Original Article

Risk Factors for Post-surgical Recurrence of Anal Fistula

Yu-Shih Liu[1]
Hung-Hsin Lin[1,2]
Chun-Chi Lin[1,2]
Yuan-Tzu Lan[1,2]
Shih-Ching Chang[1,2]
Huann-Shenn Wang[1,2]
Shung-Haur Yang[1,2]
Wei-Shone Chen[1,2]
Tzu-Chen Lin[1,2]
Jen-Kou Lin[1,2]
Jeng-Kai Jiang[1,2]
[1]*Division of Colon & Rectal Surgery, Department of Surgery, Taipei Veterans General Hospital,*
[2]*School of Medicine, National Yang-Ming University, Taipei, Taiwan*

Key Words
Anal fistula;
Recurrence;
Fistulotomy

Purpose. The treatment of anal fistula has continually raised problems requiring various surgical techniques. This study aimed at evaluating the risk factors for post-surgical recurrence.
Methods. This was a retrospective study which included patients who underwent surgery for anal fistula at Taipei Veteran General Hospital.
Results. A total of 768 patients with anal fistula underwent surgery from January 2013 to December 2015. Patients were followed up for a median period of 59.8 months. Recurrence of fistula was recorded in 54 patients (7.0%) after a mean duration of 7.4 months. Recurrence rates for simple and complex fistula were 1.9% and 16.3% ($p < 0.001$), respectively. Non-identification of internal opening (OR = 5.681, $p < 0.001$) was a significant predictor of recurrence. After comparing all interventions, it was determined that simple fistulotomy alone carried the lowest recurrence rate (5.7%, $p = 0.003$); however, the recurrence rate after application of Seton was lower than simple fistulotomy or LIFT in complex fistula (11.6% vs. 24.1%, $p < 0.02$).
Conclusion. Complexity of the fistula and identification of the internal opening were predictive factors for post-surgical recurrence. Regarding intervention, fistulotomy/fistulectomy was associated with the lowest recurrence rate, while Seton application is required for complicated fistula.
[*J Soc Colon Rectal Surgeon* (*Taiwan*) *2021;32:61-69*]

Anal fistula, also called fistula-in-ano, is a disease that has been described virtually since the Hippocratic era.[1] The most frequent presenting symptoms are pain, swelling, and discharge surrounding the anal region.[2] The most famous theory of anal fistula development is the cryptoglandular theory,[3] according to which a perianal abscess constitutes the acute inflammatory event and anal fistula represents the chronic stage of the process. Furthermore, anal fistula can arise secondary to many conditions, such as anal fissure, inflammatory bowel diseases, malignancy, tuberculosis, and radiation therapy.[4]

The most common classification of anal fistula was published by Parks et al. in 1967,[5] where anal fistula was classified into four different types: intersphincteric, transphincteric, suprasphincteric, and extrasphincteric. In addition, there is the horseshoe fistula, composed of subcutaneous communication in a horseshoe or U shape.

The principle of anal fistula treatment is surgery, with the goal of draining local infection, eliminating the fistulous tract, and avoiding recurrence while preserving sphincter function.[6] The different types of the fistula have a direct involvement in the complexity of

Received: January 26, 2021. Accepted: March 24, 2021.
Correspondence to: Dr. Jeng-Kai Jiang, Division of Colon & Rectal Surgery, Department of Surgery, Taipei Veterans General Hospital, No. 201 Section 2, Shih-Pai Road, Beitou District, Taipei 11217, Taiwan. Tel: 886-2-2875-7544 ext. 110; Fax: 886-2-2875-7396; E-mail: jkjiang@vghtpe.gov.tw

the disease, which leads to a different choice of treatment. Fistulotomy is an effective treatment for simple anal fistula. The procedures for fistulotomy are identification, curetting of the internal opening to ensure adequate drainage, and widening of the external wound.[7] Fistulotomy alone may not be sufficient for complex fistula. The Seton procedure involves any foreign material being inserted through the fistulous tract,[8] which induces fibrosis while slowly dividing the remaining track and avoiding incontinence. Apart from the above methods, there is ligation of the intersphincteric fistula tract, which was designed as a total sphincter-preserving technique,[9] with less risk of incontinence.

The two major challenges of surgical treatment for anal fistula are recurrence and incontinence. Some patients could completely heal after primary surgery for anal fistula, while others have recurrent disease. The rate of recurrence was approximately 7%-10% in all patients with anal fistula,[10,11] and it could be higher in those with complex fistula.[4,12] Several predictive factors of anal fistula recurrence have been mentioned in previously published articles, such as complex fistula, failure of identification of an internal opening, anterior anal fistula, and horseshoe fistulous tract.[4,10]

This study aimed to determine the potential predictive factors of post-surgical recurrence of fistula, and the procedures with less risk for recurrence of fistula.

Method

We studied patients who underwent surgery for anal fistula at Taipei Veterans General Hospital from January 2013 to December 2015. All fistula tracts were identified and classified clearly during surgery. The description of fistula was based on Parks' classification and also simplified to simple (i.e. intersphincteric type) and complex (i.e. transphincteric, suprasphincteric, and extrasphincteric) fistula.

The surgeries were all performed by coloproctological subspecialists at Division of Colon & Rectal Surgery, Department of Surgery, Taipei Veterans General Hospital. All patients were follow-up at the outpatient department after surgery until a well healed wound was identified. The endpoint for follow-up was September 1, 2019, or the date of fistula recurrence. Only one fistulous tract (the most complicated one) of each patients were enrolled in calculation. The definition of fistula recurrence in our study was "a fistula that healed after primary surgery within a period of time, with re-appearance of abscess or fistulous tract at the same location as the prior operation". Mean follow-up time was 58.3 months. Median follow-up time was 59.8 months. The range of follow-up period was 43.2 to 74.1 months.

The exclusion criteria (Fig. 1) included patients lost during post-surgical follow-up, patients who ex-

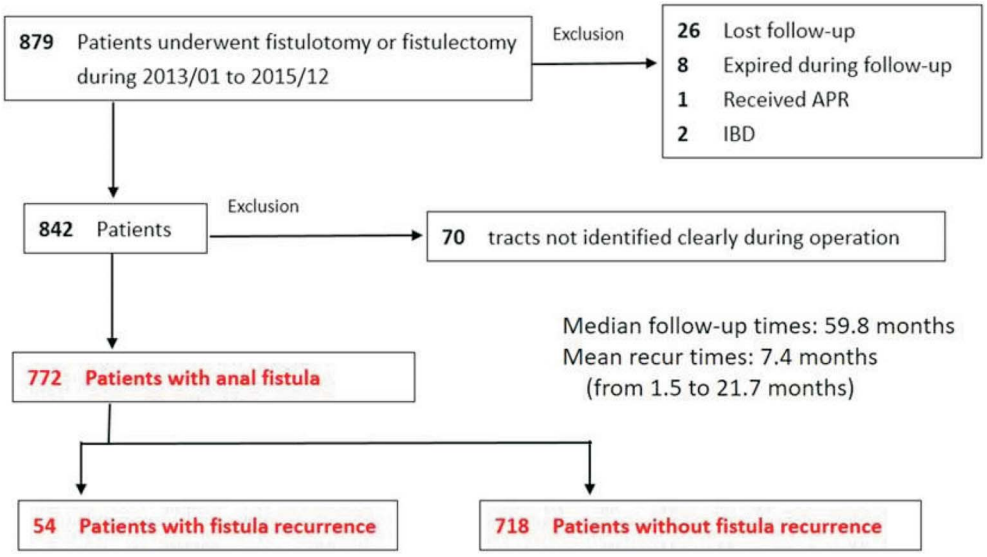

Fig. 1. Patient selection flowchart.

pired before follow-up endpoint, those with inflammatory bowel disease, and those whose fistula tracts were not clearly identified during surgery.

Results

The patient selection flowchart is presented as Fig. 1. Out of 768 patients who underwent surgery for anal fistula, 54 (7.0%) had recurrence. Recurrence time was between 1.5 months and 21.7 months, and mean time was 7.4 months. The demographic data are presented in Table 1, which show that there was no difference between the recurrent and non-recurrent groups in terms of emergency, gender, age, BMI, DM, smoking, and blood cell counts (Table 1).

The fistulas were classified intra-operatively according to Parks' classification and 73.6% of cases were classified as intersphincteric type fistula, which had the lowest recurrence rate (1.9%) and the longest mean recurrence time (9.8 months). Recurrence rates for other types of fistula were all more than 10% (Fig. 2, Table 2). Compared to simple fistula, complex fistula had a shorter mean recurrence time (9.8 months vs. 5.9 months, $p = 0.232$), although not at a significant level. The recurrence-free curve for anal fistula clearly demonstrated that intersphincteric-type fistula

Table 1. Descriptive characteristics of patients

	Total (%)	Recur (%)	Non-recurrent (%)	*p*-value
Number of patients	768	54 (7.03)	714 (92.97)	
Emergency surgery	57	2 (3.50)	55 (96.50)	0.335
Gender				0.641
Male	605	46	559	
Female	163	8	155	
Age (average)		45.11	46.92	0.394
< 40	261	22 (8.24)	239 (91.57)	
41-60	358	24 (6.70)	334 (93.30)	
61-80	133	6 (4.51)	127 (95.49)	
> 81	16	2 (12.5)	14 (87.5)	
BMI (average)				0.638
< 18.5	22	3 (16.64)	19 (86.36)	
18.5-26.9	437	34 (7.78)	403 (92.22)	
27-29.9	154	7 (4.55)	147 (95.45)	
30-34.9	98	5 (5.10)	93 (94.90)	
> 35	29	2 (6.90)	27 (95.10)	
Smoking	227	18 (7.93)	209 (92.07)	0.546
DM	67	5 (7.46)	62 (92.54)	0.889
WBC count				0.158
< 4500	6	1 (16.67)	5 (83.33)	
4500-11000	661	40 (6.05)	621 (93.95)	
11000-20000	94	11 (11.70)	83 (88.30)	
> 20000	5	1 (20.0)	4 (80.0)	
Platelet count				0.520
< 100000	6	2 (33.33)	4 (66.67)	
100000-150000	33	3 (9.10)	30 (90.90)	
> 150000	723	49 (6.78)	674 (93.22)	

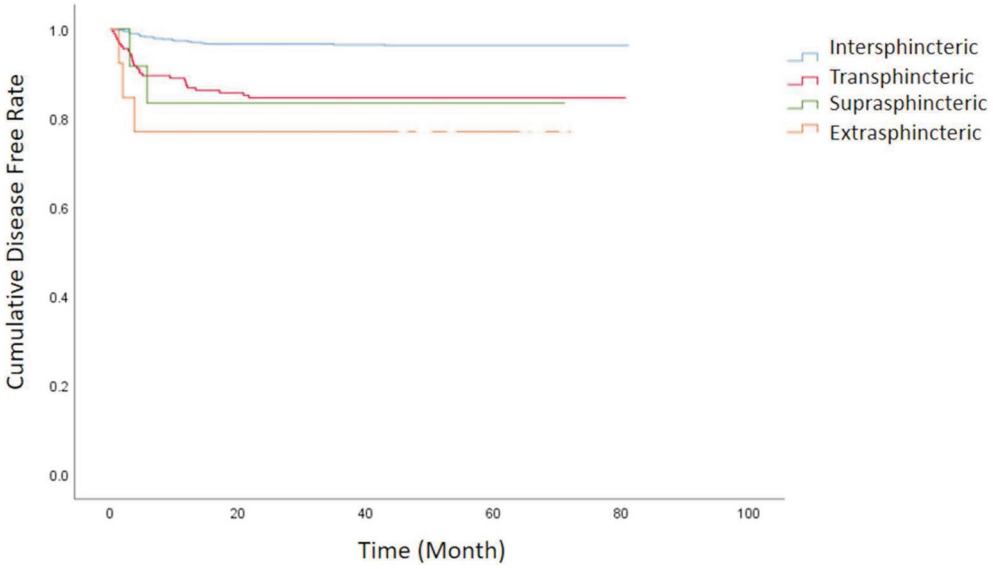

Fig. 2. Post-surgical recurrence-free curve for anal fistula. The recurrence-free curve for intersphincteric-type fistula had the lowest recurrence rate, while the other higher types of fistula were all more than 10%.

had the lowest recurrence rate (Fig. 2). Non-identification of internal opening was an important factor of recurrence, and it was found in 24.1% cases in the recurrent group, and in only 4.5% cases in the non-recurrent group ($p < 0.001$) (Table 2). There were no significant differences between the two groups in terms of the other characteristics of anal fistula, including fistula number, position, horseshoe tract, and identification of external opening or multiple external openings (Table 2).

Statistical significance was found in transphincteric, extrasphincteric, and horseshoe tract fistula and non-identification of the internal opening, in multivariate analysis for recurrence risk (Table 3) (OR = 5.681, $p < 0.001$).

Finally, a comparison of all interventions for anal fistula determined that fistulotomy/fistulectomy alone had the lowest recurrence rate (5.75%, $p = 0.003$) (Table 4). However, the recurrence rate for complex anal fistula after simple fistulotomy/fistulectomy was 22.4%.

Table 3. Multivariate analysis of risk of recurrence

	Odds ratio	95% confidence interval	*p* value
Types of fistula			
Intersphincteric	-	-	-
Transphincteric	5.311	2.713-10.397	< 0.001
Suprasphincteric	2.184	0.392-12.160	0.373
Extrasphincteric	7.590	1.860-30.965	0.005
Number of fistula			
One fistula	-	-	-
Two fistulas	1.125	0.356-3.555	0.840
More than two fistulas	2.646	0.356-19.658	0.342
Identified fistula opening			
No internal opening	5.681	2.449-13.181	< 0.001
No external opening	1.384	0.524-3.536	0.497
Horseshoe tract	1.544	0.217-3.362	0.194

Table 2. Descriptive characteristics of anal fistula

	Total (%)	Recur (%)	Non-recurrent (%)	*p*-value
Type of fistula				< 0.001
Intersphincteric	565 (73.6)	21 (1.9)	544 (98.1)	
Transphincteric	178 (23.2)	28 (15.7)	150 (84.3)	
Suprasphincteric	12 (1.6)	2 (16.7)	10 (83.3)	
Extrasphincteric	13 (1.7)	3 (23.1)	10 (76.9)	
Associated abscess	127 (16.7)	12 (9.4)	115 (90.6)	0.599
Type of abscess				
Perianal	84 (66.1)	8 (9.5)	76 (90.5)	
Ischeorectal	22 (17.3)	2 (9.1)	20 (90.9)	
Supralevator	4 (3.1)	2 (50.0)	2 (50.0)	
Deep postanal	15 (11.8)	0	15	
Non-defined	2 (1.6)	0	2	
Number of fistulas				0.075
One fistula	715 (93.1)	48 (6.7)	667 (93.3)	
Two fistulas	46 (6.0)	4 (8.7)	42 (91.3)	
≥ Three fistulas	7 (0.9)	2 (28.6)	5 (71.4)	
Position of fistula				0.555
Posterior aspect	404 (55.5)	26 (6.4)	378 (93.6)	
Anterior aspect	145 (19.9)	9 (6.2)	136 (93.8)	
Lateral aspect	179 (24.6)	14 (7.8)	165 (92.2)	
Culture (n = 115)				0.782
GNB[1]	85 (73.9)	6 (7.1)	79 (92.9)	
GPC[2]	7 (6.1)	2 (28.6)	5 (71.4)	
Mixed	23 (20.0)	1 (4.4)	22 (95.6)	
Character of fistula				
No internal opening	45 (5.36)	13 (28.8)	32 (71.2)	< 0.001
No external opening	57 (7.42)	7 (12.3)	50 (87.7)	0.107
Multiple external openings	29 (3.78)	4 (13.8)	25 (86.2)	0.147
Horseshoe tract	68 (8.8)	9 (13.2)	59 (86.8)	0.111

[1] GNB: gram-negative bacilli; [2] GPC: gram-positive cocci.

This was higher than the recurrence rate with application of Seton (11.6%) (Table 5), although the result was not statistically significant. If we were to stratify complex fistula according to those treated with Seton tie versus fistulotomy and LIFT, the recurrence rates would be 11.6% versus 24.1% ($p = 0.02$). This would be an indication that Seton procedure is a better approach in complex anal fistula.

Discussion

This study focused on post-surgical recurrence of anal fistula that was resulted from infected anal gland. The database included 768 patients who underwent surgery for anal fistula at a tertiary medical center from January 2013 to December 2015, with a follow-up period averaging 58.3 months. The classification we used was established by Parks et al.,[5] which is the most popular classification of fistula. We also classified fistula into complex and simple fistula, where complex fistula included transphincteric, suprasphincteric, and extrasphincteric fistula. Simple fistula, on the other hand, included the intersphincteric type only.[13]

In summary, intersphincteric fistula was the most common type (n = 565, 73.6%), followed by the transphincteric type (n = 178, 23.2%). Suprasphincteric (n = 12, 1.6%), and extrasphincteric (n = 13, 1.7%) were relatively uncommon. The results were similar to previous studies. In the study of Parks and his colleagues, intersphincteric fistula had an incidence rate of 55% to 70%, and 20% to 25% in transphincteric fistula. The incidence of suprasphincteric and extrasphincteric type were all less than 5%.[5] In a more recent study that included 1696 cases of anal fistula, MRI was used to classified type of fistula, they found that 1057 cases were intersphincteric type (62.3%), and 407 cases were transphincteric type (24.0%).[14]

The overall post-surgical recurrence rate of fistula in our investigation was 7.0%, and recurrence rates for simple and complex fistula were 1.9% and 16.3%, respectively. In most of the previous literature, the recurrence rate for anal fistula fell between 7% and 10%.[10,15-17] Some studies obtained a higher recurrence rate because they enrolled more cases with complex fistula.[4,18,19]

The complexity of fistula has a decisive effect on both recurrence rate and recurrence time,[10,20] and particularly in our study, in cases of transphincteric, suprasphincteric, and extrasphincteric fistula. Another factor that proved to be statistically associated with fistula recurrence was non-identification of the internal opening during surgery, which was also identified by other authors.[9,17] In our experience, non-identification of an internal opening is usually related to immature fistulous tract and associated abscess. In these situations, using Goodsall's rule alone is insufficient,

Table 4. Intervention for anal fistula

	Total (%)	Recurrence (%)	Non-recur (%)	*p*-value
Intervention				
Fistulotomy/fistulectomy	626 (81.5)	36 (5.75)	590 (94.25)	0.003
Seton procedure	131 (17.1)	13 (9.92)	118 (90.08)	0.155
LIFT[1]	7 (0.9)	3 (37.50)	5 (62.50)	0.192
Core-out & IO closure[2]	2 (0.3)	1 (50.00)	1 (50.00)	0.395
Flap reconstruction	2 (0.3)	0	2	

[1] Ligation of fistula; [2] Closure of internal opening.

Table 5. Intervention for complex fistula

	Total (n = 203)	Recurrence (n = 33, 16.3%)	Non-recurrence (n = 170, 83.7%)	$\chi 2$	*p*-value
Fistulotomy	76 (37.4%)	17 (22.4%)	59 (77.6%)		
Seton tie	120 (59.1%)	14 (11.6%)	106 (88.4%)	9.134	0.058
LIFT	7 (3.5%)	3 (42.9%)	4 (57.1%)		

and several techniques have been used to identify internal openings such as those that employ probes or hydrogen peroxide solution.[21] However, these methods sometimes fail to find the internal openings, so it was reasonable that the recurrence rate would be high in this situation.

The analysis of treatment showed that the lay open technique, including fistulotomy or fistulectomy, is still the most effective way for obtaining a definitive cure. The healing rate post-fistulotomy was 94.4% in our study, which is consistent with other studies.[15,22] However, fistulotomy alone may not be enough for complex fistula. In our study, the overall recurrence rate of complex fistula was 16.3%, and the recurrence rate with fistulotomy alone was higher – up to 22.4%. In fact, recurrence rate was lower (11.6%) after application of seton. Seton has been used for treatment of anal fistula for a long time, and in 430 BC it was described by Hippocrates, who first used horse bristles (in Latin, *seta*) as a seton for treatment of anal fistula.[1] This method is currently used. Seton can be either tight (cutting seton) or loose (drainage seton). In our hospital, the former employed several No. 2 silks to induce fibrosis while slowly dividing the remaining track and sphincter muscles, whereas the latter employed a Penrose drain to promote adequate drainage of the infection.[23] However, drainage seton alone was not considered definitive surgery for fistula, and this technique was therefore not used in our study. In previous reports, the recurrence rate of complex fistula after managing of seton was approximately 10%,[4,8,24,25] which is consistent with our results. One report included a significantly higher recurrence rate after Seton procedure, of up to 22%, because it included fistula secondary to Crohn's disease.[26]

There are other procedures used for anal fistula. Ligation of the intersphincteric fistula tract (LIFT) is a sphincter-sparing procedure for complex transphincteric fistulas.[9] This procedure can downgrade complex fistulas to a more benign intersphincteric variant,[27] and recurrence rate after the LIFT procedure in this investigation was between 15% and 43%.[27-30] In our study, out of 7 cases of complex fistula who received LIFT procedure, 3 of them (42%) had recurrent fistula. The use of endoanal advancement flaps is another technique for complex anal fistula, which closes off the internal opening with a mobilized flap of healthy tissue consisting of mucosa and submucosa.[31] Compared to the LIFT procedure, use of an advancement flap has a similar recurrence rate; however, the LIFT procedure has less side effects, such as post-operative pain.[32,33] Only 2 cases received flap reconstruction for high transphincteric fistula in our study, and all of them suffered from fistula recurrence. Both the LIFT procedure and use of an advancement flap are effective procedures for complex fistula, but there were few cases in our study, which could not provide effective data to compare with other procedures such as fistulotomy or Seton procedure. The other special elements, such as fibrin sealant or biosynthetic fistula plug, were not discussed in our study.

Another important issue regarding the outcome of anal fistula surgery is post-surgical incontinence. The risk of post-surgical incontinence was higher with anterior fistula in women, complex anal fistula, previous surgery,[17] and in those who had incontinence pre-operatively.[10] Risk of incontinence after fistulotomy was higher for patients with low resting anal pressure.[34] The method of surgical intervention had no significant influence on incontinence.[15]

Our study was limited by its retrospective design, which was associated with risk of selection bias. The participating surgeon, rather than an independent observer, evaluated fistula type and postoperative outcome. Secondarily, follow-up time was identified solely according to chart entries and may underestimate the possibility of fistula recurrence. As we know, detection of fistula recurrence rate increased with longer follow-up. Finally, we could not address the impact of different types of fistula surgery on continence.

Conclusion

There was still 7% of patients with post-surgical recurrence despite the multiple methods for surgical treatment of fistula and recurrence rate could be higher for complex fistula. Complexity of the fistula and non-identification of the internal opening were predictive factors for post-surgical recurrence. In terms

of intervention, fistulotomy and fistulectomy were associated with the lowest recurrence rate, while seton could be considered to apply in cases of complicated fistula.

References

1. Corman ML, Bergamaschi RC, Nicholls RJ, Fazio VW. Corman's Colon and Rectal Surgery. 6th ed. New York: Lippincott Williams and Wilkins; 2013.
2. Vogel JD, Johnson EK, Morris AM, Paquette IM, Saclarides TJ, Feingold DL, Steele SR. Clinical practice guideline for the management of anorectal abscess, fistula-in-ano, and rectovaginal fistula. *Dis Colon Rectum* 2016;59:1117-33.
3. Gosselink MP, van Onkelen RS, Schouten WR. The cryptoglandular theory revisited. *Colorectal Dis* 2015;17:1041-3.
4. Emile SH, Elfeki H, Thabet W, et al. Predictive factors for recurrence of high transsphincteric anal fistula after placement of seton. *J Surg Res* 2017;213:261-8.
5. Parks AG, Gordon PH, Hardcastle JD. A classification of fistula-in-ano. *Br J Surg* 1976;63:1-12.
6. Williams JG, Farrands PA, Williams AB, Taylor BA, Lunniss PJ, Sagar PM, Varma JS, George BD. The treatment of anal fistula: ACPGBI position statement. *Colorectal Dis* 2007;9 Suppl 4:18-50.
7. Rizzo JA, Naig AL, Johnson EK. Anorectal abscess and fistula-in-ano: evidence-based management. *Surg Clin North Am* 2010;90:45-68.
8. Subhas G, Bhullar J, Al-Omari A, Unawane A, Mittal V, Pearlman R. Setons in the treatment of anal fistula: review of variations in materials and techniques. *Dig Surg* 2012;29: 292-300.
9. Rojanasakul A, Pattanaarun J, Sahakitrungruang C, Tantiphlachiva K. Total anal sphincter saving technique for fistula-inano; the ligation of intersphincteric fistula tract. *J Med Assoc Thai* 2007;90:581-6.
10. Jordán J, Roig JV, García-Armengol J, García-Granero E, Solana A, Lledó S. Risk factors for recurrence and incontinence after anal fistula surgery. *Colorectal Dis* 2010;12: 254-60.
11. Limura E, Giordano P. Modern management of anal fistula. *World J Gastroenterol* 2015;21:12-20.
12. Subhas G, Singh Bhullar J, Al-Omari A. Setons in the treatment of anal fistula: review of variations in materials and techniques. *Dig Surg* 2012;29:292-300.
13. Fazio VW. Complex anal fistulae. *Gastroenterol Clin North Am* 1987;16:93-114.
14. Liu DC, Li WR, Wang XH, Qiu JP, Wang L, Xiong F, Zhou ZY. Classification of anal fistulas based on magnetic resonance imaging. *Zhonghua Wei Chang Wai Ke Za Zhi* 2018; 21(12):1391-5.
15. Hall JF, Bordeianou L, Hyman N, Read T, Bartus C, Schoetz D, Marcello PW. Outcomes after operations for anal fistula: results of a prospective, multicenter, regional study. *Dis Colon Rectum* 2014;57:1304-8.
16. van Koperen PJ, Wind J, Bemelman WA, Bakx R, Reitsma JB, Slors FM. Long-term functional outcome and risk factors for recurrence after surgical treatment for low and high perianal fistulas of cryptoglandular origin. *Dis Colon Rectum* 2008;51:1475-81.
17. Garcia-Aguilar J, Belmonte C, Wong WD, Goldberg SM, Madoff RD. Anal fistula surgery. Factors associated with recurrence and incontinence. *Dis Colon Rectum* 1996;39:723-9.
18. Sainio P, Husa A. Fistula-in-ano. clinical features and long-term results of surgery in 199 adults. *Acta Chir Scand* 1985; 151:169-76.
19. Marks CG, Ritchie JK. Anal fistulas at St. Mark's Hospital. *Br J Surg* 1977;64:84-91.
20. Thompson HR. The orthodox conception of fistula-in-ano and its treatment. *Proc R Soc Med* 1962;55:754-6.
21. Gunawardhana PA, Deen KI. Comparison of hydrogen peroxide instillation with Goodsall's rule for fistula-in-ano. *ANZ J Surg* 2001;71:472-4.
22. Abramowitz L, Soudan D, Souffran M, Bouchard D, Castinel A, Suduca JM, Staumont G, Devulder F, Pigot F, Ganansia R, Varastet M. The outcome of fistulotomy for anal fistula at 1 year: a prospective multicentre French study. *Colorectal Dis* 2016;18:279-85.
23. Lim CH, Shin HK, Kang WH, et al. The use of a staged drainage seton for the treatment of anal fistulae or fistulous abscesses. *J Korean Soc Coloproctol* 2012;28:309-14.
24. Pinedo MG. Modified loose-seton technique for the treatment of complex anal fistulas. *Colorectal Dis* 2010;12:e310-3.
25. Balogh G. Tube loop (seton) drainage treatment of recurrent extrasphincteric perianal fistulae. *Am J Surg* 1999;177:147-9.
26. Faucheron JL. Long-term seton drainage for high anal fistulas in Crohn's disease - a sphincter-saving operation? *Dis Colon Rectum* 1996;39:208-11.
27. Osterkamp J, Gocht-Jensen P, Hougaard K, Nordentoft T. Long-term outcomes in patients after ligation of the intersphincteric fistula tract. *Dan Med J* 2019;66:pii: A5537.
28. Malakorn S, Sammour T, Khomvilai S, Chowchankit I, Gunarasa S, Kanjanasilp P, Thiptanakij C, Rojanasakul A. Ligation of intersphincteric fistula tract for fistula in ano: lessons learned from a decade of experience. *Dis Colon Rectum* 2017;60:1065-70.
29. Hong KD, Kang S, Kalaskar S, Wexner SD. Ligation of intersphincteric fistula tract (LIFT) to treat anal fistula: systematic review and meta-analysis. *Tech Coloproctol* 2014;18:685-91.
30. Zirak-Schmidt S, Perdawood SK. Management of anal fistula by ligation of the intersphincteric fistula tract - a systematic review. *Dan Med J* 2014;61:A4977.
31. Soltani A, Kaiser AM. Endorectal advancement flap for cryptoglandular or Crohn's fistula-in-ano. *Dis Colon Rectum* 2010; 53:486-95.

32. Madbouly KM, El Shazly W, Abbas KS, Hussein AM. Ligation of intersphincteric fistula tract versus mucosal advancement flap in patients with high transsphincteric fistula-in-ano: a prospective randomized trial. *Dis Colon Rectum* 2014; 57:1202-8.
33. Mushaya C, Bartlett L, Schulze B, Ho YH. Ligation of intersphincteric fistula tract compared with advancement flap for complex anorectal fistulas requiring initial seton drainage. *Am J Surg* 2012;204:283-9.
34. Chang SC, Lin JK. Change in anal continence post-surgical for intersphincteral anal fistula: a functional and manometric study. *Int J Colorectal Dis* 2003;18:111-5.

原　著

肛門瘻管術後復發的風險因子分析

劉佑碩[1]　林宏鑫[1,2]　林春吉[1,2]　藍苑慈[1,2]　張世慶[1,2]　王煥昇[1,2]
楊純豪[1,2]　陳維熊[1,2]　林資琛[1,2]　林楨國[1,2]　姜正愷[1,2]

[1]台北榮民總醫院　大腸直腸外科
[2]國立陽明大學　醫學院

目的　本文在探討可能造成肛門瘻管術後復發的風險因子。

方法　此為回溯性研究，分析在台北榮民總醫院接受肛門瘻管手術的病人。

結果　在三年內合計 768 名病人接受手術。共有 54 位病人 (7.0%) 出現復發，且平均在術後 7.4 個月後復發。簡單型與複雜型瘻管的復發率分別為 1.9% 與 16.3% ($p < 0.01$)。沒有內開口是復發的風險因子 ($p < 0.01$)。單純瘻管切開術的復發率最低，但在複雜型瘻管的病人上，綁線手術法有較低的復發率。

結論　瘻管的複雜度與術中能否找到內開口是最重要的復發預後因子。在手術方法上，瘻管切開術的復發率最低。但是在複雜型瘻管上，有時必須加上綁線手術法才行。

關鍵詞　肛門瘻管、手術後復發、瘻管切開手術。