A prospective audit of fistula-in-ano at St. Mark’s hospital

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Abstract

Objective To conduct a prospective audit of all patients presenting with anal fistula at St. Mark’s Hospital during one calendar year and to compare the presentation and outcome of this cohort with previous reports from this institution.

Patients and methods All patients undergoing examination under anaesthetic (EUA) for anal fistula during 1997 were studied. All fistulae were anatomically classified and operative procedures recorded. During a mean follow-up period of 14 months details of healing, recurrence and function were gathered.

Results 98 patients with a mean age of 43.7 years were assessed. 86 (88%) patients had fistulae of cryptoglandular (idiopathic) origin. Fistulae were superficial in 11 (11%) patients, intersphincteric in 30 (31%) patients, trans-sphincteric in 52 (53%) patients, suprasphincteric in 3 (3%) patients and extra-sphincteric in 2 (2%) patients. 49 (50%) fistulae were classified as complex. Eradication of fistulae with preservation of function was achieved in 89 (91%) patients. Fistula recurrence occurred in 4 (4%) cases. Ten (10%) patients had some degree of incontinence, 9 (9%) of whom had undergone previous fistula surgery. Nine (9%) patients still had setons in situ at the end of the follow-up period.

Conclusions A greater proportion of difficult fistulae was seen during the year compared with previous studies from St. Mark’s. Despite this a satisfactory outcome was achieved in the vast majority with a relatively low rate of disturbed function. Previous fistula surgery is a risk factor for incontinence, which can usually be managed conservatively.

Keywords Fistula-in-ano, faecal incontinence

Introduction

Management of fistula-in-ano is an important aspect of colorectal practice. The aims of treatment are to eradicate the primary fistula track, adequately drain sepsis and secondary tracks and maintain sphincter integrity whenever possible. The majority of anal fistulae are simple and low and can be satisfactorily treated by fistulotomy [1]. More complex fistulae, in which there may be involvement of a substantial portion of the sphincter mechanism, pose a surgical challenge, as fistulotomy in such cases may render the patient incontinent [2]. Common techniques for dealing with difficult fistulae include the use of setons [3,4] and advancement flaps [5]. More recently the use of a fibrin sealant has been described [6].

Sir Alan Parks provided a detailed classification of fistula-in-ano as a result of a study of 400 cases treated over 15 years [7]. Subsequent application of this classification retrospectively to 793 patients admitted to St. Mark’s over a 6-year period demonstrated that simple superficial and intersphincteric fistulae constituted 70% of all fistulae, whilst trans-sphincteric, supra-sphincteric and extra-sphincteric fistulae made up 21%, 3% and 3%, respectively [8]. In that series there was a significant incidence of incontinence postoperatively with soiling being reported by 31%, flatus incontinence by 25% and incontinence to liquid stool by 17% of patients.

This study aimed to assess prospectively the presentation, classification, management and outcome of a consecutive series of patients referred with fistula-in-ano to St Mark’s Hospital in one recent calendar year.

Patients and methods

All patients who had their first examination under anaesthesia (EUA) for fistula-in-ano at St Mark’s Hospital

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Prospective audit of fistula-in-ano

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During 1997 were prospectively followed for a mean period of 14 months (range 5.3–21 months). Anovaginal and rectovaginal fistulae were excluded. Details of existing and previous anal pathology, all pre- and post-referral investigations and treatments were recorded. All patients were questioned regarding their continence prior to surgery and if any degree of faecal incontinence was suggested, this was fully assessed using the Pescatori Continence Scoring System [9] and anorectal physiological testing [10]. All patients underwent EUA where comprehensive operative details were recorded. Fistulae were classified on the basis of operative findings according to Parks’ classification [7]. At follow-up, details of wound healing, complications, faecal continence, fistula recurrence and further surgical interventions required were recorded.

**Results**

Ninety-eight patients (68 male) of mean age 43.7 years (range 15–84 years) were assessed. Fifty-nine patients (60%) were referred to St. Mark’s by other surgeons though only two (2%) of referrals were made by coloproctologists. Thirty-six patients (37%) were referred to St. Mark’s by their General Practitioner, one (1%) by a Consultant Physician and 2 patients (2%) self-referred for private treatment. Mean duration of symptoms prior to referral to St Mark’s was 2.2 years (range 0.1–21 years). Each patient was managed by one of six St. Mark’s surgeons. Eighty-two (84%) patients had an abscess preceding their fistula, either surgically (n = 62) or spontaneously (n = 20) drained. Fifty-one patients (52%) had undergone a total of 115 surgical procedures for fistula (median 2, range 1–11) at other hospitals prior to referral. Eleven patients had a history of miscellaneous perianal surgery, including haemorrhoidectomy (n = 6), lateral sphincterotomy (n = 2), excision of anal warts (n = 1), excision of anal skin tags (n = 1), excision of vaginal or Bartholin’s cysts (n = 2), repair of ano-rectal fistulae (n = 1) and gracilis transposition flap (n = 1). Six female patients had a history of significant obstetric trauma.

The aetiology of fistulae was idiopathic in 86 (88%) patients, inflammatory bowel disease in 10 (10%) patients (1 in association with UC), tuberculosis in one (1%) patient and HIV infection in one (1%) patient. Ten of these 13 (77%) unusual cases were referred to St Mark’s by other surgeons.

Eighteen patients had a total of 25 investigations as part of their pre-operative assessment. These included 3 fistulograms (performed elsewhere), 10 anal MRI scans (7 at St. Mark’s), 8 anal ultrasound scans and 4 anorectal physiology studies (all at St. Mark’s). All patients underwent EUA.

The operative findings are summarized in Fig. 1. Eleven (11%) fistulae were superficial, 30 (31%) intersphincteric, 52 (53%) transphincteric, two (2%) extraspincteric and three (3%) supraspincteric. Ten patients had more than one primary fistula track identified at operation: seven had 2 primary tracks, two had three primary tracks, and one patient with hidradenitis suppurativa had multiple tracks. 6 patients with no visible external opening at EUA were classified as follows: 3 with a high interspincteric fistula had no perineal opening, 1 with a low interspincteric track only had perineal induration, 1 had a high interspincteric track opening into the rectum and 1 patient who initially had a normal EUA developed an abscess at the same site as the MRI scan had indicated a problem.

Forty-nine patients (50%) had complex fistulae, defined by the presence of more than one external opening (n = 10), horseshoeing (n = 23), an abscess cavity not directly related to the primary track (n = 28), or secondary extensions in association with the primary fistula track (n = 13) [3]. Of these patients 24 (25%) fulfilled more than one of these criteria for complex fistulae. There was no relationship between length of history and fistula complexity.

The radial site of fistulae was identified, with 53 (54%) presenting with an internal opening in the posterior anal canal, 14 (14%) opening laterally and 30 (31%) opening into the anterior canal. These figures are comparable with other series. The group presenting with anteriorly sited anal fistulae included 20 males and 10 females. Amongst the females, 1 supraspincteric and 1 extraspincteric fistula were managed by seton drainage and 3 mid-transpincteric fistulae were successfully managed by lay-open, lay-open and sphincter repair, and core out

![Figure 1](https://example.com/fistula-classification)

**Figure 1** Classification of fistulae. ■ Superficial; □ Interspincteric; ▪ Transpincteric; □ Supraspincteric; ■ Extraspincteric.
fistulectomy with advancement flap, respectively, without any symptoms of incontinence.

Surgical treatment for each primary fistula track is shown in Table 1. The commonest procedure performed was fistulotomy (n = 64), 17 of which were also marsupialized. A Salmon cutback was used in 10 patients undergoing fistulotomy. Some 25 of 52 (48%) trans-sphincteric fistulae were laid open, the majority of these (13) being mid trans-sphincteric. High trans-sphincteric fistulae, however, were usually managed initially with loose setons.

A total of 23 patients had placement of a loose seton, and three a tight seton, usually for more complex fistulae (Table 1). Four patients in whom a loose seton was initially placed for drainage had their seton uneventfully removed at subsequent EUA with no requirement for any further surgery. These consisted of 2 high trans-sphincteric, one mid-trans-sphincteric and one supra-sphincteric fistula. Of the 2 remaining supra-sphincteric fistulae, one had a seton still in situ at 6.5 months follow-up and the other had a core-out fistulectomy with advancement flap closure of the internal opening. This fistula recurred at 7 weeks and the patient was subsequently lost to follow up.

The 2 extra-sphincteric fistulae were managed by a seton in one patient with Crohn’s disease, and by core-out fistulectomy and closure of the internal opening in the other. This second patient made an uneventful recovery.

Two other patients underwent core-out fistulectomy. Of these, one had an advancement flap for a mid trans-sphincteric fistula which healed by one month, and another, with a high trans-sphincteric fistula, had suture closure of the internal opening but developed fistula recurrence at 7 months. This was laid open without complication.

Other procedures undertaken included fistulotomy with primary direct sphincter repair in 3 patients – one for a low trans-sphincteric and two for high trans-sphincteric fistulae (one covered with a temporary sigmoid loop colostomy) – and fistulectomy via a Kraske approach in one patient (for an anterior mid-trans-sphincteric fistula with a high secondary extension between rectum and prostate). In all patients, secondary tracks and associated collections were laid open widely.

Nine fistulae were seen in association with Crohn’s disease and one with ulcerative colitis. The latter was an intersphincteric fistula that was treated by fistulotomy without complication. Of the patients with Crohn’s disease 6 had undergone previous fistula surgery, including colovaginal fistula repair in one patient who presented with a suprasphincteric fistula. Two superficial, one intersphincteric and one low trans-sphincteric fistula were treated by fistulotomy. One superficial (in a patient with significant obstetric trauma), 3 high trans-sphincteric and the suprasphincteric fistula were managed with loose setons. The remaining patient with a high trans-sphincteric fistula managed initially with a seton subsequently required a colostomy.

Horseshoeing of fistula tracks was noted in 23 cases. In eight cases the primary fistula track was laid open, with curettage of the secondary tracks. 7 patients underwent loose seton drainage of the primary track with secondary tracks laid open. A loose seton was also employed as part of a staged procedure in 4 cases and as definitive treatment in 2 cases. One patient had a tight seton placed after all secondary tracks had been laid open and in another case was managed by core out fistulectomy and advancement flap.

The mean follow-up of patients was 14 months (range 5.3–20.6 months). During the period of follow-up, 43 further fistula-related procedures were required in 34 patients (median 1, range 1–3). These included 14 EUA’s, nine seton-related procedures (4 removals, 2 re-insertion, 2 tightening and 1 insertion), one evacuation of haematoma, one colostomy for iatrogenic faecal incontinence, one closure of colostomy, 1 secondary sphincter repair, 1 lateral sphincterotomy and 1 fissurectomy with island advancement flap repair. Five additional fistulotomies were required following seton removal (3 low trans-sphincteric, 1 mid trans-sphincteric and 1 extrasphincteric fistula). Wound bridging requiring further surgery occurred in 6 patients and 4 patients developed recurrent abscesses, 2 of which necessitated surgical drainage. 3 of these patients underwent STIR MRI scans after abscess drainage, though recurrent or persistent fistula was not demonstrated on the scans. One case, however, developed a recurrent fistula confirmed on MRI, which occurred two years later in exactly the same site as the abscess had been.

True fistula recurrence was seen in 4 patients. Two recurrent trans-sphincteric fistulae were treated by fistulotomy, whilst the high trans-sphincteric and the suprasphincteric fistula recurrences were treated by core out fistulectomy.

Table 1 Operations performed.

<table>
<thead>
<tr>
<th></th>
<th>Lay-open</th>
<th>Tight seton</th>
<th>Loose seton</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersphincteric</td>
<td>29</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trans-sphincteric</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>11</td>
<td>2</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Mid</td>
<td>13</td>
<td></td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>High</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suprasphincteric</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extrasphincteric</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
During follow-up, 10 patients reported some degree of faecal incontinence, 9 of who had been treated by fistulotomy, the exception being managed with a tight seton (Table 2). 9 of these patients had also undergone previous fistula surgery. Even 2 patients undergoing lay-open of superficial fistulae developed soiling. There was an equal distribution (four each) of incontinent patients in those with intersphincteric and trans-sphincteric fistulae. In the former group one patient subsequently required sphincter repair and in the latter one patient with Crohn’s disease and a high trans-sphincteric fistula required a colostomy. The remainder were managed satisfactorily with pads or antidiarrhoeal medication.

Definitive treatment successfully eradicated the primary fistula track in 89 patients (91%) during follow-up, all of whom remained healed at the time of last review. Wound healing (in 84 patients) was demonstrated at a mean of 11.6 weeks (range 2–44 weeks) following surgery. One patient’s wound remained unhealed at 11 months.

Nine patients still had a seton in situ controlling a residual primary fistula track. Five of these patients had fistulae in association with Crohn’s disease as previously described. Of the remainder one had extensive hidradenitis suppurativa and three had high trans-sphincteric fistulae.

**Table 2** Patients with incontinence following fistula surgery.

<table>
<thead>
<tr>
<th>Fistula type</th>
<th>Surgery</th>
<th>Degree of incontinence</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial</td>
<td>*Fistulotomy</td>
<td>Soiling</td>
<td>Pads</td>
</tr>
<tr>
<td></td>
<td>*Fistulotomy</td>
<td>Soiling</td>
<td>Pads</td>
</tr>
<tr>
<td>Intersphincteric</td>
<td>*Fistulotomy &amp; seton</td>
<td>Soiling</td>
<td>Pads</td>
</tr>
<tr>
<td></td>
<td>*Fistulotomy</td>
<td>Soiling</td>
<td>Pads</td>
</tr>
<tr>
<td>Trans-sphincteric</td>
<td>*Fistulotomy</td>
<td>Liquid stool</td>
<td>Loperamide</td>
</tr>
<tr>
<td></td>
<td>*Fistulotomy</td>
<td>Liquid stool</td>
<td>Sphincter repair</td>
</tr>
<tr>
<td>*Denotes previous fistula surgery.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 3** Comparison of series.

<table>
<thead>
<tr>
<th></th>
<th>Marks &amp; Ritchie 1977 (n = 793)</th>
<th>Vasilevsky &amp; Gordon 1984 (n = 160)</th>
<th>Malouf et al. 2000 (n = 98)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial</td>
<td>16%</td>
<td>N/S</td>
<td>11%</td>
</tr>
<tr>
<td>Intersphincteric</td>
<td>56%</td>
<td>41.9%</td>
<td>31%</td>
</tr>
<tr>
<td>Trans-sphincteric</td>
<td>21%</td>
<td>52.1%</td>
<td>53%</td>
</tr>
<tr>
<td>Suprasphincteric</td>
<td>3.5%</td>
<td>1.3%</td>
<td>3%</td>
</tr>
<tr>
<td>Extrasphincteric</td>
<td>3%</td>
<td>0%</td>
<td>2%</td>
</tr>
</tbody>
</table>

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**Discussion**

This audit of fistula patients seen over one calendar year demonstrates a greater proportion of difficult fistulae, mainly trans-sphincteric, compared with the previous, albeit larger, St. Mark’s retrospective analysis [8]. The proportions are similar to a more recent retrospective Canadian study of 160 patients [12] (Table 3). Presumably the simpler fistulae, that is the superficial and intersphincteric fistulae, are being satisfactorily managed in referring hospitals as understanding of fistulae improves, perhaps through subspecialization. A relationship between symptom duration and complexity noted in the St. Mark’s study [8] was not seen in our patients, probably on account of the small sample size.

In spite of greater complexity, a satisfactory outcome in terms of eradication of the primary track and preservation of function was achieved in 91% of patients. A study of the longer-term follow-up of these patients at 3 years is currently being undertaken to determine the incidence of recurrence, maintenance of function and outcome of those with setons.

The study also shows that most fistulae can be treated satisfactorily by lay-open techniques, even many mid trans-sphincteric fistulae in which a seemingly substantial part of the external sphincter is divided. Sir Alan Parks, in his classic paper, stated that ‘as a general rule the whole of the internal and most of the external sphincter can be cut, with the exception of the puborectalis muscle, without any serious loss of function’ [7].

One centimetre of normal sphincter muscle above the internal opening may be sufficient for the primary track to be laid open [13]. This is most applicable to males with
no history of previous fistula surgery or perineal surgery but should be adopted with caution in females whose anterior external sphincter and anal canal have been demonstrated to be shorter [14], and often harbour occult obstetric injury [15]. Three females with anterior trans-sphincteric fistulae in this study represented a high-risk group and were successfully managed by lay-open (low/mid canal), lay-open and immediate sphincter repair (mid canal) and core out fistulectomy with advancement flap (mid canal). None developed symptoms of faecal incontinence.

Fistulotomy remains the most effective means of eradicating a fistula track and it is our opinion that many patients will accept a minor degree of incontinence in order to be cured of a troublesome fistula with its associated mucus discharge, recurrent sepsis, pruritus and disability. In experienced hands, sphincter division with immediate or delayed repair may be a feasible option as in 3 of our patients.

Horseshoeing of fistula tracks poses additional problems to the surgeon. Usually infection related to trans-sphincteric fistula passes into the deep post anal space. If the whole track system is opened posteriorly this may cause a large defect which, on healing, predisposes to incontinence. This was successfully avoided using several methods described above.

Few patients underwent radiological imaging by Magnetic Resonance Imaging (MRI) or Anal Endosonography (AES). This may reflect the relative infancy of these techniques for anal fistula in 1997 but also probably reflects the experience of the operating surgeons. Indeed, the experienced examining finger using a detailed knowledge of fistula anatomy and actiology is a very sensitive tool for accurately determining fistula type and complexity in relation to the sphincter complex [7] and compares favourably with AES [16]. MRI, however, is becoming more widely utilized as techniques and understanding improve, and may be useful in predicting clinical outcome, particularly for complex fistulae [17]. Although MRI did not demonstrate fistula recurrence in three out of four patients who developed further abscesses postoperatively, it successfully outlined fistula recurrence in 1 of these cases 2 years later, in accordance with earlier studies [18].

As this was a prospective observational study anorectal physiology testing and formal continence assessment was carried out in the few cases where clinically indicated. Risk factors for developing incontinence after fistula surgery are well-documented [19] and these can usually be identified by clinical assessment. Manometry is advocated by some to help direct the surgical approach and therefore prevent incontinence developing after fistula surgery [20]; however, its routine use is by no means universal practice. Most experienced coloproctologists perform these investigations only when indicated after full clinical assessment.

Faecal incontinence remains a problem after fistula surgery. Reported incontinence rates vary considerably from 0 to 40% [12] largely on account of lack of standardization and variable follow-up. A 10% rate of incontinence in our group of patients is probably acceptable given the complexity of many of the fistulae. This compares favourably with rates of 39% [7] and 30% [8] reported previously from this institution and is similar to the 6% reported prospectively in the Canadian study over a 6–108 month follow-up period [12]. However, lack of uniform peri-operative continence data is a notable failing in this audit, and with the recent development of simple, validated continence scoring methods this should now be performed routinely [21].

Previous fistula surgery appears to be a risk factor for incontinence in these patients and previous perineal surgery, particularly haemorrhoidectomy or sphincterotomy, may also influence ultimate function. Selective use of imaging and the performance of more complex procedures for eradication of fistulae in these circumstances may be required, possibly at the expense of recurrence.

Most uncomplicated fistulae should heal within about 12 weeks [12], which is consistent with our mean healing time of 11.6 weeks. Considerably longer healing times have been reported previously from this institution; for example, of 51 trans-sphincteric fistulae treated and for whom follow-up data was available, 13 remained unhealed at 6 months [8]. Following fistulotomy optimal healing is achieved by saucerizing the wound to create a wide shallow area. Use of the Salmon backcut, as in 10 of our patients, delays the healing of the outer part of the wound to allow the anal canal to fill with granulation tissue.

Use of a controlled cutting seton avoids the necessity for formal muscle division, but its use requires experience, regular supervision and a certain amount of discomfort for the patient [22]. Minor degrees of faecal incontinence are recognized following the application of this technique [23].

Loose setons were more widely adopted in this cohort of patients, usually for more difficult fistulae. Such an approach allows initial drainage of sepsis prior to subsequent definitive treatment to eradicate the fistula. Four of our patients had loose setons removed without any requirement for further surgery by the end of the study period and these were all high or complex fistulae. Approximately 50% of fistulae will heal after seton removal without external sphincter division, and this can be performed when the external opening of the fistula has closed around the seton approximately three months after insertion [4]. Three of our patients...
undergoing management with setons did report some disturbance of continence. This is a well-recognized problem, which may be related to internal sphincter division [24]. It remains to be seen in our follow-up study what the outcome will be in those patients still with setons in situ.

Patients with Crohn’s disease are more likely to be managed conservatively [25]. The use of a long-term seton in these patients is preferable to the risk of incontinence and a nonhealing wound, which may result from attempts at more definitive surgery. Four of the 9 patients in this series were managed with a long-term seton. Of the 5 treated by fistulotomy one complained of soiling and one other with a complex fistula subsequently had a colostomy raised. There was not, however, a delay in healing in this group, a fact that has been observed by others [12,26]. Other sphincter conserving techniques have recently proved successful in Crohn’s Disease [27] and may obviate the need for proctectomy in this group. Medical therapies are being evaluated in controlled trials to see what role they may play in this setting after some encouraging early results [28].

Only 4 recurrences (4%) were seen during the follow-up period, 2 of which were treated by techniques other than fistulotomy. Few reports of long-term follow-up and recurrence exist. An average follow-up of just over 3 years of 160 patients [12] reported a recurrence rate of 6.3%, most often seen in those patients in whom high blind tracks were evident on EAU. Most recurrences probably occur within 12 months, although later recurrences have been reported [12,29]. A distinction must be made between true recurrence following treatment and persistence of fistulae resulting from inaccurate assessment. A previous study of 24 difficult fistulae from a total of 671 seen at St. Mark’s over a 4-year period identified 5 in which misdiagnosed primary and secondary tracks were responsible for treatment failure [30].

In conclusion, a greater proportion of difficult fistulae were seen over 12 months than previously. Despite this, a satisfactory outcome in terms of eradication of sepsis and preservation of function was achieved in the vast majority of cases. The 3-year follow-up of these patients is awaited with interest.

References


