

The THAI Journal of SURGERY

Official Publication of the Royal College of Surgeons of Thailand

Vol. 35

April - June 2014

No. 2

Original Article

Long-term Results of Ligation of Intersphincteric Fistula Tract (LIFT) Versus Traditional Fistulotomy for Fistula-in-Ano

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Abstract

Objective: To determine and compare the post-operative outcomes for a LIFT operation and traditional fistulotomy for treatment of anal fistulas.

Background: No single technique is appropriate for the treatment of all fistula-in-ano cases; therefore, treatment must be determined by the etiology and anatomy of the fistula, degree of symptoms, patient co-morbidities, recurrence rate, incontinence rate and the surgeon's experience. LIFT is a new technique that has the advantages of anal sphincter preservation and less extensive surgery. This current study compares LIFT with traditional fistulotomy.

Material and Methods: We retrospectively studied 64 fistula-in-ano patients who underwent surgery. All cases took place between July 20, 2008 and June 30, 2009. Patient characteristics, including sex, age, fistula-in-ano classification, operative time, healing time, recurrence rate, incontinence rate and any complications, were obtained by reviewing each patient's medical record.

Results: Thirty-two patients underwent the LIFT procedure, and 32 patients underwent fistulotomy. The mean patient age was 38.84 ± 9.64 years in the LIFT group and 36.18 ± 12.14 years in the fistulotomy group ($P = 0.337$). The majority of cases were simple fistula-in-ano. Simple fistula-in-ano cases comprised 78.1% of the LIFT group and 81.3% of the fistulotomy group ($P = 1.000$). The fistula tract shape was typically straight (90.6%) and was equally prevalent in both groups ($P = 1.000$). The fistula tract length from anal verge was 3.10 ± 1.78 cm in the LIFT group. The most frequent internal opening site of the LIFT group was at 6 o'clock (31.3%). The most frequent external opening site of the LIFT group was at 5 o'clock. The number of external openings was not different between the groups ($P = 0.173$). The healing time was 33.54 ± 8.18 days for the LIFT group and 29.90 ± 9.76 days for the fistulotomy group ($P = 0.290$). The healing rate was 81.2% and the local failure rate was 18.3% in the LIFT group. The recurrence rate was 9.4% in the fistulotomy group, and there was no recurrence in the LIFT group. There were no incontinence cases for either group.

Conclusion: The LIFT technique preserves the anal sphincter muscle for fistula-in-ano patients. The procedure is safe, shows minimal complications, no recurrence and no incontinence when compared with traditional fistulotomy.

Keywords: Fistula-in-ano, ligation of intersphincteric fistula tract, Fistulotomy

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INTRODUCTION

Although the pathogenesis of fistula-in-ano is known and many surgical techniques have been developed for this condition, recurrence and incontinence rates remain high at 0-56% and 0-54%, respectively¹. The majority of fistula-in-ano cases are classified as simple and effectively treated by traditional fistulotomy. If the fistula is complex, fistulotomy is not recommended because there is a chance of recurrence and the potential for incontinence. In the current study, we assessed a new surgical technique referred to as ligation of the intersphincteric fistula tract (LIFT)². The LIFT creates a secure closure of the internal opening, concomitant removal of infected cryptoglandular tissue in the intersphincteric plane and preserves the anal sphincter muscle. A previous study of long-term results showed a success rate of 61% and an incontinence rate of 0%³. However, the guidelines of the American Society of Colon and Rectal Surgeons Practice Parameters published in 2011 had no recommendation for the treatment of perianal abscess and fistula-in-ano because the majority of the methodology was obtained from observational studies or case series¹. No comparative studies between LIFT and fistulotomy have been completed in Thailand. Thus, this present study compared the LIFT technique with traditional fistulotomy. Sophisticated interventions, such as fistulography, endoanal ultrasound, CT scan, and MRI were not included. The long-term postoperative outcomes were analyzed after a minimum follow-up of 2 years.

MATERIAL AND METHODS

This retrospective cohort study of sixty-four patients with fistula-in-ano was designed to determine the effectiveness of the LIFT technique compared to traditional fistulotomy. The patients were each informed of the advantages and disadvantages of the procedure as well as the potential complications and risks prior to surgery. All patients underwent surgery between July 20, 2008 and June 30, 2009. Thirty-two patients underwent the LIFT procedure completed by the author, and 32 patients underwent a traditional fistulotomy completed by another general surgeon. Our hospital does not have an endorectal ultrasound or MRI for identifying the fistula-in-ano type, but the cases were evaluated by clinical examination at the

preoperative field, including digital rectal examination and proctoscopy. While at the intra-operative field, hydrogen peroxide was injected through the external opening. Patient data were collected by reviewing each patient's medical records after surgery. Patients who were diagnosed with anal TB, HIV infection, incontinence, local irradiation, or Crohn's disease were excluded.

Postoperative Management and Follow-Up Data

All patients were postoperatively prescribed an anti-inflammatory analgesic, a stool softener, and oral antibiotic for two weeks. There were no diet restrictions. Patients were instructed to complete wound cleaning 2 times a day until the wound healed. All patients were examined at the surgical outpatient clinic by the operating surgeon during the first month and every three to six months thereafter. All patients completed follow-up for at least two years. The following parameters were noted at the visits: healing time, recurrence, clinical fecal incontinence, and any other associated morbidity.

Definitions^{1,2,4,5}

Each case of fistula-in-ano was classified as one of two types with the following additional criteria:

1) Simple fistula-in-ano

- Intersphincteric fistula
- Low transsphincteric fistula: The fistula tract passes between or just above the subcutaneous external anal sphincter, or the fistula tract passed through less than one-third (30%) of the external sphincter complex.

2) Complex fistula-in-ano

• High transsphincteric fistulas were defined as one encompassing more than one-third (30%) of the external sphincter complex.

• Multiple fistula tracts (consisting of more than one fistula tract)

- Extrasphincteric fistula
- Horseshoe fistula
- Recurrent fistula
- Anterior fistula in females

3) Primary wound healing was defined as complete epithelialization of the wound.

4) Recurrence was defined as a non-healing wound or reappearance of an external opening with persistent discharge after six months.

5) Incontinence was defined as the loss of voluntary control of feces (liquid or solid) from the bowel.

6) Local failures were classified as 1 of 3 types. Type I failures represented residual sinus tracts without an internal opening. Type II failures represented a down staged tract from the intersphincteric incision to the internal opening. Type III failures are complete failures that extend from the previous internal opening to one or more external skin openings.

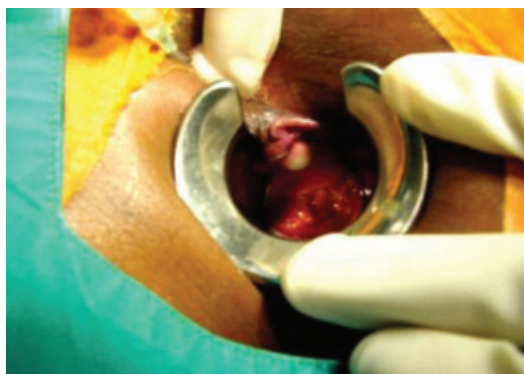
Statistical analysis

Chi-square or Fisher exact tests were used for the analysis of categorical variables. The Student's t-test was used for continuous variables. Data collected from the database were analyzed using SPSS version 17.0. A p -value less than 0.05 was considered significant.

LIFT technique^{6,7}

After regional anesthesia, the patient was placed

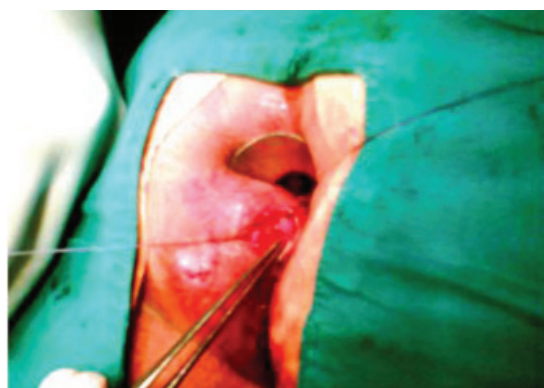
in a prone position with the buttocks taped widely apart. A Fansler anoscope with a 28-mm diameter without a handle was gently inserted. The location of the internal opening was identified by injection of hydrogen peroxide through the external opening or by gently probing the fistula tract. The inter-sphincter groove or plane at the site of the fistulous tract was entered via a curvilinear skin incision using electrocautery. The intersphincteric tract was identified and isolated by meticulous dissection using electrocautery and scissors. Once isolated, the intersphincteric tract was hooked using a small, right-angled clamp. The tract was then ligated close to the internal sphincter with absorbable Vicryl 3/0 sutures. Next, the tract was divided distally to the point of ligation. Subsequently, the external tract was cleared by coring out up to the proximity of the external sphincter complex. Unlike the procedure described by Rojanasakul et al², the skin opening was widened and left open⁴. Finally, the intersphincteric incision



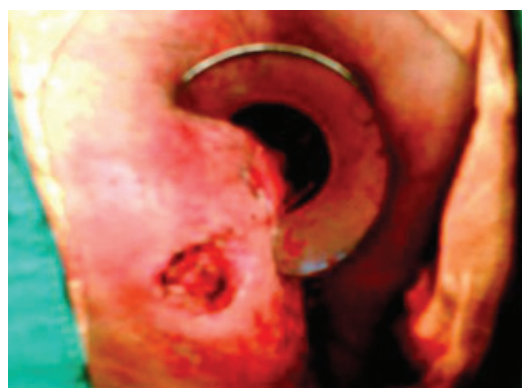
The internal opening is identified by injecting hydrogen peroxide (H_2O_2).



The inter sphincteric tract is hooked by using a small, right-angled clamp.



The fistula tract is divided distal to the point of ligation.



The external tract is cleared by coring out up to the proximity of external sphincter complex and the skin opening widened and left open for drainage

Figure 1 Demonstration of the LIFT technique.

was loosely re-approximated with interrupted absorbable Vicryl 4/0 sutures. A cored-out wound was left opened for dressing. All pieces of the fistula tract were sent for histopathology. The surgical steps are illustrated in Figure 1.

Fistulotomy technique

The patient was placed in the prone jackknife position or lithotomy position following induction of anesthesia with a regional anesthetic. A probe was inserted from the external opening to the internal opening at the dentate line. The tissue overlying the probe was incised and the granulation tissue was extracted with a curette.

RESULTS

Data for all patients are shown in Table 1. The mean age was 38.84 ± 9.64 years in the LIFT group and 36.18 ± 12.14 years in the fistulotomy group. No significant difference was observed between groups, $P = 0.337$. The male-to-female ratio was 25:7 in the LIFT group and 21:11 in the fistulotomy group. The simple type of fistula-in-ano comprised 78.1% of the LIFT group and 81.3% of the fistulotomy group. The complex type of fistula-in-ano was found in 7 patients (21.9%) from the LIFT group (1 case of high transphincteric fistula, 6 cases of multiple fistula) and 6 patients (18.8%) from the fistulotomy group (2 cases of recurrence, 4 cases of multiple fistula tracts). However,

Table 1 Patient characteristics based on intervention

Variable	LIFT (n=32)	Fistulotomy (n=32)	P - value
Age in Years (Mean \pm SD)	38.84 ± 9.64	36.18 ± 12.14	0.337
Gender (Male: Female)	25:7	21:11	0.404
Type of fistula in ano (n)			
• Simple	25 (78.1%)	26 (81.3%)	1.000
• Complex	7 (21.9%)	6 (18.8%)	
Underlying disease (n)			
• No	30 (93.8%)	26 (81.3%)	
• Hypertension	1 (3.1%)	5 (15.6%)	
• Diabetes mellitus	1 (3.1%)	0	
• Valvular heart disease	0	1 (3.1%)	
Operative time (min)	46.71 ± 20.30	14.21 ± 9.07	0.000
Time of follow up (yrs)	3.40 ± 1.27	2.75 ± 0.90	0.021

Table 2 Details of intraoperative findings.

Variable	LIFT (n=32)	Fistulotomy (n=32)	P - value
Fistula tract shape			
Straight tract	29 (90.6%)	29 (90.6%)	1.000
Curve tract	3 (9.4%)	3 (9.4%)	
Fistula tract length from anal verge (mean \pm SD)	3.10 ± 1.78	-	-
Internal opening site			
• 1 o' clock	6 (18.8%)	-	
• 5 o' clock	5 (15.6%)	-	
• 6 o' clock	10 (31.3%)	-	
• 7 o' clock	6 (18.8%)	-	
• 11 o' clock	1 (3.1%)	-	
• 12 o'clock	3 (9.4%)	-	
• 6,12 o' clock	1 (3.1%)	-	
Number of external openings (mean \pm SD) (min-max)	1.34 ± 0.82 (1 - 4)	1.12 ± 0.33 (1 - 2)	0.173

fistula-in-ano type did not significantly differ between groups, $P = 1.000$. The 13 patients (20.3%) classified with complex fistula-in-ano exhibited the following characteristics: 5 patients had multiple fistula and 2 patients had high transsphincteric fistula in the LIFT group; 2 patients had recurrence and 4 patients had multiple fistula in the fistulotomy group. The majority of patients did not have underlying diseases. The operative time was significantly different with a mean time of 46.71 ± 20.30 minutes in the LIFT group and 14.21 ± 9.07 in the fistulotomy group, $P = 0.000$. The average follow-up was more than two years for both groups; however, the follow-up time was longer in LIFT group when compared with the fistulotomy group. The majority of fistula tracts in both groups had a straight tract shape (90.6%) $P = 1.000$. The fistula tract length from the anal verge was 3.10 ± 1.78 cm in the LIFT group. The internal opening sites of the LIFT group were at 6 o'clock (31.3%), 1 o'clock (18.8%) and 7 o'clock (18.8%). The most frequent external opening site of the LIFT group was at 5 o'clock as shown in figure 2. However, the number of external openings was not different between groups, and some patients had more than one external opening.

As shown in Table 3, the mean healing time was 33.54 ± 8.18 days in the LIFT group and 29.90 ± 9.76

days in the fistulotomy group, $P = 0.290$. The recurrence rate was 9.4% (1 simple fistula case, 2 complex fistula cases) and the external opening wound healed in twenty-nine patients (90.6%) in the fistulotomy group. The type I local failure rate was 18.3% (6 simple fistula cases), and the external opening wound healed in twenty-six patients (81.2%) with no cases of recurrence in the LIFT group. The healing rate was not significantly different between groups, $P = 0.474$. There was no cases of incontinence in either group.

DISCUSSION

The principle of fistula-in-ano treatment is identified by the internal opening, eradication of infectious anal gland, adequate drainage, preservation of continence and low recurrence. In the present study, fistula-in-ano treatment was classified into two types, including simple fistula and complex fistula¹. The main consideration for treating anal fistula is the complexity of the fistula and the amount of sphincter muscle involvement; thus, the surgical options were divided into two categories: 1) non-sparing sphincter muscle techniques, such as fistulotomy or marsupialization with fistulotomy, for simple fistula with success rates of 92% to 97%^{8,9}; and 2) sparing sphincter

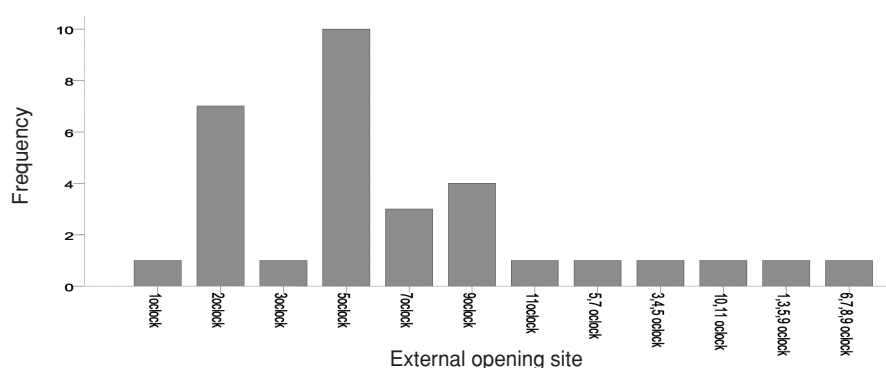


Figure 2 Histogram of external opening sites used for the LIFT technique.

Table 3 Postoperative outcomes

Variable	LIFT (n=32)	Fistulotomy (n=32)	P - value
Healing time (days)	33.54 ± 8.18	29.90 ± 9.76	0.290
Recurrence (n)	0	3(9.4%)	-
Incontinence (n)	0	0	-
Local failure (sinus tract) (n)	6 (18.8%)	0	-
Healing rate (%)	81.2%	90.6%	0.474

muscle techniques, such as endoanal advancement flap, fibrin glue injection, anal plugs and the new LIFT technique, for complex fistula with a success rate that varies from 50% to 100%¹. Our hospital does not have access to sophisticated instruments, such as an endorectal ultrasound or MRI for preoperative localization of the fistula tract; thus, we used clinical examinations, such as direct visualization, palpation, and the use of hydrogen peroxide or methylene blue injections into the external opening for identification of tract origin, had success rates greater than 80%¹. In the current study, the majority of fistula-in-ano cases for both groups were classified as simple and had a straight tract. Our LIFT technique showed a healing rate of 81.2% and the healing time was estimated as 4 - 6 weeks. These findings are similar to those of Rojanasakul et al² and Shanwani et al⁴ which reported a healing rate of 94.4% and 82.2%, respectively, and a mean healing time of 4 and 7 weeks, respectively. The similarity between studies may be due to the high number of simple fistula-in-ano cases. However, the LIFT group had a significantly longer operative time when compared with the fistulotomy group. Similar to a previous multicenter study that showed a healing

rate of 87% and no cases of incontinence, the fistulotomy group showed a healing rate of 90.6% and no cases of incontinence¹⁰. Sahakitrungruang et al combined marsupialization with fistulotomy and showed a decrease in postoperative pain¹¹. In the current study, there were 3 (9.4%) recurrence cases in the fistulotomy group and no recurrence in the LIFT group. The lack of recurrence in the LIFT group is likely due to the prevention of the entry of fecal material into the fistula tract and eliminated the formation of a septic nidus in the intersphincteric space². The current study showed no recurrence cases but had a type I local failure rate of 18.3%. However, the author treated localized wound failure with debridement, curetting and antibiotics. All local wounds were completely healed within two weeks. The management of LIFT failure can be evaluated intraoperatively by using probes and the injection of hydrogen peroxide. Thus, type I failures can be managed with curettage of the tract, silver nitrate application and short-term antibiotics. The local incision can be drained for underlying sepsis. Type II failures can be managed with simple or staged intersphincteric fistulotomy. Type III failures can be managed with a cutting seton followed by a repeat

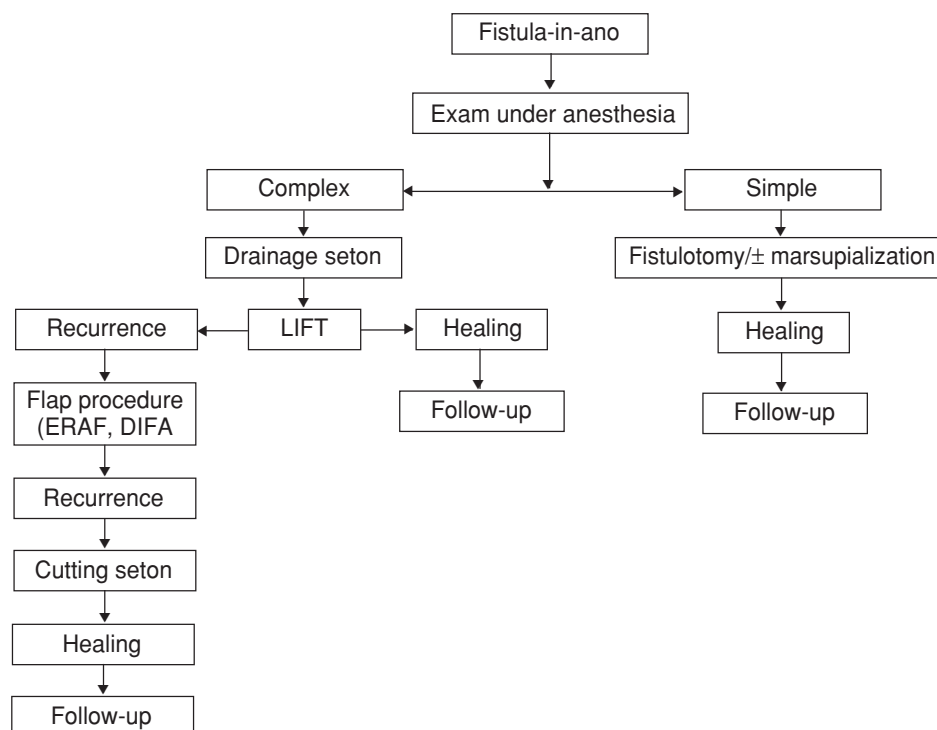


Figure 3 The treatment algorithm. ERAF: Endoanal advancement flap; DIFA: Dermal island flap anoplasty; LIFT: Ligation of intersphincteric fistula tract.

definitive fistula procedure, such as LIFT, fistula plug, or mucosal advancement flap^{3,5}. Decreasing the local failure rate can be achieved by coring out the external fistula tract, widening the skin opening and leaving the wound open. In addition, the LIFT technique may prevent a perianal sinus tract (local failure) from developing in the epithelial external tract remnant⁴. Currently, no single technique is appropriate for treating all fistula-in-ano cases. The treatment depends on the surgeon's experience and the type of fistula-in-ano. The extent of anal sphincter muscle division, incontinence rate and healing rate should also be considered. The Standards Practice Task Force of the American Society of Colon and Rectal Surgeons 2011 recommended fistulotomy or fistulotomy with marsupialization for simple fistula types and did not recommend the LIFT procedure for complex fistula types because the data were preliminary¹. However, in the recent short term comparative study for complex fistula in ano, showed success rate 85%, recurrence rate 19 %, local failure rate 2.4%, no incontinence rate and obesity factor caused failure by univariate analysis¹². In long term result of LIFT for complex fistula was 62% and no incontinence³. There has been many study that suggested inserting a drainage seton in complex fistula, had a success rate vary 62% to 100% and incontinence rate was 0% to 50% depended on secondary procedure (eg. ERAF, DIFA, cutting seton)^{1,13,14}. The most common of incontinence is flatus more often than liquid or solid stool. The purpose of drainage seton was to eradicate septic foci by adequate drainage and to promote maturation of the fistula tract around the seton. For flap procedure need to use a high experience surgeon that has recurrence rates 13 % to 56 % and incontinence rate 7 % to 38 %¹. However, future fistula-in-ano cases should be classified into simple or complex and treated as outlined in the treatment algorithm shown in Figure 3¹⁵.

CONCLUSION

The postoperative outcomes are not significantly different between the LIFT and fistulotomy groups. However, the advantages of the LIFT technique are preservation of the anal sphincter muscle which prevents incontinence, especially in female patients and cases of complex fistula-in-ano.

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