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Comparative Study between Re-Routing Technique and Ligation of Intersphincteric Fistula Tract (LIFT) In Treatment of High Perianal Fistula

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Abstract: Background: Complex anal fistula has been a hot topic in clinic. Many surgical techniques have been described for the treatment of such anal fistula, including the use of seton, fibrin glue, collagen plugs, rectal advancement flaps, fistulotomy with sphincter repair, and rerouting the fistula tract. However, the results have been variable, and no one procedure is superior to the others absolutely. It is worth our concern that the goal of any treatment procedure is to obliterate the tract and to have low recurrence rates while maintaining full continence. **Aim of the Work:** an objective comparison was made between the two procedures focusing on multiple aspects of both procedures to stand on the superiority of each one over the other. We compared data including: Healing time, post operative bleeding and infection, recurrence rates and continence. **Patients and Methods:** The study was conducted over 60 patients with high trans-sphincteric fistulas, randomly divided into 2 equal groups, who underwent Rerouting of the tract and LIFT procedure. **Results:** In comparison of the recurrence rate, postoperative complications and continence the results were similar in both groups with no statistically significant difference. **Conclusion:** In patients with high trans-sphincteric anal fistulas, both ligation of intersphincteric fistula track procedure and rerouting technique have a similar long-term healing rate, recurrences, continence, and quality of life.
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1. Introduction

Fistula-in-ano is a common medical problem affecting thousands of patients annually. [1] Most fistulas are thought to arise as a result of cryptoglandular infection with resultant perirectal abscess. The abscess represents the acute inflammatory event, whereas the fistula is representative of the chronic process. Symptoms generally affect quality of life significantly, and they range from minor discomfort and drainage with resultant hygienic problems to sepsis. [2]

The true prevalence of anal fistulas is unknown, as anorectal discomfort is often attributed to symptomatic hemorrhoids. The incidence of an anal fistula developing from an anal abscess ranges from 26 to 38 percent. The mean age for presentation of anal abscess and fistula disease is 40 years (range 20 to 60). Adult males are twice as likely to develop an abscess and/or fistula compared with women. [3]

Different classifications have been put forward which categorize these Fistula into low or high simple or complex, or according to their anatomy inter-sphincteric, trans-sphincteric, and supra- sphincteric or extra-sphincteric. [4]

The ideal treatment for an anal fistula should be associated with low recurrence rates, minimal incontinence and good quality of life. Because of the risk of a change in continence with conventional techniques, sphincter-preserving techniques for the management of complex anal fistulae have been evaluated. [5]

To achieve the objective in high anal Fistula, different surgical techniques have been described in literature from time to time. These include Park's fistulotomy, insertion of a seton, two-stage fistulotomy, primary fistulectomy with occlusion of the internal ostium, fistulotomy with primary repair of the sphincter, endorectal advancement flaps, anocutaneous advancement flap, repair of fistula using fibrin adhesive glue and re-routing the fistula. The number of procedures mentioned indicates that there is no single established way of treating these high Fistulas. [6]

Conventional laying-open technique in high perianal fistula may involve sacrifice of part or whole

of the sphincter muscle impairing continence. It is quite obvious that the more the extent of anal muscle division, the greater the degree of anal incontinence. [7]

A transposition technique for the management of high anal and anorectal fistulae is described by Mann and Clifton in 1985. The method involves re-routing the extrasphincteric portion of the track into an intersphincteric position with immediate repair of the external sphincter. The newly positioned intersphincteric fistula is then dealt with at a later date when the external sphincter is soundly healed. [8]

In 2007 Arun Rojanasakul et al. Departement of Colorectal Syrgery, Chulalongkorn University, Bangkok, Thailand, developed the technique Ligation of the Intersphincteric Fistula Tract (LIFT). The central idea of this procedure is that the excision and ligation of intersphincteric tract can occlude the entry of fecal particles in the fistula and, at the same time, eliminate the septic focus intersphincteric. [9]

Aim of the work

The aim of this study is to prospectively evaluate the success rate, the recurrence and incontinence when using the re-routing technique in comparison to Ligation of Intersphincteric Fistula Tract (LIFT) for treating high trans-shpincteric perianal fistula.

2. Patients and methods

This study is a randomized prospective study which will be conducted at Ain Shams University hospitals recruiting (60) patients and will be operated upon between October 2016 and October2017 with minimal follow up to 12 months postoperatively.

An informed consent is taken from all patients who accept to participate in the study. Risks, complications and alternative procedures are explained to the patient. Confidentiality is assured of the personal data and medical information of all patients.

Inclusion criteria:

Fistula in ano, High Trans-sphincteric Type (Primary or recurrent)

Exclusion criteria:

Patients with low perianal fistula. Patients with Horse-shoe fistula. Patients with inflammatory bowel disease or tuberculosis. Patients with acute perianal abscess. Patients with major incontinence.

All the patients in this study was under the care of one surgical team under supervision of consultant surgeon.

Methods:

All patients were subjected to the following:

Preoperative:

Clinical history:

Personal history:

Personal history including age, occupation, and special habits of medical importance particularly smoking. **History of present illness:** mode of onset, duration of illness, any previous treatment for intestinal disease like tuberculosis, ulcerative colitis and Crohn's disease and history of previous surgeries in the perianal area. **Past history of medical diseases:** such as diabetes, drug allergy, previous blood transfusion, and previous operations.

Clinical examination: Clinical examination of the perineum and ano-rectum, and proctoscopy to detect the type of fistula.

The degree of continence is evaluated by The Wexner scoring system.

Investigations:

Routine preoperative investigations are requested for all patients, including complete blood picture, coagulation profile, liver and kidney function tests, fasting blood sugar, chest x-ray. Special investigations are requested for patients with specific complaints as pulmonary function tests for patients with manifestations of chronic obstructive airway disease; ECG for patients above the age of 40. **MRI (Magnetic resonance imaging)** for anorectal region.

The first group (A) will include 30 patients who will undergo the rerouting technique.

The second group (B) will include 30 patients who will undergo Ligation of Intersphincteric Fistula Tract (LIFT).

Operative technique for group (A):

Position: Lithotomy. Anesthesia: General or Spinal anesthesia. 500 mg of metronidazole with 1.5 gm of cefuroxime given intravenously at the beginning of surgery. Antisepsis of the operative site. Inspection is followed by a digital rectal examination and proctoscopy. The site of the external opening is probed to define the internal opening. Identification is aided, if necessary by a dilute hydrogen peroxide injection through the external opening. Assessing the extent and disposition of the fistula by palpation and the gentle use of a probe which is kept as a guide for dissection. The skin around the external opening is elliptically incised and the track is dissected as high as possible. The fistulous track is "cored-out" up to and through the external sphincter or puborectalis muscle which are clearly exposed during the operation. Then the inter-sphincteric plane is opened and dissected up to the opening of the fistulous track. The external part of the track is now passed through the hole in the sphincter and is brought down into the inter-sphincteric plane. At second stage (after 4 to 5 weeks) when the external wound is healed, the fistulous track marked by silk, is laid open by dividing the remaining tissues.

Operative technique for group (B):

Position: Lithotomy. Anesthesia: General or Spinal anesthesia. 500 mg of metronidazole with 1.5 gm of cefuroxime given intravenously at the beginning of surgery. Antisepsis of the operative site. Inspection is followed by a digital rectal examination and proctoscopy. The site of the external opening is probed to define the internal opening. Identification is aided, if necessary by a dilute hydrogen peroxide injection through the external opening. Assessing the extent and disposition of the fistula by palpation and the gentle use of a probe which is kept as a guide for dissection. Dissection through intersphincteric plane to find intersphincteric fistula tract. Secure suture ligation of intersphincteric fistula tract close to the internal opening. Remove the fistula tract. Curette fistula tract from external opening to remove all granulation tissue. Suture closure of external sphincter muscle defect. Closure of intersphincteric wound.

Postoperative assessment:

Patients were assessed as regards: Operative time. Infection- Bleeding. Recurrence. Degree of continence by Wexner scoring system. Outcomes were evaluated at hospital, 2 weeks, 3 months, 6 months, and 1 year.

Statistical Analysis

Data were collected, revised, coded and entered to the Statistical Package for Social Science (SPSS) version 21 and the following were done:

Qualitative data were presented as number and percentages while quantitative data were presented as mean, standard deviations and ranges.

The comparison between two groups with qualitative data were done by using Chi-square test and/or Fisher exact test was used instead of Chi-square test when the expected count in any cell was found less than 5.

The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered ± significant as the following: P > 0.05: Non significant. P < 0.05: Significant. P < 0.01: Highly significant.

3. Results

The results are shown in the following Tables Tables 1-7).

Table (1): Demographic data and complications among the studied patients

		No. = 60
Age	Mean±SD Range	38.45 ± 10.51 20 – 63
Sex	Female Male	10 (16.7%) 50 (83.3%)
Fecal Diversion	No	60 (100.0%)
DE Novo/Recurrent	De novo Recurrent	32 (53.3%) 28 (46.7%)
Wexner score before operations	0	60 (100.0%)
Complication		4 (6.7%)
Post-op bleeding	No Yes	59 (98.3%) 1 (1.7%)
Incontinence	No	60 (100.0%)
Perianal absc	No	60 (100.0%)
Stitch sinus	No	60 (100.0%)
Infection	No Yes	57 (95.0%) 3 (5.0%)
Wexner score after all operations	No Yes	59 (98.3%) 1 (1.7%)
1st stage in weeks	Mean±SD Range	5.08 ± 0.74 4 – 7
2nd stage in days	Mean±SD Range	8.77 ± 1.96 6 – 13
Recurrence rate	No Yes	51 (85.0%) 9 (15.0%)

Table (2): Comparison between rerouting group and lift group regarding demographic data, fecal diversion, denovo/recurrent and Wexner score before operation.

		Rerouting group No. = 30	LIFT group No. = 30	Test value	P-value	Sig.
Age	Mean±SD Range	39.07 ± 10.41 20 – 63	37.83 ± 10.74 20 – 63	0.451•	0.653	NS
Sex	Female Male	5 (16.7%) 25 (83.3%)	5 (16.7%) 25 (83.3%)	0.000*	1.000	NS
Fecal Diversion	No	30 (100.0%)	30 (100.0%)	NA	NA	NA
DE Novo/Recurrent	De novo Recurrent	15 (50.0%) 15 (50.0%)	17 (56.7%) 13 (43.3%)	0.268*	0.605	NS
Wexner score before operations	0	30 (100.0%)	30 (100.0%)	NA	NA	NA

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS)
*: Chi-square test; •: Independent t-test

Table (3): Comparison between rerouting group and lift group regarding incidence and types of complications.

		Rerouting group		LIFT group		Test value*	P-value	Sig.
		No.	%	No.	%			
Complication **** Non-complicated*** ****Complicated***		29 1	96.7% 3.3%	27 3	90.0% 10.0%	1.071	0.301	NS
Post-op bleeding	No Yes	30 0	100.0% 0.0%	29 1	96.7% 3.3%	1.017	0.313	NS
Incontinence	No	30	100.0%	30	100.0%	NA	NA	NA
Perianal absc	No	30	100.0%	30	100.0%	NA	NA	NA
Stitsh sinus	No	30	100.0%	30	100.0%	NA	NA	NA
Infection	No Yes	29 1	96.7% 3.3%	28 2	93.3% 6.7%	0.351	0.554	NS
Wexner score after all operations	No Yes	30 0	100.0% 0.0%	29 1	96.7% 3.3%	1.017	0.313	NS

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS) *:Chi-square test

Table (4): Comparison between rerouting group and lift group regarding time of healing.

		Rerouting group No. = 30	LIFT group No. = 30	Test value•	P-value	Sig.
1st stage in weeks	Mean±SD Range	5.23 ± 0.77 4 – 7	4.93 ± 0.69 4 – 6	1.583	0.119	NS
2nd stage in days	Mean±SD Range	8.77 ± 1.96 6 – 13	-- --	--	--	--

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS) •: Independent t-test

Table (5): Comparison between rerouting group and lift group regarding recurrence rate.

Recurrence rate	Rerouting group		LIFT group		Test value*	P-value	Sig.
	No.	%	No.	%			
No Yes	27 3	90.0% 10.0%	24 6	80.0% 20.0%	1.176	0.278	NS

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS) *:Chi-square test

Table (6): Relation of recurrence with demographic data of the studied patients

		No Recurrence No. = 51	Recurrence No. = 9	Test value	P-value	Sig.
Age	Mean±SD Range	37.51 ± 9.74 20 – 60	43.78 ± 13.56 25 – 63	-1.675•	0.099	NS
Sex	Female Male	8 (15.7%) 43 (84.3%)	2 (22.2%) 7 (77.8%)	0.235*	0.628	NS
Fecal Diversion	No	51 (100.0%)	9 (100.0%)	NA	NA	NA

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS) *: Chi-square test;
•: Independent t-test

Table (7): Relation of recurrence with de novo/recurrent, Wexner score before operation and complications

		No Recurrence		Recurrence		Test value*	P-value	Sig.
		No.	%	No.	%			
DE Novo/Rec	Denovo Recurrent	29 22	56.9% 43.1%	3 6	33.3% 66.7%	1.702	0.192	NS
Wexner score before operations	.0	51	100.0%	9	100.0%	NA	NA	NA
complication	Non-complicated Complicated	49 2	96.1% 3.9%	7 2	77.8% 22.2%	4.118	0.042	S

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS) *: Chi-square test

4. Discussion

Anal fistulas have been treated since the beginning of medicine and the classical treatment of anal fistulas is to surgically lay-open the fistula (fistulotomy). Although this treatment is highly effective for healing of anal fistulas, fistulotomy risks diminished fecal continence in patients with anal fistulas that require division of a large proportion of the anal sphincters. In modern colorectal surgery the main objective in treatment of anal fistulas is healing of the fistula without diminished fecal continence. Recent findings even indicate that for most patients it is more important to minimize their risk of diminished faecal continence than to have a highly successful treatment for their fistula. Over time several sphincter preserving procedure have been developed for anal fistulas. [10]

Rerouting technique was first described by Mann and Clifton in 1985. A transposition technique for the management of high anal and anorectal fistulae is described. The method involves re-routing the extrasphincteric portion of the track into an intersphincteric position with immediate repair of the external sphincter. The newly positioned intersphincteric fistula is then dealt with at a later date when the external sphincter is soundly healed. In this way the number of operations needed to deal with such a fistula may be reduced, a colostomy is not necessary, healing is more rapid and continence is preserved. The value of the procedure lies principally in that it enables complete laying-open to be achieved without sacrificing either the normal shape or the integrity of the external sphincter muscle. [8]

First paper concerning the LIFT technique was described in 2007 by Rojanasakul and his colleagues and reported impressive healing rate (over 94%) with no complications for transsphincteric fistulas. Since then, LIFT was familiar to clinicians; long-term success rates from studies with a follow-up period report healing rates of 40–95% for LIFT. [9]

In this thesis, we evaluated the two sphincter preserving procedures for anal fistulas. The present prospective randomized trial was conducted to assess the value of rerouting of the tract technique in the treatment of high trans-sphincteric anal fistulas compared with the Ligation of intersphincteric tract technique.

60 patients were operated on, 30 in each group with follow up period 1 year postoperative.

Out of 30 patients in the rerouting group only one case suffered from postoperative complications in the form of infection of the external wound (3.3%), in comparison to 3 cases out of 30 suffering from postoperative complications in the LIFT group (10%), a case of postop bleeding and hematoma and two cases of infection. However this was found not statistically significant.

In the current study, average time for healing was 5.23 ± 0.77 vs 4.93 ± 0.69 in rerouting and LIFT respectively which was not statistically significant.

In comparison of the recurrence rate in cases with post-operative complications and those without,

statistically significant relation found with complications with p-value = 0.042.

After 1 year of follow-up, the recurrence rate in patients was 20% in lift group compared with 10% in the rerouting group which was not statistically significant.

Comparing both groups, we found no significant difference in the postoperative quality of life or change in wexner scoring after 1 year.

In search of literature, we found no studies so far comparing these two procedures in retrospective or prospective manner. Also few studies were found describing the rerouting technique.

Comparing to the literature regarding the rerouting technique, it was found the procedure described by Mann and Clifton in 1985, performing the rerouting technique on 5 patients with healing rate 100% and no recurrences with follow up reaching up to 3 years. [8]

Another paper describing fourteen patients with high anal fistulae were treated at Basrah General Hospital from 1992 to 2000 by re-routing of the track and the external opening to the anal canal. All patients had satisfactory results, with a period of follow up ranging from 10 to 91 months, no recurrence of fistulae or abscess formation. Healing was rapid, short hospital stay and continence to flatus and faeces preserved. [11]

Comparing to the literature regarding the LIFT technique, Gendia et al describes in a meta-analaysis overall healing rates of the pooled data were 78.9% (95% CI 58.5–93.7). Overall healing rates increased in 2 studies: 92% (95% CI 73.969–99.016) and 100% (95% CI 84.56–100.0). [12]

Recurrences occurred in only 3 studies with 8% (95% CI0.984–26.031), 20% (95%CI8.441–36.938), (and25.8% (95% CI 17.287–35.923) with median time to recurrence of 3.5, 4, and 7 months respectively. [12]

Other notable complications when mentioned were, secondary bleeding in 1 patient, one patient had hematoma in a study with 93 patient, and finally wound dehiscence and infection in intersphinteric wound of 7 patients in 2 studies with 47 patient. [12]

In all studies, there was no change in continence function, except in one study which reported that 1 patient had incontinence for liquid and gas, and 4 patients reported incontinence for gas. [12]

Our results are in concordance with the findings reported.

The limitations of this study include the length of follow-up, keeping in mind that we do not have clear data about the expected time of recurrence in either procedure. Van der hagen reported that recurrences still occur many years after initial healing. [13]

Further work is still warranted to confirm the long term outcome of these 2 techniques. In addition, the determination of predictors of failure of both techniques would be useful in defining their roles in the surgical management of all anal fistulas.

Conclusion

In patients with high trans-sphincteric anal fistulas, both ligation of intersphincteric fistula track procedure and rerouting technique have a similar long-term healing rate, recurrences, continence, and quality of life.

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