Recurrence Pattern of Fistula-in-Ano in a Chinese Population

Poon Chi-Ming, Ng Dennis Chung-Kei, Cheung Michael Ho-Yin, Li Raymond Shiu-Ki, Leong Heng-Tat

Department of Surgery, North District Hospital, Hong Kong SAR, China

Abstract

Background and aims: Fistula-in-ano is a common colorectal complaint. Despite of the advancement in preoperative imaging and surgical techniques, recurrence is not uncommon in this disease entity. We aimed to determine the recurrence pattern and predictors of FIA in Chinese population. **Methods:** *Setting:* single regional hospital serving a 300,000 population. *Design and Participants:* A systematic retrospective review of inpatient and follow up records and operation records in patients with diagnosis of fistula-in-ano (ICD code - 565.1) from January 2001 to December 2004 was performed. *Intervention:* Surgery for fistula-in-ano. **Results:** 135 out of 137 Chinese patients received anal fistula operations. 14 patients (10.4%) had high type anal fistulas and 27 patients (20%) had perianal sinus. The most common operation was combined fistulotomy-fistulectomy (78 patients, 57.8%). 18 patients (13.3%) had recurrence with a median time to recurrence of 7.5 months. Six factors including: 1) positive history of perianal abscess, 2) previous perianal operation, 3) complex fistula, 4) perianal sinus, 5) absence of an internal opening, 6) surgical procedure of sinus tract excision were significantly associated with recurrence in univariate analysis. Sinus tract excision was the only independent factor to predict recurrence in logistic regression (p=0.002, 95%CI=1.29-3.27). **Conclusion:** Fistula-in-ano carried a significant risk of recurrence in perianal sinus with sinus tract excision performed. No difference was found between Chinese and Caucasian in recurrence pattern of fistula-in-ano.

Key words:

Fistula-in-ano – recurrence – endoanal ultrasound

J Gastrointestin Liver Dis
March 2008 Vol.17 No 1, 53-57
Address for correspondence: Dr. Poon Chi-Ming
Department of Surgery
North District Hospital
Sheung Shui, N.T.
Hong Kong SAR, China
E-mail: lamyn@ha.org.hk

Introduction

Fistula-in-ano (FIA) is one of the most common benign anal conditions in daily surgical practice. It is defined as an epithelized abnormal tract connecting two surfaces, usually the rectal mucosa and perianal skin [1]. Low type fistula accounts for the majority of cases up to 90% [2]. Most of the anal fistulas run a benign course, but complicated FIA still carries significant morbidity, namely fecal incontinence and recurrence. Despite the advancement in preoperative road mapping of fistula tracts by magnetic resonance imaging (MRI) and endoanal ultrasound (EAUS) [3-4], there is a significant recurrence rate of 4% up to 45% [5-10]. Modification of conventional surgical treatment for closure of fistula tract by primary closure, endorectal advancement flap, fibrin glue injection and fistula plug has been extensively investigated in the prevention of recurrence [11-14]. The results regarding reduction of recurrence are not impressive. Either recurrence is due to the natural history of the disease itself, or the choice of surgery has not been clearly identified in past literature.

In this retrospective study we aimed to investigate surgical outcomes of patients receiving surgery for FIA, and identify the pattern and predictors of recurrence in a Chinese population.

Patients and methods

This was a retrospective study in a regional hospital. Between January 2001 and December 2004, patients with the diagnosis of FIA (ICD 9 code of 565.1) were retrieved from Clinical Data and Report system (CDARS) computer database of Hong Kong Hospital Authority. Their hospital records were reviewed systematically. Anal fistulas are classified according to Parks et al, namely intersphincteric, transphincteric, suprasphincteric and extrasphincteric type [1]. Subcutaneous fistula that is not included in the original Parks classification is described as low type fistula. Complex fistulas are defined as high transsphincteric or intersphincteric (concerning more than 50% of internal

anal sphincter), suprasphincteric, extrasphincteric fistulas or those with previous history of perianal surgery. Sinuses are defined as those with no internal opening identified during operation, low type fistulas are defined as low transsphincteric or intersphincteric and subcutaneous fistulas, while high type fistulas are defined as high transsphincteric or intersphincteric, suprasphincteric, extrasphincteric fistulas.

Preoperative assessment

Clinical diagnosis of FIA was based on the patients' complaint of perianal discharge and positive identification of external opening in digital rectal examination. Surgery was directly offered to patients with simple FIA. Selective preoperative MRI was offered to patients who were uncertain of fistula tract anatomy in clinical examination. Standardized MRI techniques with gadolinium enhanced T1-weighted and T2-weighted axial and coronal cut, short tau inversion recovery (STIR) and fat suppression was utilized. Colonoscopy was performed in patients with suspected perianal Crohn's disease.

Surgical interventions

Surgery was performed or supervised by colorectal surgeons. All patients received examination under anesthesia (EUA) spinal or general in lithotomy position. Intraoperative identification of internal opening was performed by hydrogen peroxide injection and gentle insertion of a probe with blunted end. Fistulectomy, fistulotomy or combined fistulectomy-fistulotomy was performed in low type fistulas, depending on the choice of surgeons. In high type fistulas, distal fistula tract was excised after identification of the internal opening. A monofilament nonabsorbable nylon suture was then inserted to the remaining fistula tract as a non-cutting loose seton. EUA was repeated three months later. When an abscess was found intraoperatively, drainage and curettage was performed. In patients where we failed to identify the internal opening, the low lying sinus tract was excised and laid open to rectal mucosa. In the high lying sinus tract, the whole tract was cored out with preservation of anal sphincters and rectal mucosa. All specimens were sent for histopathological examination. Patients were discharged once they were ambulatory and able to manage the wound as an outpatient.

Postoperative care

Potassium permanganate Sitz bath and oral analgesia were prescribed upon discharge. All patients were examined in the outpatient clinic four weeks after surgery and then there was a yearly follow up after wound healing. They were diagnosed as recurrent FIA if: 1) complete wound healing failed with persistent external opening found 8 weeks after surgery, or 2) new external opening was found during follow up.

Statistical analysis

Data on 8 preoperative variables, four operative variables and presence of recurrence were retrieved from the patients' records. Preoperative variables included sex, past history of perianal abscess, previous perianal operations, past history of Crohn's disease, tuberculosis, diabetes mellitus, preoperative MRI mapping and classification of simple or complex fistula. Operative variables included type of fistulas, identification of internal opening, operative procedures and operative findings of abscess formation. All patients' records and follow up notes were reviewed until June 2007.

Statistical calculation was performed with SPSS 12.0 for windows. Chi square or Fisher's Exact test were used to analyse the association between recurrence and nominal variables as appropriate. Logistic regression was performed on significant variables to determine independent predicting factors. A p-value of <0.05 was counted as significant.

Results

Patients' characteristics

A total of 137 patients with FIA were identified with 135 patients receiving operations between January 2001 and December 2004. 118 were males while 19 were females. The mean age was 44.2 (SD 12.8). Colonoscopies were performed in 7 patients with one of them diagnosed to have Crohn's disease. Nine patients (6.7%) had a history of diabetes mellitus and three patients (2.2%) had Crohn's disease. Mesalazine was prescribed to all patients with Crohn's disease; one patient had additional prednisolone and another patient had additional azathioprine. None of them were put on infliximab. 42 out of 135 patients (31%) had previous operations for a perianal abscess. Seven patients (5.2%) had had previous anal fistula surgery before the first consultation. 111 patients (82.2%) underwent operation without preoperative imaging. 21 patients had preoperative MRI mapping and three patients had CT fistulogram before operation. Significantly more preoperative imaging was performed in patients with previous perianal operations compared with patients with a first attack (19/49 versus 5/86, $p<0.0001$).

Operative findings

Ninety-four patients (69.6%) had low anal fistulas and 14 patients (10.4%) had high anal fistulas. Internal opening could not be identified in 27 patients (20%) and they were labeled as perianal sinus: 21 out of these 27 patients received sinus tract excision, 6 patients received combined fistulotomy-fistulectomy with the tract laid open through the rectal mucosa at the level of sinus tract. One patient had horseshoe type high anal fistula. An abscess was found in 8 patients (5.9%) intraoperatively. Operative procedures are summarized in Table I. The most common operation was combined fistulectomy-fistulotomy (78 out of 135 patients, 57.8%). When the findings in MRI and EUA were compared, EUA agreed with MRI in 16 out of 21 patients (76%).

Seton placement with or without partial fistulectomy was performed in 9 patients. Two out of these 9 patients required long term seton placement, where one had Crohn's

Table I. Type of operations performed in fistula-in-ano

Fistulectomy	15
Fistulotomy	3
Combined fistulectomy-fistulotomy	78
Partial fistulectomy-fistulotomy	7
Excision of sinus tract	22
Seton placement +/- partial fistulectomy	9
Loop colostomy	1

disease and the other had multiple high anal fistulas. Five patients received subsequent fistulotomy with no further recurrence. One patient developed recurrence six months after seton removal and tissue glue injection. One patient defaulted follow up after operation. A total of 129 specimens were sent for histopathological examination. Two patients (1.5%) were found to have tuberculosis. The rest were all benign pathologies.

Pattern and predictors of recurrence

The overall recurrence rate was 13.3% (18/135). Sixteen patients were males and two patients were females. None of the three patients with Crohn's disease had suffered from recurrence, with one of them on long term seton. Internal opening could only be identified in three patients. Excision of sinus tract was performed in 15 patients. The median time to recurrence was 7.5 months, ranging from 3 to 50 months. Four out of 18 patients refused re-operation, where 3 of them had spontaneous healing of the fistula tract and one patient defaulted follow up. Fistulotomy-fistulectomy was performed as a second operation in 8 patients. Excision of sinus tract was performed in four patients as an internal opening was not found intraoperatively. No further recurrence was found in these 12 patients, at a mean follow up of 40.5 months. Seton placement was performed in two patients. One patient required long term seton placement and the other was found to have carcinoma of anus on a regular follow up after three years. Abdominoperineal resection was then performed.

Preoperative and operative variables were included in univariate analysis to study the relation with recurrence (Table II). Presence of Crohn's disease, tuberculosis, diabetes mellitus, preoperative MRI mapping were not associated with recurrence. In sub-group analysis of patients with MRI performed, agreement between MRI and EUA was not associated with recurrence (Table IIa). Six factors including positive history of perianal abscess, previous perianal operation, complex fistula, perianal sinus, lack of identification of internal opening, surgical procedure of sinus tract excision were significantly associated with recurrence. Sinus tract excision was the only independent factor to predict recurrence in logistic regression analysis (Table III).

Table IIa. Preoperative variables in relation to recurrence

Preoperative variables		Recurrence	No recurrence	p value
Sex	Male	16	100	1.0
	Female	2	17	
Crohn's disease	Present	0	3	1.0
	Absent	18	114	
Tuberculosis	Present	0	2	1.0
	Absent	18	115	
Diabetes Mellitus	Present	2	7	0.343
	Absent	16	110	
Pre-operative MRI	Performed	4	17	0.48
	Not performed	14	100	
EUA findings agreed with MRI	yes	4	12	0.21
	no	0	5	
Previous perianal operation	yes	11	38	0.019
	no	7	79	
History of perianal abscess	yes	10	32	0.016
	no	8	85	
Classification	Simple	6	77	0.008
	Complex	12	40	

Table IIb. Operative variables in relation to recurrence

Factors		Recurrence	No recurrence	p value
Type	Sinus	13	14	<0.001
	Low	3	91	
	High	2	12	
Internal opening	Identified	5	103	<0.001
Operation types	Fistulectomy	2	13	<0.001
	Fistulotomy	0	3	
	Fistulotomy + excision of fistula tract	2	76	
	Fistulotomy with partial excision of fistula tract	0	7	
	Excision of sinus tract	13	9	
	Seton placement +/- partial fistulectomy	1	8	
	Loop colostomy	0	1	
Abscess during surgery	Present	2	6	0.29
	Absent	16	111	

Discussion

Fistula-in-ano is one of the most common benign colorectal diseases, with significant risk of morbidity and recurrence. A number of factors were identified to be associated with recurrence in our series, while the surgical procedure of sinus tract excision was the only independent risk factor. Our findings are similar to those published in Caucasians. In a retrospective study of 624 patients with FIA, lack of identification of an internal opening was found to be a significant factor associated with fistula recurrence [6]. In another study of 523 fistulas, 53.3% of recurrent fistulas were accounted by missed internal opening at initial surgery [15]. In our series, 27 out of 135 patients had no internal

Table III. Logistic regression analysis to determine independent factors of recurrence

Factors	p value	95% confidence interval	
		lower	upper
Classification of fistula	0.081	0.73	192.9
Type of fistula	0.49	0.28	14.0
History of perianal abscess	0.95	0.055	15.11
Previous perianal operations	0.90	0.02	28.56
Procedure of sinus tract excision	**0.002**	**1.29**	**3.27**
Identification of internal opening	0.39	0.01	5.28

opening identified during the operation but only 21 patients (77.8%) had sinus tract excision. The rest had the low lying sinus tract laid open through the rectal mucosa to the level of sinus tract, where the missing internal opening was assumed to be there. None of these six patients developed recurrence. This probably explains why the lack of identification of an internal opening was not an independent risk factor.

Perianal sinus is diagnosed in patients with the lack of identification of an internal opening intraoperatively. To avoid the diagnosis of perianal sinus and subsequent procedure of sinus tract excision, effort is put on preoperative localisation of the internal opening by EAUS or MRI. MRI has the sensitivity and specificity of 96% and 90% for detecting the internal opening [16]. A therapeutic impact of 10% with alternation of surgical approach by MRI was found in primary FIA [17]. MRI is also beneficial in case of recurrent fistulas. Surgery for recurrent FIA guided by MRI can reduce further recurrence by 75% [18]. Surprisingly, MRI was not significantly related to recurrence in our series. This may be due to our selective use of MRI instead of routine use in all anal fistulas. Endoanal ultrasound is the other alternative imaging for anal fistulas. In a study comparing MRI and hydrogen peroxide-enhanced EAUS in evaluation of perianal fistulas, both had good agreement, especially for classification of the primary fistula tract and the location of an internal opening [19]. A low recurrence rate of 2% was reported in case of routine use of EAUS [20]. Based on our findings in univariate analysis, high risk patients should be offered MRI. These include patients with complex fistula, history of perianal abscess with or without perianal surgery.

While preoperative MRI road mapping or EAUS can give important information on the anatomy of anal fistulas, MRI and EUA only agreed in 55% of patients [17-18]. Even if an internal opening is found in MRI, it may not be localised during EUA. Intraoperative identification of internal opening is still required to delineate the fistula tract. In our series, 8 out of 18 patients with recurrent anal fistulas (44.4%) were found to have an internal opening in re-operation, which was probably missed in the first operation. Intraoperative identification of internal opening relies on hydrogen peroxide injection through external opening and EUA by a blunt-tip probe. The absence of gas from hydrogen peroxide enhancement does not necessarily mean the absence of an internal opening. In a study comparing EAUS versus hydrogen peroxide-enhanced EAUS, only 44% of internal openings showed gas from hydrogen peroxide enhancement [21]. The use of intra-operative EAUS may help to improve the accuracy of EUA in localization of obliterated internal openings and perform appropriate surgery [22]. In patients with the final diagnosis of perianal sinus, low type should be laid open as fistulotomy. In high lying transphincteric perianal sinus, excision of sinus tract with part of rectal mucosa where a suspected obliterated internal opening is located, with seton insertion, may reduce the incidence of recurrence. Regular follow up is essential to evidence recurrence in the intersphincteric type of perianal sinus.

To conclude, FIA carries a significant risk of recurrence. Preoperative MRI may help to localize the internal opening and should be performed in all complex fistulas. The excision of the sinus tract is the single independent predictor of anal fistula recurrence. There is no difference between Chinese and Caucasians in the recurrence pattern. A high index of suspicion should be raised in the operative diagnosis of perianal sinus. Regular follow-up in patients with perianal sinus is required to monitor recurrence.

Conflicts of interest

None to declare.

References

1. Parks AG, Gordon PH, Hardcastle JD. A classification of fistula-in-ano. Br J Surg 1976; 63: 1-12.
2. Seow-Choen F, Nicholls RJ. Anal fistula. Br J Surg 1992; 79: 197-205
3. Law PJ, Talbot RW, Bartram CI, Northover JM. Anal endosonography in the evaluation of perianal sepsis and fistula in ano. Br J Surg 1989; 76: 752-755.
4. Lunniss PJ, Armstrong P, Barker PG, Reznek RH, Phillips RK. Magnetic resonance imaging of anal fistulae. Lancet 1992; 340: 394-396.
5. Vasilevsky CA, Gordon PH. Results of treatment of fistula-in-ano.Dis Colon Rectum 1985; 28: 225-231.
6. 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: 723-729.
7. Gustafsson UM, Graf W. Excision of anal fistula with closure of the internal opening: functional and manometric results. Dis Colon Rectum 2002; 45: 1672-1678.
8. Malouf AJ, Buchanan GN, Carapeti EA, et al. A prospective audit of fistula-in-ano at St. Mark‘s hospital. Colorectal Dis 2002; 4: 13-19.
9. Gonzalez-Ruiz C, Kaiser AM, Vukasin P, Beart RW Jr, Ortega AE. Intraoperative physical diagnosis in the management of anal fistula. Am Surg 2006; 72: 11-15.
10. Sygut A, Zajdel R, Kedzia-Budziewska R, Trzcinski R, Dziki A. Late results of treatment of anal fistulas. Colorectal Dis 2007; 9: 151-158.
11. Mizrahi N, Wexner SD, Zmora O, et al. Endorectal advancement flap: are there predictors of failure? Dis Colon Rectum 2002; 45: 1616-1621.
12. Athanasiadis S, Helmes C, Yazigi R, Köhler A. The direct closure of the

internal fistula opening without advancement flap for transsphincteric fistulas-in-ano. Dis Colon Rectum 2004; 47: 1174-1180.
13. Champagne BJ, O'Connor LM, Ferguson M, Orangio GR, Schertzer ME, Armstrong DN. Efficacy of anal fistula plug in closure of cryptoglandular fistulas: long-term follow-up. Dis Colon Rectum 2006; 49: 1817-1821.
14. Swinscoe MT, Ventakasubramaniam AK, Jayne DG. Fibrin glue for fistula-in-ano: the evidence reviewed. Tech Coloproctol 2005; 9: 89-94.
15. Sangwan YP, Rosen L, Riether RD, Stasik JJ, Sheets JA, Khubchandani IT. Is simple fistula-in-ano simple? Dis Colon Rectum 1994; 37: 885-889.
16. Beets-Tan RG, Beets GL, van der Hoop AG, et al. Preoperative MR imaging of anal fistulas: Does it really help the surgeon? Radiology 2001; 218: 75-84.
17. Buchanan GN, Halligan S, Williams AB, et al. Magnetic resonance imaging for primary fistula in ano. Br J Surg 2003; 90: 877-881.
18. Buchanan G, Halligan S, Williams A, et al. Effect of MRI on clinical outcome of recurrent fistula-in-ano. Lancet 2002; 360: 1661-1662.
19. West RL, Zimmerman DD, Dwarkasing S, et al. Prospective comparison of hydrogen peroxide-enhanced three-dimensional endoanal ultrasonography and endoanal magnetic resonance imaging of perianal fistulas. Dis Colon Rectum 2003; 46: 1407-1415.
20. Ratto C, Grillo E, Parello A, Costamagna G, Doglietto GB. Endoanal ultrasound-guided surgery for anal fistula. Endoscopy 2005; 37: 722-728.
21. Buchanan GN, Bartram CI, Williams AB, Halligan S, Cohen CR. Value of hydrogen peroxide enhancement of three-dimensional endoanal ultrasound in fistula-in-ano. Dis Colon Rectum 2005; 48: 141-147.
22. Tilney HS, Heriot AG, Trickett JP, et al. The use of intra-operative endo-anal ultrasound in perianal disease. Colorectal Dis 2006; 8: 338-341.