

Laser ablation in fistula-in-ano treatment: A single-center experience

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ABSTRACT

Introduction: Fistula-in-Ano (FIA) is a frequently encountered condition that can be hard to rectify and, to date, several different treatment options have been developed. In such complex FIA cases, sepsis and anal incontinence are the two most feared complications after fistulotomy. An alternative method that would be able to destroy the epithelial integrity of the fistula tract, while protecting the patient from sepsis and preserving the sphincters was needed, and in response to these requirements, laser ablation therapy was developed. In this study, we share the early results of laser ablation used to treat FIA in our clinic.

Materials and Methods: This retrospective cohort study included patients who were treated using laser ablation between November 2018 and January 2021. Only patients with benign isolated anorectal disease were included in the study, while cases of FIA secondary to immunosuppressive conditions such as malignancy and inflammatory bowel diseases were excluded. Post-operative complications and any cases of recurrence and/or reoperation were followed up.

Results: There were no perioperative complications requiring additional intervention in any of the patients. Recurrence was seen in 18 (22.5%) patients during follow-up. The primary recovery rate was 77.5%; secondary recovery rate was 95%.

Conclusion: In this study, we found an acceptable primary success rate (77.5%) and a high secondary success rate (95%) for the laser ablation method. With a success rate comparable to other methods, the biggest advantage of laser ablation therapy seen in our study was the lack of major perioperative complications in any of the patients.

Keywords: Ablation, Complication, Fistula-in-Ano, Laser, Recurrence

Introduction

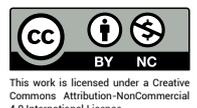
In routine general surgery, Fistula-in-Ano (FIA) is a frequently encountered condition that can be hard to rectify and, to date, several different treatment options have been developed. While fistulotomy is considered the

most effective method, it does have several drawbacks. In general, FIA that develop due to obstetric pathologies, inflammatory bowel disease, or certain immunosuppressive diseases tend to be more complex, and their management is more demanding. In such complex FIA cases, sepsis and anal incontinence due to perianal infection



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are the two most feared complications after fistulotomy.^[1] To prevent this type of complication, a sphincter-sparing approach is frequently chosen and several sphincter-preserving methods have been established over the years. The main options are ligation of the fistula tract, closure using a clip or filling the fistula by injecting biological infill agents;^[2] however, the success rate of these techniques in treating FIA is only in the region of 50%.^[2,3] The main cause of this low success rate is the inability of these methods to disrupt the epithelial integrity of the fistula tract. As the fistula epithelium preserves its integrity with conventional sphincter-sparing methods, success rates are low and recurrence rates are high.^[4] For this reason, an alternative method that would be able to destroy the epithelial integrity of the fistula tract, while protecting the patient from sepsis and preserving the sphincters was needed, and in response to these requirements, laser ablation therapy was developed.^[5] This technique uses laser energy: A radial laser probe sent into the fistula tract destroys the epithelium of the fistula tract with its 360-degree laser energy and also causes shrinkage. In this way, it serves to close the fistula.^[5]

In this study, we share the early results of laser ablation used to treat FIA in our clinic.

Materials and Methods

This retrospective cohort study included patients who applied to our clinic with FIA and were treated using laser ablation between November 2018 and January 2021. Approval for the study was given by the Local Ethics Committee and informed consent was obtained from all patients before the procedure. Only patients with benign isolated anorectal disease were included in the study, while cases of FIA secondary to immunosuppressive conditions such as malignancy and inflammatory bowel diseases were excluded from the study. All patients were evaluated preoperatively with detailed anal examination and pelvic Magnetic resonance imaging (MRI). According to results of the physical examination and imaging, patients were classified as having intersphincteric, transsphincteric, suprasphincteric, and extrasphincteric FIA.^[6] Demographic characteristics of the patients, such as age, gender, and comorbid diseases, were recorded. Any history of previous perianal surgery was investigated and categorized in three subgroups: hemorrhoidectomy, anal abscess drainage, and fistulectomy. Post-operative patients were invited for check-up on the 1st, 7th, and 13th days. Post-operative complications and any cases of recurrence and/or

reoperation were followed up. Complete recovery was accepted as the absence of any symptoms of FIA during the follow-up period, and the absence of new fistula tract as detected by imaging and endoscopic techniques, even in asymptomatic patients. Primary recovery was defined as complete recovery achieved after only one session of laser ablation, while secondary recovery was considered as recovery where more than one session of laser ablation was required. If additional intervention was needed besides laser ablation therapy, then this method was considered unsuccessful.

Surgical Technique

All patients were treated under spinal anesthesia in the lithotomy position. After identifying the external and internal openings, the fistula tract was cleaned with a curette and irrigated with saline. First, the inner opening of the fistula was closed using 3/0 absorbable surgical suture (MITSU™ Meril Endo Surgery Pvt. Ltd.). Then, a 10 W 1470 nm radial laser probe (G.N.S neoLaser Ltd.© HaEshel, Israel) was advanced along the fistula tract and then withdrawn slowly, delivering 360° laser energy for 3 s per 1 cm. In this way, the fistula tract was completely obliterated. If there were no complications, patients were discharged after overnight observation. Oral pain medication was started 6–8 h after the spinal anesthesia and no dietary restrictions were imposed.

Results

Eighty patients who underwent laser ablation for FIA between November 2018 and January 2021 were included in this study (Table 1). Seventy-two (90%) of the patients were male, 8 (10%) were female and the mean age was 42.9±13.3 years. The median hospital stay was 1 day, while the mean follow-up period was 19.6 months. There were no perioperative complications requiring additional intervention in any of the patients. Seven (8.8%) patients had Type 2 diabetes mellitus, 4 (5%) hypertension, 5 (6.3%) cardiovascular disease, and 7 (8.8%) had other comorbid diseases. No significant correlation was found between age ($p=0.111$), gender ($p=0.386$), comorbid diseases, and recurrence.

MRI imaging detected a fistula tract in 65 (81.3%) patients. According to both the physical examination and MRI results, 57 (71.3%) intersphincteric, 20 (25%) transsphincteric, and 3 (3.8%) suprasphincteric FIAs were detected. No significant correlation was found between localization and recurrence ($p=0.474$).

Table 1. Clinicopathological characteristics of the patients

	All patients n=80	No recurrence n=61	Presence of recurrence n=19	p
Age, mean±SD	42.9±13.3	41.5±13.3	47.1±12.7	0.111
Sex, n (%)				0.386*
Male	72 (90)	56 (91.8)	16 (84.2)	
Female	8 (10)	5 (8.2)	3 (15.8)	
MR imaging, n (%)	65 (81.3)	48 (78.7)	17 (89.5)	0.501*
Localization, n (%)				0.474
Intersphincteric	57 (71.3)	44 (72.1)	13 (68.4)	
Transsphincteric	20 (25)	14 (23)	6 (31.6)	
Suprasphincteric	3 (3.8)	3 (4.9)	0	
Comorbidity, n (%)				
Diabetes mellitus	7 (8.8)	4 (6.6)	3 (15.8)	0.348*
Hypertension	4 (5)	4 (6.6)	0	0.568*
Coronary artery disease	5 (6.3)	4 (6.6)	1 (5.3)	1.000*
Other	7 (8.8)	5 (8.2)	2 (10.5)	0.668*
Previous perianal surgery, n (%)				
Abscess drainage	7 (8.8)	3 (4.9)	4 (21.1)	0.051*
Fistula surgery	9 (11.3)	9 (14.8)	0	0.106*
Hemorrhoids	8 (10)	6 (9.8)	2 (10.5)	1.000*
Length of hospital stay, median (Q1-Q3)	1 (1–1)	1 (1–1)	1 (1–1)	0.744

*Fischer's Exact test was used.

Investigation into previous perianal surgery showed that 7 (8.8%), 9 (11.3%), and 8 (10%) patients had a history of abscess drainage, fistulectomy, or hemorrhoidectomy, respectively. Recurrence was found to be high in patients with a history of abscess drainage, but this association was not statistically significant ($p=0.051$).

Recurrence was seen in 18 (22.5%) patients during follow-up. Thirteen (16.3%) patients underwent a second session of laser ablation. One (1.3%) patient underwent abscess drainage followed by laser ablation, while abscess drainage alone was performed in two (2.5%) patients. Despite the second session of laser ablation in one (1.3%) patient, the fistula continued and a Seton was inserted. A Seton was directly used in one other (1.3%) patient. The primary recovery rate was 77.5%; secondary recovery rate was 95%.

Discussion

Before introducing the laser ablation technique to treat FIA at our clinic, our general approach had been to perform fistulectomy in straightforward fistula cases, while in more

complex cases, where preservation of the sphincter muscles during fistulectomy was uncertain, the Seton method was favored over major surgical intervention. This choice was made with the intention of avoiding perianal infection and incontinence – the most feared complications of FIA treatment. However, using loose or tight Setons prolongs the overall treatment time and is more demanding. In particular, the requirement for repeated hospital appointments means additional labor loss for both patient and surgeon. Hence, laser ablation has become a method of choice.

In this study, we found an acceptable primary success rate (77.5%) and a high secondary success rate (95%) for the laser ablation method. According to the literature, a study comprising 45 patients resulted in 67.7% primary recovery and 80% secondary recovery rates.^[7] Another study with 117 patients reported a primary cure rate of 64.1% and a secondary cure rate of 88%.^[8] Other studies also found recovery rates ranging from 71.4% to 82% on average.^[9-11] These rates are similar to other sphincter-sparing methods such as ligation of the intersphincteric fistula tract and video-assisted anal fistula treatment.^[12,13]

With a success rate comparable to other methods, the biggest advantage of laser ablation therapy seen in our study was the lack of major perioperative complications in any of the patients. No cases of anal stenosis, perianal infection, or incontinence were encountered in any of our patient population. The most common minor complications were pain and bleeding after the procedure; however, no additional interventions were required to treat any complications. One study of 50 cases indicated that all patients were discharged on the 1st or 2nd day without incident. Similarly, in another study conducted on 35 patients, no major complications were observed in any of the patients.^[9,10] In a systematic review of this topic, the mean complication rate was found to be 4%, while no patients were reported to need additional intervention.^[14] Therefore, according to our study and other studies in the literature, the laser ablation method seems reliable.

During post-procedure follow-up, recurrence was observed in 18 patients (22.5%) in our study. Late anal abscess was seen in three of our patients (3.8%). In one of these patients, a second session of laser ablation was performed after abscess drainage, and recovery was achieved. The other two patients were discharged after abscess drainage alone, and further, follow-up appointments were made. Setons were inserted in two patients (2.5%) but without success. The laser ablation method was considered unsuccessful in four of our patients and we reverted to conventional methods in these cases.

Our patient population was 90% male. In the literature, male patient ratios range from 53.3% to 85.2%.^[15,16] We attributed the high rate of our male patient population to the fact that women in our area are reluctant to seek hospital treatment for social reasons. The mean age of our patients was 42.9±13.3. In the literature, the median age was 42 years in one study of 82 patients and 46 years in another study with a large series of 117 patients.^[8,17] Therefore, the mean age of our population was consistent with the literature. Again, similar to the literature, no significant relationship was found between gender or age and recurrence in our study.

When comorbidities were considered, DM was expected to adversely affect tissue healing and increase recurrence, but no statistically significant relationship was found. Neither was any correlation found between a history of perianal surgeries and recurrence. Recurrence was relatively high only in the group of patients who had previously had perianal abscess drainage which was left for secondary

healing, but this difference was not statistically significant. There was no correlation between the anatomical location of the FIA and recurrence. As in previous studies, no direct relationship was found between clinicopathological features of the patients and recurrence.

In the literature, hypotheses explaining the failure of the laser ablation method generally focus on characteristics of the fistula tract such as length, diameter, and total number.^[11,14,15] Another issue centers on whether the orifice of the fistula should be closed or not. While there are studies advocating closure of the fistula using the flap method, other studies suggest this may lead to unnecessary additional morbidity.^[5,15] As yet, there is no clear consensus on this subject in the literature. Clinically, we prefer routine closure of the internal opening to facilitate a more controlled advance of the laser probe along the fistula tract and because we believe it reduces recurrence.

Limitations

Our study has certain weaknesses. First, due to the retrospective nature of this study, the above-mentioned possible reasons for failure of the laser ablation technique could not be precisely investigated. In our opinion, prospective studies on the length, diameter, number, and detailed anatomy of the fistula tract should be carried out to identify such causes. Second, our follow-up period was relatively short and precluded any observations on the long-term success of this method. Finally, one obvious disadvantage to the laser ablation method is its cost compared to more conventional methods. In our clinic, laser ablation is a more expensive procedure than other methods, but as the price difference is covered by the state health insurance in our country, there is no negative impact on our patients.

Conclusions

In this study, we found an acceptable primary success rate (77.5%) and a high secondary success rate (95%) for the laser ablation method. With a success rate comparable to other methods, the biggest advantage of laser ablation therapy seen in our study was the lack of major perioperative complications in any of the patients.

Disclosures

Ethics Committee Approval: The study was approved by the Health Sciences University Tepecik Training and Research Hospital Ethics Committee (Date: 15.04.2022, No: 2022/04-17).

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