COMPREHENSIVE EVALUATION OF VARIOUS AVAILABLE SURGICAL MANAGEMENT OF FISTULA IN ANO :EXPERIENCE IN A TERTIARY CARE CENTRE OF INDIA

Dermatology

Dr Satish Kumar	M.S, General Surgery, INHS, Asvini, Colaba , Mumbai
Dr Anindya Halder	Senior Resident, Department Of Surgery, All India Institute Of Medical Sciences Raipur
Dr Jyoti Ranjan Swain*	Assistant Professor, Surgical Oncology, Homi Bhabha Cancer Hospital, Varanasi *Corresponding Author
Dr Rishila Majumder	Senior Resident, Department Of Pathology, All India Institute Of Medical Sciences, Bhubaneswar
Dr Niru Das	Senior Resident, Department of Dermatology, Coochbehar government medical college and hospital

ABSTRACT

Background: There are various conventional and emerging surgical modalities for management of fistula in ano. But every modality has its own pros and cons. The aim of our study was to compare various surgical modalities in term of its recurrence rate, cost and their complication rates

Materials And Methods: A prospective observational study was conducted with 50 patients from July 2016 to June 2018. Prospective data was collected on proforma basis regarding clinical presentation, imaging findings, various surgical modalities, complications and reoperation rate.

Results: The mean age of the patients was 40.04 ± 10.77 years. The most common type of surgery was Fistulectomy (28%) and Fistula plug (28%) followed by Fistulotomy (20%), Seton Application (16%) and Video Assisted Anal Fistula Treatment (VAAFT) (8%). 8 (16%) patients required reoperation. There was no significant association of reoperation and type of surgery in patients ($p > 0.05$). The mean values of post-operative recovery (VAS Score) at different time intervals (post-op, post-op 3 months and post-op 6 months) was comparable and statistically not significant as per ANOVA test ($p > 0.05$). There was no significant association of post-operative recovery (VAS Score) and type of surgery in patients. There was no significant association of post-operative complications after 3 months and 6 months and type of surgery in patients ($p > 0.05$).

Conclusion: All the surgical modalities used in our study revealed comparable success rate and no significant differences in complication rates. A large randomised controlled trial comparing various surgical modalities is required in future to decide the best surgical method to treat fistula in ano.

KEYWORDS

Fistula in ano, fistulectomy, surgery, complications

INTRODUCTION

Fistula is an abnormal connection between two hollow organs or between hollow organ and the skin lined by epithelial tissue. In cases of fistula in ano, it is a track that connects deeply the anal canal or rectum to the skin around the anus. Fistula-in-ano is a chronic phase of anorectal infection and is characterized by chronic purulent discharge or cyclical pain associated with the abscess reaccumulation followed by intermittent spontaneous decompression.[1] Surgery remains the only modality for the effective treatment of this condition.

Surgery is considered the best treatment modality for anal fistula. The aim of any treatment method used for anal fistula is to completely remove the fistulous tracts and septic foci and yet prevent the occurrence of recurrence or incontinence. Conventional surgical options for a simple anal fistula include a fistulotomy and a fistulectomy. The main objective of the operative intervention is to heal the fistula with minimal morbidity. [2] There are a number of sphincter-sparing methods such as fibrin or cyanoacrylate glue injection,[3,4] anal fistula plug,[5] endorectal advancement flap,[6,7] ayurvedic seton,[8] ligation of intersphincteric Fistula tract (LIFT),[9,10] and finally, video-assisted anal fistula treatment. [11] Several sphincter-sparing methods carry their own risk of recurrence and some degree of incontinence. Most of these are complicated and difficult procedures, and require expertise, highly experienced surgeons, or high-technology equipment. [12] LIFT technique is the novel modified approach through the intersphincteric plane for the treatment of fistula-in-ano, known as LIFT procedure. LIFT procedure is based on the secure closure of the internal opening and removal of infected crypto glandular tissue through the intersphincteric approach.

Hence the present study was done at our tertiary care centre to study the demographic features of fistula in ano, to evaluate post op recovery of various modalities of management and to determine success and complication rates of the various surgical procedures.

MATERIALS AND METHODS

A hospital based prospective observational study was conducted with 50 patients from July 2016 to June 2018 to evaluate the demographic

features of fistula in ano and their various available modalities of management after the study was being passed by ethics committee of the hospital. Patients of fistula in ano associated with crohns disease, HIV (human immunodeficiency virus), TB (Tuberculosis) and malignancy were excluded. Prospective data was collected on proforma basis from patients diagnosed to have fistula in ano and being managed surgically during the study period with follow up of six months. Clinical history and examination including per rectal and proctoscopic examination was done in all the patients. All the patients were processed by routine investigations, chest X-ray etc., and prior to surgery. Pus culture sensitivity and fistulogram was done in all cases. C.T. Scan (computed tomography) and M.R (magnetic resonance) fistulogram as per requirement. The procedures were done under spinal anaesthesia in lithotomy position according to standard guidelines. The excised fistula track was sent for histopathological examination. Operative time and blood loss were noted. Postoperative complications like bleeding, nausea, vomiting, urinary dysfunction, faecal impaction were noted.

Pain was recorded by the patient on the Visual Analogue Scale with a rating of 1 equivalent to no pain and 10 meaning most severe pain imaginable. Patients were instructed to take analgesics as required. The time for which a patient required analgesics was recorded as duration of severe pain. Continence was assessed by Clinical Continence Grading [13]

STATISTICAL ANALYSIS

Quantitative data is presented with the help of Mean and Standard deviation. Comparison among the study groups is done with the help of unpaired t test as per results of normality test. Qualitative data is presented with the help of frequency and percentage table. Association among the study groups is assessed with the help of Fisher test, student's t test and Chi-Square test. 'p' value less than 0.05 is taken as significant.

RESULTS

The mean age of the patients was 40.04 ± 10.77 years. There was male preponderance (70%) while female patients constituting about 30% of the study population. 12 (24%) patients had high internal opening

while 38 (76%) patients had low internal opening. The most common type of surgery was Fistulectomy (28%) and Fistula plug (28%) followed by Fistulotomy (20%), Seton Application (16%) and Video Assisted Anal Fistula Treatment (VAAFT) (8%). 8 (16%) patients required reoperation while 42 (84%) patients had a successful outcome after the first operation. 5 (62.5%) patients underwent Fistulectomy + Seton Application for recurrence while 3 (37.5%) patients underwent Seton Application. The mean Resting Anal Pressure and Maximum squeeze pressure was 29.64 ± 5.11 mmHg and 68.76 ± 10.56 mmHg respectively. The mean Sensory threshold was 24.60 ± 5.67 ml. The mean post-op recovery (VAS Score) was 70.72 ± 4.56 while the mean post-op 3 months and post-op 6 months VAS Score was 86.38 ± 3.57 and 95.92 ± 3.04 respectively. There was significant improvement in VAS score of patients over 3 months and 6 months follow-up ($p < 0.05$). Complications like discharge was observed in 9 (18%) patients after 3 months and in 4 (8%) patients after 6 months. 7 (14%) and 4 (8%) patients developed faecal incontinence and bleeding per rectum respectively while 3 (6%) patients had pruritus at the end of 3 months follow-up period. At the end of 6 months follow-up, 2 (4%) patients each had faecal incontinence and bleeding per rectum respectively while 1 (2%) patient had pruritus.

5 (10%) and 2 (4%) patients that underwent Fistulectomy and Fistulotomy respectively had to be reoperated while 1 (2%) patient that underwent Seton had to be reoperated. There was no significant association of reoperation and type of surgery in patients ($p > 0.05$). The mean values of anal manometry findings (Resting Anal Pressure, Maximum squeeze pressure and Sensory threshold) was comparable and statistically not significant as per ANOVA test ($p > 0.05$). There was no significant association of anal manometry findings and type of surgery in patients. The mean values of post-operative recovery (VAS Score) at different time intervals (post-op, post-op 3 months and post-op 6 months) was comparable and statistically not significant as per ANOVA test ($p > 0.05$). There was no significant association of post-operative recovery (VAS Score) and type of surgery in patients.

4 (8%) patients that underwent Fistulectomy had faecal incontinence while 5 (10%) patients that underwent Fistula plug had discharge. There was no significant association of post-operative 3 months complications and type of surgery in patients ($p > 0.05$).

2 (4%) patients that underwent Fistulectomy had faecal incontinence while 2 (4%) patients each that underwent Fistula plug had discharge and bleeding per rectum. There was no significant association of post-operative 6 months complications and type of surgery in patients ($p > 0.05$).

DISCUSSION

Fistula in ano is very common surgical problem in third world countries due to poor hygiene, posing great challenge in treatment. There are many treatments available at present namely fistulectomy, fistulotomy, LIFT, fistula plug, Seton technique. As each procedure is associated with its own complications, patient satisfaction depends on factors like postoperative hospital stay, postoperative pain and bleeding, return to routine activity, wound healing time, interference with the anal continence and most importantly the recurrence of the disease.

Treating anal fistula remains a challenge because of the anatomical location of the disease and the potential risks of postoperative stool incontinence and septic complications. Although the primary objective of operative intervention is to heal the fistula, equally important is the morbidity of the procedure. Fistulotomy remains one of the most commonly performed operations for anal fistula with a reported success rate ranging from 87% to 94%. [14, 15, 16]

Fistulotomy entails the division of a various degree of anal sphincter muscle, putting the patient at risk for postoperative incontinence, adversely affecting the patient's quality of life. Postoperative incontinence has been noted in 6% to 40% of patients who undergo fistulotomy. [14, 15, 16]

This finding has prompted surgeons to identify the subgroups of patients who are at an increased risk of developing post fistulotomy incontinence and to offer such patients sphincter-preserving operations. Patients who are predisposed to incontinence include patients with baseline incontinence, those with a history of anal operations, women with anterior-based fistulas, and patients with

horseshoe fistulas or high tracts involving a significant amount of sphincter muscle. [16, 17]

In the present study, majority of the patients (48%) were in the age group of 31-40 years followed by 20% in the age group of 41-50 years, 14% in the age group of 21-30 years, 10% in the age group of 51-60 years and 8% in the age group of 61-70 years. The mean age of the patients was 40.04 ± 10.77 years. There was male preponderance (70%) while female patients constituted 30% of the study population. This is similar to the studies of Dalbem CS et al [8], Abbas MA et al [9], Ramachandra ML et al [10], Khadia M et al [11] and Emile SH et al [12].

Dalbem CS et al [8] prospective study evaluating the effectiveness of the use of the LIFT technique in patients with perianal trans-sphincteric fistulas found 22 patients, 12 (55%) were male and 10 (45%) were female. The age ranged from 17 to 62 years, with a mean of 45 years.

Abbas MA et al [9] retrospective study evaluating the patients treated for anal fistula secondary to cryptoglandular disease and to determine factors that influence postoperative outcome found median age was 45 years with a predominance of male patients (79.3%).

Ramachandra ML et al [10] randomised, comparative, prospective study comparing the various aspects like per operative complications, post-operative complications, mean hospital stay in the treatment of fistula in ano using various modalities like fistulotomy, fistulectomy, setons and LIFT procedure found out of 80 patients most common age of presentation is 31-40 years and more common in males than females (M: F = 2.3:1).

Khadia M et al [11] prospective study evaluating LIFT in the management of patients of fistula-in-ano of cryptoglandular origin found maximum or peak incidence of fistula-in-ano was in the age group 41-50 years. The median age was 46 (range 29-65) years. The oldest patient was a male of 65 years and the youngest patient was female of 29 years. The male to female ratio was 4:1.

Emile SH et al [12] prospective study assessing the characteristics and the outcomes of surgery of fistula-in-ano in each gender found out of 491 (87%) males and 74 (13%) females with a male-to-female ratio of 6.6:1. The mean age of patients was 41.7 ± 12.4 (range, 18-87) years. There was no significant difference in the mean age of male and female patients.

In our study, 12 (24%) patients had high internal opening while 38 (76%) patients had low internal opening. This is consistent with the study of Emile SH et al [12]. Emile SH et al [12] was a prospective study assessing the characteristics and the outcomes of surgery of fistula-in-ano found position of the external opening of the fistula was anterior to the transverse anal line in 131 (23.1%) patients, posterior in 368 (65.1%) patients, lateral in 49 (8.7%) patients, whereas 17 (3%) patients had more than one external opening. Anterior anal fistula was more common in female patients (69% vs. 16.3%; $p < 0.0001$) whereas posterior Fistula in ano was more common in males (71.6% vs. 21.6%, $p < 0.0001$).

Proper identification of the internal opening is an integral part of fistula surgery if an unacceptable high recurrence rate is to be avoided. [13, 18] Abou-Zeid AA [19] observed recurrence is inevitable if the correct internal opening is not identified and dealt with. This is simply because in such cases, the original source of sepsis will not be eliminated. Every effort should be made to localize the correct internal opening preoperatively. Besides clinical examination, many investigations can help in preoperative localization of the internal opening. [20]

The most common type of surgery in the present study was Fistulectomy (28%) and Fistula plug (28%) followed by Fistulotomy (20%), Seton Application (16%) and Video Assisted Anal Fistula Treatment (VAAFT) (8%). This is comparable with the studies of Abbas MA et al [9] and Emile SH et al [12]. Abbas MA et al [9] was a retrospective study evaluating the patients treated for anal fistula secondary to crypto glandular disease and to determine factors that influence postoperative outcome reported Fistulotomy was performed in 82.7% of patients. Emile SH et al [12] prospective study assessing the characteristics and the outcomes of surgery of fistula-in-ano reported Fistulotomy was performed in 86 (15.2%) patients (33

subcutaneous & 53 intersphincteric FIA), fistulectomy in 198 (35%) patients (46 intersphincteric, 152 low transsphincteric), two-stage drainage seton in 261 (46.2%) patients (6 low transsphincteric, 252 high transsphincteric, 3 extrasphincteric) anocutaneous advancement flap in 9 (1.6%) patients (6 high transsphincteric, 3 extrasphincteric), and LIFT in 11 (2%) patients (9 intersphincteric and 2 high transsphincteric).

It was observed in our study that 2 (4%) patients had chronic fissure in ano while 1 (2%) patient had cholelithiasis. 8 (16%) patients required reoperation while 42 (84%) patients had a successful outcome after the first operation. 5 (62.5%) patients underwent Fistulectomy + Seton Application in reoperation while 3 (37.5%) patients underwent Seton Application. 6 (12%) patients had lax sphincter tone while no abnormalities were detected in 44 (88%) patients.

The mean Resting Anal Pressure and Maximum squeeze pressure was 29.64 ± 5.11 mmHg and 68.76 ± 10.56 mmHg respectively. The mean Sensory threshold was 24.60 ± 5.67 ml. The mean post-op recovery (VAS Score) was 70.72 ± 4.56 while the mean post-op 3 months and post-op 6 months VAS Score was 86.38 ± 3.57 and 95.92 ± 3.04 respectively. There was significant improvement in VAS score of patients over 3 months and 6 months follow-up ($p < 0.05$). Incidence of discharge was observed in 9 (18%) patients after 3 months and in 4 (8%) patients after 6 months. 7 (14%) and 4 (8%) patients had Faecal incontinence and Bleeding per rectum respectively while 3 (6%) patients had Pruritus at the end of 3 months follow-up period. At the end of 6 months follow-up, 2 (4%) patients each had faecal incontinence and Bleeding per rectum respectively while 1 (2%) patient had Pruritus. This is in concordance to the study of Abbas MA et al. [9]

Abbas MA et al [9] retrospective study evaluating the patients treated for anal fistula secondary to cryptoglandular disease and to determine factors that influence postoperative outcome reported median follow-up was 53 days (range, 6 days to 40 months). In 28 patients (15.6%), the operative intervention failed. Of these 28 patients, persistence of disease was apparent in 20 within 1 month of the intervention and in 8 within 1 to 6 months. New postoperative incontinence was noted in 15.6% of patients (stool incontinence in 10.6% of patients and gas incontinence in 5.0%).

In our study, the mean age of patients that underwent surgery (Fistulectomy, Fistula plug, Fistulotomy, Seton or VAAFT) was comparable and statistically not significant ($p > 0.05$). There was no significant association of age and type of surgery in patients ($p > 0.05$). Majority of the male patients (22%) underwent Fistulectomy while majority of the female patients (10%) underwent Seton. There was no significant association of sex and type of surgery in patients ($p > 0.05$). This is concordant to the studies of Emile SH et al [12] and Abbas MA et al. [9]

Emile SH et al [12] prospective study assessing the characteristics and the outcomes of surgery of fistula-in-ano in each gender observed females had a significantly ($p = 0.002$) higher percentage of low anal fistula than males (52/74; 70.2% vs. 247/491; 50.3%). The percentage of low subcutaneous FIA was significantly higher in female than male patients (16.2% vs. 4.3%; $p < 0.0001$). Conversely, male patients had a significantly higher percentage of high trans-sphincteric anal fistula. The percentage of female patients that underwent lay open fistulotomy was significantly higher than males, whereas males were treated with draining seton significantly more than females.

Abbas MA et al [9] retrospective study evaluating the patients treated for anal fistula secondary to cryptoglandular disease and to determine factors that influence postoperative outcome reported being older than 45 years was associated with a higher postoperative incontinence rate (23.2%) compared with the younger group (12.4%). High transsphincteric and suprasphincteric fistulas were more likely to predict incontinence compared with subcutaneous fistulas (AOR, 22.9 [95% CI, 2.2-242.0; $P = .009$] and 61.5 [4.5-844.0; $P = .002$], respectively.

In our study, 5 (10%) and 2 (4%) patients that underwent Fistulectomy and Fistulotomy respectively had to be reoperated while 1 (2%) patient that underwent Seton had to be reoperated. There was no significant association of reoperation and type of surgery in patients ($p > 0.05$). Emile SH et al [12], Dalbem CS et al [8], Ooi K et al [21] and Shanwani

et al [22] noted similar observations in their results.

Emile SH et al [12] prospective study assessing the characteristics and the outcomes of surgery of fistula-in-ano in each gender observed male patients had previous surgery for anal fistula significantly more than female patients. Overall, recurrence of FIA was detected in 42 (7.4%) patients. Although males had around twice the recurrence rate of females 7.9% vs. 4%; this difference was not significant. Regarding the outcome of the individual procedures, fistulotomy and fistulectomy achieved the lowest rates of recurrence (0 and 4%), followed by recurrence after removal of the drainage seton (10.7%) and LIFT (18.1%). Anocutaneous advancement flap had the highest recurrence rate (44.4%).

Dalbem CS et al [8] prospective study evaluating the effectiveness of the use of the LIFT technique in patients with perianal transsphincteric fistulas reported seventeen (77%) patients obtained complete resolution of their fistula with the technique adopted, while five (23%) relapsed. Of these five, all had a recurrence in the form of an intersphincteric fistula, being subsequently operated by fistulotomy, with complete resolution – thus, a third surgical procedure. A female patient developed mild fecal incontinence.

Ooi K et al¹⁰⁴ [21] reported recurrent perianal fistulas in 40% of the patients achieved primary healing in 68.0% of cases. On the other hand, Shanwani et al [22] reported cure in 82% of the patients.

It was observed in the present study that the mean values of anal manometry findings (Resting Anal Pressure, Maximum squeeze pressure and Sensory threshold) was comparable and statistically not significant as per ANOVA test ($p > 0.05$). There was no significant association of anal manometry findings and type of surgery in patients. The mean values of post-operative recovery (VAS Score) at different time intervals (post-op, post-op 3 months and post-op 6 months) was comparable and statistically not significant as per ANOVA test ($p > 0.05$). There was no significant association of post-operative recovery (VAS Score) and type of surgery in patients. This is consistent with the study of Ramachandra ML et al. [24]

Ramachandra ML et al [10] randomised, comparative, prospective study comparing the various aspects like per operative complications reported Post-operative pain seen in 7 (35%) patients undergoing setons procedure and 5 (25%) patients undergoing fistulectomy. On long term follow up chronic pain seen maximum in patients undergoing setons procedure about 6(30%) followed by 4 (20%) and 3 (15%) patients undergoing fistulotomy and fistulectomy respectively.

In our study, 4 (8%) patients that underwent Fistulectomy had faecal incontinence while 5 (10%) patients that underwent Fistula plug had discharge. There was no significant association of post-operative 3 months complications and type of surgery in patients ($p > 0.05$). Similar observations were noted in the studies of Abbas MA et al [9] and Ramachandra ML et al. [10]

Abbas MA et al [9] retrospective study evaluating the patients treated for anal fistula secondary to cryptoglandular disease and to determine factors that influence postoperative outcome reported Anal fistula plugging carried the highest failure rate (83.3%) compared with fistulotomy (10.1%) (OR, 44.3 [95% CI, 8.9-221.0; $P < .001$]) and was the only independent predictor of failure after adjusting for all other variables (55.4 [8.3-369.0; $P < .001$]).

Ramachandra ML et al [10] randomised, comparative, prospective study comparing the various aspects like per operative complications reported post-operative fever and wound infection seen in 3 (15%) patients each of fistulectomy and fistulotomy. The number of patients with post-operative fever and wound infection is quite low about 1 (5%) each in patients undergoing setons and LIFT procedure.

In the present study, 2 (4%) patients that underwent Fistulectomy had faecal incontinence while 2 (4%) patients each that underwent Fistula plug had discharge and bleeding per rectum. There was no significant association of post-operative 6 months complications and type of surgery in patients ($p > 0.05$). This is similar to the studies of Ramachandra ML et al [10] Dalbem CS et al [8], Abbas MA et al [9], Khadia M et al [11] and Emile SH et al [12].

Ramachandra ML et al [10] randomised, comparative, prospective

study comparing the various aspects like per operative complications, post-operative complications, mean hospital stay in the treatment of fistula in ano using various modalities like fistulotomy, fistulectomy, setons and lift procedure reported post-operative complications include bleeding seen in 4 (20%) patients undergoing fistulotomy, 7 (35%) patients undergoing fistulectomy and 1 (5%) patient of seton's procedure. Sphincter injury seen in 4 (20%) patients of fistulotomy and 3 (15%) patients undergoing fistulectomy. Per operative course of LIFT procedure patients was complication free. Post-operative complications include bleeding seen in 3 (15%) patients of fistulotomy and 4 (20%) patients of fistulectomy with no post-operative bleeding seen in patients with setons and LIFT procedure. Recurrence seen in 5 (25%) cases of fistulectomy followed by 3 (15%) patients in LIFT procedure and 2 (10%) each in fistulotomy and setons respectively.

Dalbem CS et al [8] prospective study evaluating the effectiveness of the use of the LIFT technique in patients with perianal transsphincteric fistulas reported patient was discharged within 24 h. During the outpatient follow-up, local infection (drainage of pus from surgical wound) occurred in five patients (23%), who were only followed without further intervention and with spontaneous resolution. The post-LIFT outpatient follow-up ranged from 4 to 24 months, with a mean follow-up of 14 months. The healing time varied from 4 to 8 weeks after the procedure.

Abbas MA et al retrospective study evaluating the patients treated for anal fistula secondary to cryptoglandular disease reported Anal fistula plugging carried the highest postoperative septic complication rate (33.3%) compared with fistulotomy (4.7%) (OR, 10.1 [95% CI, 2.4-41.7; P=.001]) and was the only independent predictor for postoperative septic complications after adjusting for all other variables. Finally, only the patients with single fistulas had postoperative sepsis; the 10 patients with multiple fistulas never had postoperative sepsis.

Khadia M et al [11] prospective study evaluating LIFT in the management of patients of fistula-in-ano of cryptoglandular origin reported recurrence was seen in all five patients having suprasphincteric (5 out of 13 recurrences: 38.46%) fistula-in-ano. While seven patients having transsphincteric fistula-in-ano (7 out of 13 recurrences: 53.84%) had a recurrence. Only one patient having an intersphincteric fistula (1 out of 13 recurrences 7.69%) had a recurrence.

Emile SH et al [12] prospective study assessing the characteristics and the outcomes of surgery of fistula-in-ano reported fecal Incontinence developed in 10 (1.77%) patients with higher incidence in female than male patients (4% vs. 1.4%); yet again the difference did not attain any statistical significance. Both genders had comparable Wexner continence scores and rates of wound infection postoperatively.

CONCLUSION:

All the surgical modalities used in our study revealed comparable success rate and no significant differences in complication rates.

Choice of surgical modalities will depend on cost and demographic profile of the patients. Larger randomised controlled trials are required in future which can guide the clinicians for deciding the most suitable surgical modality for patients on case to case basis.

Funding: Not Applicable

Conflicts Of Interest: None

Table 1: Clinical Details

Sl No	Clinicopathologic Features	N
1. Age	Age	40.88 ± 11.19
2. Sex	M:F ratio	2:1
3.internal Opening	High Low	12(24%) 38(76)
4.typeof Surgery	Fistulectomy Fistula Plug Fistulotomy Seton Application Vaaft	14(28 %) 14(28%) 10(20%) 8(16%) 4(8%)
5.comorbidities	Chronic fissure in ano Cholelithiasis	2(4%) 1(2%)
6.reoperation	Yes No	8(16%) 42(84%)
7.type Of Reoperation	Fistulectomy+seton Application Seton	5(10%) 3(6%)
8.per Rectal Findings	1)lax Sphincter 2)no Significant Abnormality	6(12%) 44(88%)
9.anal Manometry Findings	1)resting Anal Pressure 2)maximum Squeeze Pressure 3)sensory Threshold	29.64 ± .11mmHg 68.76 ± 10.56 mmHg 24.60 ± 5.67ml
10.complications	Discharge Fecal Incontinence Bleeding Per Rectum Pruritus	3months 6 Months 9(18%) 4(8%) 7(14%) 2(4%) 4(8%) 2(4%) 3(6%) 1(2%)

Table 2: Association Of Reoperation And Type Of Surgery In Patients

Type of Surgery	Reoperation						Chi-Square value	P Value
	Yes		No		Total			
	N	%	N	%	N	%		
Fistulectomy	5	10%	9	18%	14	28%	4.213	>0.05
Fistula plug	0	-	14	28%	14	28%		
Fistulotomy	2	4%	8	16%	10	20%		
Seton	1	2%	7	14%	8	16%		
VAAFT	0	-	4	8%	4	8%		
Total	8	16%	42	84%	50	100%		

Table 3: Association Of Anal Manometry Findings And Type Of Surgery In Patients

	Fistulectomy		Fistula plug		Fistulotomy		Seton		VAAFT		F value	p Value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Resting Anal Pressure	29.00	5.80	29.29	5.64	31.20	5.51	29.75	3.77	29.00	2.58	1.308	>0.05
Max. squeeze pressure	67.71	6.74	68.71	14.29	70.80	13.89	68.25	3.11	68.50	10.88	1.639	>0.05
Sensory threshold	24.57	6.81	23.86	5.74	25.60	5.56	24.75	5.12	24.50	4.73	1.426	>0.05

Table 4: Association Of Post-operative Recovery (vas Score) And Type Of Surgery In Patients

	Fistulectomy		Fistula plug		Fistulotomy		Seton		VAAFT		F value	p Value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Post-op	71.07	4.92	70.50	4.55	70.40	4.86	70.88	5.03	70.75	3.77	3.124	>0.05
Post-op 3 months	87.21	4.25	85.71	4.34	86.20	2.53	86.25	2.25	86.50	3.42	3.457	>0.05
Post-op 6 months	96.71	3.29	96.07	4.03	95.60	1.26	94.75	2.82	95.75	1.71	3.664	>0.05

Table 5: Association Of Post-operative 3 Months Complications And Type Of Surgery In Patients

Type of Surgery	Discharge		Faecal incontinence		Bleeding per rectum		Pruritus		Chi-Square value	p Value
	N	%	N	%	N	%	N	%		
Fistulectomy	2	4%	4	8%	1	2%	0	-	5.132	>0.05
Fistula plug	5	10%	0	-	2	4%	1	2%		
Fistulotomy	2	4%	0	-	0	-	1	2%		

Seton	0	-	2	4%	0	-	1	2%		
VAAFT	0	-	1	2%	0	-	0	-		
Total	9	18%	7	14%	4	8%	3	6%		

Table 6: Association Of Post-operative 6 Months Complications And Type Of Surgery In Patients

Type of Surgery	Discharge		Faecal incontinence		Bleeding per rectum		Pruritus		Chi-Square value	p Value
	N	%	N	%	N	%	N	%		
Fistulectomy	1	2%	2	4%	0	-	0	-	3.667	>0.05
Fistula plug	2	4%	0	-	2	4%	1	2%		
Fistulotomy	1	2%	0	-	0	-	0	-		
Seton	0	-	0	-	0	-	0	-		
VAAFT	0	-	0	-	0	-	0	-		
Total	4	8%	2	4%	2	4%	1	2%		

REFERENCES

- Whiteford MH, Kilkenny J, Hyman Net al. Practice parameters for the treatment of perianal abscess and fistula-in-ano (revised) 3rd. Dis Colon Rectum. 2005; 48:1337–42.
- Abbas MA, Jackson CH, Haigh PI. Predictors of outcome for anal fistula surgery. Arch Surg. 2011; 146(9):1011–6.
- De La Portilla F, Rada R, León E et al. Evaluation of the use of BioGlue in the treatment of high anal fistulas: Preliminary results of a pilot study. Dis Colon Rectum. 2007; 50:218–22.
- Barillari P, Basso L, Larcinese A et al. Cyanoacrylate glue in the treatment of ano-rectal fistulas. Int J Colorectal Dis. 2006; 21:791–4.
- Han JG, Wang ZJ, Zhao BC et al. Long-term outcomes of human acellular dermal matrix plug in closure of complex anal fistulas with a single tract. Dis Colon Rectum. 2011; 54:1412–8.
- Abbas MA, Lemus-Rangel R, Hamadani A. Long-term outcome of endorectal advancement flap for complex anorectal fistulae. Am Surg. 2008; 74:921–4.
- Jarrar A, Church J. Advancement flap repair: A good option for complex anorectal fistulas. Dis Colon Rectum. 2011; 54:1537–41.
- Dalbem CS, Tomiyoshi SDT, Marques dos Santos CH. Assessment of LIFT (ligation of the intersphincteric fistula tract) technique in patients with perianal transsphincteric fistulas. J coloproctol (rioj). 2014;34(4):250–253.
- Abbas MA, Lemus-Rangel R, Hamadani A. Long-term outcome of endorectal advancement flap for complex anorectal fistulae. Am Surg. 2008; 74:921–4.
- Ramachandra ML, Garg M. A comparative study in the management of fistula in ANO using various modalities. Int Surg J. 2018; 5:2223–7.
- Khadia M, Muduli IC, Das SK et al. Management of Fistula-In-Ano with Special Reference to Ligation of Intersphincteric Fistula Tract. Nigerian Journal of Surgery : Official Publication of the Nigerian Surgical Research Society. 2016; 22(1):1–4.
- Emile SH, Elgendy H, Sakr A et al. Gender-based analysis of the characteristics and outcomes of surgery for anal fistula: analysis of more than 560 cases. Journal of Coloproctology. 2018; Volume 38, Issue 3, Pages 199–206.
- Guadalajara H, Herreros D, De-La-Quintana P et al. Long-term follow-up of patients undergoing adipose-derived adult stem cell administration to treat complex perianal fistulas. Int J Colorectal Dis. 2012; 27:595–600.
- Rosa G, Lolli P, Piccinelli D et al. Fistula in ano: anatomoclinical aspects, surgical therapy and results in 844 patients. Tech Coloproctol. 2006; 10(3):215–21.
- Van Koperen PJ, Wind J, Bemelman WA et al. Longterm functional outcome and risk factors for recurrence after surgical treatment for low and high perianal fistulas of cryptoglandular origin. Dis Colon Rectum. 2008; 51(10):1475–1481.
- Van Tets WF, Kuipers HC. Continence disorders after anal fistulotomy. Dis Colon Rectum. 1994; 37(12):1194–1197.
- Hyman N, O'Brien S, Osler T. Outcomes after fistulotomy: results of a prospective, multicenter regional study. Dis Colon Rectum. 2009; 52(12):2022–7.
- Steichen FM. Improving Craft Through Science in Health Care. Surg Laparosc Endosc Percutaneous Tech. 2000; 10(1):48–53.
- Deeba S, Aziz O, Sains PS et al. Fistula-in-ano: advances in treatment. Am J Surg. 2008; 196(1):95–9.
- McCourtney JS, Finlay IG. Setons in the surgical management of fistula in ano. Br J Surg. John Wiley & Sons, Ltd.; 1995; 82(4):448–52.
- Ooi K, Skinner I, Croxford M et al. Managing fistula-in-ano with ligation of the intersphincteric fistula tract procedure: the Western Hospital experience. Colorectal Dis. 2012; 14:599–603.
- Shanwani AMS, Nor AM, Amri NMK. The ligation of the intesphincteric fistula tract (LIFT): a sphincter-saving technique for fistula-in-ano. Dis Colon Rectum. 2010; 53:39–42.