



A Comparative Study between Laser and Ligation as Sphincter Preserving Techniques in the Management of Intersphincteric Perianal Fistula

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ABSTRACT

Background:In general surgery, recurrence of perianal fistula and anal incontinence are fearful morbidities of surgeons. The incidence of recurrence, anal incontinence and postoperative pain was high with old techniques. Fistula tract Laser Closure (FiLaC) and Ligation of Intersphincteric Fistula Tract (LIFT) are feasible and safe techniques with low postoperative pain and minimal incontinence.

Purpose:Our study aimed to preserve the sphincter of anal canal and reduce the recurrence rate of the fistula during the management of intersphincteric perianal fistula.

Method:This was a prospective observational study for 6 months at Department of General Surgery, Zagazig University Hospitals. Two groups of 56 patients were formed. Group A underwent fistula tract laser closure and group B ligation of intersphincteric fistula tract. Patients were followed for 6 months for postoperative pain, recurrence, and complication.

Results:In our analysis, the average operating time was 19.3 minutes (min), while in the LIFT group it was 48.6 min with a statistically significantly higher mean operation time in the LIFT group. The mean hospital stay time postoperatively in the FiLaC group was 8.1 hours, which was significantly lower than in the LIFT group (17.1 hours). In the FiLaC group, the mean time of healing was 16.4 days while in LIFT the mean healing time was 32 days, which was statistically higher than the FiLaC group. Postoperative pain was statistically worse in the LIFT group than the FiLaC group. There was no substantial difference between the two groups after a considerable period of follow-up.

Conclusion:Our research found that both approaches are promising techniques, with higher healing rates and a lower risk of incontinence or recurrence after surgery. However, LIFT was quite significantly better for healing rate and recurrence, while Fistula tract laser closure was slightly significantly better for postoperative pain and incontinence.

Keywords: Fistula tract laser closure; Ligation of intersphincteric fistula tract; Perianal fistula.

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INTRODUCTION

An ideal treatment for an anal fistula should include, no incontinence, low recurrence rate and high quality of life. Sphincter-preserving methods for the

treatment of chronic anal fistulae have been considered due to the possibility of change in continence with standard approaches (1).



Fistulotomy was thought to be the gold standard for fistulous tract treatment; however, the recurrence rate was reported to be greater than 90% (2). However, Participants who underwent a fistulotomy, had a risk of anal sphincter dysfunction postoperatively (3).

As a result, a number of 'sphincter-sparing' techniques such as the use of fibrin glue, anal fistula plugs, and anorectal advancement flap were applied to decrease concerns about functional outcomes in the surgery of fistulas, these past attempts were initially promising, but the rate of success revealed conflicting results (4).

At Chulalongkorn University in Bangkok, Thailand, the Ligation of the Intersphincteric Fistula Tract (LIFT) technique was developed in 2007. The main principle behind this treatment is that the intersphincteric tract is excised and ligated, which will prevent fecal particles from entering the fistula and removing the septic focus(5). The Fistula tract Laser closure (FiLaC) technique, which involved using a laser diode source and a radial laser probe to seal the fistula's tract and close the internal opening of the fistula., was first applied eleven years ago. FiLaC's most essential feature is that the laser tip used is safe for sphincters and other structures. The FiLaC technique was designed to use a photothermal effect to eliminate both the anal gland/crypt and the epithelial lining of the fistula, as well as to close both the internal and external fistula openings (6).

This study represents the results of an analysis of Fistula tract Laser Closure (FiLaC) in the management of intersphincteric perianal fistula comparable with ligation of intersphincteric fistula tract (LIFT).

PATIENTS AND METHODS

A 6-month prospective observational study was conducted at Zagazig University Hospitals' General Surgery Department. Fifty-six cases that fulfilled the inclusion and exclusion criteria were included in the study. All Patients included in this study were those above 18 years old, suffering intersphincteric anal fistula diagnosed by clinical examination or fistulogram or MRI in doubtful cases. Excluding patients less than 18 years old or with previous radiotherapy, anal incontinence and suspected malignancy. Patients were divided into two groups:

Group A (28 cases): They underwent Fistula tract Laser Closure (FiLaC).

Group B (28 cases): They got their intersphincteric fistula tract ligated (LIFT).

All patients underwent a complete medical history, clinical examination, and regular preoperative preparation.

Surgical techniques:

All patients were under general or spinal anesthesia in lithotomy position.

In group A: The anal canal was exposed using a Parks' anal retractor. The external hole was gently explored to detect the fistula tract and the internal opening. To pass through this tract, a 2/0 polyglactin guide wire was used. In patients with a draining seton, this was utilized as a guidewire to introduce the fistula probe. The guidewire was put into a fistula probe and passed into the tract without a seton in the fistulas. The fistula was probed using a radial laser fiber with a wavelength of 1470 nm. A laser light of 12 W was used to close the tract. The probe was progressively withdrawn after probing the tract, and it was then initiated at the internal opening at a speed of around 1 mm/s to seal the tract. The fiber transmitted laser energy uniformly at 360°, causing the tract to shrink around it. The entire amount of



energy required to seal the tract was measured in Joules. There was no additional therapy given to the internal incision (flap or suture) (**Figure1**).

In group B: Over the course of the tract, a curvilinear incision was made in the groove between the internal and external sphincter of the anal canal, employing sharp and blunt dissect and bipolar diathermy as needed. Between both sphincters, the cut was deepened until it reached the supported fistulous tract. At this stage, the tract had been

dissected all throughout. We ligated the fistulous tract using polyglactin 3/0 sutures at two points: the medial one as close to the internal sphincter as possible, and the lateral one as close to the external sphincter as possible (**Figure2**). Hemostasis was obtained and the wound was closed in two layers after the tract was cut in between both ligatures. The skin around the external orifice was cut out and the lateral half of the tract was curetted.

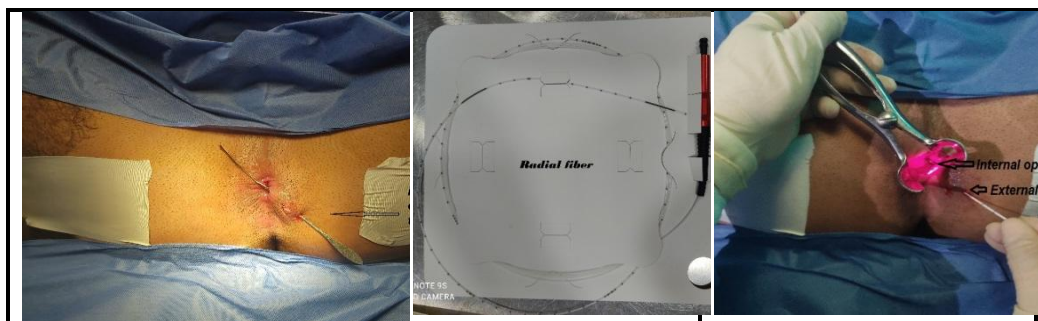


Figure (1): Surgical technique for patients underwent Fistula tract Laser Closure (Group A).

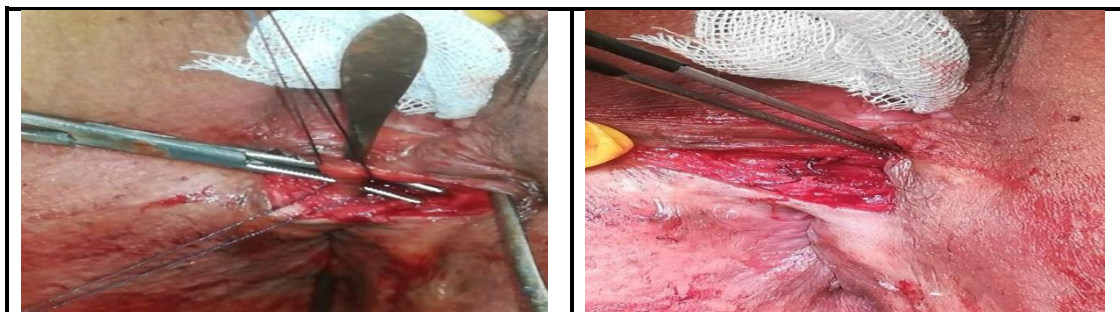


Figure (2): Surgical technique for patients got their intersphincteric fistula tract ligated (Group B).

Postoperative follow-up:

After surgery, we discharged the patients on the day of the operation or the next day. They were free to roam for the following six months, but they were instructed to clean the external wound 1–2 times daily in the shower and after defecation. The visual analog scale (VAS) was used to track postoperative pain after 12 and 24 hours. All patients were followed for one week, one month, and

then six months in the outpatient clinic. To assess postoperative complications, recurrence, and incontinence.

Statistical analysis

SPSS version 24 was used to tabulate and analyze the gathered data (SPSS Inc, Chicago, ILL Company). In this study, the acceptable threshold of significance was ≤ 0.05 ($P \leq 0.05$ was considered significant). Categorical data

were presented as numbers and percentages and compared by chi2 test. Quantitative data were expressed as mean ± standard deviation (SD) and compared by independent t-test or Mann-Whitney test as suitable test.

RESULTS

Demographic and clinical data were present in Tables (1&2). Mean operation time in the FiLaC group was 19.3 min, while in the LIFT group it was

48.6 min with a statistically significantly higher mean operation time in the LIFT group. Postoperative data were illustrated and showed a statistically significant higher mean hospital stay, healing time and postoperative pain in LIFT (Table 3). Post-operative complications without any significant difference between both groups (Table 4).

Table (1): Demographic data of study groups

		FiLaC		LIFT		P- Value
		Mean	SD	Mean	SD	
Age (years)		40	5.9	38.7	9.9	0.6
		N.	%	N.	%	P- Value
Sex	Male	24	85.7	16	57.1	0.018*
	Female	4	14.3	12	42.9	

* for Significant

Table (2): Clinical data of study groups

		FiLaC		LIFT		P- Value
		N.	%	N.	%	
History of perianal abscess		24	85.7	24	85.7	1
Diagnosis	Clinical	12	42.9	16	57.1	0.28
	Imaging and clinical	16	57.1	12	42.9	
Imaging	Fistulogram	16	57.1	0		<0.0001*
	MRI	0		16	57.1	
Number of tracts (branching tracts)		8	28.6	8	28.6	1

* for significant

Table (3): Postoperative data of study groups

		FiLaC		LIFT		P- Value
		Mean	SD	Mean	SD	
Hospital stay (hour)		8.1	0.9	17.1	6.1	<0.0001*
Healing time (Day)		16.4	14.6	32	20.8	0.002*
Min-max		N.	%	N.	%	P- Value
Postoperative pain (VAS)	1 - 3	24	85.7	0		<0.0001*
	4 - 6	4	14.3	16	57.1	
	7 - 10	0		12	42.9	

* for Significant



Table (4): Postoperative complications of study groups

	FiLaC		LIFT		P- Value
	N.	%	N.	%	
Complication	12	42.9	16	57.1	0.4
Infection	12	42.9	12	42.9	1
Major fecal incontinence	0	0	2	7.1	0.1
Incontinence to flatus	0	0	3	10.8	0.2
Recurrence	12	42.9	8	28.6	0.4

* for significant

DISCUSSION:

One of the most frequent benign anorectal disorders treated by surgeons, is anal sepsis. Up to 65 percent of patients with a perianal abscess would develop a chronic or recurrent anal fistula. The only effective treatment for this illness is surgical intervention. Although the main goal of treatment is to remove the fistula, it's also essential to keep anal continence, reduce postoperative complications, and reduce the chances of recurrence (7).

The goal of surgical treatment for an anal fistula is to cure the fistula and avoid injury to the sphincter muscles. To attain this purpose, various approaches have been created (8).The LIFT technique and the FiLaC technique are compared in the management of inter-sphinctericperianal fistulas in this study.

As regarding demographic, our study showed that a mean of age was 40 years in the FiLaC technique, while was 38.7 years in the LIFT technique, and this is in agreement with FilaC technique in Nordholm et al.(9) and go with LIFT technique in Shanwani et al. (10) and there was no significant difference between the studied groups regarding age. Also, the study showed 24 males in the FiLaC technique, and 16 males in the LIFT technique, this is matching with the FiLaC technique in Donmez et al. (11) in which were 23 males, and did not agree with others since it depends on the number of total cases and there was non-significant difference between the studied

groups regarding gender.

As regards operative time, our analysis showed that the mean operative time was 19.3 min in the FiLaC technique; go with Giamundo et al. (12)study which was 20 min. And 48.6 min in the LIFT technique and this is consistent with Rojanasakul et al. (5) who observed that it was 40 ± 2.67 min and in Shanwani et al. (10) was 67.5 ± 3.54 min.

As regards hospital stay, this study showed that a mean length of hospital stay was 8.1 hours in the FiLaC technique, while it was 17.1 hours in the LIFT technique. The mean length of hospital stay regarding FiLaC technique in Giamundo et al. (12), Terzi et al.(13) and Lauretta et al.(14) was 24 hours (one day case), while the mean length of hospital stay regarding LIFT technique inRojanasakul et al.(5) was 24 ±1.2 hours and in Shanwani et al. (10)was 48 ± 2.25 hours.

As regards postoperative pain measured by visual analogue scale, our study found that only 14.3% (4) cases had (4-6 VAS) pain with no reported cases with (7-10 VAS) pain in the FiLaC technique, this is consistent with Giamundo et al. (12)which was 18%, while 57.1% (16) cases had (4-6 VAS) pain and 42.9%(12) cases had (7-10 VAS) pain in LIFT technique, this is matching with Al Sebai et al.(15)who detected that, it was 53.3%. Our study showed a significant difference between the studied groups, as regard to postoperative pain, with favor



to the FiLaC group.

This research found that a mean healing time was 16.4 days in the FiLaC technique, which disagree with the mean healing time regarding FiLaC technique in **Giamundo et al.(12)** who detected that, it was 35 days, which may be due to the study having a small sample size. While 32 days in the LIFT technique, this goes with the mean healing time regarding LIFT technique in **Shanwani et al.(10)** study which showed that, the healing time was 45 ± 3.54 days and in **Rojanasakul et al.(5)** was 30 ± 2.67 days.

As regards postoperative suppuration, our study discovered that the postoperative suppuration was 42.9% in the FiLaC technique and 42.9% in the LIFT technique. Post-operative suppuration regarding the FiLaC technique in **Stijns et al.(16)** was 20%. There was a non-significant difference between the studied groups regarding suppuration. We prescribed IV 3rd generation cephalosporin and oral metronidazole and strictly follow-up.

As regards postoperative incontinence, our research revealed two cases of temporary fecal incontinence and three cases of incontinence to flatus in the LIFT technique, while no recorded cases in the FiLaC technique. This is inconsistent with others, no recorded cases of incontinence regarding the LIFT technique in **Rojanasakul et al.(5)** and in **Shanwani et al.(10)** And three cases were recorded regarding the FiLaC technique in **Serin et al.(17)**. We followed up the patient and put them under conservative management, all patients improved clinically with no need for reinterference.

In the present study, the recurrence rate was 42.9%(12) cases in the FiLaC technique while 28.6 % (8) cases in the LIFT technique this is consistent with the results of the LIFT technique in **Shanwani et al.(10)** who found that, it was 17 % and

regarding the FiLaC technique in **Isik et al.(18)** it was 48% and **Wilhelm(6)**, it was 45.9%. Half of the patient (10) cases with recurrent perianal fistula underwent LIFT procedure with anorectal advancement flap or LIFT procedure plus FiLaC procedure. The other half refused reoperation.

CONCLUSION:

Both Laser and ligation are promising techniques for sphincter preserving surgical procedures for the management of inter-sphincteric perianal fistula.

Our research found that both approaches are effective, with higher healing rates and a lower risk of incontinence or recurrence after surgery. However, Fistula tract laser closure was slightly better regarding postoperative pain and incontinence, while LIFT was slightly better regarding recurrence.

No Conflict of interest.

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