

## Evaluation of Outcomes of Ligation of Intersphincteric Fistula Tract in Treatment of Transsphincteric Perianal Fistula

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### ABSTRACT

**Background:** The intersphincteric fistulous tract ligation treatment has been presented as a new sphincter-saving procedure with high success rates and excellent continence preservation.

**Objective:** To assess the efficacy and outcomes of intersphincteric fistula tract (LIFT) ligation in the treatment of transsphincteric perianal fistula.

**Patients and Methods:** At the General Surgery Department (GIT Unit) at Zagazig University Hospitals, 18 patients who were treated with the LIFT technique were involved in this cohort clinical study. All patients were followed up for three months to assess recovery, complications, discomfort, incontinence, and recurrence after surgery.

**Results:** all cases had restored a good function through the three months according to the Wexner score post-operative. There was a statistically significant association between age, DM, Quality of life, time of operation, healing time, and recurrence where recurrence was associated with the highest mean age of cases, diabetic patients, the longest stay in the hospital, and the longest healing time. Also, the quality of life of all recurrent cases was not good.

**Conclusion:** Long-term control of uncomplicated trans-sphincteric perianal fistula can be achieved with little complications using the sphincter-preserving approach of LIFT. It is a safe procedure for patients with simple trans-sphincteric perianal fistula with good healing rates at short-term follow-up.

**Keywords:** Ligation, Intersphincteric Fistula Tract, Transsphincteric Perianal Fistula.

### INTRODUCTION

A perineal fistula is an epithelized opening connecting the rectum or anal canal to the perineal region. Fistula in the ano is a frequent benign anal disease seen in surgical surgery. The prevalence of fistula is higher in men than in women, with men being affected more often than women by a ratio of 2:1. The third, fourth, and fifth decades of life are peak incidence of the disease <sup>(1)</sup>.

Most medical professionals agree that idiopathic fistulas indicate the long-term effects of intermuscular anal gland infection (i.e., the cryptoglandular hypothesis) Although Crohn's disease and tuberculosis are the most common causes of peri-anal fistulas, birthing trauma, pelvic infection, pelvic malignancy, and radiation therapy are other potential contributors. Alternatively, in around 20% of instances, the infection will form a fistula through both layers of the anal sphincter and enter the ischiorectal fossa <sup>(2)</sup>.

Classification of peri-anal fistulas depends on how they affect the anal sphincter. Intersphincteric, transsphincteric, suprasphincteric, and extrasphincteric fistula are the four types of peri-anal fistula recognized by the Parks classification system <sup>(3)</sup>.

Additionally, the American Gastroenterological Association classifies anal fistulas as either simple or complex. Low-type (simple) fistulas include a limited portion of the sphincter complex and have their origins below the dentate line. These fistulas are typically small, located near the surface, and can be either intersphincteric or transsphincteric. However, complicated fistulas encompass a sizable portion of the sphincter mechanism and have their origins above the dentate line (high type). Patients with a history of

incontinence, those with an anterior fistula, recurrent fistulas, fistulas with several tracts, and those with recurrent fistulas all fall into this category. Local radiation therapy and Crohn's disease have both been linked to the development of complex fistulas <sup>(4)</sup>.

Diagnostic procedures such as magnetic resonance imaging for the evaluation of perianal Crohn's disease and cryptoglandular fistula, anorectal ultrasound, which is highly dependent on the experience of the examiner, and examination under anesthesia, which is considered to be the gold standard when performed by an experienced colorectal surgeon, endoscopy, and fistulography, which has a very limited role in the evaluation of perianal fistula, and so on can be quite challenging <sup>(5)</sup>.

For complex fistulas, whereby standard surgery results in a high incontinence rate, sphincter-saving techniques have recently received increased attention <sup>(6)</sup>.

Using closure of the inter-sphincteric fistulous tract, **Rojanasakul et al.** <sup>(7)</sup> proposed a novel sphincter-saving method. The anal sphincter complex is not divided during this procedure, which comprises separating the internal opening from the fistula tract and removing the infected remnants of the anal gland. The LIFT method's excellent success rate and ability to maintain continence have contributed to its rise in popularity <sup>(8)</sup>.

It was the objective of this study to assess the efficacy and outcomes of intersphincteric fistula tract (LIFT) ligation in the treatment of transsphincteric perianal fistula.

### PATIENTS AND METHODS

At the General Surgery Department (GIT Unit) at Zagazig University Hospitals, 18 patients with transsphincteric fistula who were treated by the LIFT

technique were studied in a prospective cohort clinical study.

**Ethical consent:**

The research ethics council at Zagazig University approved the study (ZU-IRB #9051) as long as all participants provided informed consent forms. Ethics guidelines for human experimentation were adhered to by the World Medical Association's Helsinki Declaration.

**Inclusion criteria:** Simple transsphincteric fistula, age above 18 to 60 years old, and both sexes.

**Exclusion criteria:** Patients with active anorectal sepsis, intersphincteric fistulae, suprasphincteric and extrasphincteric fistulas, horseshoe fistulas, rectovaginal fistula, traumatic fistula, and patients associated with inflammatory bowel disease, specific infection (e.g. tuberculosis), radiation, malignancy, preexisting incontinence or chronic diarrhea.

**All patients have gone through:**

**A. History taking:** Full clinical history taking was obtained from each patient with special emphasis on the presenting symptoms including pain, discharge, itching, and absence of incontinence. Patient demographics and previous surgical history were obtained.

**B. Clinical Examination:** Both general and local examinations were performed to every patient. Local examination included perineal and perianal inspection, palpation, digital rectal examination in males and rectal and pervaginal in females, and proctoscopic evaluation to identify the external opening (site and number), the internal opening (radial and longitudinal location) primary and secondary tracks, horseshoe or Supralelevator tracks and the anal sphincter condition. The absence of anal incontinence in the study patients was confirmed by the Wexner incontinence scale.

**C. Imaging:** MRI on the anal region was done to confirm the diagnosis of the transsphincteric fistula as well as pelviabdominal ultrasound.

**D. Laboratory investigations:** Liver functions, kidney functions, CBC, coagulation profile, glycemic profile.... Etc were done for all patients.

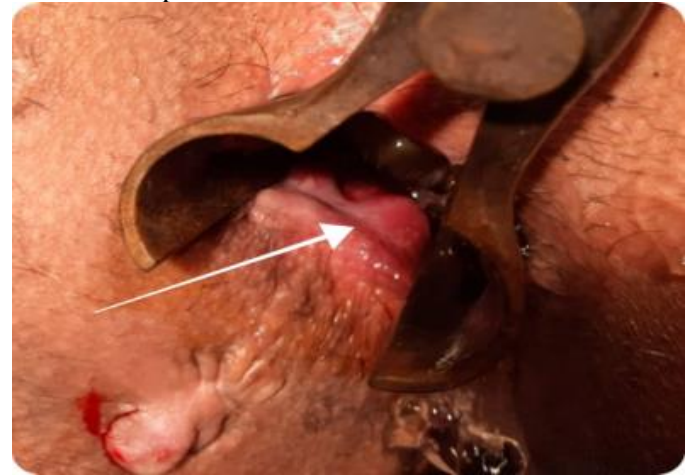
**Procedure:**

**Identification of the external and internal opening:** Methylene blue or hydrogen peroxide was injected into the external opening to pinpoint the exact location of the internal opening, after which the proctoscope was used to confirm the presence of an internal opening.

**A fistula probing:** To determine the fistula tract's orientation and place it into Park's categorization system, a fistula probe was inserted via the fistula's exterior or internal orifice.

**Identification of the intersphincteric groove and Incision at it.** Identification of the intersphincteric groove was done by just retracting the opened

proctoscope and inspecting and palpating the groove between external (laterally located) and internal (medially located) anal sphincters. In order to insert the probe into the intersphincteric groove, a 1.5-2 cm curved incision was performed.

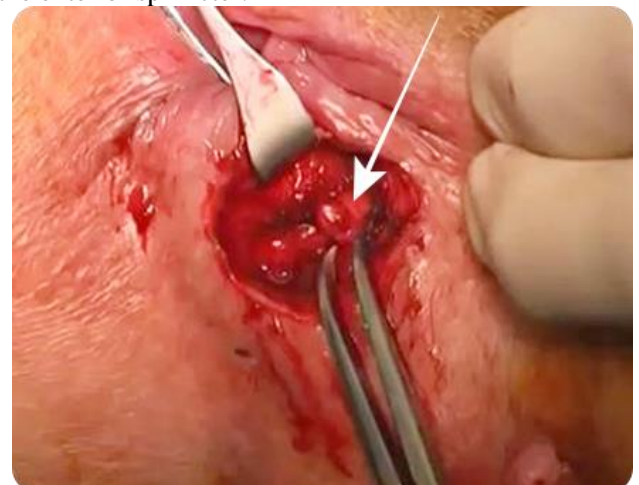


**Figure (1): Identification of the intersphincteric groove.**

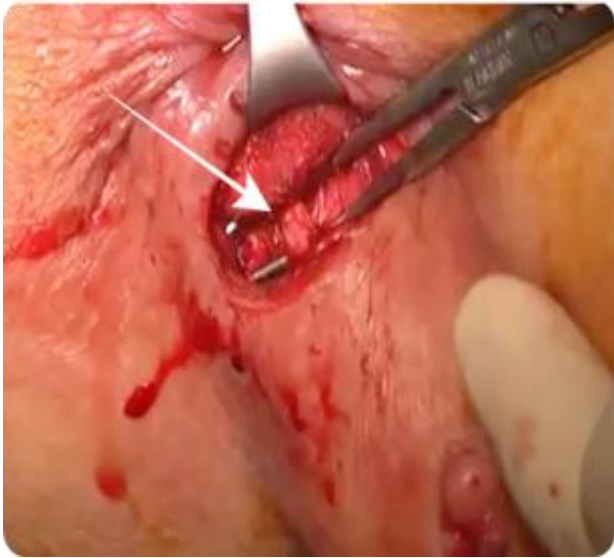


**Figure (2): Surgical incision across the intersphincteric groove.**

The fistula track was located in the intersphincteric region, and dissection began in that area. To prevent cutting through the internal sphincter and so rupturing the anal mucosa, the dissection was performed very close to the exterior sphincter.



**Figure (3): Dissection through the intersphincteric plane.**



**Figure (4): Isolation of fistula tract.**



**Figure (5): Curette fistula tract from the external opening.**

**Fasten the closure of the intersphincteric fistula tract with sutures and take out the fistula:**

Following successful isolation of the fistula tract, the probe was withdrawn. The key to successful treatment was the use of two absorbable sutures to double secure and close the fistulous tract as close as possible to the lateral margin of the internal anal sphincter and the medial margin of the external anal sphincter; the tract between these two sutures was then divided, excised a few millimeters, and sent for pathologic examination and Close to the internal anal sphincters, the track was fixated using absorbable sutures (3/0 Vicryl), and a section of the track between the two muscles would be removed.

**Verification of Fistulous Tract Excision:**

When the intersphincteric tract was removed, it was followed up with a saline injection or probing through the external orifice to ensure the correct removal of the fistula tract.

**Remove fistula tract using a curette through the external entrance:**

Infected granulation tissue was removed by curetting the remainder of the tract through the external sphincter and irrigating it with hydrogen peroxide and saline.



**A defect in the external sphincter muscle was sutured closed:** With (3/0) vicryle, we closed the intersphincteric wound to close the open defect at the external anal sphincter.

**Closure of the intersphincteric wound:** To close the wound in the intersphincteric space, we used the interrupted absorbable sutures (3/0 vicryle) to tie it off loosely. The granulation tissue was then carefully curetted out of the external and internal apertures, and the holes were left open for drainage.

**Follow-up:**

Patients were checked on at the outpatient clinic at least once per week for the first month, and then once per month for the next two months (for a total of three months).

General and local examinations, as well as assessments, were performed for patients during the follow-up period. Postoperative complications such as wound infection were recorded. The time needed for complete healing, and continence status (following Wexner score system) as well as recurrence, and quality of life were recorded.

A Visual Analogue Scale (VAS) which is a type of assessment tool was used to assess qualities or emotions that were difficult to quantify in a single number.

Although it has not yet been subjected to rigorous validation trials during specific treatments, the Jorge-Wexner score is now the most popular instrument for assessing the success of surgical interventions for AI.

**Statistical analysis**

To analyze the data acquired, the Statistical Package of Social Services (SPSS version 20) was used and tables and graphs were employed. The quantitative data were presented in the form of the mean, median, standard deviation, and confidence intervals. The information was presented using qualitative statistics such as frequency and percentage. The student's t-test

(T) is used to assess the data while dealing with quantitative independent variables. Pearson Chi-Square and Chi-Square for Linear Trend (X2) were used to assess qualitatively independent data. The significance of a P value of 0.05 or less was determined.

**RESULTS**

Among the eighteen patients who contributed to the present study, the mean age of the group was 35.39±9.09 ranging from 22-53 years More than half of the cases (61.1%) were males. Regarding the type of fistula, all fistulas were simple transsphincteric perianal fistula and all external orifices were clear. Only (27.8%) of the internal orifices were not clear by clinical preoperative examination preoperative (Table 1).

**Table (1): Patient characteristics of the studied group (n=18).**

Variables		Study group (n=18)	
		No.	(%)
Sex	Male	11	61.1
	Female	7	38.9
Age	Mean ±SD Range	35.39±9.09 (22-53)	
Type of fistula	Simple transsphincteric perianal fistula	18	100
External opening	Clear	18	100
Internal opening	Clear	13	72.2
	Not clear	5	27.8

Regarding intraoperative and post-operative complications this table showed that all cases didn't exhibit bleeding, (33.3%) of cases had post-operative pain moderate to severe, and (66.7%) of cases had mild pain according to the VAS scale. All patients responded to simple analgesics in the form of NSAIDs and non-opioids, and only two patients (11.1%) were diabetic and suffered from post-operative wound infection. The onset of infection in one patient was at the end of the first week, while in the other one infection developed after ten days. Infection in both patients resolved completely with proper dressing and one week course of third-generation cephalosporin combined with metronidazole, without hospitalization. Both patients had a recurrence of the fistula after three months (Table 2).

**Table (2): Intraoperative and postoperative complications of the studied group**

Variables		Study group (n=18)	
		No.	(%)
Bleeding (intraoperative)	No	18	100
Post-operative pain (1 week)	Mild	12	66.7
	Moderate	6	33.3
Post-operative infection (1 month)	No	16	88.9
	Yes	2	11.1

In most of the cases, sixteen patients (88.9%) stayed for only 1 day. In nearly half of the cases, eight patients (44.4%) needed (4 weeks) for healing, and six patients (33.3%) needed 5 weeks. The mean value of healing time was 5.06±1.34 ranging from (4 to 8) weeks. The mean value of operation time was 48.89±9.38 (Table 3).

**Table (3): Hospital stays and healing time of the studied group (n=18).**

Variables		Study group (n=18)	
		No.	(%)
Hospital stay	1	16	88.9
	2	1	5.6
	3	1	5.6
Healing time	4 weeks	8	44.4
	5 weeks	6	33.3
	6 weeks	1	5.6
	7 weeks	1	5.6
Healing time	8 weeks	2	11.1
	Mean ±SD Range	5.06±1.34 (4-8)	
Operation time	Mean ±SD Range	48.89±9.38 (39-65) minuet	

All cases had no pain through the three months, only two patients (11.1) had grasped an infection in the first week other cases had no infection through the three months, and all cases had restored a good function through the three months according to post-operative Wexner score (Table 4).

**Table (4): Follow-up of pain, infection of fistula, function after operation at different intervals.**

Variables		Study group (n=18)	
		No.	(%)
second week	No pain	18	100
One month	No pain	18	100
Two months	No pain	18	100
Three months	No pain	18	100
First week	2	18	11.1
One month	No infection	18	0
Two months	No infection	18	0
Three months	No infection	18	0
First week	Good function	18	100
One month	Good function	18	100
Three months	Good function	18	100

The results of the preoperative Wexner questionnaire compared to post-operative, the Wexner score was not significantly different before and after surgery (Table 5).

**Table (5): Comparison between the pre and post-operative Wexner score.**

	The patients				Sig
	Mean	n.	±SD	P	
Preoperative wexner score	2.32	18	1.215	<b>0.157</b>	NS
Postoperative wexner score	2.48	18	1.531		

There was a statistically significant association between age, DM, Quality of life, Time of operation, Healing time, and recurrence where recurrence was associated with the highest mean age of cases, diabetic patients, the longest stay in the hospital, and the longest healing time. Also, the quality of life of all recurrent cases was not good (Table 6).

**Table (6): Correlation between recurrence and different parameters of the studied group**

Characteristic	No recurrence group (n=15)		Recurrence group (n=3)		Test	P-value	
	Mean ±SD Range		Mean ±SD Range				
Age	33.13 ±8.14		46.67 ±3.06		-2.782	0.013*	
Time of operation	8.8 ±6.73		64.33± 1.15		-4.644	<0.001*	
Healing time	4.53 ±0.64		7.67 ±0.58		-7.833	<0.001*	
Category	No.	%	N o.	%			
Sex	Female	6	40	1	33.3	0.047	0.829
	Male	9	60	2	66.7		
DM	No	14	93.3	0	0	12.600	<0.001*
	Yes	1	6.7	3	100		
HTN	No	13	86.7	1	33.3	4.114	0.043
	Yes	2	13.3	2	66.7		
MRI	Done	10	66.7	3	100	1.385	0.239
	Not done	5	33.3	0	0		
QOL	Good	15	100	0	0	18.00	<0.001*
	Not good	0	0	3	100		

**DISCUSSION**

Traditional treatments for high anal fistulas, such as fistulotomy and/or seton insertion, are often unsuccessful in preventing recurrence or restoring anal function. However, sphincter preservation approaches appear to maintain fecal continence at the cost of increased recurrence rates<sup>(8)</sup>.

Many surgeons have looked into sphincter-sparing options for fistula care due to the requirement for definitive control of local sepsis, maintenance of fecal continence, and improvement of patient quality of life. The LIFT procedure was first described by **Rojanasakul et al.**<sup>(9)</sup>. Since then, providers have flocked to this method due to its low learning curve and ease of implementation, especially in comparison to alternative sphincter-preserving methods<sup>(10)</sup>.

This study included 18 patients (11 males and 7 females) who were diagnosed with simple

transsphincteric perianal fistula, with mean age distribution was 35.39±9.09 ranging from 22-53 years.

Regarding age distribution, the mean age at operation in this study was 35 years, this is lower than other studies such as **XU and Tang**<sup>(11)</sup> study, where their mean age was 42.1 years. **Elsebai et al.**<sup>(12)</sup> study.

The sex distribution found in our study (11 males: 7 females) was near the ratio of other studies such as **Elsebai et al.**<sup>(12)</sup> study, where it was (20 males: 10 females).

The LIFT procedure was originally described specifically for the management of transsphincteric fistula, however, it is also described for other types of fistulas as well including the suprasphincteric<sup>(13)</sup>. Studies showed a great variation of the included types of fistulous tracks but the majority were of the transsphincteric type, Regarding the type of fistulous track our study included (18 patents all with Simple transsphincteric perianal fistula ) similar to **Liu et al.**<sup>(14)</sup> study included only the transsphincteric type.

The mean time of hospital stay was 1.2 days with a maximum stay was three days and a minimum stay was one day, this is relative to **Elsebai et al.**<sup>(12)</sup> in which all patients were discharged within 24 h. and **XU and Tang**<sup>(11)</sup> study with a mean time of 2 days (1-4 days), and much less than **Chen et al.**<sup>(8)</sup> study with 11 days (7-28 days) this could be explained by adding the time needed for managing complications and recurrence and not only limited for evaluating the technique.

Although 3 months may seem like a very short time to monitor recurrences, that's how long it took for us to notice that 3 of our patients had stopped responding to treatment in our trial.

Two cases had postoperative wound infection without dehiscence, which was mild and resolved with conservative management, assessment of the postoperative pain using the Visual analog scale (VAS) for patients only 6 cases suffered from moderate pain, 12 cases suffered from a mild pain that controlled by NSAIDs. Our findings suggest that the lack of postoperative pain reporting in the majority of LIFT studies may be since pain after LIFT is quite modest compared to pain after other anal surgeries. There were complications mentioned in the published studies which included bleeding, anal fissure, persistent anal pain, wound dehiscence, hematoma, subcutaneous infection, hemorrhoidal thrombosis, and vaginal fungal infection, all of these were mild and resolved with conservative treatment<sup>(13)</sup>. In our study, the healing rate did not differ a lot from the mean healing rate of most published papers (80%). As we achieved a success rate of about 83% in all patients The healing time observed in this study ranged from 4 to 8 weeks after the procedure (mean±SD, 5.06±1.34) which was similar to **Elsebai et al.**<sup>(12)</sup> study where it was 5 to 8 weeks after the procedure.

Regarding fistula recurrence, this study's recurrence ratio was (16.7%), 3 patients with an overall healing rate without recurrence at the end of the follow-

up period (83.3%), 15 patients (all three patients (2 males and one female) who had recurrence) were diabetic and two of them had postoperative wound infection, however, the first study by **Rojanasakul et al.** <sup>(9)</sup>, reported healing rate over 94.4%, most studies reported healing rate of 40-95% with overall healing of 60% at a median follow-up of nearly 16 months.

Multifactorial factors affect the healing rate of anal fistula, including possible complexity of the original fistula, manipulation of operative bed, comorbidities, the surgeon's proficiency with the procedure, previous operations, and other unidentified factors. **Abcarian et al.** <sup>(15)</sup>, reported that the patients with previous surgery had a healing rate of 70%, at end of follow-up (median, 9 months) **XU and Tang** <sup>(11)</sup>.

Perhaps the greatest advantage of the LIFT procedure is the preservation of the sphincter mechanism and even there is no continence dysfunction. We assessed the continence of the patients with the Wexner score, there was a little affection for the continence, and there was minor continence in 5.6% (1 patient) only in the early postoperative period which improved gradually without any intervention to reach a rate of 0%, this is similar to the published literature with no reports of incontinence, with the assessment of continence functions using Wexner score as in **Gentile et al.** <sup>(16)</sup> study and **Elsebai et al.** <sup>(12)</sup> study.

All healed patients in this trial reported high levels of satisfaction with the LIFT technique, which the authors attribute to the little tissue harm that is inherent to the procedure, which allows for a quicker recovery, an earlier return to work, and a shorter healing time. Because the anal sphincter was not divided, continence was not compromised. After 2 and 4 weeks, our patients report a marked improvement in their quality of life, supporting our clinical judgment. Similar findings were found in a 2016 study investigating patient satisfaction 2 and 4 weeks following surgery by **Hegab et al.** <sup>(17)</sup>. All patients who responded to the survey said they were pleased with the outcomes of their treatment.

## CONCLUSION

Long-term control of uncomplicated trans-sphincteric perianal fistula can be achieved with little complications using the sphincter-preserving approach of LIFT. It is a safe procedure for patients with simple trans-sphincteric perianal fistula with good healing rates at short-term follow-up, its advantages include no effect on continence functions as the infective focus is removed without dividing any part of the sphincter complex, also it is easy to learn, perform, safe with low morbidity, rapid recovery and easily treat perianal fistula.

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**Author contribution:** Authors contributed equally to the study.

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