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ORIGINAL ARTICLE

Ligation of Intersphincteric Fistula Tract (LIFT) Procedure Versus Fistulotomy for the Management of Trans-sphincteric Anal Fistulas

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ABSTRACT

Background: Trans-sphincteric perianal fistulas are a surgical challenge due to their complex anatomy and the potential risk of compromising sphincter function. Among the available surgical options, open fistulotomy remains a widely used standard, while the Ligation of Intersphincteric Fistula Tract (LIFT) technique has emerged as a sphincter-preserving alternative. Subsequently, we aimed to compare the effectiveness of open fistulotomy and the LIFT procedure in terms of postoperative recurrence rates and incidence of fecal incontinence**.**

Methods: This prospective comparative study included 38 patients with trans-sphincteric perianal fistulas. Participants were divided into two groups: Group A underwent the LIFT technique, while Group B was treated with conventional fistulotomy. Postoperative outcomes evaluated included recurrence, fecal incontinence, operative duration, pain intensity, complications, and time to complete wound healing.

Results: The mean operative time was significantly longer in the LIFT group compared to the fistulotomy group. Postoperative pain was significantly lower in the LIFT group than in the fistulotomy group. Wound healing was faster in the LIFT group compared to the fistulotomy group. Postoperative complications were comparable, with no significant difference in incidence. Temporary gas incontinence occurred in two patients (10.5%) in the fistulotomy group and none in the LIFT group. No cases of permanent incontinence were observed in either group. Recurrence was slightly higher in the LIFT group compared to the fistulotomy group.

Conclusions: LIFT technique serves as a safe and effective sphincter-sparing option for treating trans-sphincteric anal fistulas with less postoperative pain and a lower risk of incontinence compared to fistulotomy.

Keywords: LIFT technique, Sphincter preservation, Anal fistula surgery, Fistulotomy, Perianal fistula.

INTRODUCTION

An abnormal epithelialized tract connecting the anal canal to the perianal skin is the hallmark of anorectal conditions like anal fistula, also known as fistula-in-ano. The most common cause is a cryptoglandular infection that starts in the anal glands and can lead to abscesses and persistent fistulous tracts if not treated properly. When it is recurrent or complicated, the condition is frequently associated with discomfort, discharge, and significant quality of life impairment [1].

Trans-sphincteric fistulas, which traverse both the internal and external anal sphincters, represent one of the more challenging subtypes to manage surgically. The elimination of the tract while maintaining anal continence is the primary objective in treating such fistulas. However, maintaining this equilibrium remains challenging. While traditional procedures such as fistulotomy are effective in terms of healing and low recurrence, they involve dividing part of the sphincter muscle, which can potentially result in varying degrees of fecal incontinence, particularly in patients with high or anterior fistulas, in women, and in those with predisposing factors for continence loss [2]. There have been a number of sphincter-preserving techniques developed to address the issue of postoperative incontinence. The procedure known as Ligation of the Intersphincteric Fistula Tract (LIFT) is one of these. Rojanasakul et al. were the first to describe it [3]. LIFT involves accessing and ligating the fistula tract in the intersphincteric space, away from the external sphincter, thereby minimizing the risk of functional impairment. This technique has the theoretical advantage of maintaining sphincter integrity while also promoting tract closure and healing. With healing rates ranging from 60 to 90 percent and low rates of complications and incontinence, early reports have shown promising results [4, 5]. However, despite its potential benefits, the LIFT procedure has shown variable outcomes across studies. Some people say it's a safe and effective alternative to traditional fistulotomy, but others say the recurrence rates are the same or even higher. In addition, due to its relative newness, there is a lack of long-term data and the need for additional comparative trials to establish its role as a first-line surgical option [6]. This study aims to compare the efficacy of LIFT and fistulotomy in reducing postoperative recurrence and fecal incontinence following trans-sphincteric fistula management.

METHODS

This prospective cohort study was conducted at Zagazig University Hospital (Zagazig), El Hamul Central Hospital (Kafr El-Sheikh), and Mansoura New General Hospital (Mansoura). It included 38 patients who had been diagnosed with a trans-sphincteric anal fistula. Each group consisted of 19 patients, as follows: Group A: patients who underwent the LIFT procedure, whereas Group B: patients who underwent conventional fistulotomy. The follow-up was designed to last for six months. The study was approved by the ethical committee of the Faculty of Medicine, Zagazig University (IRB number: 6989-4/7/2020). Informed written consent was obtained from all patients.

Inclusion criteria: Patients aged 18 years old or over. Fistulography, magnetic resonance imaging (MRI), and clinical examination all supported the diagnosis of trans-sphincteric anal fistula. Cases who were able to adhere to postoperative follow-up and were medically ready for surgery.

***Exclusion criteria*:** Trans-sphincteric fistula that was large. Fistulas that were intersphincteric, suprasphincteric, or extrasphincteric; multiple fistula tracts or branches; a history of previous anal surgery or inflammatory bowel disease (such as Crohn's disease or tuberculosis), and the presence of fecal incontinence prior to surgery.

Preoperative Preparation

The day before surgery, all participants were instructed to eat lightly and take a mineral-based laxative. Patients underwent a warm tap water rectal enema the evening before the procedure. On the morning of surgery, patients were instructed to shower and had their perineal hair shaved. An extensive medical history, a general physical examination, and an anorectal examination were all part of the preoperative assessment. In selected cases, pelvic MRI was utilized to assess fistula anatomy. The Wexner incontinence score was used to assess continence status.

Anesthesia and Intraoperative Protocol

All procedures were performed under spinal anesthesia with the patient placed in the lithotomy position. At the time of anesthetic induction, a single prophylactic dose of a third-

generation cephalosporin (1 g) was given intravenously.

Surgical Technique

Group A: LIFT Procedure

Following appropriate positioning and examination, hydrogen peroxide was injected through the external fistula opening to visualize the internal opening. The tract was gently delineated with a probe. At the intersphincteric groove, a curvilinear incision of 1.5–2 cm was made. To prevent injury to the internal sphincter, careful dissection was carried out in the intersphincteric plane, staying close to the external sphincter. Once isolated, the tract was doubly ligated near both the internal and external sphincters using 3/0 absorbable Vicryl sutures and then divided. To confirm the correct tract had been addressed, saline was injected or probing was repeated. Curetted tissue was used to remove any granulation, and the external opening was left open for drainage. The intersphincteric incision was loosely approximated using interrupted absorbable sutures.

Group B: Fistulotomy

Using hydrogen peroxide injection and probing, the fistula's internal and external openings were identified. Using diathermy, the overlying skin, anal epithelium, and sphincter muscle were cut to expose the entire tract along the probe's path. After achieving hemostasis, a sterile gauze dressing was applied.

Postoperative Care

Cephalosporins of the third generation were given to each patient intravenously for three days, and then they were taken orally for a week. On the evening of the surgery, liquid diets were resumed, followed by a soft diet for two days and bulk-forming laxatives for at least two weeks. On day two after surgery, wound dressings were removed, and patients were instructed to take antiseptic solutions for daily sitz baths. The Visual Analogue Scale (VAS) was used to measure pain, which ranged from 0 (no pain) to 10 (worst possible pain). Preoperatively, patients were instructed on how to use the scale. During the first 24 hours after surgery and during follow-up visits, pain scores were measured every 8 hours.

Follow-Up and Outcome Measures

Patients were evaluated weekly during the first month, biweekly during the second month, and then monthly for a total duration of six months.

Primary outcomes *included:*

Persistent or recurrent discharge from the external opening after two months is referred to as postoperative recurrence. The Wexner score is used to measure fecal incontinence after the wound has healed completely or after six months.

Secondary outcomes *were:*

Wound healing time (defined as full epithelialization of the external opening with absence of discharge). Postoperative complications such as early transient incontinence, urinary retention, wound infection, abscess formation, and bleeding. The severity of pain as determined by VAS scores. At the end of follow-up or upon complete healing, all patients underwent clinical reevaluation and completed the Wexner incontinence questionnaire. During the follow-up period, no patients were lost, which is noteworthy.

Statistical Methodology:

The Fisher test, chi-square test, and analysis of variance were used to analyze the baseline data gathered from the 20 study participants. Analysis of variance was used to look at the mean and the confidence interval of differences at 95 percent. The average and standard deviation of the data were displayed. Our findings were examined using either the chi-square test or the Fisher test. Data were presented, and suitable analysis was done according to the type of data (parametric and non-parametric) obtained for each variable. P-values less than 0.05 (5%) were considered to be statistically significant. $P < 0.001$ was considered highly significant (HS), whereas if the P-value is more than 0.05, it means non-significant.

RESULTS

In terms of any demographic data, there was no significant difference between the two groups (Table 1). There was a statistically significant difference between both groups as regards time of operation (minutes) and postoperative pain (VAS). When compared to Group B, Group A had a shorter operation time and lower postoperative pain (VAS) (P=0.001), respectively. The length of time spent in the hospital did not differ significantly between the two groups (Table 2). In terms of postoperative complications, there was no significant difference between the two groups (Table 3). The recurrence rate did not differ significantly between the two groups (Table 4). There was no significant difference between both groups as regards anal incontinence at postoperative 1st week and at postoperative 4th week (Table 5).

Table 1. Demographic and preoperative data

Data		Group A (n=19)	Group b (n=19)	P value
Age		**32.3±7.2**	**30.2±8.3**	**0.41**
Sex	**male**	**11(60%)**	**12 (66%)**	**0.74**
	female	**8(40%)**	**7(34%)**	
BMI		**28.2±3.5**	**28.2±4.2**	**1.00**
Duration of symptoms(m)		**13.03±5.49**	**12.7±5.17**	**0.85**

Table 2. Comparison between the two studied groups according to time of operation (minutes), hospital stay (days) and postoperative pain (visual analogue scale VAS)

	Group A (n=19)	Group B (n=19)	P value
Time of operation (minutes)	**30.52 ± 4.4**	**20.6 ± 3.05**	**0.001**
Time of Hospital stay (days)	**1(1-2) days**	**1(1-2) days**	**1.00**
Postoperative pain (vas)	**3.4 ± 1.4**	**5.8±2.2**	**<0.001**

Table 3. Comparison between the two studied groups according to postoperative complication.

Postoperative complications	Group A (n=19)	Group B (n = 19)	P value
Bleeding	0	2(11%)	0.49
Urine retention	3(16%)	3(16%)	1.00
Wound infection	3(16%)	1(5%)	0.61
Abscess formation	1(5%)	0	1.00

Table 4. Comparison between the two studied groups according to recurrence.

Recurrence	Group A (n = 19)	Group B (n = 19)	P value
Abscent	16(84%)	18(5%)	0.61
Present	3(16%)	1(5%)	

Table (5): Comparison between the two studied groups according to anal incontinence.

Anal incontinence		Group A (n = 19)	Group B (n = 19)	P value
At post operative 1st week	Perfect continence	19(100%)	17(89%)	0.49
	Incontinence	0 (0 %)	2 (11 %)	
At post operative 4th weeks	Perfect continence	19(100%)	19(100%)	1.00
	Incontinence	0 (0%)	0 (0%)	

DISCUSSION

Because they involve both the internal and external sphincter muscles, trans-sphincteric anal fistulas are categorized as complex anorectal conditions. The surgical treatment of such fistulas remains a clinical challenge due to the necessity of minimizing the risk of compromising anal continence while simultaneously effectively eliminating the fistulous tract. Due to its simplicity and high cure rate, traditional fistulotomy is still widely used for low anal fistulas. However, when used on trans-sphincteric cases, it poses a significant risk of fecal incontinence and sphincter dysfunction [7]. This risk has prompted the development of and growing interest in procedures that maintain high healing success while preserving sphincter function [8]. The Ligation of the Intersphincteric Fistula Tract (LIFT) is one notable method that has emerged as a response to these difficulties. This technique closes the internal opening without dividing the sphincter muscles by targeting the fistula tract at the intersphincteric space. The LIFT procedure has been the subject of numerous studies that have shown positive outcomes, such as lower rates of incontinence, quicker wound healing, and success rates that are comparable to those of conventional methods [9, 10]. In the surgical treatment of trans-sphincteric fistulas, LIFT has emerged as a viable, sphincter-preserving option. The objective of this prospective comparative study was to compare and contrast the clinical efficacy of the Ligation of Intersphincteric Fistula Tract (LIFT) technique and conventional fistulotomy in the surgical treatment of trans-sphincteric anal fistula in a

group of 38 patients. In terms of baseline demographic characteristics, there was no statistically significant difference between the two groups in this study. Patients in Group I (managed by the LIFT procedure) had a mean age of 32.3 years, while those in Group II (managed by fistulotomy) had a mean age of 30.2 years. This suggests that the age distribution of the two groups was comparable. Our findings are in line with those of Alsebai et al. [11], who found that patient ages ranged from 24 to 50 years, with the LIFT group having a mean age of 34.4 years and the fistulotomy group having a mean age of 35.05 years. Similarly, Sahai [12] reported that patients with trans-sphincteric fistula who underwent surgical treatment were on average between 30 and 41 years old. According to these comparable age profiles from various studies, the patient's age has no significant impact on the surgical technique chosen or the outcome. The LIFT group's mean operative time was 32.5 minutes, compared to 20.6 minutes for the fistulotomy group, according to our research. This is probably because the LIFT procedure requires more precise and careful dissection to isolate and ligate the tract in the intersphincteric plane. These findings align closely with Al Sebai et al. [11], who reported mean operative times of 32.5 minutes and 20.8 minutes, respectively. Similar trends were observed by Vinay & Balasubrahmanya [13] and Elkaffas et al. [14], who documented LIFT durations of 28 and 34 minutes versus fistulotomy times of 19.6 and 17 minutes. The mean VAS score for fistulotomy patients was 5.8, compared to 3.4 for the LIFT group, indicating significantly higher pain scores. This suggests that fistulotomy's greater tissue disruption contributes to increased postoperative discomfort. Al Sebai et al. [11], who reported mean VAS scores of 5.7 for fistulotomy and 3.3 for LIFT, are supported by this observation. Sahai [12] and Elkaffas et al. [14] found that fistulotomy patients had VAS scores of 8 and LIFT patients had VAS scores of 6. No significant difference was found in hospital stay durations; both groups averaged one day. This demonstrates that both procedures could be performed as day-case surgeries. Al Sebai et al. [11] similarly noted an average stay of one day for both treatments, whereas Elkaffas et al. [14] reported a longer stay of two days, potentially influenced by different postoperative care protocols. Wound Infection occurred in 16% of LIFT patients and 5% of fistulotomy patients, with no significant difference. Al Sebai et al.'s rates were comparable to ours [11] (13.3% for both) and Elkaffas et al. [14] (26% vs. 20%), though Vinay & Balasubrahmanya [13] reported higher infection in LIFT (8% vs. 4%). Urinary retention reported in 16% of patients in both groups, a transient condition successfully managed with analgesia and catheterization. Elkaffas et al. [14] and Al Sebai et al. [11] reported rates of occurrence that were comparable. There was no bleeding in any of the fistulotomy cases in the LIFT group, whereas this difference was not statistically significant. Elkaffas et al. [14] reported a 13.3% bleeding rate in LIFT cases, while Al Sebai et al. [11] found no bleeding. Bleeding in our study was controlled via diathermy and compression. Abscess Formation was seen in one case (5%) in the LIFT group, with none in the fistulotomy group. Al Sebai et al. [11], who found no abscesses, and Elkaffas et al. [14], who found one abscess in the fistulotomy group, are comparable to our findings. The issue was resolved with drainage and antibiotics. According to Al Sebai et al. [11], who found healing times of 4.5 versus 5.67 weeks, LIFT showed a significantly faster healing time than fistulotomy (mean 4.53 weeks). 5.6 weeks. Elkaffas et al. [14] and Vinay & Balasubrahmanya [13] also reported that LIFT healed faster (approximately 5 weeks) than fistulotomy did (approximately 8 weeks). Overall healing rates did not differ significantly: 84% for LIFT versus 95% for fistulotomy. These outcomes mirror those in Al Sebai et al. [11] (80% vs. 93.3%), Elkaffas et al. [14] (87% vs. 93%), and Vinay & Balasubrahmanya [13] (88% vs. 100%). In the fistulotomy group, temporary anal

incontinence (limited to gas leakage) was experienced by 11% of patients and resolved within four weeks, scoring 4/20 on the Wexner scale. Although Sahai [12] did not report any cases of incontinence, this is comparable to the 6.7% [11] and 4% Vinay & Balasubrahmanya, [13] reported in previous studies. The LIFT procedure's sphincter-preserving advantage was supported by the fact that none of the patients in the group experienced either temporary or permanent incontinence, as reported in multiple studies [11-14].

CONCLUSIONS

Compared to traditional open fistulotomy, the LIFT procedure offers faster wound healing and a lower risk of postoperative anal incontinence, making it an efficient and favorable sphincter-preserving method for managing fistula in ano. Due to its simplicity, practicality, and capacity to preserve sphincter integrity, this study recommends the integration of the LIFT technique as a standard option alongside other established surgical methods for low trans-sphincteric perianal fistulas.

Conflict of Interest:

None

Financial Disclosures:

None

Availability of the data:

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Author's contribution:

S. I., H. M. were responsible for data collection and analysis and M. E. was responsible for writing and publication.

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