

Long-term outcomes in patients after ligation of the intersphincteric fistula tract

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ABSTRACT

INTRODUCTION: Ligation of the intersphincteric fistula tract (LIFT) to treat transsphincteric fistulae has yielded varied but promising results. However, it has been shown that long-term follow-up (> 250 days) is vital to obtain the correct surgical outcome. Here, we present the long-term results of patients undergoing the LIFT procedure at Herlev Hospital, Denmark.

METHODS: The study was based on a retrospective chart review of 65 consecutive patients who underwent the LIFT procedure for transsphincteric fistula-in-ano in 2011-2015.

RESULTS: At the first follow-up, at a median 50 (interquartile range (IQR): 29-92) days, there were 28 recurrences of which 17 were transsphincteric. At the long-term follow-up, a median of 274 (IQR: 162-573) days, 16 patients (ten of whom were asymptomatic at the first follow-up) presented with a recurrence, of which seven were transsphincteric; 27 patients (42%) showed complete fistula healing following their initial LIFT surgery. Another 29 patients presented complete healing after repeated surgical treatment (additional LIFT, advancement flap and/or simple incision/fistulotomy), yielding a positive outcome in 86% of our patients.

CONCLUSION: The present study shows that the LIFT procedure is a viable treatment option for transsphincteric fistulae. Furthermore, a second LIFT procedure is a plausible option for recurrent transsphincteric fistulae. In the case of recurrence, the fistula was frequently downgraded to a more benign intersphincteric variant. The study supports previous findings showing that long-term follow-up is required to successfully measure the outcome of LIFT surgery.

FUNDING: none.

TRIAL REGISTRATION: not relevant.

The treatment of fistula-in-ano has long been a surgical challenge. Fistula-in-ano is defined as a persistent hollow tract or cavity from the anal canal to an opening in the perianal skin [1]. The symptoms accompany those of chronic infection with purulent drainage and recurrent abscess formation associated with pain, discomfort and hygiene issues [1]. Fistula-in-ano is classified according to the Parks classification based on its anatomical location [2]. Treatment of simple fistula-in-ano, defined as little or no involvement of the sphincter muscle, can successfully be achieved by fistulotomy

with success rates of approximately 90% [3]. However, treatment and surgical outcome remain ambiguous for complex fistulae (involving 30% or more of the sphincter muscle, multiple tracts, recurrent fistulae, anterior fistulae in women, those occurring in individuals with previous local irradiation, Crohn's disease or pre-existing incontinence) [4-9]. Several sphincter-preserving treatment procedures have been used to date, including, for example, loose seton, fibrin glue, anorectal advancement flap (FLAP), anal fistula plug and ligation of the intersphincteric tract (LIFT) [4-8].

The LIFT procedure was first presented by Rojana-sakul et al in 2007 [6] and a refined approach was described in 2009 [10]. The technique presented a novel approach of securing the closure of the internal opening and the simultaneous removal of the fistula tract through the intersphincteric plane, thereby preserving the anal sphincter. The procedure has since been widely adopted and is now a global standard treatment option for complex fistulae. Success rates of 40-90% have been reported; consequently, the adoption rate of LIFT is increasing [3, 4, 11, 12]. However, in a comparative randomised trial by Madbouly et al in 2014 [13], the LIFT procedure was not significantly superior to the mucosal advancement flap in a long-term follow-up.

The length of follow-up varies considerably in the literature with periods presented ranging from 19 weeks to 26 months [3, 4, 11, 12]. Several studies have shown the importance of a long-term follow-up post-LIFT, as many recurrences present seven to eight months post-treatment [9, 14-17].

This is a long-term retrospective study of patients who underwent the LIFT procedure for transsphincteric fistula-in-ano in our clinic at Herlev Hospital, Denmark.

METHODS

All consecutive patients who underwent the LIFT procedure in 2011-2015 were included in the study. Each patient presented with a complex transsphincteric fistula, and the diagnosis was assisted by transrectal ultrasound (TRUS) in all patients. The LIFT procedure was performed as described in the literature by the same three experienced surgeons, all at the consultant level [6, 10, 18].

Data were collected by retrospective chart review.

ORIGINAL ARTICLE

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Dan Med J
2019;66(4)A5537

 **TABLE 1**

Patient demographic and clinical data. The values are n (%) (N = 65, median age (interquartile range) = 48 (20-78) years).

<i>Sex</i>	
Male	29 (45)
Female	36 (55)
<i>ASA class</i>	
I	39 (60)
II	26 (40)
<i>Comorbidities</i>	27 (42)
Hypertension	6
Diabetes mellitus	2
Crohn's disease	2
Ischaemic heart disease	14
Previous malignity	5
Hypothyroidism	2
Respiratory disease	1
<i>Previous treatment</i>	25 (38)
LIFT	0
Advancement FLAP	3
Incision	16
Fibrin plug	6
Seton placement	64 (98)
Transsphincteric fistula	65 (100)
<i>Fistula sphincter involvement</i>	
1/3	46 (70)
2/3	18 (28)
3/3	1 (2)

ASA = American Society of Anesthesiologists; FLAP = anorectal advancement flap; LIFT = ligation of the intersphincteric fistula tract.

All patients received a first follow-up (F/U-1) at a median of 50 (interquartile range (IQR): 29-92) days; 82% went on to have a long-term follow-up (F/U-2) at a median of 274 (IQR: 162-573) days after their initial or second LIFT procedure.

The outcome was defined as successful if the patient was symptom-free and presented with complete healing of the intersphincteric wound and the external opening, concluded by TRUS, fistula cannulation, anoscopy or clinical examination. All patients who had a second LIFT procedure were examined by TRUS at F/U-2. We grouped recurrences into three types: Type 1 was defined as a minor recurrence, such as abscess formation, and was treatable with a simple excision/revision; Type 2 was an intersphincteric fistula, treatable with simple incision/fistulotomy; Type 3 recurrences were complete failures, i.e., the persistence or reappearance of a transsphincteric fistula. All recurrences were verified by TRUS or fistula cannulation.

Trial registration: not relevant.

RESULTS

Patient demographics are detailed in **Table 1**. The study comprised 65 patients (36 female and 29 male).

Comorbidities were present in 42% of the patients; however, all patients were classified as either American Society of Anesthesiologists (ASA) class I or II. All but one patient had a seton placement prior to surgery, and 25 patients had received other surgical treatment, albeit none had previously undergone the LIFT procedure. All fistulae were transsphincteric and involved a third of the sphincter or more; five (8%) patients had two separate fistula tracts. All patients received perioperative antibiotics; the mean operating time was 64 (IQR: 51-85) minutes, and patients were admitted for a median of two days. There were no major complications during any of the procedures. Two procedures were done as outpatient procedures, whereas 63 patients were admitted before surgery.

First post-procedural follow-up

Outcome at the F/U-1 is detailed in **Table 2**, and an overview of further treatment and follow-up is shown in **Figure 1**. The median time to F/U-1 was 50 (IQR: 29-92) days. Of the patients, 28 (43%) presented with a recurrence and 37 (57%) were symptom-free. Two of the recurrences were superficial (Type 1), nine were intersphincteric (Type 2) and 17 were transsphincteric (Type 3). Of the 17 transsphincteric failures, eight patients underwent an additional LIFT procedure, one had FLAP surgery and the remaining eight went on to have a simple fistula treatment, i.e., excision/revision or incision/fistulectomy (this was deemed possible owing to the low level of sphincter involvement). Of the 11 patients with Type 1 and Type 2 failures, ten received a simple additional treatment following their F/U-1. The last patient with a Type 2 recurrence chose conservative treatment (loose seton).

After F/U-1, 12 patients were discharged, of whom ten presented no symptoms of recurrence, one was discharged after a fistula incision and the last patient was discharged after choosing a conservative option (loose seton).

Second post-procedural follow-up

Outcome at F/U-2 is detailed in **Table 3**, and an overview of further treatment and outcome is shown in **Figure 1**. Of the 65 patients, 53 (82%) received a F/U-2 median of 274 (IQR: 162-573) days after their LIFT surgery (in patients having undergone a second LIFT, time to F/U-2 was calculated from their second LIFT).

Thirty-seven patients (70% of n = 53) showed no signs of recurrence, of whom 17 were also recurrence-free at F/U-1; the remaining 20 had undergone additional treatment following F/U-1. Of these 20 patients, six had a second LIFT procedure, one had undergone a FLAP procedure and the remaining 13 had received a simple treatment. Subsequently, all 37 recurrence-free patients were discharged from the outpatient clinic.

Sixteen patients (30% of $n = 53$) presented with recurrence at F/U-2, of which nine were intersphincteric (Type 2) and seven were transsphincteric (Type 3). Of these 16 patients, ten had no signs of recurrence at the short-term follow-up (i.e., we had ten late failures of the LIFT procedure), while six had failures already at the first post-surgical consultation. Of the six patients who had a recurrence both at F/U-1 and F/U-2, two had undergone an additional LIFT procedure following F/U-1, and the remaining four had undergone a simple treatment. Of these six patients, three could then be treated (including the two who had undergone a second LIFT) with a simple incision and then be discharged; two continued in the outpatient clinic due to continuous fistula problems, and one was referred to another hospital. There were ten patients with primary recurrences (seven transsphincteric and three intersphincteric) at F/U-2, of whom four were discharged after a simple incision and six remained in the outpatient clinic.

Eleven patients underwent two LIFT procedures, of whom eight had a successful outcome (two needed additional simple treatment following the second LIFT), and three patients remained in the outpatient clinic due to continued symptomatic fistula-in-ano. As of November 2016, of the 65 patients, 56 were no longer attending the outpatient clinic, eight remained

in the outpatient clinic, and one patient had been referred to another hospital for further treatment.

In summary, we found that 27 patients (42%) showed complete fistula healing following their initial LIFT surgery. An additional 29 patients presented complete healing after repeated surgical treatment (additional LIFT, advancement flap and/or simple revision/fistulotomy), yielding a positive outcome in 86% of our patients. The median time to recurrence was 89 (IQR: 42-141) days.

DISCUSSION

Of the 65 patients included in the study, only eight (12%) remained in the outpatient clinic because of recurrences (one patient was referred to another hospital for further treatment) as of November 2016. The overall long-term success rate was 86%. However, only 27 (42%) patients were discharged after their initial LIFT surgery. Therefore, in our study population, the primary success rate was about half the overall long-term success rate. Many failures were Type 1 and Type 2 failures (or transsphincteric, Type 3, with little involvement of the anal sphincter), meaning that the initial transsphincteric fistula was downgraded to a less complex fistula.

This places the patients one step closer to final treatment as these fistulae have a high treatment suc-

TABLE 2

First post-operative follow-up.

	N	Type of additional treatment				
		LIFT	FLAP	excision	incision	conservative
N	65					
Time from surgery, median (IQR), days	50 (29-92)					
Symptom-free, n (%)	37 (57)					
Recurrence, n (%)	28 (43)					
<i>Type of recurrence, n (% of N) [% of n_i]</i>						
1: minor	2 (3) {7}					
2: intersphincteric	9 (14) {32}					
3: transsphincteric	17 (26) {60}					
Subtotal, n _i	28 (43)					
Asymptomatic patients discharged from out-patient clinic after F/U-1, n (% of N)	10 (15)					
<i>Patients receiving additional treatment after F/U-1</i>						
Fistula type:						
1	2			2		
2	9				8	1
3	17	8	1		8	
Subtotal, n _a (% of N)	28 (43)	8	1	2	16	1
Patient discharge from the out-patient clinic following additional treatment after F/U-1, n (% of N)	2 (3)					

F/U-1 = 1st post-operative follow-up; FLAP = anorectal advancement flap; LIFT = ligation of the intersphincteric fistula tract; IQR = interquartile range

cess rates with a relatively minimal surgical intervention [3]. In other studies, with a long-term follow up > 8 months, the success rates of the LIFT procedure varied between 26% and 95% [13, 15-17]. Wallin et al 2012 [17] presented a primary success rate of 40% in 93 patients who underwent the LIFT procedure in 2007-2011 with a median follow up of 19 months. When including patients who underwent reoperation with an intersphincteric fistulotomy or a second LIFT, the success rate increased to 57% [17]. Tan et al 2011 [16] presented a freedom of failure of 78% in 93 patients at one year following the LIFT procedure; most failures were intersphincteric, and only one patient underwent a second LIFT procedure, whereas another had undergone an advancement flap procedure. The results recorded in the two studies are similar to those obtained in the present study.

In our study, ten patients who were recurrence free at F/U-1 presented with a recurrence at F/U-2; four were discharged after a simple incision but the other six patients represent 75% (six of eight) of those remaining in the outpatient clinic due to recurring fistulae. This strengthens the results found in previous studies, showing that to obtain a correct clinical outcome of the LIFT procedure, F/U-2 is necessary.

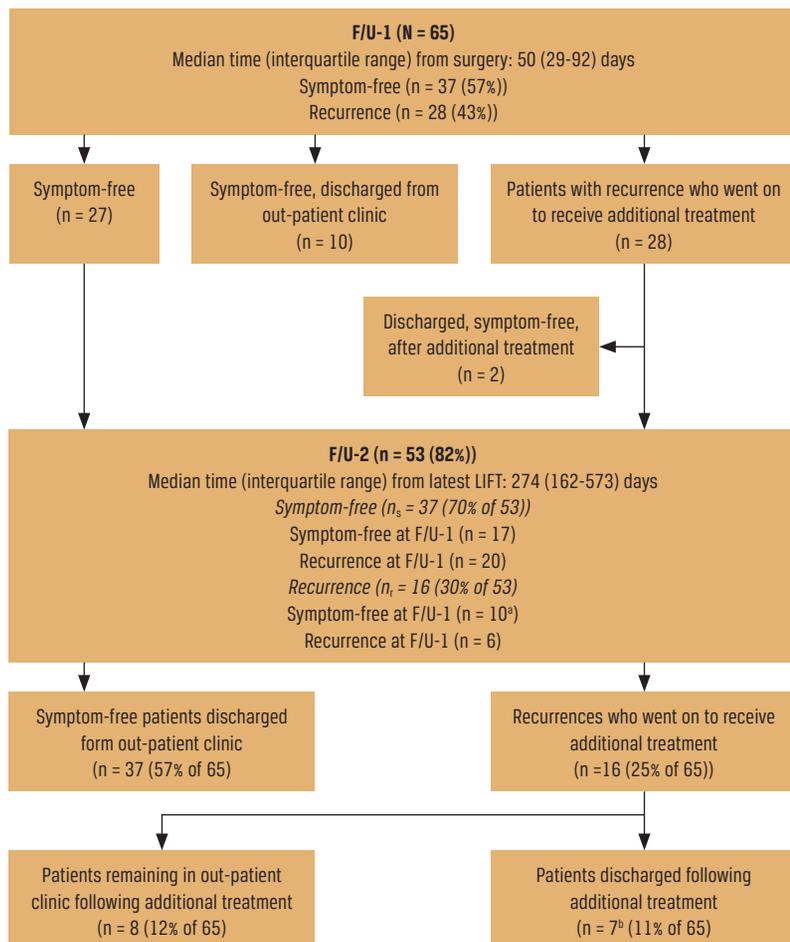
Of our 65 patients, two had been diagnosed with Crohn's disease (CD) of whom one was free of recurrence at both F/U-1 and F/U-2, whereas the other was free of recurrence at F/U-1 but presented with a transsphincteric recurrence at F/U-2. Although patients with CD have been shown to develop new fistulae at a higher rate than patients without CD, our samples size of two patients is too small to draw any conclusions in this respect [19]. Ginglöd et al 2014 [20] presented a long-term success rate of 33% in 15 consecutive CD patients who underwent the LIFT procedure at their centre.

Our study has limitations. The retrospective design comes with the risk of missing or incorrect data, but since all information was stored electronically, we consider this a minor weakness. The procedures were performed by three different surgeons, which could imply inter-surgeon skill differences, and this may have affected our results. At F/U-1, all symptomatic patients were examined with TRUS or by fistula cannulation. However, in asymptomatic patients at F/U-1, healing was not confirmed by TRUS, which was performed in only a minority of cases, and the examination conducted varied greatly. Of these patients, nine were examined by TRUS, 17 by cannulation, three by anoscopy and eight received a "clinical examination" (as per chart). We can conclude that two asymptomatic patients who received a "clinical examination" at F/U-1 later presented with transsphincteric recurrence at F/U-2. It is possible that these patients already had a recurrence at F/U-1, and that this recurrence could have been diagnosed by TRUS. In general, variation in examination increases the possibility of a false positive outcome at F/U-1. Again, at F/U-2 TRUS was not performed in all patients. Among the patients who were asymptomatic at F/U-1 and also at F/U-2, roughly half were examined by TRUS. However, all patients who had received an additional LIFT were examined by TRUS. When isolating the patients with a second LIFT, the median time to F/U-2 (from their second LIFT) was 231 days (IQR: 132-337). This median follow-up is slightly shorter than recommended [9, 14-17]; nevertheless, as all patients were examined by TRUS, we feel confident that the outcome of a second LIFT is reliable.

Twelve patients did not receive F/U-2 and their charts did not specify why they were discharged after F/U-1. Accordingly, of the 27 patients with a successful

FIGURE 1

Flow chart of patient follow-up and surgical outcome.



F/U-1 = 1st post-operative follow-up; F/U-2 = 2nd post-operative follow-up; LIFT = ligation of the intersphincteric fistula tract.

a) I.e. late failure.

b) 1 additional patient was referred to another clinic for treatment.

 **TABLE 3**

Second post-operative follow-up.

		Type of additional treatment		
		LIFT	incision	conservative
N	53			
Time from latest LIFT, median (IQR), days	274 (162-573)			
<i>Symptom-free, n</i>				
Symptom-free at F/U-1	17			
Recurrence at F/U-1	20			
Subtotal (% of N)	37 (70)			
<i>Recurrence F/U-2, n</i>				
Symptom-free at F/U-1	10 ^a			
Recurrence at F/U-1	6			
Subtotal, n, (% of N)	16 (30)			
<i>Type of recurrence, n (% of n)</i>				
1: minor	0			
2: intersphincteric	9 (56)			
3: transsphincteric	7 (44)			
Patients discharged directly after F/U-2, n (% of 65)	37 (57)			
Patients discharged following additional treatment after F/U-2, n (% of 65)	7 (11) ^b			
Fistula type:				
1: minor	0	0	0	0
2: intersphincteric	6	0	6	0
3: transsphincteric	2 ^b	0	0	1
Patients remaining in the out-patient clinic following additional treatment after F/U-2, n (% of 65)	8 (12)			
Fistula type:				
1: minor	0	0	0	0
2: intersphincteric	3	0	3	0
3: transsphincteric	5	3	2	0

F/U-1 = 1st post-operative follow-up; F/U-2 = 2nd post-operative follow-up; IQR = interquartile range; LIFT = ligation of the intersphincteric fistula tract.

a) I.e. late failure.

b) 1 additional patient was referred to another clinic for treatment.

outcome after their initial LIFT, ten did not have F/U-2. Therefore, it is possible that our primary success rate of 42% (27 of 65) could be falsely high. At the time of data collection, these patients were still living in the service area of Herlev Hospital and in case of a recurrence, they would most likely have been readmitted to our clinic. However, as patients have freedom of choice regarding where they receive their treatment, there is a possibility that they could have received additional treatment elsewhere.

Although our study has limitations, we can present F/U-2 in a relatively large patient population, adding knowledge to the expected outcome of the LIFT procedure.

CONCLUSION

We found that the LIFT procedure is a viable treatment option for patients with complex fistula-in-ano. Many of the recurrences were more benign than the primary fistulae, and hence less problematic to treat. Our re-

sults also show that a second LIFT procedure can provide a positive outcome. Our study supports previous findings and demonstrates the importance of F/U-2 to ensure a successful outcome when using LIFT surgery to treat transsphincteric fistulae.

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ACCEPTED: 30 January 2019

CONFLICTS OF INTEREST: none. Disclosure forms provided by the authors are available with the full text of this article at Ugeskriftet.dk/dmj

LITERATURE

- Seow-Choen F, Nicholls RJ. Anal fistula. *Br J Surg* 1992;79:197-205.
- Parks AG, Gordon PH, Hardcastle JD. A classification of fistula-in-ano. *Br J Surg* 1976;63:1-12.
- Malik AI, Nelson RL. Surgical management of anal fistulae: A systematic review. *Colorectal Dis* 2008;10:420-30.
- Garg P, Song J, Bhatia A, Kalia H et al. The efficacy of anal fistula plug in fistula-in-ano: a systematic review. *Colorectal Dis* 2010;12:965-70.
- Lewis P, Bartolo DCC. Treatment of transsphincteric fistulae by full thickness anorectal advancement flaps. *Br J Surg* 1990;77:1187-9.
- Rojanasakul A, Pattanaarun J, Sahakitrungruang C et al. Total anal sphincter saving technique for fistula-in-ano; the ligation of intersphincteric fistula tract. *J Med Assoc Thai* 2007;90:581-6.
- Sentovich SM. Fibrin glue for anal fistulas: long-term results. *Dis Colon Rectum* 2003;46:498-502.

8. Williams JG, MacLeod CA, Rothenberger DA et al. Seton treatment of high anal fistulae. *Br J Surg* 1991;78:1159-61.
9. Schulze B, Ho Y. Management of complex anorectal fistulas with seton drainage plus partial fistulotomy and subsequent ligation of intersphincteric fistula tract (LIFT). *Tech Coloproctol* 2015;19:89-95.
10. Rojanasakul A. LIFT procedure: a simplified technique for fistula-in-ano. *Tech Coloproctol* 2009;13:237-40.
11. Hong KD, Kang S, Kalaskar S et al. Ligation of intersphincteric fistula tract (LIFT) to treat anal fistula: Systematic review and meta-analysis. *Tech Coloproctol* 2014;18:685-91.
12. Vergara-Fernandez O, Espino-Urbina LA. Ligation of intersphincteric fistula tract: what is the evidence in a review? *World J Gastroenterol* 2013;19:6805-13.
13. Madbouly KM, El Shazly W, Abbas KS et al. Ligation of intersphincteric fistula tract versus mucosal advancement flap in patients with high transsphincteric fistula-in-ano: a prospective randomized trial. *Dis Colon Rectum* 2014;57:1202-8.
14. Bleier JIS, Moloo H, Goldberg SM. Ligation of the intersphincteric fistula tract: An effective new technique for complex fistulas. *Dis Colon Rectum* 2010;53:43-6.
15. Liu WY, Aboulian A, Kaji AH et al. Long-term results of ligation of intersphincteric fistula tract (LIFT) for fistula-in-ano. *Dis Colon Rectum* 2013;56:343-7.
16. Tan K-K, Tan IJ, Lim FS et al. The anatomy of failures following the ligation of intersphincteric tract technique for anal fistula: a review of 93 patients over 4 years. *Dis Colon Rectum* 2011;54:1368-72.
17. Wallin UG, Mellgren AF, Madoff RD et al. Does ligation of the intersphincteric fistula tract raise the bar in fistula surgery? *Dis Colon Rectum* 2012;55:1173-8.
18. Lange EO, Ferrari L, Krane M et al. Ligation of intersphincteric fistula tract: a sphincter-sparing option for complex fistula-in-ano. *J Gastrointest Surg* 2016;20:439-44.
19. Makowiec F, Jehle EC, Becker HD et al. Clinical course after transanal advancement flap repair of perianal fistula in patients with Crohn's disease. *Br J Surg* 1995;82:603-6.
20. Gingold DS, Murrell ZA, Fleshner PR. A prospective evaluation of the ligation of the intersphincteric tract procedure for complex anal fistula in patients with Crohn's disease. *Ann Surg* 2014;260:1057-61.