, replaced monthly as necessary	20 (4-76)	4	0	0	12
Hamalainen, and Sainio[19]	1997	35	25 high trans 5 low trans 3 extra 2 supra	Non-absorbable braided suture 0/0, tightened every 1-2 weeks	12 (3-23)	8	64	40	67
Garcia-Aguilar et al[20]	1998	12	11 trans 1 supra	Rubber band, tightened every 2 weeks after 16	16 (8-36)	6	67	25	27

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

				(8-36) acute sepsis resolved					
Isbister and Al Sanea[21]	2001	47	16 high trans 11 low trans	No. 1-Silk. Tightened every 2-3 weeks	-	2	36	11	13
Durgan et al[22]	2002	10	extra	1-silk setons tightened sequentially every 10 days	-	0	20	0	3-108
Zbar et al[23]	2003	34	18 high trans 16 high trans	0 – Nylon tightened every 2 weeks	14 12	11 6	6 13	0 0	13(6-30) 12(5-28)
Hamel et al[24]	2004	12	trans	2-0 nonabsorbable braided, replaced and tightened every 2 weeks	-	0	0	0	-
Raslan et al[25]	2016	51	High trans	Number 1 silk	-	10	16	6	-
Kamrava et al[26]	2011	47	High trans	Number 1 silk	-	10	2	2	-
Memon et al[27]	2011	79	High trans Supra	Thin electrical cable tie	12	5	0	0	12
Rosen and Kaiser et al[28]	2016	121	High trans	Number 1 silk	-	10	7	0	20

In this study, among the patients treated with combined fistulectomy and seton 2 (6.45%) had recurrence. A single patient (11.11%) out of 9 patients treated with cutting seton alone had recurrence. The overall recurrence rate seen with seton usage in high fistula-in-ano treatment was 7.5% which was lower than the recurrence rates of 10% seen in recent studies.

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

In this study, 2 patients (6.45%) and a single patient (3.22%) out of the 31 patients treated with combined fistulectomy and seton developed minor and major incontinence respectively. Among the ones treated with cutting seton alone, only 1 patient (11.11%) developed minor incontinence and none had major incontinence. The overall incontinence rate encountered in seton usage while treating high fistula-in-ano was 7.5% for minor incontinence and 2.5% in major incontinence. These results were similar to the ones achieved in the recent studies of seton usage as mentioned in the table above.

Comparing with the study done by Isbister and Al Sanea et al in 2001 on cutting seton in complex fistula where there was major incontinence in 11% cases, minor incontinence in 36% of patients and recurrence occurred in 2% cases.[21] Whereas in this study, both minor and major incontinence rates were lower while overall recurrence rate was slightly higher.

There was found to be a statistically significant association between presence of secondary tracks and incidence of recurrence($p=0.014$) after surgery with seton application. Similar significant association ($p=0.036$) was found between presence of secondary tracks and incontinence after surgery.

SUMMARY

This is a prospective study of forty patients suffering from high fistula-in-ano admitted to the surgery department of MKCG Medical College and Hospital, Berhampur during the period of two years (August 2020 to July 2022)

At the time of admission, detailed history taken and clinical examination was carried out. All included patients were subjected to digital rectal examination, proctoscopy, X-RAY fistulogram and MRI abdomen and pelvis.

In my study, the maximum incidence of high fistula-in-ano was in the age group 41-50 years (42.5%) and the minimum incidence was in the age group below 30 years(5%)

Out of 40 patients, 22.5% were female and 77.5% patients were male. The male to female ratio was 3.4:1.

77.5% patients had high trans-sphincteric fistula (high TSF) and 22.5% patients were diagnosed with supra-sphincteric fistula-in-ano.

In the present study, 77.5% underwent combined procedure of fistulectomy of the lateral portion of the tract followed by insertion of cutting seton in the medial portion of the tract encircling the external sphincter. 22.5% were treated with cutting seton alone. Details of patient selection for particular type of fistula is given below in table.

TABLE 14: SURGERY FOR HIGH FISTULA-IN-ANO BASED ON CLASSIFICATION ACCORDING TO PRIMARY TRACK

Name of surgery	High TSF	SSF	Total (%)
Combined fistulectomy and cutting seton	25	6	31(77.5)
Cutting seton alone	6	3	9(22.5)
Total	31	9	40

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

Number 1 Silk was used as seton in both types of surgery. Tightening of the seton was started from post-operative day 3 and continued every alternative day till the seton cut through the fistulous tract.

All the patients were treated with post-operative intravenous antibiotics for 5 days, sitz bath from first post-operative day followed by local antibiotic application of colloidal silver spray on the surgical area, analgesics, stool-bulking agents and good perianal hygiene.

Patients treated with cutting seton alone had a longer duration of hospital stay compared to those who underwent combined fistulectomy with seton use. Overall most patients (40%) of high fistula-in-ano stayed in the hospital post-operatively for 7-10 days after seton usage.

All the patients were followed up for 6 months and clinically assessed for incontinence as per Park's classification for incontinence. Patients were also followed up for detection of persistence or recurrence of local sepsis.

Among the patients treated with the combined procedure of fistulectomy and seton, 6.45% experienced recurrence. Recurrence was seen in 11.11% among patients treated with cutting seton alone. Overall recurrence rate involving both procedures was 7.5%.

Out of patients who were treated with combined fistulectomy and cutting seton both, 6.45% developed minor incontinence and only 3.22% developed major incontinence. Among the patients treated with cutting seton alone, 11.11% developed minor incontinence and no patients developed major incontinence. Overall incontinence encountered while treating high fistula-in-ano with seton during follow-up was 7.5% for minor incontinence and 2.5% for major incontinence.

Statistically significant association was seen between presence of secondary tracks and both recurrence and incontinence post seton usage in high fistula-in-ano.

CONCLUSION

Successful treatment of high anal fistula requires understanding of the pathological anatomy. There is an extensive literature on the subject accrued over many years. This includes data on the success of the various treatments and the prevalence of continence disturbance. Despite this, however, some questions are unanswered and for this reason treatment decisions should be based on clinical judgement through knowledge and experience, while taking the available data into account.

In summary, a high proportion of high fistula-in-ano was seen in the present audit compared to previous studies.

Despite this, a satisfactory outcome was achieved in the vast majority with a relatively low rate of incontinence and recurrence with seton usage in high fistulas. The silk seton is safe, precise, and cost-effective option for the treatment of high fistula-in-ano. Therefore, it can be recommended for treating high fistulae-in-ano. It does not carry the disadvantage of repeated anaesthesia and visits to the operating theatre and reduces the morbidity, inconvenience, and cost to the patient. But it should be in expert surgeon's hand.

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

However further studies and randomised control trials are required to compare between seton and other newer modalities to evolve the best possible treatment to manage high fistula-in-ano, which causes long-term morbidity to the patients both preoperatively as well as postoperatively.

BIBLIOGRAPHY

1. Zanotti C, Martinez PC, Pascual I, Herreros D and Garcia D;Fistula-in-ano its incidence and prevalence; International journal of colorectal disease, 2007,voI22, no12:p1459-1462.
2. Lunnis P, Nugent K. The anus and anal canal. In: Williams NS, Bulstrode CJK, O' Connell PR Editors; Bailey & Love's Short Practice of Surgery; 26th Ed, BocaRaton, CRCPress, 2013:p1259-1261.
3. BulIardDunn KM; Colon, Rectum and Anus. In: Brunicardi FC, Anderson DA, Billiar TR, Dunn DL, Hunter JG, Mathews JB, Pollock RE Editors: Schwartz principles of surgery, 9th Ed, NewYork. McGraw Hill, 2010: p1583-98
4. Nicholls J, Roger R D; The Anus. In: Surgery for colon and rectum, 10th edition, Newyork. McGraw Hill, 1998:p255-67.
5. Parks AG, Gordon PN, Hardcastle JD. A classification of fistula-in-ano. Br J Surg 1976;63:1-12.
6. Hamalainen KP, Sainio AP. CuRing seton for anal fistulas: high risk of minor control defects. Dis Colon Rectum,1997;40:1443-7.
7. lsbister WH, AI Sanea N. The cutting seton: an experience at King Faisal Specialist Hospital. Dis Colon Rectum 2001; 44:722-7.
8. Dziki A, Bartos M. Seton treatment of anal fistula: experience with a new modification. Eur J Surg 1998;164:543-8.
9. Parks AG, Stitz RW. The treatment of high fistula-in-ano. Dis Colon Rectum 1976; 19:48799.
10. Van Tets WF, Kuijpers JH. Seton treatment of perianal fistulas with high anal or rectal opening. Br J Surg 1995;82:895-7.
11. Parks AG. Anorectal incontinence. J R Soc Med 1975; 68:21-30.
12. Eckardt VF, Kanzler G. How reliable is digital examination for the evaluation of anal sphincter tone? Int J Coloreaal Dis 1993 Jul;8(2):957.
13. Buchanan GN, Halligan S, Bartram CI, Williams AB, Tarroni D, Cohen CR. Examination, endosonography, and MR imaging in preoperative assessment of fistula-in-ano: comparison with outcome- based reference standard. *Radiology* 2004; 233(3): 674-681
14. Kuijpers HC, Schulpen T. Fistulography for fistula-in-ano.Dis Colon Rectum;1985;28:103-4
15. Ahlbäck S, Holmström B, Syk B. Anal fistulography. Acta Radiol 1974; 15: 282-7
16. Weisman RI, Orsay CP, Pearl RK, Abcarian H. The role of fistulography in fistula-in-ano. Dis Colon Rectum 1991;34:181-4.
17. Williams JG, Farrands PA, Williams AB, Taylor BA, Lunniss PJ, Sagar PM, Varma JS, George BD. The Treatment of Anal Fistula: ACPGBI Position Statemnt. Journal compilation. The Association of Coloproctology of Great Britain and Ireland. Colorectal Disease 2007;9(4):18-50
18. McCourtney JS, Finlay IG. Cutting seton without preliminary internal sphincterotomy in management of complex high fistula-in-ano. Dis Colon Rectum

ISSN: 0975-3583,0976-2833 VOL13,ISSUE08,2022

1996; 39: 55-8
19. Hamalainen KP, Sainio AP. Cutting seton for anal fistulas: high risk of minor control defects. Dïs Colon Rectum 1997; 40: 1443-6
20. Garcia-Aguilar J, Belmonte C, Wong D, Goldberg SM, Madoff RD, Cutting seton versus two-stage seton fistulotomy in the surgical management of high anal fistuIa.Br J Surg 1998;85:243-5
21. Isbister WH, Al Sanea N. The cutting seton. An experience at King Fisal Specialist Hospital. Dis Colon Rectum 2001;44: 722–731.
22. Durgan V, Perek A, Kapan M et al. Partial fistulotomy and modified cutting seton procedure in the treatment of high extrasphincteric perianal fistulae. Dig Surg 2002; 19: 56–8.
23. Zbar AP, Ramesh J, Beer-Gabel M et al. Conventional cutting vs. internal anal sphincter-preserving seton for hightrans-sphincteric fistula: a prospective randomized manometric and clinical trial. Tech Coloproctol 2003; 7: 89–94.
24. Hamel CT, Marti WR, Oertli D. Simplified placement and management of cutting setons in the treatment of trans- sphincteric anal fistula: technical note. Int J Colorectal Dis 2004; 19: 354–6
25. Raslan SM, Aladwani M, Alsanea N. Evaluation of the cutting seton as a method of treatment for perianal fistula. Ann Saudi Med 2016; 36: 210–5.
26. Kamrava A, Collins JC. A decade of selective use of adjustable cutting seton combined with fistulotomy for anal fistula. Am Surg 2011; 77: 1377–80.
27. Memon AA, Murtaza G, Azami R, Zafar H, Chawla T, Laghari AA. Treatment of complex fistula in ano with cable-tie seton: a prospective case series. ISRN Surg 2011; 2011: 636952.
28. Rosen DR, Kaiser AM. Definitive seton management for transsphincteric fistula-in-ano: harm or charm? Colorectal Dis 2016; 18: 488–95.