

Comparison of the modified ligation of intersphincteric fistula tract (LIFT) with Incision thread drawing method on serum IgA and IL-10 levels in high simple anal fistula

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Abstract

Objective: To compare the effect of different techniques on serum immunoglobulin A and interleukin-10 in patients with high simple anal fistula.

Method: The cross-sectional study was conducted at Dongyang People's Hospital, Weishan, China, from January 2019 to April 2021, and comprised patients with high simple anal fistula who were randomly and equally divided into Group A getting treatment with modified ligation of intersphincteric fistula tract, and Group B getting treatment with incision-thread-drawing method. Serum immunoglobulin A and interleukin-10 as well as the Wexner score were compared between the groups. Data was analysed using SPSS 25.

Results: Of the 140 patients, there were 70(50%) in each of the two groups. There were 125(89.2%) male subjects overall. The mean age in Group A was 38.91±8.91 years, while in Group B it was 38.20±8.51. Mean hospital stay in Group A was shorter than that in Group B ($p<0.001$). Mean serum immunoglobulin A and interleukin-10 values were not significantly different at baseline, but on day 7 post-surgery, the difference was significant between the groups ($p<0.05$). Likewise, Wexner score was significantly different at 3 months post-surgery ($p<0.05$). There was no significant difference in the incidence of postoperative complications between the groups ($p=0.730$).

Conclusion: The modified ligation of intersphincteric fistula tract method was found to be a better option in the management of patients with high simple anal fistula.

Keywords: Modified ligation of intersphincteric fistula tract, LIFT, Incision-thread-drawing method, High simple anal fistula, Immunoglobulin A, IgA, Interleukin 10, IL-10. (JPMA 73: 792; 2023)

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Introduction

Anal fistula is a common anorectal disease and can occur at any age. High simple anal fistula (HSAF) is a common anal fistula.¹ Surgery is the only way to manage a fistula.² The surgical treatment of HSAF pays attention not only to the cure rate, but also to the recovery of the patients after the operation and the preservation of the anal function. Incision-thread-drawing (ITD) is a common method for HSAF treatment, but it has a risk of causing anal dysfunction and deformity.³ In 2007, the treatment of anal fistula through ligation of intersphincteric fistula tract (LIFT) was proposed for the first time as an alternative method that can preserve the function of anal sphincter, reduce postoperative complications, and alleviate surgical pain.⁴ In recent years, the LIFT technique has improved. To avoid the possibility of recurrence, complete resection and suture from the external port to the sphincter sulcus is

preferred.⁵ The sphincter sulcus incision is not sutured to facilitate unobstructed wound drainage.^{6,7} Modified LIFT has been described as a useful procedure for HSAF treatment.⁸

The immune function of the body can be assessed by the level of immunoglobulin A (IgA).^{9,10} Interleukin-10 (IL-10) is an important inflammatory mediator involved in systemic inflammatory response syndrome and can reflect the inflammatory response of the body.^{11,12} The effect of modified LIFT has generally not been compared with the ITD method in terms of their impact on serum IgA and IL-10 in the body.

The current study was planned to compare the effect of modified LIFT and ITD methods on serum IgA and IL-10 levels in HSAF patients.

Patients and Methods

The cross-sectional study was conducted at Dongyang People's Hospital, Weishan, China, from January 2019 to April 2021. After approval from the institutional ethics review committee, the sample size was calculated using G*Power at 0.05 significance level and 80% power with two-tailed test for difference between two independent

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means.¹³

Those included were patients who met HSAF diagnostic criteria, namely preoperative colour, three-dimensional (3D) intracavitary ultrasound and/or magnetic resonance imaging (MRI) scan confirming that the internal orifice was located in the anal recess near the dentate line. The patients had only 1 fistula and it passed through or above the anal rectum ring, had simple anal fistula, were aged 18-65 years, were in good physical condition and could tolerate surgery. The fistula was in a stable stage and had not been treated surgically; pathological examination confirmed anal fistula; no obvious abnormality of anal function before the operation; the fistula traversed the deep layer of external sphincter layer; the internal orifice of anal fistula was in the relative dentate line; and there was no rupture in the rectal cavity.

Patients excluded had high complex anal fistula (HCAF), low anal fistula, high anal fistula caused by trauma, tuberculosis (TB), syphilis, acquired immunodeficiency syndrome (AIDS), ulcerative colitis and Crohn's disease; previous history of anal and colorectal surgery; complications with other rectal diseases, like rectal cancer, colorectal polyps, perianal abscess, internal haemorrhoids, mixed haemorrhoids and anal fissures, etc.; patients with recent treatments, such as blood transfusions and infections; had diseases that may affect the level of serum IL-10; complications related to heart, liver, lung, kidney, cerebrovascular, haematopoietic systems or mental diseases; diabetes, immunosuppression and immune deficiency; and patients who were pregnant, or in the menstrual or lactating phases.

After taking informed consent from the patients, they were randomly divided into Group A and Group B using random number table. Patients in Group A were treated with modified LIFT. After routine disinfection and towel-laying, the patients were taken from prone position and anaesthetised in the spinal canal. The position of the inner orifice was determined by methylene blue test, and the probe was detected from the outer port and pierced through the inner orifice. Arc incision was made between internal and external sphincter. Sphincter fistula and internal sphincter were separated bluntly. The fistula was hooked up with right-angle forceps, and the muscle fistula tube was free. Haemostatic forceps were used to clamp the outer and internal sides of the intermuscular fistula. The fistula near the internal orifice was cut off and the medial side of the intermuscular fistula was sewed. To confirm that the fistula had been cut off, hydrogen peroxide was injected from the external orifice of the fistula. The fistula under the suture was completely resected, and the external sphincter defect of the intermuscular fistula was closed. The

wound was filled with vaseline gauze, and the external dressing was fixed.¹⁴

Patients in Group B were treated with ITD method. The anaesthesia mode and surgical position of the patients were the same as those of Group A. The position of the internal orifice and fistula was examined and the inner orifice of the anal tooth line was determined. The doctor used one forefinger to guide, while the other hand explored along the fistula from the outer orifice, and the probe was penetrated into the anus. The tissue from tooth line to the surface of the fistula was cut open to remove the internal orifice and infection lesion. Under the guidance of the probe, a rubber band was pulled and tensioned through the incision of external orifice to the inner orifice of the anorectal ring traction rubber band. Silk thread was used for ligation and fixation. Rotting tissue was removed and the wound edge was pruned. After ensuring there was no bleeding spot, the wound surface was filled, and the drainage tube was indwelled.¹⁵

The surgery time and hospital stay were noted in for both the groups. Besides, 5ml peripheral venous blood was collected before the surgery and on the 7th postoperative days. The levels of serum IgA and IL-10 were detected using the enzyme-linked immunosorbent assay (ELISA).

The Wexner score was used to evaluate the anal function of the patients pre-surgery and 3 months postoperatively. The total score ranges 0-20, with higher score indicating worse anal function.¹⁶

Postoperative complications were also noted for the entire sample, including urinary retention, air leakage, keyhole deformity, incision infection and anal incontinence.

Data was analysed using SPSS 25. Kolmogorov-Smirnov test was used for normal data distribution. Independent samples t test and chi-square test were used, as appropriate. Likewise, Data was expressed as frequencies and percentages and mean±standard deviation (SD), as appropriate. $P < 0.05$ was considered statistically significant.

Results

Of the 140 patients, there were 70(50%) in each of the two groups. There were 125(89.2%) male subjects overall. The mean age in Group A was 38.91 ± 8.91 years, while in Group B it was 38.20 ± 8.51 . Mean hospital stay in Group A was shorter than that in Group B ($p < 0.001$) (Table 1).

Mean serum IgA and IL-10 values were not significantly different at baseline, but on day 7 post-surgery, the difference was significant between the groups ($p < 0.05$). Likewise, Wexner score was significantly different at 3 months post-surgery ($p < 0.05$) (Table 2).

Table-1: Inter-group comparison of study parameters.

Parameters	Group A (n=70)	Group B (n=70)	p-value
Male [n(%)]	63(90.00)	62(88.57)	0.785
Mean Age (year) Mean±SD	38.91±8.91	38.20±8.51	0.629
Course of disease (months) Mean±SD	11.61±1.32	11.74±1.29	0.541
Fistula length (mm) Mean±SD	28.79±3.28	29.02±3.19	0.674
Operation time (min) Mean±SD	43.95±3.35	43.78±3.14	0.762
Hospital stay (d) Mean±SD	9.66±2.28	14.71±2.31	<0.001

SD: Standard deviation.

Table-2: Inter-group comparison of the study variables.

Study variables	Group A (n=70) Mean±SD	Group B (n=70) Mean±SD	p-value	
Serum IgA (mg/L)	Before operation	15.72±1.84	15.82±1.72	0.751
	The 7th day after operation	9.86±1.10	10.24±1.06	0.041
Serum IL-10 (ng/L)	Before operation	49.25±4.70	48.40±4.19	0.257
	The 7th day after operation	30.54±2.91	33.92±2.86	<0.001
Wexner score	Before operation	14.70±2.36	14.67±2.28	0.942
	The 3 months after operation	8.91±2.61	9.71±2.14	0.049

IgA: Immunoglobulin A, IL-10: Interleukin -10, SD: Standard deviation.

In Group A, 4(5.71%) patients had postoperative complications; 3(75%) cases of urinary retention, and 1(25%) of incision infection. In Group B, 5(7.14%) cases had postoperative complications; 4(80%) cases of urinary retention and 1(20%) of mild sensory anal incontinence ($p=0.730$).

Discussion

The formation of anal fistula is mainly caused by sphincter anal gland infection.¹⁷ As external treatment cannot eliminate fistula, operation is the main clinical choice to eradicate anal fistula. Modified LIFT can preserve anal sphincter function to the maximum extent, reduce surgical trauma, and help to reduce anal incontinence and other complications.¹⁸

Through the external orifice of anal fistula by tunnel method, the modified LIFT operation can free the fistula to the sphincter sulcus, which is conducive to the complete removal of anal sphincter fistula tissue, and also to minimise anal sphincter injury, to preserve the integrity of anal sphincter effectively to reduce surgical trauma, to reduce the degree of postoperative pain, to help speed up the recovery of the anal function, and to reduce the recurrence rate.^{19,20}

There was no significant difference in terms of gender, age, course of disease and fistula length between the groups in the current study, indicating that the baseline data of the

sample was balanced and comparable. There was no significant inter-group difference related to operation time, but the hospital stay in Group A was shorter than that in Group B, indicating faster recovery in modified LIFT surgery cases.

There was no significant difference in the incidence of postoperative complications. Postoperative urinary retention occurred in both groups, which may be related to pain in incision, excessive bladder filling after anaesthesia and the weakness of contraction.

The increase of serum IgA level leads to hyperimmunity in patients with anal fistula and aggravates the immune injury of perianal tissue.²¹ After surgical resection of necrotic tissue, the inflammatory reaction and the inflammatory factors, such as IL-10, decreases. It has been found that the surgical effect and anal function of patients were associated with anal fistula with low level of IgA and IL-10; and the levels of IgA and IL-10 are helpful in predicting the postoperative curative effect and the anal function of patients with anal fistula.²¹ Wexner anal incontinence score is a commonly used method to evaluate anal function.²² On the basis of current findings, modified LIFT could reduce the level of serum IgA and IL-10 and improve the anal function of HSAF patients compared to the ITD method.

However, a study showed that modified LIFT for high fistula achieved a success rate that was comparable with other sphincter-preserving techniques.²³ A meta-analysis showed that true therapeutic effect of LIFT compared to other sphincter-preserving techniques to treat anal fistula needed to be further determined.²⁴

The sample size and a short follow-up time are limitations of the current study. Further studies, preferably randomised controlled trials (RCTS), with large samples are recommended.

Conclusion

Compared to the ITD method, modified LIFT was found to be a worthy option as it improved the immune injury and anal function of HSAF patients, and reduced the degree of inflammatory response of the body.

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Conflict of Interest: None.

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