

Clinical Outcomes of Conventional Fistulotomy versus Ligation of Intersphincteric Fistula Tract in Patients with Fistula-in-ano: A Prospective Interventional Study

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ABSTRACT

Introduction: Fistula-in-ano is a common anorectal condition that poses significant challenges for surgical management, with the primary concern being the preservation of sphincter function and prevention of complications such as recurrence and incontinence. Two common surgical procedures for managing fistula-in-ano are conventional fistulotomy and the Ligation of Intersphincteric Fistula Tract (LIFT) procedure. Fistulotomy is considered the gold standard for treatment but carries risks, including delayed wound healing and the potential for postoperative fecal incontinence. The LIFT procedure, which was introduced as a sphincter-preserving alternative, offers advantages such as reduced pain, quicker recovery, and lower risk of incontinence, particularly in anal fistulas involving the external sphincter.

Aim: To compare the clinical outcomes of fistulotomy versus LIFT in fistula-in-ano.

Materials and Methods: A prospective interventional study was done in a total of 62 patients at Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India with fistula-in-ano for a duration of 18 months. Among them, 31 patients underwent

conventional fistulotomy (Group I), and 31 underwent the LIFT procedure (Group II). Key outcome measures included wound healing time, infection rates, postoperative pain, recurrence rates, and patient satisfaction. Categorical variables were compared using Chi-square tests, while continuous variables were compared using independent t-tests. A p-value of less than 0.05 was considered statistically significant.

Results: The study found that LIFT patients experienced faster wound healing, with a statistically significant p-value of 0.003. They also had fewer infections, with 38.7% of patients developing an infection in conventional fistulotomy group compared to 16.1% in the LIFT group (p=0.002). Additionally, lower rates of incontinence were observed; 6.5% of patients in the conventional fistulotomy group reported mild incontinence (Wexner score of 2-4), while none of the patients in the LIFT group reported any significant incontinence (Wexner score of 1) (p=0.018).

Conclusion: The findings support the use of LIFT as a viable alternative to conventional fistulotomy, especially in cases where sphincter preservation is critical. This study highlights the need for individualised treatment approaches to optimise patient outcomes in the surgical management of fistula-in-ano.

Keywords: Anal sphincter, Incontinence, Recurrence

INTRODUCTION

Fistula-in-ano is a debilitating and recurrent condition characterised by an abnormal tract or cavity that forms between the anal canal and the perianal skin. The condition often arises from a cryptoglandular infection, whereby the anal glands become obstructed and infected, leading to abscess formation and the eventual development of a fistulous tract. The clinical symptoms of fistula-in-ano can significantly impair a patient's quality of life, causing pain, swelling, perianal discharge, and the frequent recurrence of infections [1,2].

The management of fistula-in-ano has been a subject of medical and surgical evolution for centuries. The earliest recorded surgical interventions for fistulas date back to ancient times, with methods described by Hippocrates and later refined by surgeons like John Arderne and Sushruta [3,4]. Over the years, various surgical techniques have been developed, with conventional fistulotomy being widely regarded as the gold standard for treatment. Fistulotomy involves surgically opening the fistula tract to allow for drainage and healing by secondary intention. This technique has proven effective in resolving fistulas, but it is not without its complications [5]. One of the primary concerns associated with fistulotomy is the potential damage to the anal sphincter, which can lead to fecal incontinence. Additionally, the healing process after fistulotomy can be prolonged, leading to extended postoperative discomfort and a delay in the patient's return to normal activities [6].

In an effort to address these challenges, alternative sphincter-preserving techniques have been developed [7]. One such technique is the LIFT procedure, which was introduced by Rojanasakul A et al., in 2007 [8]. The LIFT procedure involves accessing the fistula tract through the intersphincteric plane, ligating it, and excising the tract without disturbing the external anal sphincter. This approach minimises the risk of sphincter injury, reduces the likelihood of postoperative incontinence, and is associated with faster recovery times. Since its introduction, the LIFT procedure has gained popularity as an alternative to conventional fistulotomy, particularly for complex trans-sphincteric fistulas [8].

Despite the growing interest in LIFT, there remains a lack of high-quality comparative data on the outcomes of fistulotomy versus LIFT. Existing studies often have small sample sizes or lack standardised outcome measures, making it difficult to draw definitive conclusions [9-12]. Furthermore, the selection of surgical technique in clinical practice often depends on the surgeon's experience and the complexity of the fistula, rather than on evidence-based guidelines. This study aims to address these gaps in the literature by providing a robust comparison of the clinical outcomes of fistulotomy and LIFT in a well-defined patient population.

This study is important because it directly compares the outcomes of these two widely used surgical techniques, providing surgeons with valuable data to guide their practice. The findings may also

help to refine the selection criteria for each procedure, ensuring that patients receive the most appropriate treatment for their specific type of fistula. Ultimately, the goal is to improve patient outcomes, reduce the risk of complications, and enhance the overall quality of life for individuals suffering from fistula-in-ano.

MATERIALS AND METHODS

A prospective interventional study was conducted at Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India from January 2023 to June 2024. Institutional Ethics Committee (IEC) approval was obtained (IEC number: 002/SBMCH/IHEC/2022/1894).

Sample size calculation: As per two previous studies [1,13], the success rate/healing rate for simple fistulotomy was 93.7%, and for LIFT, it was 60%. With this information, an alpha error of 0.05, and a power of 90%, the sample size was calculated as 62 patients.

Inclusion criteria: Patients included in this study were adults aged between 18 and 65 years, presenting with primary fistula-in-ano. Patients with simple, low-lying fistulas and trans-sphincteric fistulas suitable for LIFT were included. The diagnosis was confirmed through clinical examination, imaging studies (such as MRI or transanal ultrasound), and a review of the patient's medical history.

Exclusion criteria: Patients under the age of 12, those with complex fistulas (such as suprasphincteric or extrasphincteric fistulas), and patients with fistulas associated with inflammatory bowel disease (Crohn's disease or ulcerative colitis) were excluded. Patients with fistulas resulting from radiation therapy, tuberculosis, or malignancies were not included in the study.

Study Procedure

The study population was divided into two groups using a stratified random sampling method. Group I underwent conventional fistulotomy, while group II underwent the LIFT procedure.

All patients were admitted to the hospital and underwent preoperative assessments, which included a complete blood count, blood glucose levels, urea, serum creatinine, urine routine examination, chest X-ray, and ECG. In selected cases, advanced imaging such as MRI or Contrast-Enhanced Computed Tomography (CECT) of the pelvis was performed to assess the extent of the fistula.

Surgical techniques:

Fistulotomy: In this procedure, the fistula tract was incised along its entire length, allowing it to heal by secondary intention. The primary goal was to remove the infected tissue and promote drainage, but care must be taken to avoid excessive damage to the anal sphincter, especially in trans-sphincteric fistulas.

LIFT procedure: The LIFT technique involves accessing the fistula tract in the intersphincteric plane, ligating the tract close to the internal opening, and excising it distally. This technique aims to preserve the external anal sphincter and reduce the risk of fecal incontinence. Hydrogen peroxide or methylene blue dye was injected through the external opening to confirm the complete closure of the fistula tract.

Postoperative care: All patients received standard postoperative care, which included antibiotic therapy (broad-spectrum antibiotics) and analgesics. Patients were advised to take sitz baths and maintain good perianal hygiene. Wounds were inspected regularly, and healing progress was monitored during follow-up visits. The development of complications like Urinary retention, bleeding, fecal impaction, thrombosed haemorrhoids, recurrence, incontinence, and anal stenosis were observed till 18 months after the postoperative period.

Outcome measures: The primary outcomes evaluated were wound healing time, which is defined as the average time taken for the surgical wound to heal completely; postoperative complications (such as wound infection and recurrence); and the incidence of fecal incontinence. Secondary outcomes included operative time, postoperative pain (measured using a Visual Analogue Scale (VAS)),

and patient Satisfaction by patient satisfaction score (Number of positive responses/Total number of responses)×100. Fecal incontinence was assessed using the Wexner incontinence score, le 0- perfect continenece, 29-complete incontinence [14].

STATISTICAL ANALYSIS

Data were analysed using Statistical Package for the Social Sciences (SPSS) software, version 23. Descriptive statistics were used to summarise the data, with means and standard deviations reported for continuous variables. Categorical variables were compared using Chi-square tests, while continuous variables were compared using independent t-tests. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 62 patients were included in the study, with 31 patients in the fistulotomy group (Group I) and 31 in the LIFT group (Group II). The mean age of patients was 45.6±6.6 years, with no significant differences in the age distribution between the two groups (p=0.67) [Table/Fig-1].

Age group (in years)	Group I (%)	Group II (%)
20-29	7 (22.5)	8 (25.8)
30-39	8 (25.8)	7 (22.5)
40-49	7 (22.5)	8 (25.8)
50-59	8 (25.8)	7 (22.5)
60-69	1 (3.22)	1 (3.22)

[Table/Fig-1]: Distribution of age group.

The male-to-female ratio was similar in both groups, with 70% of patients being male and 30% female, reflecting the general epidemiological trend of fistula-in-ano being more common in men [Table/Fig-2].

Group	Male (%)	Female (%)
I	24 (77.42)	7 (22.58)
II	21 (67.74)	10 (32.26)

[Table/Fig-2]: Gender distribution.

The majority of patients in both groups underwent MRI of the perineum (Group I: 80.6%, Group II: 90.3%), which is crucial for identifying the extent and course of the fistulous tract. Colonoscopy was performed in a significant portion of patients in both groups (Group I: 58.1%, Group II: 64.5%), especially to rule out colonic malignancy or other colorectal conditions. None of the patients had malignancy or any other colorectal problems. A chest X-ray (PA view), ECG, and complete blood count were conducted for all patients in both groups to assess overall health status and identify any underlying conditions that could affect surgery. None of the patients had any significant co-morbidities. Urine routine examination, blood glucose, and serum creatinine tests were performed, and all results were within normal limits. Montoux test, indicating exposure to tuberculosis, was conducted in a considerable number of patients in both groups (Group I: 64.5%, Group II: 71.0%), especially relevant in regions with a high prevalence of tuberculosis. The subjects tested negative.

These diagnostic tests collectively contribute to a comprehensive preoperative evaluation, ensuring that patients are optimally prepared for surgery and reducing the risk of complications [Table/Fig-3].

In Group I (Fistulotomy), out of 31 cases, the intersphincteric fistula tract was identified in 28 cases (90.3%). In Group II (LIFT), out of 31 cases, the intersphincteric fistula tract was identified in 30 cases (96.8%) [Table/Fig-4].

The mean operative time for the LIFT procedure was significantly shorter than that of the fistulotomy group. LIFT procedures took an average of 28.7±6.3 minutes, whereas fistulotomy took 36.4±7.1 minutes (p=0.004) [Table/Fig-5].

Diagnostic test	Group I (Fistulotomy)	Group II (LIFT)
MRI perineum	25 (80.6%)	28 (90.3%)
Colonoscopy	18 (58.1%)	20 (64.5%)
CECT abdomen	12 (38.7%)	15 (48.4%)
X- ray chest (PA view)	31 (100%)	31 (100%)
ECG (in all leads)	31 (100%)	31 (100%)
Urine routine examination	30 (96.8%)	30 (96.8%)
Blood glucose	28 (90.3%)	28 (90.3%)
Serum creatinine	27 (87.1%)	27 (87.1%)
Complete blood count	31 (100%)	31 (100%)
Montoux test	20 (64.5%)	22 (71.0%)

[Table/Fig-3]: Preoperative evaluation and diagnostic tests conducted before surgery.

Category	Group I (Fistulotomy)	Group II (LIFT)
Operative findings		
Intersphincteric fistula tract identified	28 (90.3%)	30 (96.8%)
Extent of fistula tract identified	25 (80.6%)	29 (93.5%)
Procedures performed		
Fistulotomy	31 (100%)	--
Other procedures (if any)	5 (16.1%)	31 (100%)
Complications		
Intraoperative bleeding	8 (25.8%)	2 (6.5%)
Sphincter injury	3 (9.7%)	1 (3.2%)
Other complications (specify)	--	--

[Table/Fig-4]: Intraoperative details.

Duration of procedure (min)	Group I (%)	Group II (%)
20-30	7 (22.5)	17 (54.8)
31-40	15 (48.3)	11 (35.4)
41-50	8 (25.8)	2 (6.45)
51-60	1 (3.22)	1 (3.22)
p-value	0.004	

[Table/Fig-5]: Comparison of duration of procedure in Group I and Group II.

A 64.29% of the LIFT patients healed by five weeks postoperatively, with mean duration of 6.6±2.6 weeks, whereas only 39.3% of fistulotomy patients had achieved full healing by seven weeks, with the mean duration of 7.6±2.5 weeks (p=0.003) [Table/Fig-6].

Wound healing time (Weeks)	Group I (%)	Group II (%)
3-5	0	18 (58.06)
>5-7	11 (35.4)	11 (35.4)
>7-9	13 (41.9)	2 (6.45)
>9-11	7 (22.5)	0
p-value	0.003	

[Table/Fig-6]: Comparison of postoperative wound healing time in Group I and Group II.

The wound infection rate was also significantly lower in patients undergoing LIFT procedure. Wound infections were more frequent in the fistulotomy group, with 38.7% of patients developing an infection compared to 16.1% in the LIFT group (p=0.002) [Table/Fig-7].

Group	Yes (%)	No (%)
I	12 (38.7%)	19 (61.3%)
II	5 (16.1%)	26 (83.9%)
p-value	0.002	

[Table/Fig-7]: Comparison of wound infection rate in both groups at 18 months.

Postoperative pain was assessed using a VAS. The mean VAS score for fistulotomy patients was 6.8±1.2, while LIFT patients had a mean score of 4.5±1.1 (p=0.005 using an independent t-test). The lower

pain levels in the LIFT group contributed to faster recovery and an earlier return to daily activities.

Patients who underwent LIFT, in comparison to the conventional procedure, had a statistically significant lower occurrence of complications [Table/Fig-8]. One of the most important outcomes of this study was the incidence of fecal incontinence, which is a common concern in fistula surgery due to the risk of sphincter damage. In the fistulotomy group, 6.5% of patients reported mild incontinence (Wexner score of 2-4), while none of the patients in the LIFT group reported any significant incontinence (Wexner score of 1) (p=0.018) [Table/Fig-8].

Postoperative complications	Group I (%)	Group II (%)
Urinary retention	3 (9.7)	1 (3.2)
Bleeding	2 (6.5)	1 (3.2)
Fecal impaction	1 (3.2)	0
Thrombosed haemorrhoids	0	0
Recurrence	4 (12.9)	2 (6.5)
Incontinence	2 (6.5)	0
Anal stenosis	1 (3.2)	0
p-value	0.004	

[Table/Fig-8]: Comparison of postoperative complications in Group I and Group II at 18 months of follow-up.

Overall, patients in the LIFT group reported higher satisfaction (n=30, 96.8%) with their treatment outcomes compared to those in the fistulotomy group (n=28, 90.3%), with a p-value of 0.002.

DISCUSSION

The comparative analysis of fistulotomy and LIFT in this study provides valuable insights into the relative merits and limitations of these two surgical techniques for treating fistula-in-ano. One of the key findings of this study was the faster wound healing time observed in the LIFT group compared to the fistulotomy group. This can be attributed to the minimally invasive nature of the LIFT procedure, which targets the fistula tract without causing extensive tissue disruption. By preserving the integrity of the external anal sphincter, the LIFT technique allows for quicker recovery, less postoperative pain, and reduced risk of infection. These findings are consistent with previous studies that have highlighted the advantages of LIFT in terms of faster wound healing and lower complication rates. For example, Rojanasakul A et al., reported healing rates of up to 94% in patients undergoing LIFT, with a particularly low incidence of postoperative incontinence [8]. Vinay G and Balasubrahmanya K.S aimed to compare open fistulotomy and LIFT procedures, noting the LIFT technique as an effective sphincter-preserving option with shorter healing times and a lower incidence of postoperative anal incontinence compared to open fistulotomy [9].

Wound infections were more frequent in the fistulotomy group, with 38.7% of patients developing an infection compared to 16.1% in the LIFT group (p=0.002). This difference is likely due to the open nature of the wound in fistulotomy, which is more susceptible to contamination and infection during the healing process. Additionally, the longer healing time and higher postoperative pain levels in the fistulotomy group may contribute to delayed recovery and extended time away from work or normal activities [15].

One of the most important considerations in fistula surgery is the preservation of anal sphincter function, as damage to the sphincter can result in fecal incontinence, a condition that severely impacts the patient's quality of life. In this study, 6.5% of patients in the fistulotomy group experienced mild incontinence, compared to none in the LIFT group. This is reinforced in the study conducted by Nirmala A et al., which found that fistulotomy presents moderate intraoperative and postoperative complications but carries a lower

risk of anal incontinence and stricture, with minimal recurrence. This finding underscores the importance of sphincter-preserving techniques in the surgical management of fistula-in-ano [16]. Ayyar P et al., assessed the LIFT technique against standard fistulectomy or fistulotomy for treating trans-sphincteric fistulas. The LIFT technique offered advantages in operative time, postoperative pain, hospital stay, and wound healing, with a very low incidence of incontinence [17].

In this study, the recurrence rate in the LIFT group was only 6.5%, which is slightly higher when compared with the recurrence rates reported in the study conducted by Laiwattanapaisa S et al., which showed the recurrence rate was 9.4% in the fistulotomy group, and there was no recurrence in the LIFT group [18]. In contrast, the study conducted by Salgado-Nesme N et al., showed a little higher recurrence rate of 20% in the LIFT group [19]. One possible explanation for the recurrence observed in both groups is the complexity of the fistula tract. In cases of trans-sphincteric or high intersphincteric fistulas, incomplete removal of the tract or failure to adequately close the internal opening may result in recurrence.

This study will enable surgeons to choose the LIFT procedure to treat fistulas without any skepticism.

Limitation(s)

The limitations of this study include its relatively small sample size and the short follow-up period of 18 months. Larger, multicenter studies with longer follow-up periods are necessary to confirm the long-term efficacy of both fistulotomy and LIFT. Additionally, while this study focused on primary fistula-in-ano, future research should explore the outcomes of these procedures in more complex cases, including those with multiple fistula tracts or recurrent disease.

CONCLUSION(S)

This study highlights the advantages of the LIFT procedure in managing anal fistulas, offering faster recovery, lower infection rates, and reduced risk of incontinence compared to conventional fistulotomy. While fistulotomy remains effective for simpler fistulas, the higher complication rates and slower recovery make it less suitable for complex cases. The LIFT procedure's sphincter-preserving approach is particularly beneficial in reducing postoperative complications and improving patient quality of life. Future research should focus on larger patient populations and long-term outcomes to further refine the selection criteria for each technique.

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