

Evaluation of the Effect of Open Fistula Removal in the Surgical Treatment of Anal Fistula

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Abstract: *Objective:* To analyze the treatment effect of open fistulotomy on patients with anal fistula. *Methods:* A total of 42 patients with anal fistula who visited the hospital from March 2021 to March 2024 were selected as samples and grouped using a random number table. The observation group received open fistulotomy, while the control group received conventional treatment. The differences in efficacy, surgical indicators, inflammatory factors, pain scores, and complications were compared. *Results:* The cure rate of patients with anal fistula in the observation group was higher than that in the control group, and the infection rate and recurrence rate were lower than those in the control group ($P < 0.05$). The surgical operation time, wound healing time, and hospital stay in the observation group were shorter than those in the control group ($P < 0.05$). There was no significant difference in intraoperative blood loss between the observation group and the control group ($P > 0.05$). The interleukin-4 (IL-4), interleukin-6 (IL-6), interleukin-10 (IL-10), and visual analog scale (VAS) scores in the observation group were lower than those in the control group ($P < 0.05$). The complication rate of patients with anal fistula in the observation group was lower than that in the control group ($P < 0.05$). *Conclusion:* Open fistulotomy for the treatment of patients with anal fistula can reduce inflammatory reactions, optimize surgical indicators, reduce pain, and is safe and efficient.

Keywords: Anal fistula; Open fistulotomy; Efficacy

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1. Introduction

Anal fistula is a common anal lesion, often induced by nonspecific infection. It consists of a fistula wall, internal opening, and external opening, with the pathological feature of having one internal opening and one or more external openings^[1]. Once an anal fistula forms, it is difficult to heal spontaneously. If not treated promptly, it can lead to secondary infectious purulent discharge, increasing the risk of complications such as anal incontinence, mental lethargy, and decreased body mass, thereby increasing the psychological and physiological stress on the patient. Currently, surgical procedures are commonly used to treat anal fistulas in clinical practice. Opening the wound in the form of an incision fistula can shorten the healing time. However, conventional surgical treatment

for anal fistulas carries a high risk of postoperative complications and the possibility of pseudo-healing. Open fistula resection is a new surgical approach that involves incision of the fistula and opening of the wound, which can shorten wound healing time. This article explores the efficacy of open fistula resection using a sample of 42 patients with anal fistulas who visited the hospital from March 2021 to March 2024.

2. Materials and methods

2.1. Materials

A total of 42 patients with anal fistula who visited the hospital from March 2021 to March 2024 were selected as samples and randomly divided into groups using a random number table. The baseline data of patients with anal fistula in the observation group (Group A) were compared with those in Group B, with $P > 0.05$ (Table 1).

Table 1. Baseline data analysis of patients with anal fistula

Group	n	Gender (%)		Age (years)		Duration of illness (days)	
		Male	Female	Range	Average	Range	Average
Group A	21	12 (57.14)	9 (42.86)	11–72	37.89 ± 2.42	3–15	11.89 ± 2.42
Group B	21	13 (61.90)	8 (38.10)	11–73	37.91 ± 2.39	4–16	11.91 ± 2.39
χ^2/t	-	0.0988		0.0269		0.0269	
P	-	0.7532		0.9786		0.9786	

2.2. Inclusion and exclusion criteria

Inclusion criteria: (1) Meet the criteria for anal fistula in the “Treatment Guidelines for Perianal Abscess, Anal Fistula, and Rectovaginal Fistula”^[2]; (2) No abnormalities detected in preoperative anal examination; (3) Informed consent obtained; (4) Stable vital signs.

Exclusion criteria: (1) Blood system disorders; (2) Coagulation disorders; (3) Acute infectious diseases; (4) Cardiovascular and cerebrovascular diseases; (5) Cognitive impairments.

2.3. Treatment method

2.3.1. Observation group

Patients were switched to a liquid diet one day before surgery. Enema with soapy water was prepared 4–6 hours before the operation. If imaging suggested a high anal fistula, a 40% iodinated oil contrast examination was performed. Patients were taken into the operating room and underwent lumbar anesthesia. They were assisted to maintain a jackknife position. White gauze was prepared and inserted into the anal canal. A small amount of methylene blue was injected through the external opening of the fistula, and the direction of the fistula was determined based on the staining of the gauze. A slotted probe was inserted through the external opening and advanced to the deepest part of the fistula. The skin, subcutaneous tissue, and outer wall of the fistula were incised sequentially until the apical fistula area was reached. The fistula was then resected, followed by the removal of adjacent skin and subcutaneous tissue. Emphasis was placed on controlling bleeding from the surgical incision. After achieving hemostasis, the incision skin was trimmed and sutured. For patients with high anal fistulas, a distal incision was performed, and the incision length was adjusted based on the length of the fistula. A rubber band was hung at the proximal end for drainage after completing the surgery. The incision dressing was changed 24

hours after the operation. Two days postoperatively, the wound surface was cleaned with potassium permanganate solution, followed by instructions for the patient to sit in a sitz bath. Three days after surgery, antibiotics were administered prophylactically. Patients were consulted about the presence of subjective symptoms, and the growth of granulation tissue on the wound surface was evaluated. Any abnormalities were promptly addressed.

2.3.2. Control group

The patients underwent conventional fistula resection in the jackknife position. Lumbar anesthesia was administered, and the fistula along with adjacent tissues was separated. The diseased tissue was then resected until healthy tissue was exposed at the fistula site. The incision was closed using absorbable sutures. Postoperatively, patients were instructed to perform medicinal sitz baths until complete wound healing and then discontinued.

2.4. Observation indicators

- (1) Efficacy criteria: If the post-operative vital signs of anal fistula patients remain stable, surgical wounds have healed, and there are no symptoms such as bleeding or edema, it is considered a complete recovery. If postoperative anal fistula patients experience abnormal fluctuations in vital signs, rough surgical wounds, presence of symptoms such as bleeding or edema, and follow-up visits reveal new external fistula openings, it is considered a recurrence. If there is a post-operative incision infection, it is noted as an infection.
- (2) Surgical indicators: Record surgical operation time, wound healing time, hospital stay, intraoperative blood loss, and other relevant indicators.
- (3) Inflammatory factors and pain scores: Detection of IL-4, IL-6, IL-10, and other indicators using enzyme-linked immunosorbent assay (ELISA). VAS (Visual Analog Scale) ranging from 0–10, where the score is directly proportional to the pain felt by the patient with an anal fistula.
- (4) Complications: Record complications such as incision infection, anal deformation, anal displacement, and others.

2.5. Statistical analysis

Data processing will be done using SPSS 21.0 software. Count data will be recorded as percentages (%) and analyzed using the chi-square test (χ^2 test). Measurement data will be recorded as mean \pm standard deviation (SD) and analyzed using the *t*-test. Statistical significance will be set at $P < 0.05$.

3. Results

3.1. Analysis of therapeutic effects on patients with anal fistula

The cure rate in the observation group was higher than that in the control group, while the infection rate and recurrence rate were lower than those in the control group ($P < 0.05$) (Table 2).

Table 2. Comparison of therapeutic effects on patients with anal fistula (*n*, %)

Group	Cure	Infection	Recurrence
Observation group (<i>n</i> = 21)	20 (95.24)	1 (4.76)	0 (0.00)
Control group (<i>n</i> = 21)	11 (52.38)	6 (28.57)	4 (19.05)
χ^2	9.9765	4.2857	4.4211
<i>P</i>	0.0016	0.0384	0.0355

3.2. Analysis of surgical indicators for patients with anal fistula

The observation group had shorter surgical operation time, wound healing time, and hospital stay compared to the control group, with $P < 0.05$. However, there was no significant difference in intraoperative blood loss between the observation group and the control group, with $P > 0.05$. See **Table 3** for details.

Table 3. Comparison of surgical indicators for patients with anal fistula (mean \pm SD)

Group	Surgical operation time (min)	Wound healing time (d)	Hospital stay (d)	Intraoperative blood loss (mL)
Observation group ($n = 21$)	12.39 \pm 1.25	8.28 \pm 1.42	14.88 \pm 2.11	97.11 \pm 3.69
Control group ($n = 21$)	27.44 \pm 1.81	14.33 \pm 2.09	20.69 \pm 2.99	98.06 \pm 3.72
χ^2	31.3535	10.9724	7.2754	0.8309
P	0.0000	0.0000	0.0000	0.4110

3.3. Analysis of inflammation indices and pain score indices in patients with anal fistula

After treatment, the levels of IL-4, IL-6, and IL-10, as well as the VAS score, were lower in the observation group compared to the control group, with $P < 0.05$. See **Table 4** for details.

Table 4. Analysis of inflammation indices and pain score indices in patients with anal fistula (mean \pm SD)

Group	IL-4 (ng/mL)		IL-6 (ng/mL)		IL-10 (ng/mL)		VAS (points)	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Observation group ($n = 21$)	134.25 \pm 2.48	40.01 \pm 1.88	246.84 \pm 2.78	46.44 \pm 1.91	57.44 \pm 2.44	40.21 \pm 1.25	3.36 \pm 1.25	1.22 \pm 0.18
Control group ($n = 21$)	133.29 \pm 2.51	72.44 \pm 2.09	246.79 \pm 2.81	114.39 \pm 2.19	57.36 \pm 2.43	46.28 \pm 1.69	3.39 \pm 1.27	2.57 \pm 0.21
t	1.2468	52.8657	0.0580	107.1568	0.1065	13.2329	0.0771	22.3673
P	0.2197	0.0000	0.9541	0.0000	0.9157	0.0000	0.9389	0.0000

3.4. Analysis of complication indexes of patients with anal fistula

The complication rate of the observation group was lower than that of the control group ($P < 0.05$) (**Table 5**).

Table 5. Analysis table of complication indexes of patients with anal fistula (n , %)

Group	Incision infection	Anal degeneration	Anal displacement	Incidence rate
Observation group ($n = 21$)	1 (4.76)	0 (0.00)	0 (0.00)	1 (4.76)
Control group ($n = 21$)	3 (14.29)	2 (9.52)	1 (4.76)	6 (28.57)
χ^2	-	-	-	4.2857
P	-	-	-	0.0384

4. Discussion

Anal fistulas are predominantly found in the male population aged between 20 and 40 years, with various contributing factors such as perianal infection, perianal abscess, and surgical procedures^[3]. Once formed, anal fistulas often persist and can lead to complications like mental lethargy and bowel dysfunction. A significant proportion of patients with anal fistulas have inadequate understanding of their condition, resulting in poor treatment adherence and delayed medical intervention, which can exacerbate the fistula's severity. Therefore, it is imperative to adopt effective treatment strategies for managing anal fistulas^[4]. Most patients with anal fistulas are unable to achieve spontaneous resolution, necessitating surgical intervention. However, conventional surgical approaches for anal fistulas carry a high risk of complications and a certain degree of recurrence after surgery. In recent years, open fistulotomy has emerged as a treatment option for patients with anal fistulas. This surgical technique not only effectively addresses the internal opening but also allows for precise localization and removal of the internal opening along with adjacent inflamed tissues, thereby reducing the likelihood of postoperative recurrence^[5]. Furthermore, open fistulotomy is characterized by minimal pain and simplicity in execution. The procedure involves minimal damage to the anal sphincter muscles, preserving the patient's anorectal function^[6]. These advantages make open fistulotomy a viable and preferred surgical option for the management of anal fistulas, offering patients a safer and more effective treatment pathway.

Based on the data analysis in this paper, the cure rate of anal fistula patients in the observation group was higher than that in the control group, while the infection rate and recurrence rate were lower than those in the control group, with $P < 0.05$. The reason for this is that open fistulotomy treatment involves removing or trimming the mucosa in the adjacent area of the internal opening, followed by closing the internal opening, fully stopping bleeding in the wound and suturing the surgical incision. This can reduce local tissue damage and postoperative infection events, which is beneficial for shortening the incision healing time, thus resulting in a higher postoperative cure rate^[7]. Another set of data showed that the operation time, wound healing time, and hospital stay in the observation group were shorter than those in the control group, with $P < 0.05$. However, there was no significant difference in intraoperative blood loss between the observation group and the control group, with $P > 0.05$. The reason for this is that open fistulotomy treats the lesion by identifying it through the primary internal opening and then removing the infected tissue adjacent to the perianal area and anal sinuses, which can eliminate the infection. Additionally, the simplicity of the open surgical procedure and its advantages in wound management can reduce damage to the anal sphincter caused by mechanical manipulation, resulting in minimal intraoperative bleeding and shortened operation time, which is conducive to postoperative recovery of anal function^[8]. Another set of data indicated that the levels of IL-4, IL-6, and IL-10, as well as the VAS score, were lower in the observation group compared to the control group, with $P < 0.05$. The reason for this is that patients with anal fistula who undergo conventional surgical treatment may experience inflammatory reactions due to mechanical stimulation, leading to increased release of IL-4, IL-6, and IL-10. If timely anti-infection intervention is not provided, it can affect the recovery of anal function^[9]. Performing open fistulotomy is a simple procedure that involves removing the fistulous tract and further trimming the internal opening and adjacent mucosal tissue. Completing procedures such as internal opening closure, hemostasis, and suturing under direct vision can reduce trauma to the affected area and shorten wound healing time. This is beneficial for reducing physiological stress responses, leading to decreased release of inflammatory factors and increased pain threshold^[10].

The final set of data showed that the complication rate in the observation group was lower than that in the control group, with $P < 0.05$. It has been demonstrated that open fistulotomy has high safety. Upon analysis, the

adoption of open fistulotomy for treatment can repair the mucosal tissue adjacent to the internal opening, laying a good foundation for wound healing. Additionally, open surgery allows for complete removal of the lesion and adequate hemostasis, thereby reducing the rate of postoperative complications ^[11]. During the actual treatment of anal fistula patients with open fistulotomy, the following considerations should be noted:

- (1) Maintain a bland diet: Increase intake of high-fiber foods, avoid spicy foods such as ginger, garlic, onions, and alcoholic beverages, and emphasize dietary hygiene management. Furthermore, patients are advised to consume more fresh fruits and vegetables after surgery to prevent constipation and diarrhea, as watery stools can easily remain in the anal sinus area, increasing the risk of postoperative infection.
- (2) Develop bowel habits: Patients are instructed not to defecate within 24 hours after anorectal surgery; after 24 hours, it is recommended to defecate 1–2 times per day.
- (3) Maintain perianal hygiene: Cleanse properly after defecation, and sit in a medicated bath as prescribed by the doctor to avoid fecal irritation and wound contamination. Additionally, patients with anal fistulas should perform local massage after defecation to promote local blood circulation and shorten wound healing time.
- (4) Increase rest time: Reduce activity during the early postoperative period to prevent postoperative bleeding and alleviate local anal symptoms. Furthermore, patients are advised to avoid sitting for long periods, limiting each sitting session to within 30 minutes, avoid long-term cycling and driving, and reduce the frequency of staying up late to shorten the recovery time of anal fistulas.
- (5) Exercise anal function: Guide patients with anal fistulas to actively perform anal lifting exercises after surgery to prevent anal complications and promote the recovery of anal physiological function. In summary, the treatment of anal fistula patients with open fistulotomy can shorten the recovery time, improve the cure rate, reduce inflammatory reactions, and decrease complications, demonstrating its promotional value.

Disclosure statement

The authors declare no conflict of interest.

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