Ligation of intersphincteric fistula tract for high trans-sphincteric fistula-in-ano: our experience

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Background
Fistula is a common perianal pathology. Management of high fistula is challenging, and up till now, there is no sole gold standard surgery for its management. The ideal treatment must eradicate local infection without endangering anal continence. This encouraged us to conduct this study to evaluate the use of one of the newly developed sphincter-saving procedures, which is ligation of intersphincteric fistula (LIFT) technique for management of high trans-sphincteric fistula, regarding fistula healing, anal continence, and recurrence.
Patients and methods
This study was a prospective study. From January 2016 to January 2017, 26 consecutive patients underwent LIFT procedure for high trans-sphincteric fistulae-in-ano in Damanhur National Institute Hospital and Medical Research Institute Hospital, Alexandria University.
Results
Success rate of the procedure was 80.8% after a follow-up period of 8 months. No change of continence had occurred in any of patients in this study. Relapse of fistula occurred in 11.5% of patients and nonhealing occurred in 7.7% of patients. The time of fistula healing was 20.0–45.0 days with a median of 26.5 days.
Conclusion
LIFT procedure is a safe procedure for management of high trans-sphincteric fistula with promising short-term results and zero incontinence rate.

Keywords:
fecal incontinence, fistula-in-ano, high trans-sphincteric, ligation of intersphincteric fistula, sphincter-saving procedure

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Introduction

Perianal fistulae are the chronic stages of infections in the anorectal regions and are symptomatized by persistent discharge of pus or recurrent attacks of perianal pain associated with abscess formation, which is relieved by either spontaneous or incisional drainage [1]. Fistula is a common perianal pathology that usually results from obstruction of intersphincteric anal gland ducts with subsequent pus accumulation and abscess formation. Pus is usually drained through an external opening in the perianal skin, resulting in the fistula formation [2]. Fistula-in-ano may be associated with trauma or specific pathologies such as malignancy, inflammatory bowel disease, tuberculosis, and perianal actinomycosis [3,4].

Surgery is the treatment for fistulae-in-ano, aiming to achieve permanent healing without impairment of fecal continence [5–7]. Fistulotomy is the traditional standard surgical modality for treatment of fistula-in-ano with a high rate of cure reaching up to 90–97% [4,8]. This high rate of cure is limited by the fact that laying out a high or complex fistulous tract may be associated with a high rate of fecal incontinence [9]; therefore, fistulotomy has been limited to management of simple and low trans-sphincteric fistulae [10,11]. Complex fistulae are treated with various other surgical techniques with the hope to achieve the same cure rate of fistulotomy but without endangering continence. These techniques have a variable degree of success rate and include endoanal (mucosal) advancement flap (MAF), seton use either cutting or draining, debridement, and fibrin glue injection or plug insertion. Recurrence after these procedures is variable reaching up to 63% for MAF, 84% for fibrin glue, and 66% for the plug [12–14]. Incontinence rate following MAF and cutting seton may reach up to 35 and 38%, respectively [15].

Novel sphincter-saving procedures such as ligation of intersphincteric fistula tract (LIFT), video-assisted anal fistula treatment, and fistula-tract laser closure have been recently developed for the treatment of

fistula-in-ano, with promising early results and minimal risk of incontinence [6,16–18]. Video-assisted anal fistula treatment and fistula-tract laser closure need special instruments and laser fiber which are not available in our institutes. This encouraged us to conduct this study to report our experience in the use of LIFT for treatment of high trans-sphincteric fistulae in terms of fistula healing, intact sphincteric function, and recurrence.

Patients and methods

Study design

This study was a prospective experimental study. From January 2016 to January 2017, 26 consecutive patients underwent LIFT procedure for high trans-sphincteric fistulae-in-ano in Damanhur National Institute Hospital and Medical Research Institute Hospital, Alexandria University.

Sample size and study power

On the basis of literature review for success rate of LIFT technique relative to traditional methods considering mainly incontinence rate, a sample of 25 patients will provide a study power of 90% to estimate a clinically acceptable effect size of 0.25 (moderate) with 95% confidence level of 0.1–0.30. The effect size was based on difference at incontinence rate between the LIFT method and what is known about traditional methods of 30% on average with precision of 7 and 10% more sample units to avoid attrition effect [15].

Preoperative course

All patients underwent full history taking with emphasis on their complaints, history of previous perianal abscesses whether relieved spontaneously or by incisional drainage, history of previous surgery for their fistulae, and presence of any type of anal incontinence. Preoperative digital rectal examination, office anoscopy, and endoanal ultrasonography (EUS) were done for each patient in this study. EUS helped in precise localization of the site of the internal opening and determined the volume of the anal sphincter passing beneath the fistulous tract. Trans-sphincteric fistula was considered high if it passed over more than one-third of the external anal sphincter [19,20]. Exclusion criteria included recurrent fistulae, presence of preoperative fecal incontinence, age younger than 18 or older than 75 years, anorectal abscesses or active inflammation, association of the fistula with anorectal malignancy, tuberculosis, HIV, local irradiation, and poorly controlled diabetics. Every patient in this study signed an informed consent, which was approved by ethics committee in our institutes after detailed explanation of the procedure and possible complications.

Surgical technique

An enema was performed for each patient in this study at least 12 h before surgery. All procedures were done under spinal anesthesia. All procedures were done in the lithotomy position. Digital rectal examination and anoscopy were done to exclude any possible associated or underlying pathology. Identification of the internal opening was done by gentle probing of the tract if possible and if not injection of hydrogen peroxide (H_2O_2) was done. Forceful passage of a probe was avoided so as to avoid false passage. A curvilinear incision of 2–3 cm in the intersphincteric space was done opposite to the internal opening. Gentle dissection between internal and external sphincters was done using scissors and bipolar diathermy to identify the fistulous tract. Dissection was facilitated by the use of long narrow blade retractors. A small right-angled clamp hooked the tract after its identification. Double transfixion of the fistulous tract with vicryl 3/0 or 2/0 (Ethicon, Somerville, New Jersey, USA) (according to the size of the tract) was done very close to the internal opening after removal of the probe. Division of the tract distal to the transfixion knots was done. Partial coring out of the external sphincter portion of the divided tract was done followed by ligation or transfixion of the remaining end of the divided tract as far as possible with excision of the intersphincteric portion of the tract and possible infected anal glands. H_2O_2 was injected through the external opening to confirm proper division of the tract. The excised tract was sent for histopathological examination. An ellipse was done around the external opening with aggressive curettage of the external portion of the tract. The internal and external sphincters were reapproximated with vicryl 3/0 (Ethicon). The intersphincteric wound was closed with interrupted loose vicyl 3/0 (Ethicon) sutures and the external opening was left open to heal by secondary intention.

Operative and postoperative course

The following intraoperative data were recorded for each patient: identification of the internal opening (probing or H_2O_2 injection), correlation of preoperative data of EUS with intraoperative findings, and operative time. Postoperatively, all patients were followed up for assessment of fistula healing, continence, and recurrence. Complete fistula healing was considered when complete closure of intersphincteric wound and external opening occurred with absence of purulent discharge or air leak from both wounds. Continence was described according

to clinical staging as: category A: full continence, category B: flatus incontinence but continence of solid and usually fluidly stool, category C: incontinence of fluidly stool and flatus but not of solid stool (intermittent fecal leakage), and category D: complete incontinence (persistent fecal leakage) [21]. Postoperatively, all patients received normal oral diet without any restrictions. Oral ciprofloxacin and metronidazole were given for 2 weeks after the operation. Patients were informed to clean their wound thoroughly with tap water. All patients were discharged on the first postoperative day after assessment of their wounds for possibility of hematomas.

Follow-up

Follow-up was done at the outpatient clinic weekly until complete fistula healing occurred then every 2 months for 8 months. If complete closure of both external opening and intersphincteric wounds did not occur after 10 weeks, this was considered as nonhealing of the fistulous tract. Reopening of the fistula after apparent complete healing, appearance of new external opening, and recurrence of symptoms after complete resolution at any time during the period of follow-up was considered as recurrence of the fistulous tract. None healing and recurrence of the fistulous tract were considered as failure of the procedure. We did not lose any patient during follow-up.

Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package, version 20.0 (SPSS, Inc., Chicago, IL, USA). Qualitative data were described using number and percentage, whereas quantitative data were described using minimum–maximum, mean±SD.

Results

Preoperative and operative data of the studied population were shown in Tables 1 and 2, respectively. Postoperative hematomas occurred in two (7.7%) patients which were mild and managed conservatively. Success rate of the procedure was 80.8% after a follow-up period of 8 months. Postoperative incontinence rate was 0% in this study. Postoperative data of the studied population were shown in Table 3. Figures 1–4, show illustrations of the steps of LIFT procedure for a 39-year-old female patient with high anterior trans-sphincteric fistula.

Discussion

In this study, all procedures were performed in the lithotomy position in accordance to the study by Sileri *et al.* [22]. Most of the authors including Rojanasakul *et al.* [6] who originally described the procedure have used prone Jack knife position [8,23–28], whereas others have used both Jack knife and lithotomy positions [29–31]. In this study, we did not find any difficulty in performing LIFT procedures in the lithotomy position as we were used to performing all anal procedures in this position in our institutes. We thought that operative positioning of patients in various studies was a matter of surgeons' preference.

Table 1 Preoperative criteria of the studied population (*n*=26)

	n (%)
Sex	
Male	17 (65.4)
Female	9 (34.6)
Age (years)	
Minimum–maximum	20–60
Mean±SD	36.8±11.0
Clinical presentation	
Discharging sinus	26 (100)
Perianal itching	14 (53.8)
History of perianal abscess	19 (73.1)
Comorbidities	
Hypertension	3 (11.5)
Cardiac	2 (7.7)
Hepatitis C	4 (15.3)

Table 2 Operative data of the studied groups (*n*=26)

	n (%)
Operative time (min)	
Minimum–maximum	25–60
Mean±SD	39.8±9.6
Identification of internal opening	
Probing	11 (42.3)
Hydrogen peroxide injection	15 (57.7)
Anatomical location of the fistula	
Anterior	8 (30.8)
Posterior	16 (61.5)
Lateral	2 (7.6)
Accuracy of endoanal ultrasonography	
True	22 (84.6)
False	4 (15.4)

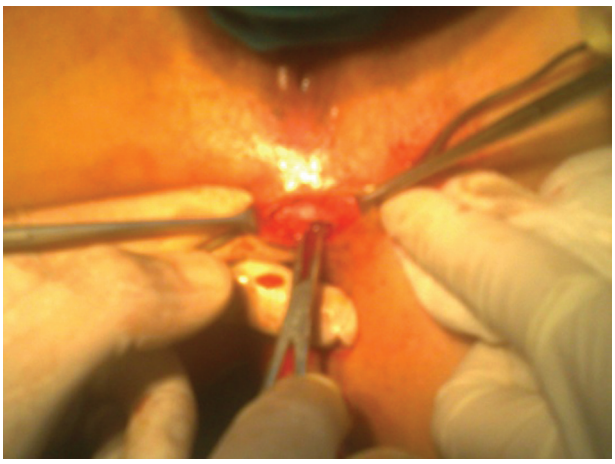
Table 3 Postoperative data of the studied groups (*n*=26)

	n (%)
Complete fistula healing	
Healing	21 (80.8)
Nonhealing	2 (7.7)
Recurrence	3 (11.5)
Incontinence	0 (0)
Hematoma	2 (7.7)
Healing time (days)	
Minimum–maximum	20.0–45.0
Mean±SD	29.3±8.0
Median	26.5

Fig. 1

Anterior trans-sphincteric fistula with probe insertion.

Fig. 2

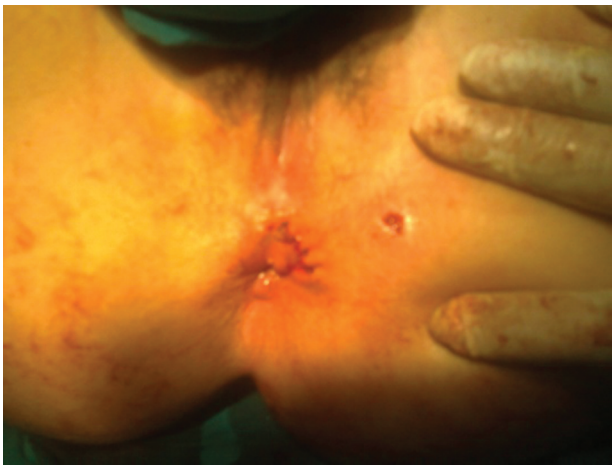


Identification of the tract.

Fig. 3

Hooking of the tract by a right angled clamp.

Fig. 4



Closure of intersphincteric wound with widening and curettage of the external opening.

Preoperative EUS was done routinely for all patients in this study, which was similar to several previous studies [22,30–35]. Other authors did not perform routine preoperative ultrasonography and depended only upon the intraoperative evaluation [8,26], and others use it selectively [23,36]. EUS was accurate in localization of internal opening in 84.6% of patients which was close to the results of the study by Tan *et al.* [37]. We thought that it was better to perform preoperative EUS if possible as it had a high accuracy and could help in precise localization of intersphincteric incision for LIFT procedure especially in a case of intraoperative nonidentification of internal opening.

We excluded patients with recurrent fistulae from this study, which was similar to some of the previous studies [38,39]. Most of the authors included patients with recurrent fistulae in their studies [22,25–27,29,30,36,40,41]. We preferred to operate upon naive patients as surgery for recurrent fistulae was expected to be more difficult, and before this study, we did not have a previous experience with the LIFT procedure in our institutes.

We did not perform a preoperative seton for all candidates of this study. Murugesan *et al.* [42] conducted a systematic review for evaluation of efficacy of the LIFT for treatment of perianal fistulae and found 13 studies that evaluated the use of seton before LIFT procedure. No significant changes were found in any of these studies regarding closure of fistulae in a case of use of preoperative seton [22,25,27–31,33,35,40,43–45].

Success rate of LIFT procedure in this study was 80.8% after 8 months of follow-up. Variable success rates of LIFT procedures were reported by previous authors with a wide range from 40 to 90%

[6,8,22–31,34,36,40,41,45–49]. This wide range may be owing to the differences in inclusion and exclusion criteria of candidates from one study to the other regarding type of the treated fistula, and trials of previous fistula repair. Moreover, differences in the period of postoperative follow-up between various studies may play a role.

The median healing time in this study (26.5 days) was close to that reported by some of the previous studies [6,29,38]. Ooi *et al.* [26] and Sharma *et al.* [41] reported a median healing time of 6 weeks in their studies. Liu *et al.* [40] reported a median healing time of 8 weeks and proposed that healing time after LIFT procedure may be prolonged up to 36 weeks. They thought that patients with persistent symptoms after surgery may be managed conservatively and observed for more than 6 months before taking the decision of reoperation [40]. This difference in healing time between different studies was expected in view of inhomogeneity of candidates of different studies.

In this study, the relapse rate was 11.5%, which was less than the reported by many of the previous studies [40,50,51]. We thought that the low relapse rate in our study was attributed to shorter follow-up (8 months) compared with these studies. Many authors described late recurrence after LIFT which extended to 7–8 months after the initial surgery [24,29]. Liu *et al.* [40] in their study found that recurrence of fistula after LIFT procedure may occur as late as 12 months after surgery and suggested a minimum postoperative follow-up of 1 year to ensure that the patient had complete fistula healing.

In this study, all recurrences presented as intersphincteric fistulae in accordance to several previous studies [26,36,40,50,51]. We thought that medialization of the fistula was beneficial as all these patients were managed by fistulotomy without any compromise of anal continence.

In this study, all patients were admitted to the hospital and discharged on the first postoperative day. Many authors performed LIFT as a same-day surgery [8,22,25,29,31,52,53]. Others admitted patients to the hospitals with 1.25 days as an overall median hospital stay (range: 1–5 days) [6,23,26,27]. We admitted patients overnight to the hospital for fear of postoperative bleeding as a result of intersphincteric dissection, but only two patients developed perianal hematomas, which were mild and managed conservatively. After this study, we thought that LIFT could be performed safely as a same-day surgery, and there was no need for overnight hospital admission to save the additional costs of hospitalization.

Anal continence was evaluated subjectively in the clinic similar to most of the previous studies [6,8,25,30,39,40]. Some authors used various scores for evaluation of anal continence such as the Cleveland Clinic Florida Fecal Incontinence Score [31], Wexner Incontinence Score [26], and Fecal Incontinence Severity Index score [22]. Sirany *et al.* [54] in their systematic review for evaluation of LIFT procedure included 12 studies of classic LIFT, including 352 patients, and described only one patient with postoperative fecal incontinence. In this study, all patients were continent after the procedure similar to most of the previous study.

In terms of high short-term success rate of LIFT procedure with 0% incontinence rate in this study together with the fact that LIFT procedure does not require any special instrument may give LIFT the chance to be an important option for treatment of high trans-sphincteric perianal fistulae in our country as ours is a developing country, and cost of the procedure is very important to us.

The principal limitations of this study were the probable small sample size and the short period of follow-up. The operating surgeons were the same who evaluated the results of the procedure, and this might produce some observational bias.

Conclusion

LIFT is a safe sphincter-saving procedure for management of high trans-sphincteric perianal fistula with reasonable short-term results without endangering anal continence. Further studies with long-term follow-up are required to evaluate LIFT and its modifications for management of various types of complex fistulae-in-ano.

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Conflicts of interest

There are no conflicts of interest.

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