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Introduction

Restorative proctocolectomy with ileoanal pouch anastomosis (IPAA) is the standard surgical procedure used to eliminate disease and preserve faecal continence in patients with ulcerative colitis[1]. Outcomes after IPAA surgery are generally favourable, although complications such as fistulas can have high morbidity rates[1,2]. Pouch-related fistulas can arise any time following the procedure and occur in [2–16] per cent of patients[3–7]. Factors associated with the development of fistula include intestinal disease, operative technique, cryptoglandular disease, malignancy, and pelvic sepsis[7,8]. Multiple interventions are typically necessary to achieve resolution of the fistula tract, with options dependent on anatomy and surgeon preference9. Despite attempts at closure, pouch failure requiring pouch excision and/ or permanent ileostomy occurs in 5–10 per cent of patients who develop pouch-related fistulas with ulcerative colitis, and 20–60 per cent with Crohn's disease[10,11]. This study assessed patient characteristics and outcomes (including failure) of pouch-related fistulas in patients with inflammatory bowel disease.

Methods

All patients evaluated and treated for a pouch fistula at Mayo Clinic from 1985 to 2017 were included in this retrospective review following institutional review board approval. Patients were excluded if they had surgery for familial adenomatous polyposis, when the pouch was not attached to the anus (Barnett pouch), if it was later determined that the fistula did not track from the pouch to the vagina or cutaneous surface, if there was insufficient information in the chart to collect all recorded variables, and if the course of treatment was complicated by rectal cancer. Variables recorded included demographic data and inflammatory disease characteristics. The date of fistula formation was estimated based on the date of symptom onset or first radiological evidence.

Fistulas were described as pouch–vaginal and/or pouch– cutaneous based on the radiological reports or surgical descriptions. Surgical management was categorized (Table 1). The date and success of each procedure were recorded and assessed by the multidisciplinary team. Fistula resolution was defined as closure of the fistula tract on imaging or resolution of fistula symptoms as documented. Pouch failure was defined as permanent diversion with or without pouch excision owing to persistence of the pouch fistula and its symptoms. Persistence of the fistula after pouch failure and date of last follow-up were recorded.

The primary aim was to determine factors associated with pouch failure in patients with fistulizing disease. Data were analysed with JMP software®, using the $\chi 2$ test for categorical and ANOVA for quantitative variables.

Results

A total of 97 patients were included in this study. Demographic information, and disease and fistula characteristics are shown in Table 2. Seventy-seven patients (79 per cent) had at least one definitive management procedure to treat a pouch-related fistula. The median number of definitive management procedures performed in these 77 patients was 2, with a maximum of 10 procedures. The median interval between the first and last operation to treat the pouch-related fistula was 2.1 years with a maximum of 22 years. The median number of total examinations under anaesthesia, including seton placement, incision and drainage procedures, and curettage, was 2 with a maximum of 19.

Twenty-seven patients (28 per cent) had resolution of the pouch-related fistula. The median interval between fistula onset and resolution was 2.8 (range 0.1–15.3) years. Seventy patients (72 per cent) did not achieve fistula resolution. Of these 70 patients, 48 (51 per cent) experienced

pouch failure owing to the fistula; only 6 had diversion with permanent ileostomy, whereas 42 required pouch excision in addition to diversion.

Male patients (n=19, 40 per cent) were more likely than female patients (n=29, 60 per cent) to experience pouch failure due to fistulas, with an OR of 4.5 (c.i. 1.6 to 12.6) (P=0.002). Fistula type was also a statistically significant predictor of pouch failure. Patients with combined pouch–cutaneous and pouch–vaginal fistulas were most likely to experience pouch failure (n=6, 6 per cent), followed by patients with pouch–cutaneous fistulas only (n=39, 40 per cent) and those with pouch–vaginal fistulas only (n=52, 54 per cent) OR 1.125 (c.i. 0.39 to 3.22) (P=0.008).

Discussion

The majority of patients who developed pouch-associated fistulas did not achieve resolution. In patients who did, symptoms from the fistula lasted for years. Some patients underwent complex or multiple procedures with the associated financial, physical, and psychological burden. Two factors were identified to be associated with pouch failure: sex and type of pouch fistula. Male patients were more likely to experience fistula-related pouch failure than female patients, although the highest risk of failure was the combination of pouch–cutaneous and pouch–vaginal fistulas. Pouch–cutaneous fistulas are a particularly troublesome challenge even in isolation. Surprisingly, Crohn’s disease did not appear to be a strong factor for pouch failure, but the comparison was limited by numbers.

Table 1. Univariable analysis of predictors of pouch failure

	No. of patients*	P‡	OR†
Age at IPAA (years), median		0.8383	
Pouch failure	30.7		
No pouch failure	28.7		
Interval between IPAA and Crohn's diagnosis (years), median		0.4159	
Pouch failure	4		-
No pouch failure	4		
Age at diagnosis of fistula (years), median		0.6505	
Pouch failure	36.8		-
No pouch failure	37.0		
Interval between IPAA and fistula diagnosis (years), median		0.7968	
Pouch failure	2.9		-
No pouch failure	3.2		
Interval between first and last fistula operation (years), median		0.8430	
Pouch failure	2.2		-
No pouch failure	2.6		
No. of definitive operations, median		0.1251	
Pouch failure	2		-
No pouch failur	2		
Sex		0.0025	
F	29 (41)		1.00 (reference)
M	19 (76)		4.5 (1.6, 12.6)χ2
Final IBD diagnosis		NS	
Crohn's disease	39 (50)		-
Ulcerative colitis	9 (53)		
Pouch fistula type		0.008	
Pouch–cutaneous	32 (63)		1.125 (0.39, 3.22)χ2
Pouch–vaginal	12 (32)		
Pouch–cutaneous + pouch–cutaneous	4 (67)		
Abscess		0.1229	
Yes	7 (41)		-
No	31 (57)		
Immunosuppressants at definitive fistula repair		0.8978	
Yes	19 (51)		-
No	29 (50)		
Smoking at definitive fistula repair		0.7766	
Yes	5 (56)		-
No	43 (51)		

*Values are n (%) unless otherwise indicated; †values in parentheses are 95% confidence intervals. IPAA, ileoanal pouch anastomosis; IBD, inflammatory bowel disease. ‡ANOVA, except χ2 test.

Table 2. Demographics and fistula characteristics and outcome

	No. of patients*
Sex ratio (F : M)	71 : 26
Age at time of IPAA (years), median (range)	30.3 (10.7, 57.5)
Final IBD diagnosis	
Crohn's disease	79 (81)
Ulcerative colitis	18 (19)
Interval between IPAA and change to Crohn's diagnosis (years), median (range)	4.2 (0, 28.2)
Age at time of fistula diagnosis (years), median (range)	37.5 (17.0, 63.9)
Interval between IPAA and fistula diagnosis (years), median (range)	3.1 (0, 33.2)
Type of pouch fistula	
Pouch–vaginal	52 (54)
Pouch–cutaneous	39 (40)
Pouch–vaginal + pouch–cutaneous	6 (6)
Associated abscess	54 (56)
Smoking at time of definitive fistula repair	9 (9)
Immunomodulator, steroid or biological at time of definitive fistula repair	38 (39)
Outcome	
Resolution of fistula	27 (28)
Interval between fistula onset and resolution (years), median (range)	2.8 (0.1, 15.3)
Pouch failure	48 (51)
Type of permanent diversion	
Pouch excision	42 (88)
Permanent end ileostomy (pouch remains in situ)	6 (12)

*Values are n (%) unless otherwise indicated. IPAA, ileoanal pouch anastomosis; IBD, inflammatory bowel disease.

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