

A single institution experience in the treatment of fistula in ano using diode laser (fistula laser closure): short-term outcomes

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Introduction

Management of the perianal fistula has been always a challenge for colorectal surgeons especially when the external sphincter is involved. Several minimally invasive procedures emerged as an alternative to the traditional surgical approach as fibrin glue injection, ligation of the intersphincteric track (LIFT) and injection of platelet-rich plasma (PRP). Recently, the use of diode laser in proctology has emerged as an alternative to conventional surgical treatment. The laser beam causes shrinkage and sealing of the fistulous track that depends on the power and the duration of laser light application.

Patients and methods

This study was carried out on 69 patients with perianal fistula in the Gastrointestinal Surgery Unit, General Surgery Department, Tanta University Hospitals, during the study period from February 2021 to December 2022. Patients underwent fistula laser closure (FILAC) using a diode laser, radial fibers, wavelength 1470 nm, and 10 watts of power.

Results

Sixty nine patients underwent fistula laser closure. The success rate was 74%. There was significance between recurrence and posterior position of the fistulous track of the intersphincteric type. Also, there was significance between recurrence and cases who had a caliber track more than 7 mm but there was no significance between recurrence and length of the track. The procedure was associated with minimal postoperative pain, long period of postoperative discharge, short hospital stay, and early return to normal activities.

Conclusion

Diode laser is a safe minimally invasive and effective procedure for the treatment of straight non branched short track fistula with some considerations as the caliber track should not exceed 7 mm and the posterior intersphincteric fistula should be treated by lay open fistulotomy. The procedure is also associated with less postoperative pain, early return to normal activities, and minimal recurrence rate but high cost remains a limitation.

Keywords:

diode laser, fistula laser closure, perianal fistula

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Introduction

An anal fistula is a persistent epithelialized tract from the anal canal to the perianal skin, it is a common problem that is usually cryptoglandular in origin, other less common causes are Crohn's disease, trauma, previous anal surgeries, and specific infections such as actinomycosis [1]. Perianal fistula can be simple (subcutaneous, intersphincteric, or low trans sphincteric fistulas) or complex (high trans sphincteric, supra sphincteric, or extra sphincteric) [2]. Surgical treatment had been always the definitive treatment for the previously mentioned lesions, even better than the medical choice, as fecal incontinence was always a concern for the surgeons after surgery of peri-anal fistula, every effort was made to settle alternative procedures to surgery that can be

less invasive [3]. These treatments include endofistular therapies such as video-assisted anal fistula treatment (VAAFT), injection of different biomaterials and fistula plugs, and fistula clip closure techniques [4]. The FILAC technique 'Fistula Laser Closing' is another endofistular management technique that had very promising results in multiple studies [5,6]. In this technique a radial-emitting disposable laser fiber is used for endovascular therapy, the photothermal effect produced by a diode laser in the FILAC approach can destroy both the cryptoglandular tissue

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and the epithelial layer of the fistula track with simultaneous obliteration of both the internal and external fistula orifices. Recently, laser treatment can be considered a new minimally invasive and considered as an alternative to the surgical choice and associated with less postoperative pain, less bleeding, and early return to normal life [5].

Patients and methods

This study was on 69 patients treated for peri-anal fistula in a single center by a team of experienced surgeons. These patients were admitted to the general surgery department, Tanta University hospitals in the period between February 2021 and December 2022.

Inclusion criteria

Age more than 18 years old.

Exclusion criteria

- (1) Associated anorectal pathology is anal fissure or anal piles.
- (2) Malignant fistulae.
- (3) Patients affected by inflammatory bowel disease (IBD) affecting the rectum or colon as Crohn's disease.

Preoperative Assessment: All patients were subjected to full history taking, general examination, digital rectal examination to determine the site of internal and external openings of perianal fistula, routine laboratory investigations, colonoscopy to exclude cancer colon and rectum in patients more than 50 years old, endo-anal ultrasound for all cases of perianal fistula and MRI for selected cases with suspected complex perianal fistula.

Operative technique

Fistula catheterization by a probe was done for proper identification of the internal opening (Fig. 1). In some cases injection of hydrogen peroxide was necessary to detect the internal opening. Closure of the internal orifice either by a figure of eight Vicryl 3/0 suture or mucosal or advancement flap was done. If the internal opening was not present or the track was blind-ended, only FILAC was done, then the introduction of laser radial fibers from external to internal openings of the fistula. Laser closure of the fistulous track was done by simultaneous destruction and sealing of the track. 100 joules were given for each 1 cm of the track using radial fibers of 1470 nm in wavelength and 10 watts in energy, feeling a sticky sensation during withdrawal is a good

sign of the obliteration of the track (Fig. 2). Coagulation of the external orifice was done at the end of the procedure. In some cases where fistula was associated with discharge and suspected abscess (clinically and by radiology), proper drainage of the external orifice was achieved then curettage was done (Fig. 3).

Follow-up

Assessment of postoperative pain using the visual analog score (VAS), need for analgesics, postoperative bleeding (either spontaneous or postdefecation), edema, and sero-mucous discharge was evaluated in the first 24 h. Patients were discharged usually 24 h after surgery or on the same

Figure 1



Catheterization of the fistulous track by probe.

Figure 2



Closure of the track using radial fiber.

Figure 3



Drainage of the external opening in cases with associated absces.

day of the surgery if there were no complications and pain was less than 5 by VAS score, they were discharged on stool softeners and 1 gm of Ceftriaxone intravenous. Follow-up was weekly for one month and monthly for 6 months, patients were instructed to visit the clinic if there were any symptoms suggesting recurrence and was considered healed if there were no recurrence for 6 months.

Data were collected and fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using numbers and percentages. The Shapiro-Wilk test was used to verify the normality of distribution. Quantitative data were described using range (minimum and maximum), mean, standard deviation, median, and interquartile range (IQR). The significance of the obtained results was judged at the 5% level. The used tests were 1- χ^2 Chi-square test for categorical variables, to compare between different groups 2 - Fisher's exact or Monte Carlo correction for chi-square when more than 20% of the cells have expected count less than 5 3 - Student *t*-test for normally distributed quantitative variables, to compare between two studied groups 4 - Mann Whitney test For abnormally distributed quantitative variables, to compare between two studied groups.

Results

Sixty-nine consecutive patients underwent laser treatment for perianal fistula, 45 (65.2%) of them were males and 24 (34.8%) were females. Age ranged from 17 to 72 years with a mean of 42.58 ± 12.37 SD (Table 1). Regarding the position of the fistula (according to Goodsall's classification) 39 (56.5%) cases were anterior 27 (39.1%) were posterior and 3 (4.4%) cases had both anterior and posterior fistulae and 9 (11.5%) cases were recurrent after previous surgeries. Regarding the type of the fistula (Park's classifications), 51 (73.9%) cases had intersphincteric tracks, 15 (21.7%) cases had transsphincteric tracks and 3 (4.4%) cases had

Table 1 Distribution of the studied cases of fistula according to demographic data (n=69)

	No. (%)
Sex	
Male	45 (65.2)
Female	24 (34.8)
Age (y)	
Min. – Max.	17.0–72.0
Mean \pm SD.	42.58 \pm 12.37
Median (IQR)	42.0 (37.0–50.0)
Operative time in minutes	
Min. – Max.	5.0–23.0
Mean \pm SD.	11.73 \pm 4.90
Median (IQR)	10.0 (8.0–14.0)

IQR, Inter quartile range; SD, Standard deviation.

suprasphincteric tracks. Affection of the external sphincter was present in 18 (26%) patients and was documented by endo-anal ultrasound as routine imaging for all the cases of perianal fistula. Nine (13%) cases were associated with discharge or abscess cavity, and 20 (28.9%) patients had a history of previous anorectal surgery (hemorrhoids, anal fissure, anal fistula, and perianal abscess). The caliber of the track ranged from 3–11 mm with a mean of 6.36 mm. 54 (78.2%) patients had a caliber of less than or equal to 7 mm while 15 (21.8%) patients had a caliber of more than 7 mm. The length of the tracks ranged from 2.3–8 cm with a mean of 3.75 ± 1.49 SD. Sixty (86.9%) patients had a single fistulous track, six (8.7%) patients had two tracks and three patients had more than two (4.3%) which were biopsied to exclude inflammatory bowel disease (Table 2). Operative time ranged from 5–23 min with a mean of 11.73 ± 4.90 SD. In these all patients we used FILAC using radial fiber of 1470 nm diode laser, six (8.6%) patients underwent FILAC combined with ligation of the intersphincteric fistula tract (LIFT) and nine (13%) patients underwent FILAC with excision of the external opening for proper drainage. Hospital stay ranged from 1–2 days and return to normal activities ranged from 3–12 days. Postoperative pain was evaluated using VAS score 6 h postoperative, VAS score ranged from 4–8 with mean of 6.27 ± 1.28 SD, after 12 h it ranged from 2–8 with mean of 4.35 ± 2.08 , after 24 h VAS score continued to decrease with a range from 0–8 with mean of 2.54 ± 2.10 SD. After 3 days, VAS score ranged from 0–2 with a mean of 0.31 ± 0.62 SD, after one week it ranged from 0–1 with a mean of 0.04 ± 0.20 SD, then it reached 0 after 2 weeks, 1, 2, and 6 months of follow-up (Table 3).

Regarding postoperative discharge, no discharge was recorded in the first 24 h, then discharge (serous and

Table 2 Distribution of the studied cases of fistula according to different parameters (n=69)

	No. (%)
Number of tracks	
1	60 (86.9)
2	6 (8.7)
4	3 (4.4)
Position of fistula	
Anterior	39 (56.5)
Posterior	27 (39.1)
Anterior and posterior	3 (4.4)
Type of fistula	
Intersphincteric	51 (73.9)
Transsphincteric	15 (21.7)
Suprasphincteric	3 (4.4)
Caliber of the track (mm)	
≤7	54 (78.2)
>7	15 (21.8)
Min. – Max.	3.0–11.0
Mean±SD.	6.36±1.63
Median (IQR)	6.0 (5.0–7.0)
Length of the track (cm)	
Min. – Max.	2.30–8.0
Mean±SD.	3.75±1.49
Median (IQR)	3.20 (3.0–4.0)

IQR, Inter quartile range; SD, Standard deviation.

sometimes slightly thick) was recorded during follow-up in the third day in 57 (80.8%) patients, in 40 (57.7%) patients continued after 1 week, in 24 (34.6%) patients continued after 2 weeks and in 18 (26%) patients after 1, 2, and 6 months of follow-up which was considered as recurrence (Table 3). It is important to mention that twelve patients out of eighteen who suffered from recurrence, all had posterior intersphincteric fistula and wide caliber track (more than 7 mm) and variable track length. During the follow-up which was up to six months, postoperative perianal edema occurred in 6 (8%) patients and was treated by anti-inflammatory medications. No incontinence or stenosis occurred in all cases of the study, itching developed in 6 (8%) cases and was treated by local soothing agents. The success

rate of the cases that underwent FILAC was 74%, recurrence occurred in 18 (26%) patients and most of them underwent lay-open fistulotomy.

There was a relation between the posterior position of the fistula and recurrence that was significant (P value was less than 0.001), while other complications such as edema, itching and infection were not significantly related to the position of the fistula (Table 4). It is important to mention that recurrence was significant in the cases that a caliber track of more than 7 mm and underwent FILAC. 15 cases had a caliber track of more than 7 mm and 12 of them (80%) suffered from recurrence, (Table 5). Other complications like edema, itching and abscess formation had no significance in relation to the caliber of the track. There was no significance between the type of the fistula and postoperative complications yet, all the recurrent cases were of the intersphincteric type. Also, there was no significance between the length of the fistulous track and postoperative complications. It is also important to mention that there was a significant relation between recurrence and all the cases who had both posterior fistula and a track caliber more than 7 mm, P value was 0.002. (Table 6).

Preoperative and postoperative photos of healed transsphincteric fistula are illustrated in (Figs 4–6).

Discussion

Management of fistula-in-ano has been always a challenge for surgeons because of the potentially complex anatomy and the possible relation to sphincters and continence mechanism. The goal of therapy is always to get rid of the fistula without damaging the sphincters, which is why there is raised attention towards minimally invasive techniques as extensive surgery may increase the risk of incontinence despite its better results regarding the recurrence [7].

Table 3 Descriptive analysis of the studied cases of fistula according to pain (visual analog score) score and discharge (n=69)

Pain (VAS) score	Min. – Max.	Mean±SD.	Median (IQR)	Discharge	No. (%)	Yes No. (%)
6 h	4.0–8.0	6.27±1.28	7.0 (5.0–7.0)			
12 h	2.0–8.0	4.35±2.08	4.0 (2.0–6.0)	6 h	69 (100.0)	0 (0.0)
24 h	0.0–8.0	2.54±2.10	2.0 (1.0–4.0)	12 h	69 (100.0)	0 (0.0)
3 days	0.0–2.0	0.31±0.62	0.0 (0.0–0.0)	24 h	69 (100.0)	0 (0.0)
1 week	0.0–1.0	0.04±0.20	0.0 (0.0–0.0)	3 days	15 (21.8)	54 (78.2)
2 weeks	0.0–0.0	0.0±0.0	0.0 (–)	1 week	33 (47.8)	36 (52.2)
1 month	0.0–0.0	0.0±0.0	0.0 (–)	2 weeks	45 (65.2)	24 (34.8)
2 months	0.0–0.0	0.0±0.0	0.0 (–)	1 month	51 (73.9)	18 (26.1)
6 months	0.0–0.0	0.0±0.0	0.0 (–)	2 months	51 (73.9)	18 (26.1)
				6 months	51 (73.9)	18 (26.1)

Table 4 Relation between position of fistula and complication in fistula laser closure cases (n=69)

Complication	Position of fistula			χ^2	MC P
	Anterior (n=39) No. (%)	Posterior (n=27) No. (%)	Anterior and posterior (n=3) No. (%)		
Postedema					
No	39 (100.0)	21 (77.8)	3 (100.0)	3.664	0.221
Yes	0	6 (22.2)	0		
Abscess					
No	39 (100.0)	24 (88.9)	3 (100.0)	2.934	0.442
Yes	0	3 (11.1)	0		
Recurrence					
No	39 (100.0)	9 (33.3)	3 (100.0)	12.173*	0.001*
Yes	0	18 (66.7)	0		
Itching					
No	39 (100.0)	21 (77.8)	3 (100.0)	3.664	0.221
Yes	0	6 (22.2)	0		
Incontinence					
No	39 (100.0)	27 (100.0)	3 (100.0)	–	–
Yes	0	0	0		

χ^2 , Chi square test; MC, Monte Carlo. P: P value for association between different categories. *: Statistically significant at P less than or equal to 0.05.

The two minimally invasive techniques, FILAC and video-assisted anal fistula treatment (VAAFT) had been well recognized since 2011 [8,9], and since this time, multiple studies had shown that using diode laser can achieve complete closure of the lumen of the fistula with minimal damage to the sphincter muscles, with the resulting denaturation, increase protein synthesis and modulating cytokines, the lumen becomes smaller and closes. It is aimed to be limited to 2–3 mm tissue

depth, thus minimizing the damage to the surrounding tissues, especially sphincter muscles [10].

This study reports the short-term outcomes (6 months at least) of 69 patients presented to Tanta University hospitals with anal fistula and treated by this sphincter preserving technique FILAC with the closure of the internal opening of the fistula as described by Wilhelm A who was the first to describe the procedure in 2011

Table 5 Relation between caliber of the track and complication in fistula laser closure cases (n=69)

Complication	Caliber of the track (mm)				
	N	Mean±SD.	Median (Min. – Max.)	≤7 (n=54) No. (%)	>7 (n=15) No. (%)
Postedema					
No	63	6.40±1.78	6.0 (3.0–11.0)	48 (88.9)	15 (100.0)
Yes	6	6.50±0.71	6.50 (6.0–7.0)	6 (11.1)	0
Test of Significance (p)			t=0.077, P=0.939	$\chi^2=0.608$, $^{FE}P=1.000$	
Abscess					
No	66	6.43±1.74	6.45 (3.0–11.0)	51 (94.4)	15 (100.0)
Yes	3	6.0#	3 (5.6)	0	
Test of Significance (p)			–	$\chi^2=0.290$, $^{FE}P=1.000$	
Recurrence					
No	51	5.79±1.23	6.0 (3.0–7.50)	48 (88.9)	3 (20.0)
Yes	18	8.17±1.72	8.0 (6.0–11.0)	6 (11.1)	12 (80.0)
Test of Significance (p)			t=3.678*, P=0.001*	$\chi^2=9.631$ *, $^{FE}P=0.008$ *	
Itching					
No	63	6.35±1.75	6.0 (3.0–11.0)	51 (94.4)	12 (80.0)
Yes	6	7.0±1.41	7.0 (6.0–8.0)	3 (5.6)	3 (20.0)
Test of Significance (p)			t=0.504, P=0.619	$\chi^2=1.028$, $^{FE}P=0.395$	
Incontinence					
No	69	6.41±1.71	6.0 (3.0–11.0)	54 (100.0)	15 (100.0)
Yes	0	–	0	0	
Test of Significance (p)			–	–	

χ^2 , Chi square test; FE, Fisher Exact; SD, Standard deviation; t, Student t-test. P: P value for association between different categories. *: Statistically significant at P less than or equal to 0.05.

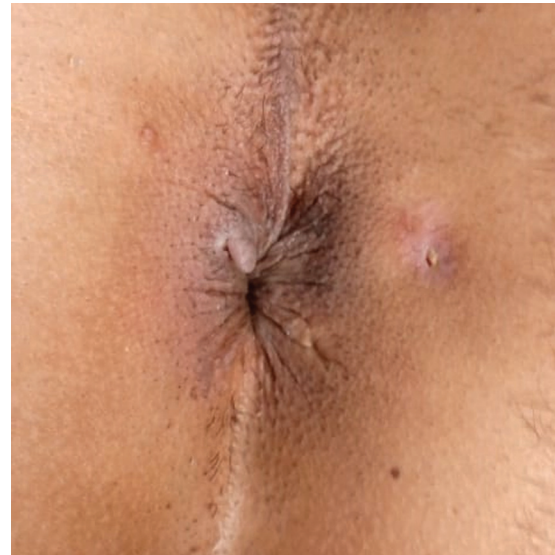
Table 6 Relation between Fistula at posterior and caliber of the track greater than 7 mm and recurrence in fistula laser closure cases (n=69)

Recurrence	Fistula at posterior and caliber of the track >7 mm		χ^2	FEP
	No (n=57) No. (%)	Yes (n=12) No. (%)		
No	51 (89.5)	0	13.719*	0.002*
Yes	6 (10.5)	12 (100.0)		

χ^2 , Chi square test; FE, Fisher Exact. P: P value for association between different categories. *: Statistically significant at P less than or equal to 0.05.

Figure 4

Anterior transsphincteric perianal fistula probed before fistula laser closure intraoperative.

Figure 5

Anterior transsphincteric perianal fistula after one week.

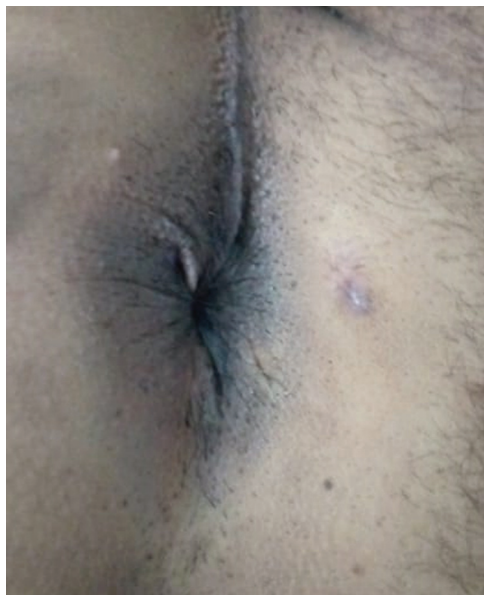
[8], in our study closure of the internal orifice was done either by a figure of eight Vicryl 3/0 suture or by performing advancement flap as was done by Wilhelm, on the contrary Giamundo and colleagues claimed that the internal orifice can be completely sealed by laser energy without the need for the advancement flap [11]. In our study sealing of the track was done using radial fiber of 1470 nm in wavelength and 10 watts in energy, this was similar to the recent studies as Tümer H and Bulbuloglu GC's study [12], the laser method was applied using different energy levels (10, 13, and 15 watts) and varying wavelengths (980–1470 nm). Some studies have reported that lower energy levels result in less pain and better recovery outcomes [11]

In our study, the success rate for complete closure of the fistula was 74% after 6 months of follow-up, this rate is comparable to Wilhem and colleagues results in 2017 after 5 years of follow-up the primary success rate of the FILAC procedure was 64.1% (75/117), the secondary

success rate was 88.0% (103/117) (they described the success of reuse of laser for treatment as secondary success) [13], also Giamundo and colleagues reported that 71.1% of patients had successful closure of the fistula tracts in their short term results that raised to 71.4% success rate in their long term results (5 years follow-up study), they assumed that the best healing rates were associated with who had been previously treated by loose seton 8 weeks before laser treatment (79%) while healing rate in patients without seton was 62% [11].

Öztürk E and Gülcü B reported a high success rate (82%) when they performed FILAC on 50 patients with transsphincteric or intersphincteric fistula. Seton was used for 3–4 weeks before FILAC if there is an associated abscess. They suggested that debridement of the track by cytology brush was an important step to avoid widening the track and as hemoglobin was the ideal protein for sealing the track, 100 joules per cm was given and the internal opening was not closed. The author proposed that to and fro movement towards the internal opening while performing FILAC was essential to augment the sealing of the track. The

Figure 6



Complete healing of anterior transsphincteric perianal fistula after 1 month.

authors described the procedure as an effective one for the treatment of anal fistula especially if the external sphincter is involved [6], while Giamundo and colleagues reported that to and fro movement which was performed by Öztürk and Gülcü B should be avoided as this could hamper the healing effect of the laser, they also assumed that better healing rate was achieved when length of the track was 4 cm or more and that fistulas with 2 cm or less in the length should not be treated with FILAC [11]. We agree with that proposal as this back and forth movement can perforate the newly forming tissue in the lumen of the fistula that was still incomplete and vulnerable during the procedure. Terzi and colleagues in 2018 reported a 40% success rate in a study included 103 patients. Seton was not used before definitive treatment and the internal opening was not closed, this could be the cause for the disappointing success rate. They also recognized FILAC as a considerable treatment option for anal fistula with modest expectations and the possibility of reapplication [14].

In our research, the position of the fistula was as follows, 39 (56.5%) cases were anterior and 27 (39.1%) were posterior and 3 (4.4%) cases had both anterior and posterior fistulae, regarding the type the fistula, 51 (73.9%) cases had intersphincteric tracks, 15 (21.7%) cases had transsphincteric tracks, and 3 (4.4%) cases had suprasphincteric track, so affection of the external sphincter was present in 18 (26%) patients only. Gorgun and Sengun and Marref and colleagues in

2019 proposed that high transsphincteric fistula and suprasphincteric fistula would get the most benefit from FILAC due to the advantage of sparing the sphincter from damage which could not be present in other conventional measures [15,16]. In our study, FILAC was combined with LIFT in 6 cases with high transsphincteric fistula to achieve good results. Our preference was not to use different surgical techniques except in selected cases of high complex fistula for proper evaluation of the effect of a laser as a single exclusive treatment but use of LIFT was supported by other studies as published by Ahmed and colleagues in 2022 who combined FILAC with LIFT and VAAFT to treat high transsphincteric and suprasphincteric fistula in 45 patients. The overall success rate was 91.1% with no incontinence or major postoperative complications [17].

The main complication of concern in our study was recurrence as we had no incontinence in our cases, recurrence occurred in 18 (26%) patients and most of them underwent lay-open fistulotomy. There was a significant relation between the posterior position to Goodsall's line and recurrence, also the recurrence was significant in the cases that had a caliber track more than 7 mm as in 15 cases had a caliber track more than 7 mm, 12 (80%) of them suffered from recurrence, all the recurrent cases were of the intersphincteric type. Also, there was no significant relation between length of the fistulous track and postoperative complications. It is also important to mention that there was a significant relation between the recurrence and all the cases who had both posterior fistula and a track caliber of more than 7 mm. We found no relation between the length of the track or affection of the external sphincter and possible recurrence.

Wilhem and colleagues found that the only statistically significant determinant of the success of fistula closure was the severity of the disease. A 1.63-fold increase in primary success rate was observed for fistulae Parks—St. type 1 (intersphincteric type) as compared with type 2,3,4 patients (trans, supra and extra-sphincteric types). In fact, the first treatment was successful in all eight type 1 patients, compared with only 55 of 90 type 2 patients (61%, Fischer's exact $P=0.048$), which is why they described FILAC as a blind procedure that may miss the side tracks [13], while in Giamundo and colleagues study, the presence of setons before the procedure was the only factor found to influence the success rates in their series (79 vs. 62%) although this figures did not reach statistical significance ($P=0.20$, χ^2 Chi-square test) [11]. In a recent study by Tumer H and Bulbuloglu GC included a total of 253 patients;

149 (58.9%) patients underwent fistulotomy and 104 (41.1%) underwent laser ablation, 21 patients experienced recurrence, with 13.6% ($n=14$) in the laser group and 4.7% ($n=7$) in the fistulotomy group, so the recurrence rate in the laser group was found to be statistically significantly higher compared with the fistulotomy group ($P<0.05$). The recurrence rate in patients with low trans-sphincteric fistulas was statistically significantly higher than in the other groups ($P<0.001$), as most of the recurrent cases were in this group, also the mean fistula tract length was found to be a statistically significant factor in recurrence ($P<0.001$), another significant factor that affected the recurrence rate was diabetes mellitus (DM); 18.4% ($n=7$) of patients with diabetes mellitus experienced relapse ($P<0.05$) [12]. We suggest that the difference between our study and these studies comes from the fact that most of our patients were from the Park 1 classification (intersphincteric type) and this was not the case in these important studies that seemed to be focused on the more complex types.

Conclusion

Our study recommends FILAC as a sphincter preserving procedure for the treatment of perianal fistula with good result regarding the postoperative sequence and accepted results regarding the possibility of recurrence. We do not recommend the procedure for simple posterior intersphincteric type as it is better to be treated by fistulotomy that will be safe and the rate of recurrence is high especially if the calibre of the track is more than 7 mm, and we recommend the usage of the procedure on a wide scale on more complex fistulae with taking in consideration adding standard surgical techniques as (LIFT, closure of the internal opening or using seton as the first stage) as these techniques will give better results for this blind technique.

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Conflicts of interest

There is no conflict of interest disclosure.

References

- 1 Sugrue J, Nordenstam J, Abcarian H, Bartholomew A, Schwartz JL, Mellgren A, *et al.* Pathogenesis and persistence of cryptoglandular anal fistula: a systematic review. *Tech Coloproctol* 2017; 21:425–32.
- 2 Nelson R. Anorectal abscess fistula: what do we know?. *Surg Clin North Am* 2002; 82:1139–1151.
- 3 Limura E, Giordano P. Modern management of anal fistula. *World J Gastroenterol* 2015; 21:12–20.
- 4 Scoglio D, Walker AS, Fichera A. Biomaterials in the treatment of anal fistula: hope or hype?. *Clin Colon Rect Surg* 2014; 27:172–181.
- 5 Giamundo P, Geraci M, Tibaldi L, Valente M. Closure of fistula-in-ano with laser—FiLaC: an effective novel sphincter-saving procedure for complex disease. *Colorectal Dis* 2013; 16:110–115.
- 6 Öztürk E, Gülcü B. Laser ablation of fistula Tract: a sphincter-preserving method for treating fistula-in-ano. *Dis Colon Rectum* 2014; 57:360–364.
- 7 Sheikh P. Controversies in fistula in ano. *Indian J Surg* 2012; 74:217–220.
- 8 Wilhelm A. A new technique for sphincter-preserving anal fistula repair using a novel radial emitting laser probe. *Tech Coloproctol* 2011; 15:445–449.
- 9 Meinerio P, Mori L, Gasloli G. Video-assisted anal fistula treatment: a new concept of treating anal fistulas. *Dis Colon Rectum* 2014; 57:354–359.
- 10 Chung H, Dai T, Sharma SK, Huang YY, Carroll JD, Hamblin MR. The nuts and bolts of low-level laser (light) therapy. *Ann Biomed Eng* 2012; 40:516–533.
- 11 Giamundo P, Esercizio L, Geraci M, Tibaldi L, Valente M. Fistula-tract laser closure (FiLaC): long-term results and new operative strategies. *Tech Coloproctol* 2015; 19:449–453.
- 12 Tümer H, Bulbuloglu GC. A Comparison of Laser and Fistulotomy Techniques in the Treatment of Fistula-in-Ano. *Cureus* 2023; 15:e37053.
- 13 Wilhelm A, Fiebig A, Krawczak M. Five years of experience with the FiLaC laser for fistula-in-ano management: long-term follow-up from a single institution. *Tech Coloproctol* 2017; 21:269–276.
- 14 Terzi MC, Agalar C, Habip S, Canda AE, Arslan NC, Obuz F. Closing perianal fistulas using a laser: long-term results in 103 patients. *Dis Colon Rectum* 2018; 61:599–603.
- 15 Gorgun E, Sengun B. Laser fistula surgery [Filac]: when and how? *Semin Colon Rect Surg* 2019; 30:104–5.
- 16 Marref I, Spindler L, Aubert M, Lemarchand N, Fathallah N, Pommaret E, *et al.* The optimal indication for FiLaC is high trans-sphincteric fistula-in-ano: a prospective cohort of 69 consecutive patients. *Tech Coloproctol* 2019; 23:893–7.
- 17 Ahmad A, Kumar A, Sonkar AA, Kumar P, Varma SK. A prospective study of combined sphincter preserving procedure (LIFT+ VAAFT+ FILAC) in complex anal fistula. *Indian J Surg* 2022; 84:1–6.