

# Predictive Factors Affecting Recurrence of Anal Fistula after LIFT Procedure

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## ABSTRACT

**Objective:** To determine the predictive factors affecting the recurrence or persistence of anal fistula of demographic and technical variables.

**Study Design:** Descriptive study.

**Place and Duration of Study:** Department of General Surgery and Radiology, Private Ortadogu Hospital General, Turkey, between 2014 and 2020.

**Methodology:** The recurrence, persistence, and complication rates of 176 patients who underwent LIFT were compared with demographic and technical data by multivariate logistic regression analysis. Inclusion criteria were patients with anal fistula cryptoglandular origin. Exclusion criteria included patients with intersphincteric fistula, rectovaginal fistula, abscess, pilonidal sinus fistula, and inflammatory bowel disease. Recurrence was defined as the opening of a fistula that persisted after 3 months.

**Results:** The mean age was 38.6±9.0 years. The mean BMI was 31.9±5.7 Kg/m<sup>2</sup>. There were no statistically significant differences between the two groups concerning, age, the complexity of fistula tract(s), the surgical technique of suture versus ligation, operation time, and seton placement duration. Twenty-three patients had previous fistula surgery. Twenty-One patients had previously required seton drainage. Higher BMI, being male, having a prior fistula surgery, and having a height IFO >15 were independent risk factors for recurrence (OR =1.28, 5.69, 23.39, and 15.38 respectively).

**Conclusion:** Higher BMI, male gender, having a prior fistula surgery, and having a height IFO >15 were independent risk factors for recurrence.

**Key Words:** LIFT, Anal fistula, Recurrence, Wexner incontinence score (WIS), Male, Prior fistula surgery, height IFO.

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## INTRODUCTION

Anal fistula is one of the most frequent benign anorectal diseases and its incidence is 8.6 cases per 100000 people.<sup>1</sup> Most anal fistulas are cryptoglandular in origin because approximately 85% of anal fistulas develop after anorectal abscess and/or infection, and 30-50% result in a fistula.<sup>1,2</sup>

Ligation of intersphincteric fistula tract (LIFT) procedure was first defined in 2007 by Rojanasakul *et al.*<sup>3,4</sup> The main purpose of the LIFT procedure involves ligating and excising the intersphincteric portion of the fistula tract, thus preventing faecal particles from entering the fistula tract.<sup>5</sup>

Although there are many studies on the success and complication ratio of the LIFT operation, there is no agreement on the predictive factors affecting the recurrence after LIFT. The aim of this study was to examine the complication rates and overall recovery after LIFT and determine the predictive factors affecting the recurrence or persistence of anal fistula by multivariate logistic regression analysis of demographic and technical variables.

## METHODOLOGY

Perianal fistula patients, who experienced LIFT operation between April 2014 and May 2020 were included in this descriptive study conducted at the Private Ortadogu Hospital, Turkey. Inclusion criteria were patients with cryptoglandular origin and fistula who underwent the LIFT procedure. Exclusion criteria included patients with intersphincteric fistula, rectovaginal fistula, abscess, pilonidal sinus fistula, hidradenitis suppurativa, inflammatory bowel disease, and anal carcinoma. Wexner incontinence score (WIS) was used to evaluate preoperative and postoperative incontinence.

The internal opening of the anal fistula was detected by giving methylene blue from the external mouth, and an incision was

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made 2 cm above the intersphincteric group, parallel to the anal verge. Dissection as far as the intersphincteric area was continued with scissors or electrocautery until the fistula tract was detected. The tract was then sutured or tied from the side by polyglactin 3/0 (Vcryl 3/0) near the internal opening before cutting, confirming the correct tract by giving methylene blue, and then suturing or ligating the tract from the external rim. Then the excised tract was sent to pathology. Patients were checked 2 weeks after the operation. Subsequent check-ups were carried out every 4 weeks until recurrence or full recovery. The follow-up period was 34 months.

Recurrence was defined as the opening of a fistula that persisted after 3 months, the development of a new fistula after the fistula was closed, or the persistence of the fistula on postoperative magnetic resonance imaging (MRI). Cukurova University, the Faculty of Medicine, Clinical Ethical Board approved the study. Written informed consent was obtained from all patients and parents.

Statistical analysis was performed using SPSS software (Version 23.0, SPSS Inc., Chicago, IL, USA). If continuous variables were normal, they were described as the mean  $\pm$  standard deviation ( $p > 0.05$  in Kolmogorov-Smirnov test or Shapiro-Wilk ( $n < 30$ )), and if the continuous variables were not normal, they were described as the median (Min-Max) and range. The continuous variables were compared by the use of the Student t-test or Mann-Whitney U test depending on parametric or non-parametric values; respectively. The categorical variables were expressed as count and percentages. The categorical variables (also called qualitative variables; for example gender and recurrence yes/no) between the groups were analysed by using the Chi-square test or Fisher's Exact Test. Factors associated with a p-value of less than 0.1 in univariate analysis were further evaluated in a multiple regression analysis. The level for statistical significance was predetermined at  $p < 0.05$ .

## RESULTS

Between April 2014 and May 2020, 176 patients with the diagnosis of perianal fistula were operated on with the LIFT procedure. There were 104 (59.1%) male patients and 72 (40.9%) female patients. The mean age was  $38.8 \pm 9.0$  years. The mean body mass index (BMI) was  $31.9 \pm 5.7$  Kg/m<sup>2</sup>. The median preoperative WIS score of 132 patients was 0.15 (0.09-0.22). The preoperative WIS score was zero in the other 44 (25%) patients. Postoperative mean WIS scores at 4 weeks and median 12 weeks were  $0.16 \pm 0.03$ , and  $0.16$  (0.11-2.00) respectively.

Twenty-three (13.1%) patients had previous fistula surgery. Twenty-One (11.9%) patients had previously required seton drainage. Recurrence developed in 26 (14.8%) patients. Forty-eight (27.3%) patients were smoking. Thirteen (7.4%) patients had diabetes mellitus with oral medications. Complex fistula was present in 165 (93.8%) patients. The median overall follow-up was 34 (14-45) months.

Demographic characteristics and fistula classification of patients with and without recurrence are shown in Tables I and

II. There were no statistically significant differences between the two groups concerning, age, the complexity of fistula tract(s), the surgical technique of suture *versus* ligation, operation time, and seton placement duration.

Multivariate logistic regression analysis was used to determine independent risk factors influencing recurrence. It has been determined that the patient's high BMI, being male, having a prior fistula surgery, and having a height internal fistula opening (IFO)  $> 15$  are independent risk factors for recurrence Table III.

## DISCUSSION

Treatment of anal fistula is still complex, although there are many options.<sup>5,6</sup> There is no single procedure for all fistulas, therefore treatment should be chosen individually.<sup>7</sup> Many surgical techniques have been described, including the use of seton, fibrin glue, collagen plugs, rectal advancement flaps, fistulotomy with sphincter repair, and rerouting the fistula tract.<sup>8</sup> The LIFT operation has appeared as an encouraging sphincter-saving procedure for anal fistulas with complex transsphincteric components.<sup>9</sup>

LIFT is a new technique to cure complex, trans-sphincteric anal fistula, and can be performed successfully even in recurrent fistulas.<sup>10,11</sup> In this cohort, the success ratio for LIFT was 85.2% with a median follow-up of 34 (14-45) months.<sup>7</sup>

In a meta-analysis by Emile *et al.*, it was stated that 85% of anal fistula cases performed with LIFT are transsphincteric. Because extra and supra sphincteric fistulas account for less than 4% of all fistula kinds, it is acceptable to treat transsphincteric fistulas with LIFT.<sup>9</sup> In this meta-analysis, the success rate of the LIFT procedure was 76.8%, and the rate of persistence or recurrence was 22%. In this study, the chance of success may have been higher due to the exclusion of horseshoe and Crohn's disease.

Recurrence has been associated with past fistula operations ( $p < 0.001$ ).<sup>12</sup> Besides prior operation, several other parameters have been related to recurrence. The height of the fistula,<sup>13</sup> genders, smoking, and obesity have also been related as reasons for recurrence or persistence.<sup>13,14</sup> In the study by Vander *et al.*, the height of IFO and previous surgery were found to be significant in terms of recurrence.<sup>15</sup> Another reason for the present success rate to be higher than the success rates in the literature is that preoperative MRI was performed in 69.9% of the patients. Pretreatment with Seton is still controversial. In this study, it was not associated with recurrence.<sup>15,16</sup>

One of the predictors for recurrence in this study was the height of the internal fistula opening. It is believed that the height of the internal fistula opening is very important in defining the complexity of the fistula. The unpredicted finding was that men experienced more recurrences than women. In the study by Vander *et al.*, males were found to be more significant in terms of recurrence.<sup>15</sup> There was no statistically significant difference in WIS preoperative and postoperative 4<sup>th</sup> and 12<sup>th</sup>-week scores. Almost all studies in the literature agree that the LIFT procedure is a promising sphincter-sparing procedure.

**Table I: Overall characteristics of the studied group.**

	Recurrence		p
	No (n=150)	Yes (n=26)	
Age (years)	38.9±8.9	39.9±10.1	t:0.519
BMI (Kg/m <sup>2</sup> )	31.1±5.6	36.9±2.5	t:<0.001
Operation time minutes	45(20-110)	43(26-86)	U:0.767
Overall follow up months	34(15-45)	37(14-45)	U:0.266
WIS score preoperative	0.15(0.09-0.21)	0.13(0.09-0.22)	U:0.256
WIS score postoperative 4 week	0.16±0.02	0.16±0.04	t:0.939
WIS score postoperative 12 week	0.16(0.11-2.0)	0.16(0.12-0.23)	U:0.760

t: Independent Sample t-test (Mean±SD); U: Mann Whitney U test (Median (Min-Max)). Men experienced more recurrences than women 21(80.8 %) and 5(19.2 %), p = 0.017.

**Table II: Variables' distribution in those with anal fistula recurrence after LIFT procedure or otherwise.**

	All	Recurrence				p
		No (n=150)		Yes (n=26)		
		n	%	n	%	
Gender						
Female	72	67	44.7	5	19.2	0.017
Male	104	83	55.3	21	80.8	
Smoking tobacco						
No	128	119	79.3	9	34.6	<0.001
Yes	48	31	20.7	17	65.4	
Diabetes mellitus						
No	163	141	94.0	22	84.6	0.105
Yes	13	9	6.0	4	15.4	
Prior to fistula surgery initial						
No	153	140	93.3	13	50.0	<0.001
Yes	23	10	6.7	13	50.0	
Height IFO						
<20	157	135	90.0	22	84.6	0.490
>20	19	15	10.0	4	15.4	
Height IFO						
<15	133	126	84.0	7	26.9	<0.001
>15	43	24	16.0	19	73.1	
Preoperative MRI						
No	53	41	27.3	12	46.2	0.065
Yes	123	109	72.7	14	53.8	
Postoperative MRI						
No	153	142	94.7	11	42.3	<0.001
Yes	23	8	5.3	15	57.7	
Fistulas requiring seton drainage						
No	155	133	88.7	22	84.6	0.521
Yes	21	17	11.3	4	15.4	
Transsphincteric						
Low	14	13	8.7	1	3.8	0.681
Mid	22	18	12.7	3	11.5	
High	140	118	78.7	22	84.6	
Fistula						
Simple	11	9	6.0	2	7.7	0.667
Complex	165	141	94.0	24	92.3	
Closure technique						
Suture	120	105	70.0	15	57.7	0.255
Ligation	56	45	30.0	11	42.3	
Hospital stay						
1 day	116	101	67.3	15	57.7	<0.001*
2 day	52	48	32.0	4	15.4	
3 day	8	1	0.7	7	26.9	

p: Fisher Exact test; \*: Chi-Square test.

**Table III: Multivariate logistic regression analysis identifying independent risk factors affecting recurrence.**

	B	S.E.	Wald	df	p	Odds Ratio	95% C.I. for Odds Ratio	
							Lower	Upper
BMI	0.25	0.08	8.73	1	0.003	1.28	1.09	1.51
Gender (M)	1.74	0.87	4.02	1	0.045	5.69	1.039	31.16
Smoking tobacco (1)	0.85	0.69	1.49	1	0.221	2.34	0.59	9.14
Prior fistula surgery initial (1)	3.15	0.94	11.32	1	0.001	23.39	3.73	146.73
Height IFO >15	2.73	0.69	15.67	1	<0.001	15.38	3.98	59.55
Constant	-10.92	3.18	11.76	1	<0.001	0.00		

In many studies found in the literature, it is seen that the follow-up period was less than one year. In this study, follow-up period was 34 months, which is a sufficient follow-up period.

### CONCLUSION

The LIFT procedure is a successful method in terms of its applicability as an incontinence protective procedure and with a success rate of 85.2%. It has been determined that the patients' high BMI, being male, having a prior fistula surgery, and having a Height IFO >15 are independent risk factors for recurrence.

### ETHICAL APPROVAL:

Permission was taken from the Cukurova University Ethics Committee vide No. 2018-76, dated 13.04.2018.

### PATIENTS' CONSENT:

Written informed consent were obtained from the parents of each subject in the study.

### COMPETING INTEREST:

The authors declared no competing interest.

### AUTHORS' CONTRIBUTION:

MB: Conception and design, data acquisition and analysis, interpretation, and drafting.

YA: Conception and design, interpretation, and critical revision.

All the authors have approved the final version of the manuscript to be published.

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