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## Original Article

# Ligation of the Intersphincteric Fistula Tract (LIFT) as a first approach in the surgical treatment of transsphincteric anal fistula is associated with modest initial success rates



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## ABSTRACT

**Purpose:** Describe our institutional experience with ligation of the intersphincteric fistula tract (LIFT) operation as the first procedure in the treatment of transsphincteric anal fistula and try to identify predictors of success.

**Methods:** This is a retrospective multi-institutional series based on two tertiary academic Hospitals in the USA. Consecutive adult patients presenting with cryptoglandular transsphincteric anal fistula that underwent a LIFT operation were included.

**Results:** The study included 77 patients, of which 68% were male and 32.5% obese. Fifteen patients presented with a recurrent fistula, and preoperative seton was placed in over 80% of the cases. No intra or postoperative complications were recorded. With a median follow-up of 37 months, the success rate was 51%; LIFT failure occurred more often in younger patients. Other patient characteristics, seton placement, fistula characteristics, patient positioning, and suture used for tract ligation were not associated with treatment outcome. None of the patients referred fecal incontinence. Seventy-four percent of patients with treatment failure underwent further surgical treatment; the success rate of the second operation was 71%.

**Conclusions:** LIFT as the first operation was associated with a modest success rate with no intra or postoperative complications. Seton placement, patient characteristics, and operative variables were not associated with failure. Most failures could be treated surgically with acceptable success rates.

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## 1. Introduction

An anal fistula is an abnormal connection between the anal canal and the perianal skin, which leads to intermittent or persistent purulent drainage [1]. The goals of its surgical treatment are the complete healing of the fistula and the preservation of anal continence.

There are two broad categories of surgical procedures, sphincter-sacrificing (fistulotomy, fistulectomy, cutting seton) and sphincter-preserving. The first have higher success rates but are associated with variable degrees of fecal incontinence; the latter presents a

minimal risk of continence impairment but only modest rates of complete healing.

Among the various fistula types, transsphincteric fistulas (TSF) are especially problematic, as they typically do not heal spontaneously. Whereas low transsphincteric fistulae can be successfully addressed by fistulotomy, cases involving more than 30 % of the internal sphincter carry a significant risk of fecal incontinence with this approach [2,3].

The ligation of the intersphincteric fistula tract (LIFT) procedure was first described in 2007 as a sphincter-preserving procedure, initially indicated for TSF [4]. Since then, this technique has become popular due to its simple technical elements, particularly when compared to anorectal advancement flaps, and favorable reported success rates of around 74% [5,6]. At our Institutions, LIFT was introduced in 2013 and has been consistently chosen to treat TSF.

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This study aims to report our institutional experience with the LIFT operation and secondarily identify predictors of treatment failure.

## 2. Materials & methods

After obtaining Institutional Review Board approval, electronic medical records of patients undergoing surgical treatment for anal fistula from 01/01/2013 to 07/01/2020 were reviewed. All consecutive patients undergoing LIFT procedure for criptoglandular disease, were included in this retrospective study. Patients with a diagnosis of Crohn's disease were excluded. Routine Magnetic Resonance Imaging (MRI) was not performed as part of the preoperative workup.

Information regarding fistula diagnosis, symptoms, demographics, preoperative operative and postoperative variables were collected. Obesity was defined as a Body Mass Index equal to or greater than 30.

Follow-up (FU) was censored at the last physical examination documented in the medical record performed by a colorectal surgeon.

### 2.1. Surgery

Operations were performed by six board-certified colorectal surgeons in two US tertiary referral academic institutions. The surgical technique was not standardized, nevertheless, in order to be included at least these steps needed to be described in the operative report. After perianal skin incision, the fistula tract was identified in the intersphincteric space, isolated, and ligated close to the internal anal sphincter. The remnant of the tract or possibly the infected gland was either removed and sent for histopathological analysis or left in situ.

Information regarding patient positioning, type of suture used for tract ligation, use of self-retaining retractor, and treatment of the internal and external fistula orifices was also collected. Patients were not routinely discharged on antibiotics.

The primary outcome was success rate, defined as complete healing of the intersphincteric wound and external orifice without any sign of recurrence.

Patients were considered to have a recurrence/persistence (treatment failure) when clinically documented by the treating colorectal surgeon.

As a secondary outcome, we searched for possible variables associated with treatment failure.

Statistical analysis was performed with IBM SPSS Statistics, Version 21 (Armonk, NY: IBM Corp.). Univariable analysis was performed with Chi-square and Fisher's test for categorical variables and the Mann-Whitney test for continuous ones. Statistical significance was set at 0.05.

## 3. Results

### 3.1. Demographics

Seventy-seven patients were included in our study, mean age was 42 years old (20-81) and 53 (68%) were male. The mean BMI was 28.5 (20-48.5), and 25 patients (32.5%) were obese. Before the initial consult, patients referred symptoms for a median time of 7 months (1-240). The median time between fistula diagnosis and surgery was 168 days (25-2711).

### 3.2. Tract preparation-Fistula characteristics

Sixty-two patients presented with primary anal fistulas (80.5%), whereas 15 (19.5%) failed previous surgical treatment. Sixty patients (78%) underwent operative seton placement in preparation for LIFT. The median time between seton placement and LIFT was 145 days (35-690). Nineteen patients (25%) had previous anorectal procedures

**Table 1**  
Demographics and fistula characteristics.

Median Age:	42 (20-81)
Sex M/F (%):	53(68)/24(31)
Median BMI (range):	27.6 (20- 48.5)
Obesity (%):	25 (32.5)
Fistula Location (external orifice) (%)	
Anterior Midline:	1 (1)
Antero-lateral:	41 (53)
Lateral:	12 (16)
Postero-lateral:	20 (26)
Posterior Midline:	2 (3)
Horseshoe:	1 (1)
Internal orifice posterior midline (%):	28 (36)
Recurrent (%):	15 (19.5)
Previous Anal surgery (%)	19 (25)
Hemorrhoidectomy	1 (5)
Fistulectomy	1 (5)
Fistulotomy	11 (58)
Biologic Plug	4 (20)
Resection of perianal cyst	1 (5)
Resection of skin bridge	1 (5)
Preoperative seton (%):	60 (78)
Median Time Seton-Lift days (range):	145 (35-690).
<b>Surgery</b>	
Median Operative time min(range):	33.5 (9-100)
Median EBL ml (range):	5 (1-30)
Position: jackknife/Lithotomy (%):	66 (86)/11 (14)
Lonestar (%):	22 (29)
Polyglactin suture used for ligation (%)	
0	8 (10)
2-0	32 (42)
3-0	37 (48)
External Orifice treatment (%):	
No treatment	62 (80.5)
Curettage	12 (16)
Curettage + Surgicell	1 (1)
Cautery	2 (3)

BMI: body mass index, LIFT: ligation intersphincteric fistula tract, min: minutes, EBL: estimated blood loss.

other than seton placement, including the 15 patients with previous interventions for anal fistula (Table 1).

All fistulas were trans-sphincteric with a compromise of more than 30% of the external sphincter (as judged by the operating surgeon); position of the external orifice is described in Table 1. The internal orifice was located at the posterior midline in twenty-eight (36%) patients.

### 3.3. Surgery

All procedures were performed in the ambulatory setting. The jackknife position was used in 86% of the cases and lithotomy in 14%. Median operative time was 33.5 min (9-100), and median estimated blood loss was 5ml (1-30ml). Ligation of the fistula tract was performed with braided polyglactin suture in all cases; 3-0 sutures in 37 patients (48%), 2-0 in 32 patients (42%), and 0 in 8 patients (10%). No intraoperative or immediate postoperative complications were recorded, and none of the patients needed to be admitted for observation.

No additional treatment was applied on the internal orifice in any case (such as suturing or advancement flap). The external orifice was addressed in 15 cases (19%); 13 patients had the external orifice curettaged; in two, it was cauterized, and one patient had oxidized regenerated cellulose (Surgicel®) applied after curettage.

### 3.4. Recurrence/Persistence

With a median FU time of 7.3 months (0-81), 38 patients (49.4%) presented recurrence/persistence of anorectal fistula. The median time to recurrence was 213 days (25-2091). Considering only patients with a primary anal fistula (no previous surgical treatment), the recurrence rate was 53% (33/62).

Treatment failure occurred in younger patients (39 vs. 46 years,  $p=0.008$ ) and was not associated with fistula location, presence of a posterior midline internal orifice (36 vs. 37%,  $p= 0.93$ ), preoperative seton placement (82 vs. 78%,  $p=0.38$ ), previous anorectal surgery (55 vs. 54%), type of suture used for tract ligation ( $p=0.28$ ) or treatment of the external orifice (18.4 vs. 20.5%,  $p=0.82$ ) (Table 2).

Intraoperative confirmation of tract ligation with hydrogen peroxide or povidone iodine solution was also not associated with treatment failure (30.8% vs. 23.7%,  $p=0.48$ ) No clinically significant fecal incontinence or soiling was documented on FU.

### 3.5. Treatment for LIFT failures

Twenty-eight (74%) of the 38 patients with recurrence underwent reoperation. Fistulotomy with or without seton placement was performed in 12 cases (43%), and a second LIFT in 7 (25%) (Figure 1). Overall success rate for a second operation after a failed LIFT was 74% (20/28 patients). Of the 12 patients that failed LIFT and were treated with Fistulotomy, with a mean FU of 18 months, 8 (67%) presented complete healing. The four failures were successfully treated with a second fistulotomy (two cases), incision and drainage of abscess (one case) and non-cutting seton that was subsequently removed (one case). Of the 7 patients that underwent a second LIFT, with a FU of 25.8 months, 5 (71%) presented complete healing and 2 failed treatments. These two failures were treated with fistulotomies and were without evidence of fistula at the end of FU.

## 4. Discussion

In our institutional experience, the success rate of the LIFT operation was 51% after a median FU of 7.3 months (0-81). Treatment failure occurred more often in younger patients; however, we could not identify any other pre- or intra-operative variable associated with it.

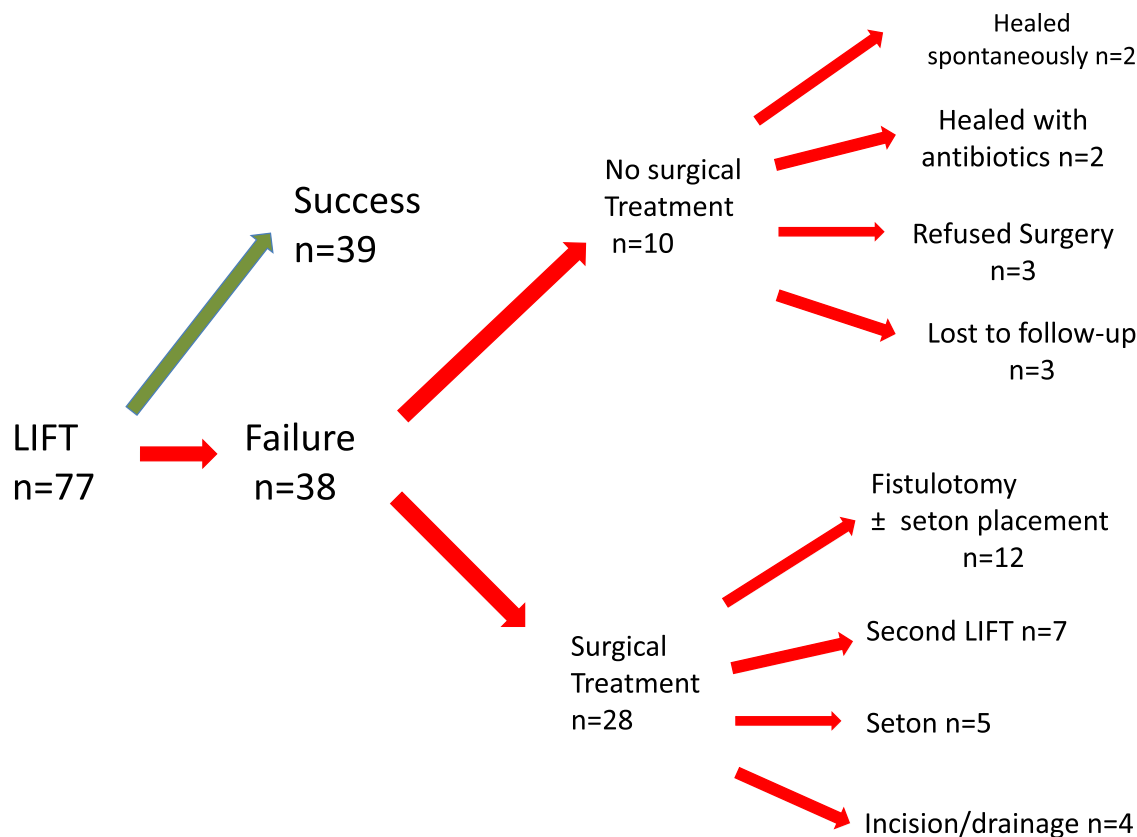
**Table 2**  
Variables associated with recurrence/persistence.

Recurrence/persistence	Yes n=38 (49.4)	No n= 39 (50.6)	P
Mean Age, years (SD)	39 (12.5)	46 (12)	<b>0.008<sup>1</sup></b>
Female Sex (%)	14 (37)	10 (26)	0.28 <sup>2</sup>
Mean BMI (SD)	27.4 (4.3)	29.7 (5.7)	0.73 <sup>1</sup>
Obesity (%)	9 (24%)	16 (41%)	0.1 <sup>2</sup>
Mean Time Diagnosis-LIFT days, (SD)	218 (222)	322 (451)	0.14 <sup>1</sup>
Location(%)			
Anterior Midline	0	1 (2.6)	
Antero-lateral	23 (60.5)	18 (46)	
Lateral	6 (16)	7 (18)	
Postero-lateral	8 (21)	11 (28)	
Posterior Midline	1 (2.6)	1 (2.6)	
Horseshoe	0	1 (2.6)	0.68 <sup>2</sup>
Posterior Internal Orifice (%)	14 (36)	14 (37)	0.93 <sup>2</sup>
External Orifice treatment (%)	7 (18.4)	8 (20.5)	0.82 <sup>2</sup>
Previous anorectal surgery (%)	21 (55)	21 (54)	0.9 <sup>2</sup>
Recurrent (%)	5 (13.2)	10 (27)	0.17 <sup>2</sup>
Type of Polyglactine suture (%)			
0	6 (16)	2 (5.1)	
2-0	14 (37)	18 (46)	
3-0	18 (47)	19 (49)	0.28 <sup>2</sup>
Jack-knife position(%)	32 (84)	34 (87)	0.71 <sup>2</sup>
Lonestar Retractor(%)	9 (24)	13 (33)	0.35 <sup>2</sup>
Seton (%)	32 (82)	28 (74)	0.38 <sup>2</sup>
Peroxide/Betadine test (%)	9 (23.7)	12 (30.8)	0.45 <sup>2</sup>
Mean Time Seton-LIFT Days (SD)	158 (144)	189 (162.5)	0.27 <sup>1</sup>

BMI: body mass index, LIFT: ligation intersphincteric fistula tract SD: Standard deviation, 1- Mann-Whitney test, 2- Chi Square test.

In two-thirds of the failures, patients underwent further surgical treatment with a success rate of 75%, and no complications or clinically relevant fecal incontinence were reported.

The success rate of the LIFT operation reported in the literature is between 40 to 95% [7] with two recent systematic reviews and



**Fig. 1.** Outcomes of LIFT procedure and treatment for recurrences.

**Table 3**

Representative series with more than 12 months of follow-up of patients treated with Ligation of the Intersphincteric Fistula tract operation for trans-sphincteric anal fistulas.

Author	n	FU (months)	Mean age (years)	Men (%)	Previous Fistula Surgery (%)	Success (%)
Liu et al. [17]	38	26	42	74	18	60
Sun et al. [18]	70	16.5	41.3	84	4	65
Kang et al. [19]	28	16	44	78	4	75
Galan et al. [20]	53	32	46	58	9	70
Chen et al. [21]	43	26.2	37.1	74	3	83
Ye et al. [22]	43	15	45.4	58	1	88
Madbouly et al. [23]	35	12	45.4	54	17	74
Dalbem et al. [24]	22	14	45	54	0	77
Lehman et al. [25]	15	13.5	49	60	100	64
Tan et al. [26]	24	13	41	87.5	4	62.5
Mushaya et al. [12]	25	16.4	47.5	68	60	92
Wallin et al. [27]	93	19	43	61	32	39.8
Tsunoda et al. [14]	19	18	42	84	na	95
Van Onkelen et al [9]	22	19.5	45	59	na	81

meta-analyses retrieving success rates of 76.5 and 76.8% [3,6]. Our result of 51% is among the lowest reported success rates for series, including only trans-sphincteric fistulas (Table 3). We speculate that patient selection could have played a role in this, since patients with low trans-sphincteric fistulas are commonly treated with fistulotomy at our Institutions, leaving only the troublesome high-trans-sphincteric cases to be treated with LIFT. A learning curve effect could have also influenced, as our series includes all consecutive cases performed since the beginning of our experience. Finally, since there was no standardized protocol, there were 5 patients that were diagnosed with failure/recurrence before 6 weeks (the time commonly accepted for healing to happen), it could be the case that these patients could have healed spontaneously with a longer FU. Irrespective of this, we assumed that the treating surgeon considered the failure to be clinically evident at that time and was included as such in the analysis.

Previous studies have looked into variables associated with LIFT failure; small series have suggested that BMI [8], length of the fistula tract [9], previous attempts at fistula repair [10], or a posterior mid-line location of the tract [11] were associated with worse outcome. One of the meta-analyses mentioned above found that horseshoe fistula and previous fistula surgery history were significantly associated with LIFT failure [6]. In the present study, patients in which LIFT failed were statistically younger. However, neither BMI, previous anorectal surgical interventions (including interventions for anal fistula), patient positioning, or fistula location were predictors of failure. Although not mentioned in the original description of the technique [4], some authors have suggested the placement of seton drainage for eight to 12 weeks before the LIFT procedure intending to promote the tract's maturation and reduce infection rates while facilitating the intraoperative identification of the tract [12]. Other authors did not find any benefit in terms of success rate when seton is placed preoperatively [5,6]. In our study, the use of seton was not associated with LIFT failure.

Since the surgical technique was not standardized, we analyzed the suture material used for ligation of the tract; all cases were performed with polyglactin braided suture. It could be speculated that a thicker suture material could lead to a more substantial granulation process with abscess formation and subsequent failure. Nevertheless, we found no association between the thickness of the suture material and the primary outcome; surprisingly, 10% of our cases used a number 0 suture.

The results of the present study illustrate the usefulness of LIFT as a first approach in the sequential surgical treatment of transsphincteric fistulas. One could argue that in these cases, a complex fistula was transformed into a simpler one amenable to be treated with a more straightforward procedure. In fact, fistulotomy was the most frequent procedure after a failed LIFT (28%). Supporting this theory, when a second LIFT was attempted (25% of the reoperations), success

rate was 71%, significantly higher than the 51% for first-time LIFT. Our results are similar to the reported literature, with fistulotomy being the most frequently used procedure after LIFT failure, followed by a second LIFT in 25% of the cases [6]. Physicians should discuss with patients these scenarios in order to set proper expectations.

None of the patients required admission, and no intraoperative or immediate postoperative complications were found on the EMR. Postoperative complications have been reported to happen in 5 to 14% of the cases [5,6], being wound dehiscence and infection the most prevalent, followed by bleeding, anal discharge, and hematoma formation [6]. The differentiation between dehiscence/infection and failure is somewhat blurry, and to avoid any interpretation problems, we opted to rely upon the surgeon's judgment to determine failure occurrence.

No evidence of clinically significant fecal incontinence or soiling was found on FU. Data available has shown that the LIFT operation is a sphincter-preserving technique resulting in minimal impact on continence even when treating high TSF [7]. Studies comparing pre- and postoperative continence using validated questionnaires (Cleveland Clinic Incontinence Index, Fecal Incontinence Severity Index, or Rockwood scale) did not show deterioration on these scales after LIFT [9,13]. Moreover, a recent study using anal manometry prior to and three months after the procedure, in association with structured clinical evaluations with validated questionnaires to assess continence, found no significant variation in resting and squeeze pressures [14]. Nevertheless, although rare, fecal incontinence still can occur; in the aforementioned systematic review, this was seen in 1.4%, being all cases of minor degree [6]. These results compare favorably to the decreased continence and frank incontinence seen in 67% of patients after cutting seton placement [15] and 35% after advancement flap [16].

The present study has some limitations other than its retrospective nature. The surgical technique was not uniform, and there was no standardized documentation for operative or postoperative notes. Because of this, some variables that could have impacted the primary outcome were not available. Furthermore, preoperative workup and follow-up were not standardized; in this sense, routine use of imaging could have detected potential secondary tracts that might have been responsible for failure when left untreated. Fecal incontinence was not investigated with standardized questionnaires or anorectal manometry. Nevertheless, no documentation was found of clinically significant fecal incontinence complaints.

## 5. Conclusions

With a mean follow-up of 37 months, the success rate of the LIFT operation was 51% and no fecal incontinence was documented on follow-up. Most of the patients with recurrence were treated surgically

with a fistulotomy or a second LIFT. The success rate of a second operation was 74%. These results should aid surgeons in discussing outcomes with the patients and setting the right expectations about treatment success.

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### Conflict of interest statement

The authors have no competing interests to declare that are relevant to the content of this article.

### References

- [1] Steele SR, Kumar R, Feingold DL, Rafferty JL, Buie WD. Practice parameters for the management of perianal abscess and fistula-in-ano. *Dis Colon Rectum* 2011;54:1465–74.
- [2] Parés D. Pathogenesis and treatment of fistula in ano. *Brit J Surg* 2011;98:2–3.
- [3] Alasari S, Kim NK. Overview of anal fistula and systematic review of ligation of the intersphincteric fistula tract (LIFT). *Techniq Coloproctol* 2014;18:13–22.
- [4] Rojanasakul A, Pattanaarun J, Sahakitrungruang C, Tantiphlachiva K. Total anal sphincter saving technique for fistula-in-ano; the ligation of intersphincteric fistula tract. *J Med Assoc Thailand = Chotmaihet Thangphaet* 2007;90:581–6.
- [5] Hong KD, Kang S, Kalaskar S, Wexner SD. Ligation of intersphincteric fistula tract (LIFT) to treat anal fistula: systematic review and meta-analysis. *Techniq Coloproctol* 2014;18:685–91.
- [6] Emile SH, Khan SM, Adejumo A, Koroye O. Ligation of intersphincteric fistula tract (LIFT) in treatment of anal fistula: An updated systematic review, meta-analysis, and meta-regression of the predictors of failure. *Surgery* 2020;167:484–92.
- [7] Lange EO, Ferrari L, Krane M, Fichera A. Ligation of intersphincteric fistula tract: a sphincter-sparing option for complex Fistula-in-Ano. *J Gastrointestinal Surg* 2016;20:439–44.
- [8] Shanwani A, Nor AM, Amri N. Ligation of the intersphincteric fistula tract (LIFT): a sphincter-saving technique for fistula-in-ano. *Dis Colon Rectum* 2010;53:39–42.
- [9] van Onkelen RS, Gosselink MP, Schouten WR. Is it possible to improve the outcome of transanal advancement flap repair for high transsphincteric fistulas by additional ligation of the intersphincteric fistula tract? *Dis Colon Rectum* 2012;55:163–6.
- [10] Tan KK, Tan IJ, Lim FS, Koh DC, Tsang CB. 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.
- [11] Sarmiento-Cobos M, Rosen L, Wasser E, Yang F, Wexner SD. High failure rates following ligation of the intersphincteric fistula tract for transsphincteric anal fistulas: are preoperative MRI measurements of the fistula tract predictive of outcome? *Colorectal Dis* 2021;23(4):932–6 Apr.
- [12] Mushaya C, Bartlett L, Schulze B, Ho YH. Ligation of intersphincteric fistula tract compared with advancement flap for complex anorectal fistulas requiring initial seton drainage. *Am J Surg* 2012;204:283–9.
- [13] Ellis CN. Outcomes with the use of bioprosthetic grafts to reinforce the ligation of the intersphincteric fistula tract (BioLIFT procedure) for the management of complex anal fistulas. *Dis Colon Rectum* 2010;53:1361–4.
- [14] Tsunoda A, Sada H, Sugimoto T, Nagata H, Kano N. Anal function after ligation of the intersphincteric fistula tract. *Dis Colon Rectum* 2013;56:898–902.
- [15] García-Aguilar J, Belmonte C, Wong DW, Goldberg SM, Madoff RD. Cutting seton versus two-stage seton fistulotomy in the surgical management of high anal fistula. *Brit J Surg* 1998;85:243–5.
- [16] Schouten WR, Zimmerman DDE, Briel JW. Transanal advancement flap repair of transsphincteric fistulas. 1999;42:1419–22.
- [17] Liu WY, Aboulian A, Kaji AH, Kumar RR. Long-term results of ligation of intersphincteric fistula tract (LIFT) for fistula-in-ano. *Dis Colon Rectum* 2013;56:343–7.
- [18] Sun XL, Wen K, Chen YH, Xu ZZ, Wang XP. Long-term outcomes and quality of life following ligation of the intersphincteric fistula tract for high transsphincteric fistulas. *Colorectal Dis* 2019;21:30–7.
- [19] Kang WH, Yang HK, Chang HJ, et al. High ligation of the anal fistula tract by lateral approach: a prospective cohort study on a modification of the ligation of the intersphincteric fistula tract (LIFT) technique. *Int J Surg* 2018;60:9–14.
- [20] Placer Galán C, Lopes C, Múgica JA, Saralegui Y, Borda N, Enriquez Navascues JM. Patterns of Recurrence/Persistence of Cryptoglandular Anal Fistula After the LIFT Procedure. Long-term observational study. *Cirugía Española (English Edition)* 2017;95:385–90.
- [21] Chen H-J, Sun G-D, Zhu P, Zhou Z-L, Chen Y-G, Yang B-L. Effective and long-term outcome following ligation of the intersphincteric fistula tract (LIFT) for transsphincteric fistula. *Int J Colorect Dis* 2017;32:583–5.
- [22] Ye F, Tang C, Wang D, Zheng S. Early experience with the modified approach of ligation of the intersphincteric fistula tract for high transsphincteric fistula. *World J Surg* 2015;39:1059–65.
- [23] Madbouly KM, Shazly WE, Abbas KS, Hussein AM. 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.
- [24] Dalbem CS, Tomiyoshi SDT, dos Santos CHM. Assessment of LIFT (ligation of the intersphincteric fistula tract) technique in patients with perianal transsphincteric fistulas. *J Coloproctol* 2014;34:250–3.
- [25] Lehmann J-P, Graf W. Efficacy of LIFT for recurrent anal fistula. 2013;15:592–5.
- [26] Tan KK, Alsuwaigh R, Tan AM, et al. To LIFT or to Flap? Which surgery to perform following seton insertion for high anal fistula? *Dis Colon Rectum* 2012;55:1273–7.
- [27] Wallin UG, Mellgren AF, Madoff RD, Goldberg SM. Does ligation of the intersphincteric fistula tract raise the bar in fistula surgery? *Dis Colon Rectum* 2012;55:1173–8.