e-ISSN: 0975-5160, p-ISSN: 2820-2651

Available online on www.ijtpr.com

International Journal of Toxicological and Pharmacological Research 2024; 14(3); 01-07

Original Research Article

Effectiveness of Various Techniques in Treating Anorectal Fistulas

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Received: 03-01-2024 / Revised: 30-01-2024 / Accepted: 29-02-2024

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Conflict of interest: Nil

Abstract

Background: Fistula in ano, although benign, poses a significant challenge for surgeons in effectively managing the condition. Successful treatment requires a comprehensive understanding of anorectal anatomy and the etiopathogenesis of anorectal abscesses. The vast majority, over 90%, of cases involving perianal abscesses and anal fistulas are attributed to cryptoglandular infections within the intersphincteric plane. Thus, a thorough grasp of these factors is imperative for the accurate diagnosis and appropriate management of fistula in ano.

Methods: This study included Patients exhibiting symptoms indicative of either simple low or high anal fistula admitted to the general surgery ward. All patients were briefed on the nature of the disease and potential post-surgery complications (recurrence, anal incontinence, and anal stricture). During the assessment, a comprehensive history was taken, signs and symptoms were noted, and internal and external openings were identified through thorough digital rectal and proctoscopic examinations conducted under sufficient light. They were operated by one of the following methods fistulectomy, fistulotomy, LIFT, and fibrin glue injection.

Results: A total of n=60 cases of fistula in ano were included in the study. Fistulectomy and Fistulotomy exhibit higher rates of chronic pain (16.67% each) and long-term anal incontinence (16.67% for Fistulotomy), with similar recurrence and stricture rates (11.11% and 5.56% for Fistulectomy, 16.67% for all three for Fistulotomy) compared to LIFT and Fibrin Glue Injection. LIFT demonstrates lower chronic pain (5.56%) and no long-term anal incontinence, while Fibrin Glue Injection shows the lowest complication rates overall, with no reported chronic pain, incontinence, recurrence, or stricture.

Conclusion: Fistulotomy and Fistulectomy entail moderate intraoperative and postoperative complications, with varied risks of anal incontinence, stricture formation, and recurrence. Fibrin Glue Treatment has no complications but a moderate recurrence rate. LIFT presents minimal complications, brief hospitalization, and low recurrence risk, enabling a swift return to normal activities.

Keywords: Fistula in ano, Fistulotomy, Fistulectomy, Fibrin glue injection, LIFT (Ligation of Intersphincteric Fistula Tract).

Introduction

Anal fistula refers to an abnormal connection between the anal canal and perianal skin, characterized by symptoms such as severe pain, perianal swelling, bleeding, and purulent discharge. [1-3] While new classification methods have been suggested, fistulas are typically categorized as "simple" or "complex" based on their anatomical course relative to the external anal sphincter (EAS). [4, 5] Simple fistulas, like inter-sphincteric or low trans-sphincteric ones, cross less than 30% of the EAS, while complex fistulas, such as high trans-sphincteric ones, involve more than 30% of the EAS, and may present with additional complications such as secondary tracts, association with inflammatory bowel disease, or malignancy. [4, 6]. The diagnosis of anorectal abscess relies primarily on patient history and physical examination findings. Perianal pain and swelling are typical symptoms of superficial abscesses, while drainage and fever occur less frequently. [7] Deeper abscesses may present with referred pain to the perineum, lower back, or buttocks. Anorectal inspection may reveal erythema and fluctuance, with tenderness upon palpation. In cases of uncertainty, digital rectal examination and anoproctoscopy may be necessary, potentially requiring sedation or anesthesia if pain limits examination [8]. The surgical approach to anal fistula management considers patient factors and anatomical complexity relative to the external anal sphincter (EAS). [9] While anal fistulotomy effectively treats simple cases, it risks bowel incontinence due to sphincter division. Sphincter-

preserving alternatives like loose setons, fibrin glue, and advanced flap techniques aim to mitigate this risk, though their efficacy and impact on bowel function vary. [10] Determining the optimal treatment for maximal healing and bowel continence preservation remains a subject of debate in the medical community [8-24]. The current study aimed to evaluate the different modalities of treatment for fistula in ano (Fistulotomy / Fistulectomy / Fibrin Glue Injection/ LIFT procedure).

Material and Methods

This cross-sectional study was conducted in the Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, Karimnagar, Telangana State. Institutional Ethical approval was obtained for the study. Written permission was obtained from all the participants of the study after explaining the nature of the study in the vernacular language. Those voluntarily willing to participate in the study were included.

Inclusion Criteria:

1. Patients exhibiting symptoms indicative of either simple low or high anal fistula were admitted to the general surgery ward.
2. Male and females
3. 18 years and above
4. Willing to participate in the study voluntarily

Exclusion Criteria:

1. Patients under the age of 18.
2. Cases involving complex fistula in ano with multiple internal and external openings or very high anal fistula, as determined by our study.
3. Patients who developed fistula in ano due to inflammatory bowel diseases such as Crohn's disease and ulcerative colitis.
4. Patients whose fistula in ano developed as a result of radiation therapy.
5. Patients whose fistula in ano developed as a complication of extrapulmonary tuberculosis.
6. Patients whose fistula in ano developed as a complication of anorectal malignancy.

Patients who met the inclusion and exclusion criteria were selected for the study. All patients were briefed on the nature of the disease and potential post-surgery complications (recurrence, anal incontinence, and anal stricture). Written consent for participation in the study and surgery was obtained. Evaluation Process: During the assessment, a comprehensive history was taken, signs and symptoms were noted, and internal and external openings were identified through thorough digital rectal and proctoscopic examinations conducted under sufficient light.

The following tests were conducted: Blood glucose and urea levels, Serum creatinine levels, Complete blood count, Urine routine examination, Chest X-ray (PA view), Electrocardiogram (ECG) in all leads, Pus culture and sensitivity other investigations were done when required were MRI of the perineum, Contrast-enhanced CT (CECT) of the chest and abdomen, Mantoux test, Colonoscopy. For cases where internal or external openings were not identified, an MRI of the perineum was recommended to trace the entire fistulous tract. Colonoscopy and CECT abdomen were suggested for six patients suspected of having colonic malignancy. One case was excluded from the study due to the detection of an ulcer proliferative growth at the rectosigmoid junction during colonoscopy. The remaining cases, with normal colonoscopy results, were included in the study. Wound swabs were taken for culture and sensitivity for all cases, and identified organisms and their antibiotic sensitivities were treated accordingly. Patients were optimized before surgery, and sepsis was controlled.

Preoperative Preparations: Patients were kept NPO (nothing by mouth) for approximately 10 hours before surgery. Informed consent for the planned procedure was obtained. Bowel preparation was conducted with a soap and water enema on the previous day of surgery. Preoperative intravenous administration of Ciprofloxacin 200mg, Ranitidine 50mg, and TT 0.5cc IM (intramuscular injection). Test dose of Xylocaine injection. Back and perineum preparation.

Procedures Performed: Patients were randomly selected for one of the following procedures: Fistulotomy, Fistulectomy Fibrin glue injection, and LIFT (Ligation of the Intersphincteric Fistula Tract) procedure.

Statistical analysis: All the available data was sorted, refined, and uploaded to an MS Excel spreadsheet and analyzed by SPSS version 21 in Windows format. The continuous values were represented as mean, standard deviation, and percentages, and the categorical values were calculated by Fischer's exact test and chi-square test the p values of (<0.05) were considered as significant.

Results

This study included n=60 cases of fistula in ano and 48(80%) of the cases had previous history of incision and drainage for perianal abscess. Of these n=48 cases, n=28 had incision and drainage history within one-year duration n=9 had a history of I and D between 1 – 2 years interval and n=7 had a history of I and D during 2 – 3 years and n=4 had a history before 3 years. The remaining n=12 (20%) cases did not have any history of I and D before the diagnosis of fistula in ano.

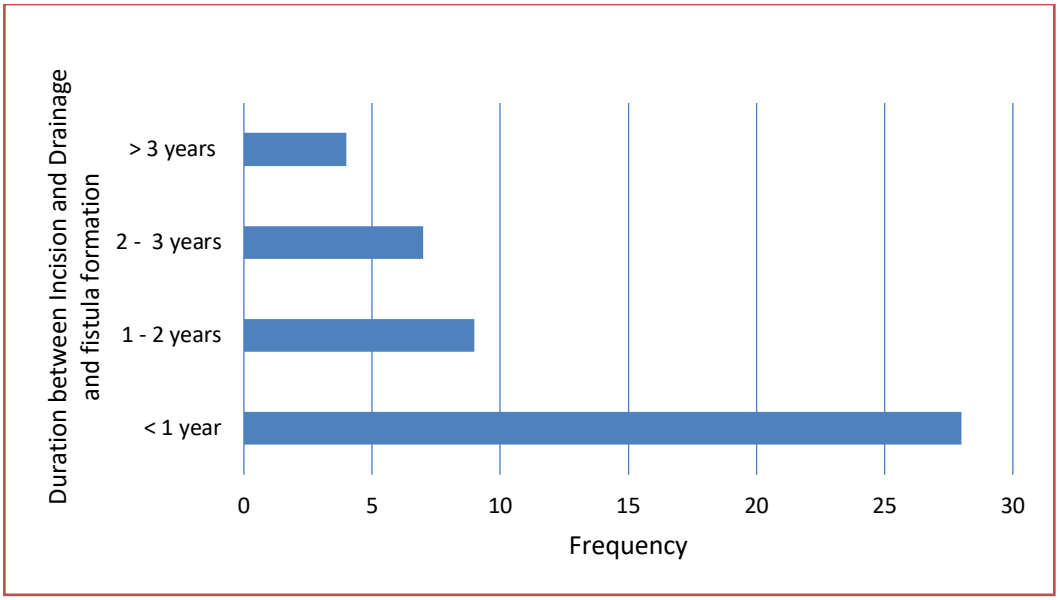

Figure 1: Showing the duration between incision and drainage and fistula formation in the case of the study

In our analysis involving 60 patients diagnosed with anal fistula, 48 cases were identified as male patients, leaving the remaining 12 cases as female. The occurrence of anal fistula appears to be notably higher in males. Specifically, the ratio of male to female cases of fistula in ano in our study stands at 4:1.

Table 1: Showing the distribution of surgical procedures done in cases of fistula in ano

Surgical Procedure	Frequency	Percentage
Fistulectomy	18	30
Fistulotomy	12	20
Fibrin glue injection	12	20
LIFT	18	30
Total	60	100

Table 1 shows the distribution of different surgical procedures performed on 60 patients with fistula in ano. *Two procedures used most frequently: Lift procedure (LIFT):* Performed in 30% (18 out of 60) of the cases. *Fistulectomy:* Performed in 30% (18 out of 60) of the cases. *Fistulotomy and fibrin glue injection:* Both were used in 20% (12 out of 60) of the cases each. The choice of our surgical procedure for treating fistulas in ano depended on various factors, including the *Severity and complexity of the fistula:* Simpler fistulas were treated with less invasive procedures like fistulotomy or fibrin glue injection, while more complex ones may require LIFT or fistulectomy. *Patient characteristics:* Age, overall health, and individual suitability for different procedures were influencing the choice of procedures in this study.

Table 2: Showing the per operative complications in various procedures done in n=60 cases of fistula in ano

Per operative complications	Bleeding		Sphincter injury		Duration > 1 hour	
	N	%	N	%	N	%
Fistulectomy (n=18)	5	27.78	2	11.11	2	11.11
Fistulotomy (n=12)	3	16.67	1	5.56	1	5.56
Fibrin Glue Injection (n=12)	0	0.00	0	0.00	0	0.00
LIFT (n=18)	0	0.00	0	0.00	5	27.78

Table 2 shows the incidence of specific complications during surgery for fistula in ano. *Bleeding*: Fistulectomy: The highest occurrence (27.78%) of bleeding complications. Fistulotomy: 16.67% of cases experienced bleeding. LIFT and Fibrin glue injection: No reported bleeding complications. *Sphincter injury:* Fistulectomy: 11.11% of cases had sphincter injury. Fistulotomy: 5.56% of cases experienced sphincter injury. LIFT and Fibrin glue injection: No reported sphincter injuries. *Surgery duration exceeding 1 hour:* Fistulectomy and LIFT: Both had 11.11% and 27.78% of cases, respectively, exceeding 1-hour duration. Fistulotomy and Fibrin glue injection:

Lower percentages (5.56% and 0%, respectively) had surgery exceeding 1 hour. *Fistulectomy*: was associated with a higher risk of bleeding (27.78%) and sphincter injury (11.11%) compared to other procedures. This was due to the more extensive nature of the surgery, involving tissue removal and potentially requiring manipulation of the sphincter muscles. *LIFT*: While showing no reported bleeding or sphincter injuries, it had a higher percentage (27.78%) of cases exceeding 1-hour duration compared to other procedures. This was a potentially longer and more technically demanding surgical process. *Fistulotomy and Fibrin glue injection* were associated with lower complication rates (no reported bleeding or sphincter injuries) and shorter surgery durations. This aligns with their generally less invasive nature compared to fistulectomy and LIFT.

Table 3: Postoperative Complications in Fistula in Ano Surgery

Per operative complications	Bleeding		pain		Short term incontinence		Fever and wound infection	
	N	%	N	%	N	%	N	%
Fistulectomy (n=18)	3	16.67	3	16.67	1	5.56	2	11.11
Fistulotomy (n=12)	1	8.33	2	16.67	1	8.33	1	8.33
Fibrin Glue Injection (n=12)	0	0.00	1	8.33	0	0.00	0	0.00
LIFT (n=18)	0	0.00	2	11.11	0	0.00	2	11.11

Table 3 shows the postoperative complications in the cases of the study. Bleeding: Lowest rates observed in LIFT (0%) and Fibrin Glue Injection (0%). Fistulectomy (16.67%) and Fistulotomy (8.33%) had higher bleeding rates compared to LIFT and Fibrin Glue Injection. *Pain:* All procedures had some patients reporting pain (16.67% to 8.33%). Fistulectomy and Fistulotomy had the highest proportions (16.67% and 16.67%, respectively). *Short-term incontinence:* Primarily seen in Fistulectomy (5.56%) and Fistulotomy (8.33%). Not reported in LIFT or Fibrin Glue Injection procedures. *Fever and wound infection:* Relatively low occurrence across all procedures (11.11% for Fistulectomy, 8.33% for both Fistulotomy and LIFT). Not reported in Fibrin Glue Injection. *Fistulectomy and Fistulotomy:* These more invasive procedures seem to be associated with higher rates of bleeding (16.67% and 8.33%) and pain (16.67% each) compared to LIFT and Fibrin Glue Injection. This is due to the greater tissue manipulation and potential disruption of normal anatomy during these surgeries. *LIFT:* While showing no reported bleeding or short-term incontinence, it had a similar proportion of patients experiencing pain (11.11%) as Fistulectomy and Fistulotomy. The presence of pain after LIFT could be related to factors like post-surgical inflammation or tissue manipulation, despite the absence of reported bleeding or incontinence. *Fibrin Glue Injection:* Appears to be associated with the lowest overall complication rates, with no reported bleeding, short-term incontinence, or wound infection. This aligns with its minimally invasive nature, where only a small amount of glue is injected.

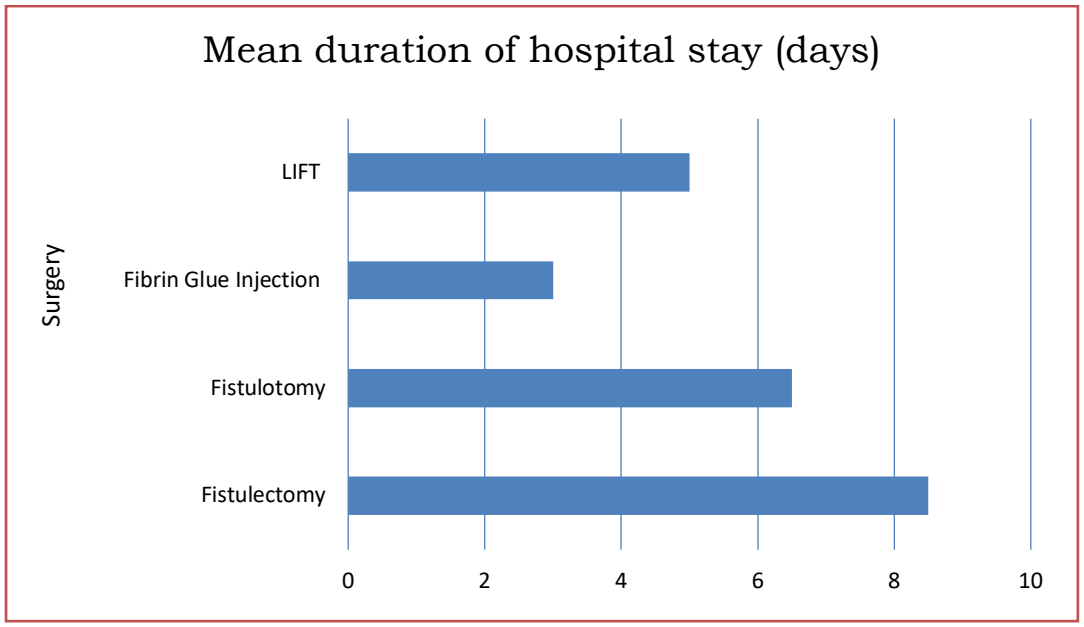

Figure 2: Showing the mean duration of hospital stay in days in different surgery cases

The mean duration of hospital stay was maximum in cases of fistulectomy 8.5 ± 2.5 days in cases of fistulotomy the mean duration of stay was 6.5 ± 1.44 days. The duration of LIFT was 5.0 ± 1.75 days and the duration of stay was minimum in fibrin glue injection with 3.0 ± 0.64 days Figure 2.

Table 4: Showing the complications in n=60 cases of fistula in ano on long-term follow-up

Complications on follow-up	Chronic Pain		Long-term anal incontinence		Recurrence		Stricture	
	N	%	N	%	N	%	N	%
Fistulectomy (18)	3	16.67	1	5.56	2	11.11	1	5.56
Fistulotomy (12)	2	16.67	2	16.67	2	16.67	2	16.67
Fibrin Glue injection (12)	0	0.00	0	0.00	0	0.00	0	0.00
LIFT (18)	1	5.56	0	0.00	1	5.56	1	5.56

This table shows the incidence of specific long-term complications in 60 patients who underwent surgery for fistula in ano, categorized by the surgical procedure performed and presented as percentages. *Fistulectomy and Fistulotomy:* These procedures seem to be associated with higher rates of chronic pain (16.67% each), long-term anal incontinence (16.67% for Fistulotomy), and similar recurrence and stricture rates (11.11% and 5.56% for Fistulectomy, 16.67% for all three for Fistulotomy) compared to LIFT and Fibrin Glue Injection. This could be due to factors like Greater tissue manipulation and potential nerve damage during surgery. More extensive surgical sites might take longer to heal and have a higher risk of scar tissue formation, potentially contributing to pain, incontinence, or stricture. *LIFT:* Shows lower rates of chronic pain (5.56%) and no reported long-term anal incontinence, but similar recurrence (5.56%) and stricture (5.56%) rates compared to Fistulectomy. This suggests it might offer advantages in terms of pain and incontinence but may not have a significant impact on recurrence or stricture rates compared to Fistulectomy. *Fibrin Glue Injection:* Appears to be associated with the lowest overall complication rates, with no reported chronic pain, long-term anal incontinence, recurrence, or stricture. This aligns with its minimally invasive nature, where only a small amount of glue is injected, potentially minimizing tissue disruption and long-term complications.

Discussion

An anal fistula arises as a consequence of abscess formation, ulceration, or incision drainage in the vicinity of the anus and rectum. This condition is characterized by the development of abnormal pathways that connect the anal canal and rectum to the surrounding skin near the anus. Because of the varied etiologies and presentations of complex anal fistulas, the treatments frequently entail a heightened risk of recurrence and potential complications related to incontinence. Moreover, there remains a scarcity of clinical agreement regarding the optimal surgical strategy. In a study conducted by Rickard MJ et al. [12] focusing on anal abscess and fistula, it was noted that fistula in ano is more commonly associated with perianal abscess compared to ischiorectal abscess. The prevalence of anal abscesses and fistula formation was found to range from 5 to 83%. Similarly, in our study, a significant majority of patients reported a history of incision and drainage for perianal abscess, with approximately 80% of patients indicating such a history. Among these cases, around 58.33% reported undergoing incision and drainage within the past year. A minority of cases, less than 20%, did not have a history of incision and drainage.

In a similar study, Vasilevsky CA et al. [13] noted that the majority of cases of perianal fistulas occur during the third or fourth decade of life. Consistent with this finding, our study observed a peak occurrence of fistula in ano between the ages of 35 and 45 years. Eisenhammer et al. [14] study on fistula in ano revealed a male-to-female ratio of incidence ranging from 1.8:1 to 8:1. Similarly, our study found that approximately 80% of patients were male and 20% were female, resulting in a male-to-female ratio of 4:1. AC Das et al. [15] reported that the most common symptom of fistula in ano is discharged from the external opening. Correspondingly, our study identified perianal discharge from the external opening as the most prevalent symptom. Nigel B et al's [16] prospective study of 107 cases with fistula in ano highlighted that over 90% of cases adhere to Goodsall's rule. Similarly, our study found that more than 85% of cases followed Goodsall's rule. Lunniss PJ et al., [17] in their examination of fistula in ano, noted that 72% of cases involved low anal fistulae and 28% were classified as high anal fistulae. In our analysis of 60 cases, we found that 71.66% were low anal fistulae and 28.33% were high anal fistulae. Among our cohort, consisting of 36 cases, 18 underwent fistulectomy and 18 underwent the LIFT procedure, while 12 cases each underwent fistulotomy and Fibrin Glue Injection. We meticulously monitored perioperative and immediate postoperative complications associated with each procedure. Our findings indicate that fistulectomy resulted in more complications compared to the other procedures. Furthermore, we observed that the mean hospital stay was longer for patients undergoing fistulectomy (8.5 days) compared to those undergoing other procedures. Patients who received Fibrin Glue

Injection had the shortest hospital stay (3 days), as illustrated in Figure 2. In the majority of cases, we were able to clinically identify both external and internal openings. For cases where the fistula tract could not be identified clinically, we offered an MRI fistulogram as an adjunct diagnostic tool. Tang CL et al. [18] in their investigation, reported an incontinence rate of approximately 23% with fistulotomy. In our study, the long-term incontinence rate in fistulotomy cases was approximately 20%. In a prospective study by Cestaro G et al. [19] on fibrin glue injection treatment for fistula in ano, they observed a success rate of 76.9% and a recurrence rate of 23%. Our study revealed similar recurrence and stricture rates (11.11% and 5.56% for fistulectomy, 16.67% for all three procedures combined) compared to LIFT and Fibrin Glue Injection. Intraoperatively, short-term incontinence was primarily observed in fistulectomy (5.56%) and fistulotomy (8.33%). Fistulectomy (16.67%) and fistulotomy (8.33%) had higher bleeding rates compared to LIFT and Fibrin Glue Injection. Postoperative fever, wound infection, and wound discharge occurred in 2 cases of fistulotomy and fistulectomy, and 1 case of the LIFT procedure, all of which were resolved with appropriate antibiotic administration. The LIFT procedure, introduced by Rojanasakul A. et al. [20] in a similar study initially demonstrated a healing rate of approximately 94%. However, subsequent studies have shown healing rates ranging from 57% to 83%. Shanwaniet et al. [21] reported an incontinence rate of 0% with the LIFT procedure. ODI et al. reported a success rate of 68% and an incontinence rate of 0% in cases of fistula in ano.

Conclusion

The findings of this study indicate that fistulotomy and fistulectomy pose moderate complications with varied risks of anal incontinence, stricture, and recurrence. Fibrin glue treatment has no complications but a moderate recurrence rate. The LIFT procedure is minimally invasive with minimal complications, brief hospitalization, and a mild recurrence risk, making it favorable for treating simple anal fistulas. In summary, both fistulectomy and the LIFT procedure are acceptable options for treating uncomplicated low-lying and high-lying fistulas.

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