



The success of laser ablation of fistula tract (laft) technique in anal fistula treatment: Early results of a tertiary center

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Abstract

Laser Ablation of the Fistula Tract (LAFT) is a newly defined technique for anal fistula treatment. Our aim in this study is to evaluate the effectiveness of the LAFT technique and to discuss the precise indications and limitations of the technique by sharing our own truths and mistakes over our early results. All patients with anal fistulas who were treated LAFT technique by same team from April 2019 until March 2020 at the our center, were evaluated in this study, retrospectively. While the patients who failed LAFT were included in the "Recurrence after LAFT" group, the patients with successful LAFT were included in the "Healing" group. Differences between the groups were investigated. LAFT technique was applied to 19 patients in the specified period. Twelve (63%) of the cases were male and 7 (37%) were female, and the mean age was 45±14.5. The mean postoperative follow-up time was 13±3.4 months. Eleven cases had undergone surgery at least once with the diagnosis of anal fistula. Loose seton was applied in only 4 (25%) cases. It was observed that only 7 (37%) patients recovered with the LAFT technique (Table 1). LAFT was found to be more successful in patients who had never been operated before ($p = 0.048$, Table 2). In conclusion, LAFT technique is more successful in primary anal fistula cases and this technique should definitely be among the surgical options for anal fistula treatment.

Keywords: Laser ablation of the fistula tract, anal fistula, laft, fecal continence

1. Introduction

High recurrence rate and risk to the fecal continence mechanism are the two biggest challenges in anal fistula management. Many sphincter-sparing procedures have been introduced in recent years. Among them; Ligation of intersphincteric fistula tract (LIFT), anal fistula plug derived from porcine small intestine submucosa, fibrin glue, laser ablation of the fistula tract (LAFT) can be counted. However, none of these methods has yet been able to provide a clear advantage over others in terms of treatment results and incontinence (Limura et al., 2015; Amato et al., 2020; Garg et al., 2020; Sammut et al., 2020). There is no gold standard treatment for anal fistulas, and the search for a satisfactory treatment option continues.

LAFT is a method developed by Wilhelm A. to preserve the integrity and continuity of the sphincter and is based on

laser probe ablation of the granulation tissue in the fistula canal (Wilhelm, 2011). It has been reported that the LAFT technique is successful in healing anal fistula at rates varying between 40% and 88% (Oztürk and Gülcü, 2014; Wilhelm et al., 2017; Terzi et al., 2018; Brabender et al., 2020; Donmez and Hatipoglu, 2017; Giamundo et al., 2014; Elfeki et al., 2020; Frountzas et al., 2020). There are even clinics that find the technique to be disappointing and abandon the practice (Stijns et al., 2019). The large differences in recovery rates are probably due to differences in patient selection and technique between surgeons. It is clear that more detailed research is required to investigate the precise indications and limitations of the LAFT technique. Our aim in this study is to evaluate the effectiveness of the LAFT technique in our center and to discuss the precise indications and limitations of the technique by sharing our own truths and mistakes over our early results.

2. Materials and methods

All the procedures performed in this study that involved human participants were conducted in accordance with the ethical standards of our institution's research ethics committee and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

All patients with primary or recurrent anal fistulas who were treated using laser ablation therapy by same team from April 2019 until March 2020 at the Ondokuz Mayıs University Medical Faculty, were evaluated in this study, retrospectively.

All patients were evaluated preoperatively by anorectal examination, proctosigmoidoscopy, and pelvic magnetic resonance imaging (MRI) and confirmed by an examination under anesthesia before the operation. Inclusion criteria were intersphincteric and transsphincteric fistulas (Parks et al., 1976). Exclusion criteria were suprasphincteric or extrasphincteric fistula, presence of undrained collections, and fistula associated with malignancy.

Among the retrospectively scanned data; patient demographics (age, gender, chronic diseases and presence of Crohn's and Ulcerative Colitis disease), fistula status (recurrent or primary), fistula type (Parks Classification (Parks et al., 1976) and St James University Hospital classification (Morris et al., 2000)), previous surgical treatments if available took.

The procedures were performed by one of the two surgeons using the same technique; however, the rate of retraction of the laser is at the discretion of the surgeon. Intraoperative findings of fistula; Internal opening, presence of external opening, direction of internal opening were recorded. Postoperative data include follow-up time, success of the procedure in closing the fistula canal, complications, and fecal incontinence. The success of LAFT was determined by history and physical examination for all patients at the next postoperative appointments. Treatment was defined as the presence of the fistula with no signs of leakage and complete resolution of symptoms.

The patients were divided into two groups. While the patients who failed LAFT were included in the "Recurrence after LAFT" group, the patients with successful LAFT were included in the "Healing" group. Differences between the groups were investigated.

2.2. Surgical technique

All patients were administered preoperative one enema and short-term antibiotic prophylaxis (1 g of Cefazolin and 500 mg of metronidazole intravenously). Spinal anaesthesia was used in 15 patients, general anaesthesia in four (patient preference). Patients were all operated on in lithotomy position. Preoperative examination was performed with the aid of the anoscope. Internal opening was investigated using a stile (guide-wire) (Fig. 1). If no internal opening was found, methylene blue was given through the external opening and

checked again. At the commencement of each treatment, the external and if there is, internal openings of the fistula track were excised.

The fistula track was cleaned mechanically using a brush curette and irrigated with saline. The internal opening was closed by means of a 3/0 vicryl suture, and the laser probe was inserted from the perineal opening. The laser was then fired in bursts as the fiber was slowly with drawn through the fistula tract from the internal opening to the external opening.

The procedure was performed with The CORONA™ fistula probe (radial laser fiber with a wavelength of 1470 nm (neoV™ device). A laser energy of 10 W was used to seal the tract. In cases where internal opening cannot be found, the fistula tract was curetted and irrigated with saline. External opening was excised and LAFT was applied with the same method.

2.3. Statistical analysis

The data were analyzed using the SPSS tools, version 18 (SPSS Inc., Chicago, IL, USA). We used descriptive statistics, chi-square test and Mann-Whitney U test to analyze the data. Statistical significance was accepted at $P < 0.05$.



Fig. 1. At the beginning of the operation, internal opening investigation with guide-wires

3. Results

LAFT was applied to 19 cases in the specified period by the same team in our center. Twelve (63%) of the cases were male and 7 (37%) were female, and the mean age was 45 ± 14.5 years. The mean postoperative follow-up time was 13 ± 3.4 months. Etiology was associated with cryptoglandular disease in 16 (84%) patients and ulcerative colitis in three (16%) patients. 11 cases had undergone surgery at least once with the diagnosis of anal fistula. Loose seton was applied in only four (25%) cases.

According to Parks classification, 11 (58%) cases were intersphincteric, while eight (42%) cases were transsphincteric. Postoperative pain was seen in six (32%) cases and anismus in four (21%) cases, while only seven (37%) cases recovered with the LAFT technique (Table 1).

Table 1. Demographic and perioperative clinical information of patients who underwent LAFT

Characteristic	Results
Number of patients	19
Age (years), mean ± SD	45±14.5
Sex (n, %)	
Male	12.63%
Female	7.37%
Follow up time (months), mean ± SD	13±3.4
Additional diseases* (n, %)	
Yes	8.42%
No	11.58%
Aetiology (n, %)	
Ulcerative Colitis	3.16%
Cryptoglandular	16.84%
Number of previous surgeries** (n, %)	
0	8.42%
1	7.37%
2	3.16%
3	1.5%
Previous fistula procedures (n, %)	
Abscess drainage	4.25%
Fistulotomy	8.50%
Loose Seton	4.25%
Types of fistulas*** (n, %)	
1	7.36%
2	3.16%
3	3.16%
4	6.32%
Parks' classification (n, %)	
Intersphincteric	11.58%
Transsphincteric	8.42%
Multiple fistulous tracks (n, %)	5.26%
Fistula direction (n, %)	
Anterior	1.5%
Posterior	18.95%
Low fistulas (n, %)	9.47%
High fistulas (n, %)	10.53%
Simple fistulas (n, %)	7.37%
Complex fistulas (n, %)	12.63%
Internal opening (n, %)	11.58%
Anterior internal opening (n, %)	3.16%
Posterior internal opening (n, %)	8.42%
Length of stay in the hospital (hours), mean ± SD	23.11 ± 7.233
Procedure complications (n, %)	
Subjective pain	6.32%
Anismus	4.21%
Fecal incontinence	0.0%
Cured (n, %)	7.37%
Recurrence (n, %)	12.63%
Reoperation after LAFT (n, %)	4.21%

* Hypertension, diabetes mellitus, coronary artery disease etc. **

Number of operations performed for anal fistula before LAFT *** St. James University Hospital classification.

The demographic and perioperative findings of the patients who recovered with the LAFT technique (Healing, n: 7) and those who did not (Recurrence after LAFT, n: 12) were compared in Table 2. LAFT was found to be more successful

in patients who had never been operated before ($p = 0.048$, Table 2). On the other hand, no other factor affecting the healing of anal fistula with LAFT technique was found among the groups.

4. Discussion

Although the LAFT technique for anal fistula is an expensive technique, it is exciting and promising for surgeons. After we completed our training, we recommended the LAFT technique to anal fistula cases we deemed appropriate. We applied it to the cases who accepted. We waited excitedly for our first results. In our retrospective study, we found that there were 19 cases at least three months after the operation. In fact, most of the cases were done in the first year. During the COVID 19 pandemic, there were very few patients in whom we applied the LAFT technique. The pandemic had a negative impact on the number of our cases. The mean follow-up period of the patients was 13±3.4 months. Although we did not encounter a major complication such as fecal incontinence, we found that only 7 (37%) of the cases we applied LAFT recovered (Table 1). This rate seems slightly below the rates reported in the literature (Oztürk and Gülcü, 2014; Wilhelm et al., 2017; Terzi et al., 2018; Brabender et al., 2020; Donmez and Hatipoglu, 2017; Giamundo et al., 2014; Elfeki et al., 2020; Frountzas et al., 2020).

The first questions that came to mind about this result were "Why are our results low and do we have something technically wrong?". As with every surgery and procedure, the application of the LAFT technique has a learning curve to learn. In the research we conducted at Pubmed, we could not find any information about the learning curve for the LAFT technique. Although we do not have any information on this subject, we acknowledge that we are at the beginning of the learning curve and therefore the number of patients recovering is low. As we continue to apply the LAFT technique, both our experience will increase and our recovery rates will increase in cases where we have applied LAFT.

The indications for the use of LAFT technique for anal fistula are still controversial. While some surgeons apply LAFT to all anal fistula cases without making any difference, some surgeons apply it to selected cases (Oztürk and Gülcü, 2014; Wilhelm et al., 2017; Terzi et al., 2018; Brabender et al., 2020; Donmez and Hatipoglu, 2017; Giamundo et al., 2014). We preferred the LAFT technique for intersphincteric and transsphincteric anal fistulas, regardless of whether it is primary or recurrent. We did not prefer LAFT for suprasphincteric and extrasphincteric fistulas. Despite this, our recurrence rates were higher than expected. The indications for the LAFT technique should be clarified by conducting more prospective randomized studies and meta-analyses.

Table 2. Comparison of demographic and perioperative findings of healing cases and recurrence cases after LAFT.

	Recurrence after LAFT (n, %)	Healing (n, %)	p
Number of patients	12.63%	7.37%	
Sex			
Male	9.75%	3.43%	0.161
Female	3.25%	4.57%	
Additional diseases*			
Yes	7.58%	1.14%	0.061
No	5.42%	6.86%	
Etiology			
Ulcerative Colitis	1.31%	2.29%	0.243
Cryptoglandular	11.69%	5.71%	
Number of previous surgeries**			
Primary	3.25%	5.71%	0.048
At least one surgery	9.75%	2.29%	
Types of fistulas**			
1	4.33%	3.43%	0.982
2	2.17%	1.14%	
3	2.17%	1.14%	
4	4.33%	2.29%	
Parks' classification			
Intersphincteric	7.58%	4.57%	0.663
Transsphincteric	5.42%	3.43%	
Number of fistula tract			
One	9.75%	5.71%	0.865
Multiple	3.25%	2.29%	
Loose seton before LAFT			
Yes	3.25%	1.14%	0.581
No	9.75%	6.86%	
Internal opening			
Yes	7.58%	4.57%	0.663
No	5.42%	3.43%	
Anterior internal opening	2.17%	1.14%	0.991
Posterior internal opening	5.42%	3.43%	
Low fistulas	5.42%	4.57%	0.515
High fistulas	7.58%	3.43%	
Simple fistulas	4.33%	3.43%	0.678
Complex fistulas	8.67%	4.57%	

* Hypertension, diabetes mellitus, coronary artery disease etc. **Number of operations performed for anal fistula before LAFT ***St. James University Hospital classification

When Wilhelm first described the technique, he evacuated the abscess, if any, and determined the internal opening of the fistula and performed seton drainage in the primary operation. In the second surgery; He mechanically cleaned the fistula track, closed the internal opening with a flap, and then placed the laser on the tract, and applied energy at a wavelength of 1,470 nm and 13 watts uniformly. While allowing the probe to retract continuously, the remaining epithelium was destroyed and the fistula tract was destroyed (Wilhelm, 2011). Again, Wilhelm et al. published the results of 117 cases in which they applied LAFT; reported that they closed the internal opening with 2/0 vicryl in some of the cases (Wilhelm et al., 2017). While we were applying LAFT, we closed the internal opening with 3/0 vicryl in all cases where we could find internal opening. It is seen in Table 2 that closing the internal opening has no effect on recurrence ($p = 0.663$). In our opinion, special closing of internal opening may play a role in the rate of recovery, but larger series are needed. On the other hand, there

are some who applied the LAFT technique by closing the laser probe with the effect of heat without applying seton and / or closing the internal opening with a flap or suture (Giamundo et al., 2014; Stijns et al., 2019; Laretta et al., 2018). We did not routinely apply loose setons in all cases. In the examination we performed in the operating room, we applied loose seton to 4 (21%) patients, who thought the tract was too large to be closed with the LAFT technique, and applied LAFT in the second session. However, even though the number of our cases is very small, it is seen in Table 2 that our loose seton application has no effect on recurrence ($p = 0.581$).

In our results, the only significant difference between the "recurrence after LAFT" group and the "Healing" group was that the results of the patients who had never been operated before (primary) were better than those who had at least one operation ($p = 0.048$, Table 2). From this we can conclude how important the initial evaluation of anal fistula patients is. Surgeons who work as proctologists in tertiary hospitals like

ours, have undergone surgical interventions many times in peripheral hospitals and we frequently encounter cases of recurrence. This situation, as our results show, decreases the possibility of recovery of previously operated cases. In our opinion, the LAFT technique is more effective in primary cases. We think that the diseases should be evaluated and treated by surgeons specialized in their field.

The LAFT technique in anal fistula treatment excited us very much, but our results did not increase our excitement. The LAFT technique is easy to learn and we think it is safe without the risk of sphincter damage. This technique should definitely have a place in the surgical options for the anal fistula treatment. More studies are needed to determine the correct indications and prognostic factors.

Our study has some limitations: it is retrospective, and was performed in a single institution on a relatively small number of patients. Using the procedure only for intersphincteric and transphincteric fistulas could be considered a limitation, also.

In our opinion, the LAFT technique is more successful in primary anal fistula cases and this technique should definitely be among the surgical options for anal fistula treatment.

Conflict of Interest

The authors declare that they have no competing financial interests.

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