

Laser versus Ligation as Sphincter Preserving Techniques in the Management of Intersphincteric Perianal Fistula

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ABSTRACT

Background: Fistula tract Laser closure (FiLaC) and Ligation of intersphincteric Fistula Tract (LIFT) are feasible and safe techniques with low postoperative pain and minimal incontinence.

Objectives: Our study aimed to preserve the anal sphincter and decrease the rate of incontinence and recurrence of the fistula during the management of intersphincteric perianal fistula.

Patients and 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 perianal fistula.

INTRODUCTION

An ideal treatment for an anal fistula should include low recurrence rates, no incontinence, and high quality of life. Sphincter-preserving methods for the treatment of chronic anal fistulae have been considered due to the possibility of a 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, patients who were treated with 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) procedure was developed in 2007. The main principle behind this treatment is that excision and ligation of the intersphincteric tract can prevent fecal particles from entering the fistula and removing the septic focus intersphincteric^[5].

The Fistula tract Laser closure (FiLaC) technique, which involved sealing the entire length of the fistula's tract with a laser diode source and a radial laser probe for closure of the track and closing 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. Patients were divided into two groups:

Group A (an odd number): They underwent Fistula tract Laser Closure (FiLaC).

Group B (even number): They underwent ligation of intersphincteric fistula tract (LIFT).

All patients were subjected to the following: Full history taking, clinical examination, and routine preoperative preparation

Surgical technique:

- General or spinal anesthesia
- Lithotomy position
- In group A: A Parks' anal retractor was used for exposure of the anal canal. To locate the fistula tract and the internal opening, the external opening was gently probed. A guide wire of 2/0 polyglactin was employed to pass through this tract. This was used as a guidewire to introduce the fistula probe in patients who had a draining seton. The guidewire was inserted on a fistula probe and transmitted through the tract in fistulas without a seton. A radial laser fiber with a wavelength of 1470 nm was used to probe the fistula. The tract was sealed with 12 W of laser energy. After probing the tract, the probe was slowly withdrawn and started at the internal opening, at a velocity of around 1 mm/s to seal the tract. The fiber delivered laser energy homogeneously at 360° causing shrinkage of the tract around the fiber. The total energy required to seal the tract (in Joules) was recorded. The internal incision was not closed with any extra treatment (flap or suture).
- In group B: Over the course of the tract, a curvilinear incision was made in the groove between the internal and external anal sphincters, employing sharp and blunt dissection 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 track using Vicryl 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. 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.

Postoperative follow-up:

After surgery, the patients were discharged on the same day or the next day. They were free to roam for the following six months, but they were advised to clean the external wound in the shower 1–2 times daily and after defecation. The visual analog scale (VAS) was used to track postoperative pain after 12 and 24 hours⁽⁷⁾. All patients were observed in the outpatient clinic for one week, one month, and then six months. To assess postoperative complications, recurrence, and incontinence.

Ethical approval:

After Institutional Review Board, Zagazig University [IRB-ZU] permission, The General Surgery Department gave their approval to the research. After hearing about the study's goal and potential consequences, each patient gave informed consent to participate in this study. This research was carried out in line with the World Medical Association's Code of Ethics (Declaration of Helsinki) for human studies.

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 \pm standard deviation (SD) and compared by independent t-test or Mann-Whitney test as suitable test.

RESULTS

Clinical and demographic data are present in **tables 1 and 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.

Table 1. Demographic data of study groups

		FiLaC N: 28		LIFT N: 28		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	

*: Significant

Table (2): Clinical data of study groups

		FiLaC N: 28		LIFT N: 28		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

*: Significant

In the table (3), postoperative data were illustrated and showed statistically significant higher mean hospital stay, healing time and postoperative pain in LIFT.

Table (3): Postoperative data of study groups

	FiLaC N: 28		LIFT N: 28		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	
	7 - 10	0		57.1	
			12	42.9	

*: Significant

Table (4) illustrated postoperative complications without any significant difference between both study groups.

Table (4): Postoperative complications of study groups

	FiLaC N: 28		LIFT N: 28		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

*: 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].

In our study, we compare between LIFT technique and the FiLaC technique in the management of inter-sphincteric peri-anal fistula.

As regard demographic data, our study showed a mean of age 40 years in FiLaC while 38.7 years in the LIFT technique, and this is in agreement with FilaC technique in **Nordholm et al.** [9] and is in agreement with LIFT technique in **Shanwani et al.** [10] and there was non-significant difference between the studied groups regarding age. Our study showed the frequency of male gender was 24 male in FiLaC while 16 male in the LIFT technique, this is in agreement with the FiLaC technique in **Dönmez et al.** [11] was 23 male and disagrees 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 study showed a mean operative time of 19.3 min in FiLaC. This is in agreement with **Giamundo et al.** [12] who observed that it was 20 min. It was 48.6 min in LIFT and this is in agreement 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 a mean length of hospital stay of 8.1 hours in FiLaC while it was 17.1 hours in LIFT. 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 in **Rojanasakul et al.** [5] was 24 ± 1.2 hours and in **Shanwani et al.** [10] was 48 ± 2.25 hours.

As regards postoperative pain, this study showed only 14.3% (4) cases had (4-6 VAS) pain with no reported cases with (7-10 VAS) pain in FiLaC, this is in agreement with **Giamundo et al.** [12] as it was 18%, while 57.1% (16) case had (4-6 VAS) pain and 42.9% (12) case with (7-10 VAS) pain in LIFT technique. This is in agreement with **Al Sebai et al.** [15] as it was 53.3%. Our study showed a significant difference between the studied groups.

As regards healing time, this study showed a mean healing time was 16.4 days in FiLaC. This did not agree with the mean healing time regarding FiLaC technique in **Giamundo et al.** [12] as it was 35 days; may be due to

this study had a small sample size. While it was 32 days in LIFT, which is in agreement with the mean healing time regarding LIFT technique in **Shanwani et al.**^[10] that was 45 ± 3.54 days and in **Rojanasakul et al.**^[5] it was 30 ± 2.67 days.

As regards postoperative suppuration, our study showed that postoperative suppuration was 42.9% in FiLaC and 42.9% in LIFT. Postoperative 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 study showed two cases of recorded fecal incontinence and three cases of incontinence to flatus in LIFT while no recorded cases in FiLaC. This is in agreement with others where no recorded cases of incontinence regarding the LIFT technique was found 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].

As regards recurrence, our study showed a recurrence rate was 42.9% (12) cases in FiLaC, while it was 28.6 % (8) cases in LIFT. This is in agreement with others; regarding the LIFT technique in **Shanwani et al.**^[10] it was 17 % and regarding the FiLaC technique in **Isik et al.**^[18] it was 48% and in **Wilhelm**^[6] it was 45.9%.

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 healing rate and recurrence.

Conflict of Interest: No

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