Comparative Study between Ligation of Trans-sphincteric Fistula Tract and Fistulectomy in Treatment of Fistula in Ano

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Abstract

Background: Treatment of trans-sphincteric fistulas with fistulectomy involves a large wound with risk of incontinence and recurrence. Procedure of Ligation of Inter-sphincteric Fistula Tract (LIFT) approach emerged recently and expected to provide more favorable outcomes and less risk of incontinence.

Objectives: This comparative study was done to evaluate operative and postoperative outcomes of LIFT procedure in comparison with traditional fistulectomy in treatment of trans-sphincteric fistulas.

Patients and methods: Study was carried out on 48 patients with trans-sphincteric fistulas assigned into 2 groups; group A treated with LIFT included 23 patients and group B treated with fistulectomy done in 25 patients.

Results: Mean operative time was significantly shorter in group A than in group B (p = 0.001). Postoperative pain means sores were significantly less in LIFT group; than in groups A and B respectively (p = 0.04), while hospital stay showed no statistical significance; in group A versus in group B (p= 0.25). The mean wound healing in LIFT group was significantly shorter than in fistulectomy group (p = 0.003). As regard postoperative complications in groups A and B, infection reported in 4 & 7 patients (17.3% & 28%), minor bleeding in 2 & 4 patients (8.6% & 16 %) respectively, no incontinence reported in group A and 3 patients shown temporary incontinence to flatus in group B. Overall recurrence was 31.2 % (15 patients); 6 patients (26.1 %) post-LIFT and 9 patients (36 %) post-fistulectomy includes failure of healing (3 post-LIFT and 5 post-fistulectomy), difference in recurrence was insignificant (p = 0.3).

Conclusion: LIFT procedure offers a shorter operative time, lower postoperative pain, faster wound healing and low incidence of incontinence in comparison to fistulectomy while recurrence rate was insignificantly different.

Keywords: Ligation; Trans-Sphincteric Fistula Tract; Fistulectomy; Ano; Granulomatous.

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Introduction

Fistula in Ano develops after acute anal or anorectal abscess spontaneous or inadequate drainage in 30-50 % of cases. It is a chronic granulomatous tract with 2 ends connecting anal canal interior to the skin of perianal area with 2 openings in the simple tract usually identified; an internal opening in the mucosa of anal canal and an external opening in skin of the perineum or perianal area but in complex cases multiple tracts, branches and openings may extend to neighboring tissues **(Abcarian, 2011)**. Fistula in ano needs surgical treatment but complexity of anatomical relation to anal sphincter necessitates to avoid fecal incontinence and recurrence. Traditionally, fistulectomy or fistulotomy procedures are used for low simple fistulas not involving large portion of anal sphincters so, there is minor risk of fecal incontinence while staged Seton procedure is commonly for complex high and extra-sphincteric fistula. Suitable surgical approach to treat trans-sphincteric fistula was always a matter of debate as staged surgery is aggressive and involves high and long-term morbidities while fistulectomy although effective in eradication of tract but may involve dissection of major part of anal sphincters with possible injury and incontinence as well as presence of a large wound area leading to long time needed for healing, infection and recurrence **(Abcarian, 2011; Dubey and Singh 2023)**.

The procedure of Ligation of Inter-sphincteric Fistula Tract (LIFT) was emerged recently, study of Rojanasakul et al. **(Rojanasakul et al., 2007)** reported this technique for treatment of fistula in ano based on concept of removal of the inter-sphincteric part of fistula tract allows removal of the cryptoglandular granulomatous tissues so eradicates the source of local infection.

This study was conducted to assess if LIFT offers advantages over standard fistulectomy in treatment of trans-sphincteric fistula in ano.

Patients and methods

A prospective comparative study was done at General Surgery Department, Mouwasat Hospital, Saudi Arabia between August 2021 and February 2024. Forty-eight patients with trans-sphincteric fistulas were treated surgically and assigned into 2 groups; group A treated with LIFT technique including 23 patients and group B treated with standard fistulectomy involved 25 patients. Approval was obtained from Hospital Ethics Committee and informative, informative consents were taken from included patients. Patients were observed for operative time, pain severity postoperatively, hospital stay, wound healing time, postoperative findings as incontinence and recurrence within 6 months after surgery.

Inclusion criteria: Patients of both genders clinically diagnosed as low trans-sphincteric fistula in ano between 20-62 years of age.

Exclusion criteria: patients with acute anal conditions at the time of surgery (as acute abscess), inflammatory bowel disease, Crohn's disease, TB fistula, malignancy, poorly controlled diabetes mellitus, pregnant females, patients unfit for surgery and patients with complex fistula in ano were excluded from study

Preoperative assessment: clinical evaluation followed by colonoscopy and MRI, or trans-rectal U/S were done for detection of fistula

type, extent, complexity and any associated pathology.

Operative Technique of Ligation of Inter-sphincteric Fistulous Tract (LIFT)

The patient in lithotomy or prone jack-knife position under general or spinal anesthesia. Injection of Hydrogen peroxide or water into the external opening was done to identify the internal opening then probing the fistula tract was done (**Fig. 1A**). Curvilinear skin incision overlying the inter-sphincteric plane in the area at the site of tract confirmed by probe inside (**Fig. 1B**). Dissection in the inter-sphincteric plane till the tract was identified and separated all around (**Fig. 1C**).

A **B** **c**

Fig.1: A: Probing of tract & internal opening shown, B: Incision & inter-sphincteric plane dissection and C: Fistula tract is dissected with probe inside

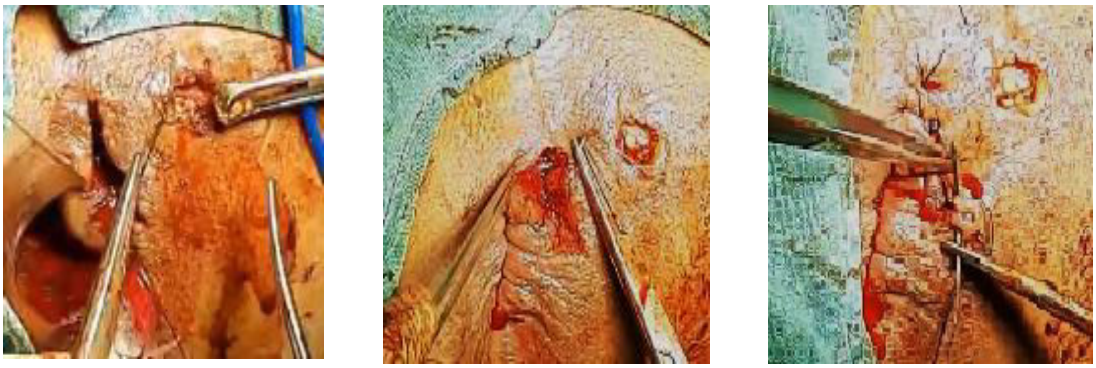
The tract was hooked by a right-angled clamp, absorbable sutures (vicryl 2/0 or 3/0 according to thickness) passed around the tract and ligation done; one near internal opening (**Fig.2 A**). When long tract is found, it is excised and sent for histo-pathological examination then remaining opening in the external sphincter is tightly ligated, if the tract was short, ligation as close to external sphincter as possible was done and tract is divided in between both ligations (**Figs 2B&C**).

A **B** **C**

Fig.2: A: Ligation close to internal opening, B: Ligation of the other tract end, and C: The tract divided between the 2 ligations

Water was injected through the external opening once more to confirm that the tract was correctly divided. Curettage was done for the external part

of fistula tract and the granulomatous external opening was removed in some cases (**Fig.3A**) or just incised and drained. Finally, internal opening is cauterized and wound closure done by approximation of the inter-sphincteric tissues then skin sutures using simple interrupted Vicryl 3/0 sutures (**Figs 3B&C**).



A **B** **C**

Fig. 3: A: Excision of external opening & curettage, B: Closure of inter sphincteric plane and C: Closure of perianal skin

Postoperative: postoperative pain was reported with use of visual analog scale (VAS) scores graded according to severity from 0 (no pain) to 10 (intolerable severe pain). Healing time in weeks, complications as bleeding, surgery site infection and incontinence were observed. Follow-up done for 6 months after surgery to detect outcomes; specifically complications and recurrence.

Statistical Analysis

Demographic, operative and postoperative collected data was revised and analyzed using R software version 4.3.1 and SPSS software 29 for Windows. Quantitative data were demonstrated in values of mean ± SD using Shapiro–Wilk test. χ^2, Fisher's exact and student's *t* tests was used for variables of qualitative data which is expressed in the form of frequencies and percentages, when *P* value was ≤ 0.05, difference between variables would be considered significant.

Results

The study was carried out on 34 (70.8 %) males and 14 females (29.2 %), group A (LIFT) included 23 patients; 16 (69.5 %) males and 7 (30.5 %) females, group B (Fistulectomy) included 25 patients; 18 (72 %) males and 7 (28 %) females (p = 0.08). The mean age was 46.2 ± 8.43 years in group A and 43 ± 6.92 years in group B (p = 0.03). No significant difference was reported in age and gender of studied groups. Mean operative time was significantly shorter in group A as it was 34.3 ± 2.3 minutes versus 41.7 ± 4.6 in group B (p = 0.001). Postoperative pain in the 1st day was significantly less in LIFT patients in fistulectomy patients (3.7 ± 2.2 and 4.9 ± 1.2 respectively, p = 0.04), while hospital stay showed no statistical significance in both groups; 1.8 ± 0.3 days in group A & 2.1± 0.5 days in group B, p= 0.25 (**Table.1**).

The wound healing time (**Fig.4**) was shorter in group A (LIFT) and ranged from 3-8 weeks with mean 4.12 ±

0.9 weeks while in group B (fistulectomy) it ranged from 5-12 weeks and mean value was 8.78 ± 2.64, difference was statistically significant (p = 0.003).

Table 1. Demographic, operative and early postoperative data

Variables		Group A n=23	Group B n=23	P-value
Gender	Male	16 (69.5%)	18 (72%)	0. 085
	Female	7 (30.5%)	7 (28%)	
Age		46.2 ± 8.43	43 ± 6.92	0.032
Operative time (min.)		34.3± 2.3	41.7± 4.6	0.001
Pain score		3.76 ± 2.19	4.89 ± 1.16	0.043
Hospital stay (weeks)		1.8 ± 0.3	2.1 ±0.5	0.25

Data are presented as mean ± SD or frequency (%).

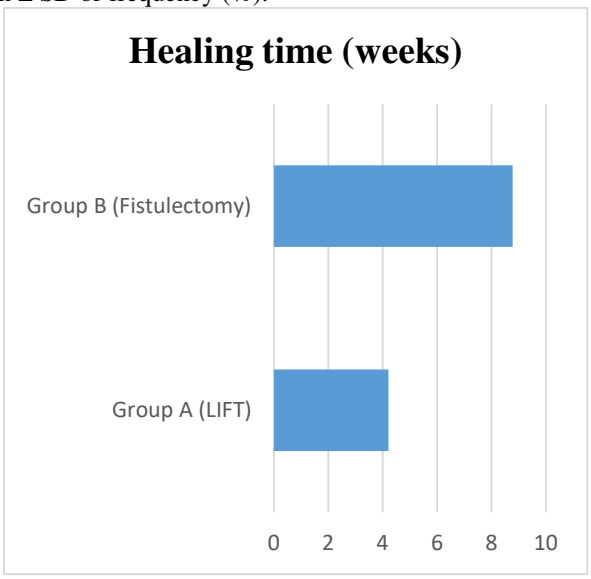


Fig.4.Mean healing time (in weeks)

As regard postoperative complications, 4 (17.3 %) patients in group A and 7 (28 %) patients in group B had mild to moderate wound infection, minor bleeding from the wound site was reported in 2 & 4 (8.6 % and 16 %) patients in A & B groups respectively. No patients with incontinence were reported in LIFT group and 3 (12 %) patients in fistulectomy group had temporary incontinence to flatus and all improved after 2-3 weeks. Total recurrence in the study was 31.2 % (15 patients), LIFT group showed recurrence in 6 (26.1 %) and fistulectomy group in 9 (36 %) patients including patients with failure of healing (group A in 3 patients and group B in 5 patients), difference in both groups was statistically insignificant; p = 0.3 (**Table.2**).

Table 2. Healing time and postoperative complications

Variables	Group A n=23	Group B n=23	P-value
Healing time	4.21 ± 0.9	8.78± 2.64	0.031

Complications	**Infection**	4 (17.3%)	7 (28%)	-
	Bleeding	2 (8.6%)	4 (16%)	
	Incontinence	0	3 (12%)	
Recurrence		6 (26.1%)	9 (36%)	0.325

Data are presented as mean ± SD or frequency (%).

Discussion

Fistula in ano is a common anorectal disease attending to general and colorectal surgery clinics. Cryptoglandular granulomatous infection is the primary pathology in the majority of fistula and a lower percentage are secondary to specific pathology as Crohn's disease, sexually transmitted or malignancy. Although fistulectomy is done for eradication of the tract but surgery outcomes in trans-sphincteric fistula showed long time for wound healing, high incidence of incontinence and high recurrence rate. New techniques were developed by researchers in order to allow faster wound healing and better outcomes. LIFT procedure was proposed by Rojanasakul et al. **(Rojanasakul et al., 2007)** for treatment of fistula-in-ano, the procedure principle depends on ligation of the tract near the internal opening to close communication and allows removal of the inter-sphincteric portion and cryptoglandular tissue thus eradicates the source of infection. This approach avoids dissection through anal sphincters so, less risk of injury and the smaller wound has less morbidity **(Rojanasakul et al., 2007; Alvandipour et al., 2016).**

Previous studies done to compare LIFT and LIFT-assisted procedures with other different surgical techniques in various types of fistula showed effectiveness of LIFT, however, variable results in those studies were noticed as most of these reports are not exclusively on certain type of fistula **(Dönmez and Hatipoğlu, 2017; Vinay and Balasubrahmanya, 2017)**.This study was conducted to evaluate outcomes of LIFT in comparison with standard fistulectomy exclusively in trans-sphincteric fistula management with exclusion of fistulas secondary to specific pathology.

In this study, patients did not show statistically significant difference as regard age and gender between groups. Like this study results, male and middle age predominance were reported in many studies as study of Anan et al. that showed 83.3% male predominance and mean age of 43.5 and Murtaza et al. study that reported 84% male predominance and 41.1 mean age **(Anan et al., 2019; Murtaza et al., 2017)**.

Shorter operative time was recoded in LIFT surgery with mean operative time of 34.3 ± 2.3 minutes while mean time in fistulectomy patients was 41.7 ± 4.6, the difference was significant (p = 0.001). Similar results was reported in Ayyar and Dharap study with mean times o 32.50 ± 7.52 in LIFT and 40.17±9.78 in fistulectomy, also in Goan study significantly sorter operative time was recoded in LIFT group **(AYYAR and Dharap, 2018; Goan, 2021)**.

The mean postoperative pain in the 1st day in LIFT group was 3.7 ± 2.2 and in fistulectomy group 4.9 ± 1.2, pain was significantly less after LIFT surgery. This finding is due to smaller wound and less tissue trauma resulting from dissection. Nambirajan et al.

comparative study also recorded a significant difference between study groups in operative time, postoperative pain and time of wound healing **(Nambirajan, 2022)**.

Although there was difference in mean hospital stay between groups A & B (1.8 ± 0.3 and 2.1± 0.5 days respectively), the difference was insignificant (p= 0.25). Other studies showed significantly shorter hospital stay in LIFT patients due to shorter recovery and less pain and analgesics required **(Al Sebai et al., 2021; Nambirajan, 2022)**.

Wound time for healing in current study was clearly shorter in LIFT patients (3-8 weeks) with mean value of 4.12 ± 0.9 weeks versus 5-12 weeks in fistulectomy patients and mean value 8.78 ± 2.64 weeks (p = 0.003). Failure of healing was reported in 3 patients of LIFT group and 5 patients of fistulectomy group and reported as recurrent cases. Similar results obtained in many comparative studies as in Elfeki et al. study and Wang et al. study that showed shorter healing time in LIFT than in fistulectomy group. Also in Saeed et al. study healing time was 3 ± 2.2 weeks in LIFT group and 7 ± 3.4 weeks and Cianci et al. reported average healing time of 4 weeks (3-5 weeks) in LIFT procedure. Results are understandable as large deep wound in fistulectomy needs more time to heal and more liable to infection that delays healing and even leads to more failure of healing compared to small wounds **(Elfeki et al., 2018; Wang et al., 2017; Saeed et al., 2022; Cianci et al., 2019)**.

Postoperative complications analysis in the study showed mild to moderate surgical site infection 4 versus 7 patients (17.3 % versus 28%) in group A and B respectively, all patients treated by antibiotics and no surgical drainage was indicated. No major bleeding was reported, only minor wound bleeding was recorded in 2 post-LIFT patients & 4 post-fistulectomy patients (8.6 % and 16 %). These reports are also explained by deep and large wounds of fistulectomy that proceed to more chances for infection and bleeding **(Saeed et al., 2022)**.

As regard fecal incontinence, no patients were reported in LIFT group while in fistulectomy patients there was 3 patients (12 %) complaining postoperative incontinence to flatus, complain was temporary and all patients improved within 2-3 weeks after surgery. Studies done previously as in Alapach et al and Vinay et al studies comparing LIFT to fistulectomy techniques had shown that LIFT is an effective and safe procedure and recorded lower incidence of fecal incontinence **(Alapach and Khaimook, 2014; Vinay and Balasubrahmanya, 2017; Nambirajan, 2022)**.

In current study the sum of recurrence was 15 patients; 31.2 %, 6 patients in LIFT group and 9 patients in fistulectomy group (26.1 % and 36 % respectively), failure of wound healing was 3 post LIFT patients versus 5 post-fistulectomy patients. Despite this difference, recurrence was statistically insignificantly in studied groups (p = 0.3). In other studies, there was significant difference between LIFT and other procedures. In early study of Rojanasakul et al. **(Rojanasakul et al., 2007)** a success rate of 94.4% and early recurrence rate of 5.6% were reported with no reported cases of incontinence. Later on, Bleier et al. reported 82.2 % success rate and 43 % recurrence within 3-8 months, other studies mentioned 57% - 68%. In the study of Sirikurnpiboon conducted on 250 total

patients with fistula in ano including 148 patients underwent LIFT between 2015 and 2020, recurrence rate was after LIFT surgery was 22.97% diagnosed between 60 and 200 days. Placer et al. study reported lower recurrence in LIFT with variable patterns in the new recurrent fistula including inter-sphincteric fistula, remaining original fistula, and remaining external part tract **(Rojanasakul et al., 2007; Placer Galán et al., 2017; Bleier et al., 2010; Ooi et al., 2012; Sirikurnpiboon, 2023; Ye et al., 2015)**.

Risk factors for fistula recurrence could be divided into three types of factors: patient-related factors, fistula-related factors and surgeons' experience. Patient related factors like immunocompromization, obesity, smoking, diabetic mellitus and Crohn's disease. Fistula-related factors like type; supra-sphincteric and extra-sphincteric fistulas have higher risk of recurrence. Also horse show extension is a common factor of high recurrence in trans-sphincteric fistula. Although a surgeon learning curve is usually an important factor for any procedure to improve results, Sirikurnpiboon in his study assumed that a surgeon with 20 years of self-studied LIFT experience can perform the surgery with no difference in outcomes compared to results of newly practicing surgeon who was recently learned with proctorship, so he considered LIFT surgery is not a difficult and does not require a steep learning curve **(Sirikurnpiboon, 2023; Tabry and Farrands, 2011; Sirany et al., 2015)**.

Conclusion

LIFT operation has an advantage in sphincter preservation with advantages of shorter surgery time, lower postoperative pain severity, shorter time required for wound healing and lower risk of fecal incontinence in comparison to fistulectomy but no difference found as regard recurrence rates. More reliable findings as regard precious findings as well as recurrence incidence still require further studies on larger database

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Conflict of Interest: Nil

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