Short Report

Management of low transsphincteric anal fistula with serial setons and interval muscle-cutting fistulotomy

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ABSTRACT

This study evaluates low transsphincteric anal fistula managed by serial setons and interval fistulotomy, with attention to healing without recurrence and preservation of continence. Following Institutional Review Board approval, consecutive anal fistula operations performed by a single surgeon from January 1, 2009 to December 31, 2013 were retrospectively reviewed using electronic medical records and telephone interviews for patients lost to follow up. Of the 71 patients, 26 (37%) had low transsphincteric fistula (23 males and 3 females; mean age: 46 years), treated at our institution by seton placement followed by interval surgical muscle cutting and subsequent seton replacement or final fistulotomy. Of the 26 patients, 22 (85%) were initially referred due to previous failed treatment, with a 30.6 month mean duration of fistula prior to referral and a mean of 2.2 (range: 0–6) prior anorectal surgeries. At a mean follow-up of 11.9 months, none of the 21 patients experienced recurrence or fecal incontinence. Serial seton with interval muscle-cutting sphincterotomy followed by complete fistulotomy is an effective treatment for the management of patients who are either initially seen for low transsphincteric fistula, or referred after failed anorectal surgery for that condition.

Keywords: low transsphincteric fistula; serial seton; fistulotomy; recurrent fistula; fecal incontinence


1 Introduction

Transsphincteric fistulas constitute approximately 23% to 53% of all anorectal fistulas¹,². The cornerstone of surgical treatment is to eradicate the fistula tract without the development of recurrence, while preserving sphincter function³. A “lay-open” fistulotomy technique can be used initially for superficial or intersphincteric tracts in most cases, while it is rarely used for high transsphincteric fistulas⁴. Low transsphincteric fistulas have their primary opening at the dentate line and usually present as an ischiorectal abscess. Similar to the high transsphincteric fistula, these patients are usually candidates for staged surgery after the abscess is drained and sepsis controlled with a seton⁵,⁶. To affect a cure after the seton is in place, the sphincter may be severed along the low transsphincteric tract of the fistula, prompting concern to both the patient and surgeon for development of incontinence. The safety of sphincterotomy unroofing the fistula tract has not been quantified, even with newer
imaging techniques, and involves judgment based on the patient’s pre-existing bowel habits, gender, location of the fistula and existing and remaining muscle after prior and subsequent serial fistulotomy. Many patients with this condition are referred to specialized centers after failed surgery, which may include sphincter preservation procedures such as fibrin glue, fistula plugs, advancement flaps, ligation of intersphincteric fistula tract (LIFT), prior setons and fistulotomy. The reasons for failure can include incorrect or incomplete identification of the primary opening or fistula tract, surgical technique, postoperative morbidity affecting healing[7], or paradoxically, the preservation of sphincter strength, which may disrupt a well placed plug, fibrin glue, or tract ligation in the postoperative period.

The aim of the study was to describe the use of serial setons and interval muscle-cutting fistulotomy leading to complete fistulotomy for low transsphincteric fistula at our institution, where the majority of cases had been referred after persistent or recurrent fistula.

2 Materials and methods

2.1 Study design

This retrospective study was approved by the Cleveland Clinic Florida Institutional Review Board (IRB # FLA 13-084). All consecutive patients with transsphincteric fistula who underwent serial seton interval muscle-cutting fistulotomy were selected from among those who underwent fistula surgery by a single colorectal surgeon at our institution between January 1, 2009 and December 31, 2013. Low transsphincteric fistula was defined in this study as that which traverses the lower third of the anal sphincter with the primary opening at the dentate line. Patients with fistulas due to inflammatory bowel disease, human immunodeficiency virus and malignant neoplasia were excluded. The patients’ electronic medical records were reviewed for demographics, prior anorectal surgery, primary and secondary openings, number and site of fistula tracts, number of seton fistulotomies, mean bowel movement prior to and after treatment, postoperative healing time, recurrence of fistula and development of fecal incontinence.

2.2 Operative technique and management

All patients were treated in an outpatient setting. Patients were placed in the prone jackknife position with the buttocks taped apart to facilitate exposure. Either general or monitored anesthesia care with local anesthesia was utilized. After inspection, palpation, digital rectal examination and anoscopy, the secondary opening, fistula tract, and primary opening were identified. Lacrimal or standard fistula probes were utilized for tract identification. In cases where the internal opening is questionable, a crypt hook can be used to explore the tract from the primary opening, or hydrogen peroxide can be injected into the secondary opening to reveal “bubbles” at the origin of the fistula tract. After delineation of the fistula tract, the transspincteric fistula was looped with a loosely tied seton. The skin and subcutaneous tissue distal to the secondary opening were sculptured for drainage. Any associated abscess cavities or horseshoe extensions were drained using a mushroom catheter or a “doubled” vessel loop, and removed within 1–2 weeks. Preoperative intravenous and postoperative oral antibiotics were prescribed to patients with concurrent abscess or cellulitis.

After an initial postoperative examination, patients had clinical follow-up every 2–3 weeks, where they were observed for evidence of residual or recurrent abscess due to errant index seton placement, a missed secondary tract, or premature healing around the seton preventing drainage.

We evaluate the thickness of the muscle bundle that involves the fistula as well as the muscle that will remain after the fistulotomy is completed. If the fistula involves the lower third of the muscle bundle and the primary opening is at the dentate line but seems too thick for primary fistulotomy, especially in obese patients, a portion of the muscle in the fistula tract may be surgically severed and the seton replaced; the patient’s condition is observed with respect to abscess formation and continence status. After a 6–8 week period, when these clinical factors are acceptable, we proceed with final fistulotomy and marsupialization. There is also the option to perform alternative fistula procedures or retain the indwelling seton on a permanent basis.

Horseshoe or half horseshoe fistula was categorized as transspincteric with secondary extensions.

Continence was assessed during office visits by questioning the patients for their specific bowel frequency and associated bowel control. Telephone interviews to assess continence were necessary in 4 patients who were not able to return for follow-up visits. A standardized questionnaire was not utilized. Our primary outcome was recurrence and our secondary outcome was continence status.

2.3 Statistical analysis

Data were analyzed with SPSS (Version 16.0., SPSS Inc, Chicago, IL, USA). Continuous variables were analyzed as mean or median (range), whereas categorical variables were analyzed as proportions and percentages.

3 Results

3.1 General information

Of the 71 consecutive patients with anorectal fistula, 26 (37%) were low transspincteric and were included in this
study. There were 23 males and 3 females with mean age of 46.4 (range: 30–73) years. The mean body mass index (BMI) was 30.5 (range: 21.4–39.7) kg/m². Twenty-two of the 26 patients (85%) had undergone anorectal surgery for fistula prior to referral (Table 1) while 4 had their index fistula surgery at our institution (Figure 1 and Figure 2). Three patients had horseshoe or half horseshoe fistulas and two patients had active abscess cavities. Six of the 26 patients had more than one external opening (a total of 26 internal and 33 external openings were found at surgery). The location of the primary opening was 38% (10/26) anterior midline, 31% (8/26) posterior midline, 23% (6/26) left anterior, 4% (1/26) right anterior, and 4% (1/26) left lateral. Twenty-two (85%) of the secondary openings were located 3–6 cm from the anal verge, while 4 were > 6 cm from that landmark.

### Table 1 Type and number of prior surgeries in the 22 patients who were referred

<table>
<thead>
<tr>
<th>Type of surgery</th>
<th>Number of surgeries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incision</td>
<td>27</td>
</tr>
<tr>
<td>Seton placement</td>
<td>15</td>
</tr>
<tr>
<td>Surgery for hemorrhoid/fissure</td>
<td>6</td>
</tr>
<tr>
<td>Surgery for fistula</td>
<td>6</td>
</tr>
<tr>
<td>Fibrin glue injection</td>
<td>2</td>
</tr>
<tr>
<td>Total number of prior surgeries</td>
<td>56</td>
</tr>
</tbody>
</table>

The mean interval from the last surgery prior to referral was 10.2 months.

Of the 26 patients, 24 underwent serial seton and interval muscle-cutting fistulotomy at our institution; the mean number of seton insertions was 1.6 (range: 1–6) with a mean interval between each surgery of 2.8 (range: 1.5–6.0) months. Seton material included Ethibond, silk or vessel loop. Two patients with serial setons preferred alternative treatment to final fistulotomy: one female with an anterior fistula had a successful fistula plug at 5 years of follow-up and one male patient with an anterior fistula underwent advancement flap by another institutional surgeon and on telephone follow-up has not healed.

Three of the 24 patients with indwelling setons (cases 22–24) were lost to follow-up. Marsupialization was performed in 86% (18) of the 21 patients who had a final fistulotomy whose mean wound healing time was 1.7 (range: 1–3) months. All 4 patients whose index seton fistulotomy was performed at our institution had a two-stage procedure with a mean healing time of 3.88 (±0.63) months while 17 referred patients with a mean healing time of 6.41 (±4.55) months. These 17 referred patients had a mean of 2.7 (range: 2–7) surgeries at our institution. None of the 21 patients with a final fistulotomy had fistula recurrence at a mean follow-up time of 11.9 (range: 8–33) months after the final surgery (Figure 2). Mean pre- and post-operative daily bowel movements were 1.6. None of these patients reported incontinence to liquid or solid stool during the serial seton process or final healed fistulotomy. Of note, incontinence to flatus was not assessed in this study.

### Figure 2 Flow diagram

The mean duration of abscess/fistula prior to referral was 30.6 months, with an average of 2.2 (range: 0–6) surgeries performed before referral.

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### 3.2 Surgical outcomes

Figure 1 and Table 1 identify the number and types of surgeries performed prior to referral and those performed initially at our institution. The mean duration of abscess/fistula prior to referral was 30.6 months, with an average of 2.2 (range: 0–6) surgeries performed before referral.

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### 4 Discussion

The classification of anorectal fistula devised by Parks
et al[1] indicates that transsphincteric fistula may be the second most common type, occurring in 23% of all fistulas. The incidence may vary according to referral patterns; we report 37% low transsphincteric fistula in 71 consecutive fistula cases in this study. Transsphincteric fistula may occur after an ischiorectal abscess and can be high or low. High transsphincteric fistula passes through the upper or middle third of the external anal sphincter, whereas low transsphincteric fistula traverses the lower third of that muscle with the primary opening at the dentate line[6]. The transsphincteric fistulas in our study had the secondary openings measured from the edge of the anal verge, and 85% were located 3–6 cm distal and 15% were 6 cm or greater.

Successful fistula surgery is measured by the incidence of recurrence, and incontinence to flatus or stool[8]. Confirmed risk factors for recurrence include missed primary openings, secondary tracts, residual abscess, or delayed healing of a properly or improperly sculptured wound[7]. Prior anorectal surgery, anterior fistula tracts, inflammatory bowel disease, bowel movements of more than 3 per day, prior radiation or chemotherapy and excessive division of sphincter, as with high transsphincteric fistula, are also risk factors for incontinence[9–11].

Fistulotomy of a correctly identified tract is the most reliable procedure for cure[8]. For patients with high transsphincteric fistula, incorporating significant muscle, surgical fistulotomy is not appropriate, although cutting seton has been described[12]. Sphincter-preserving alternatives such as advancement flap, the use of fibrin glue or plug, and LIFT are alternatives. The healing rates range from 10%–90%, with incidence of incontinence reportedly 0%–18%[13–16]. For patients with low transsphincteric fistula, the risk of impaired continence is not insignificant[17]. Outcome is dependent on proper classification of the fistula, technique and perioperative management. In this series of low transsphincteric fistula, 85% had prior anal abscess or fistula surgery and 65% were obese with a BMI greater than 30 kg/m^2. In cases of obese patients, it could be speculated that the secondary openings could be iatrogenically created farther from the anal verge than necessary.

Serial seton fistulotomy is initiated when the seton is placed loosely to control sepsis, and identify the fistula tract. An incorrect primary opening may need to be corrected (Figure 3). In our series, associated abscess cavities or secondary extensions of horseshoe fistulas were counterdrained and the drains were removed in the office setting, as necessary. Timely postoperative follow-up for recurrent or residual abscess at 2–3 week intervals may allow the opportunity to correct premature healing of the secondary opening around the seton, which may obviate the false impression that a missed primary opening or secondary tract is the source of a recurrent abscess under the seton. The seton may contract the length and depth of the fistula collapsing the abscess cavity. That tract may then be re-evaluated electively in the operating room, wherein additional muscle is severed and a new seton is utilized (Figure 4), or complete fistulotomy is performed, if indicated. At the final stage of fistulotomy, marsupialization of the edges of the tract is performed to minimize muscle separation and the extent of the wound (Figure 5). Fistulotomy with marsupialization has been associated with less postoperative blood loss, faster wound healing and anal squeeze pressure preservation[18,19].

Figure 3 A patient referred to our institution with a missed horseshoe fistula
A: Incorrect placement of vessel loop seton into the left posterior crypt. B: Seton relocated to the deep posterior anal space and midline crypt with counter drains.

Figure 4 Two different patients with prior index setons
A: Prior seton was removed (arrow over scar) and a second seton (blue) was inserted pending final fistulotomy. B: Prior sequential seton fistulotomy scar and placement of a seton while awaiting final fistulotomy.

Figure 5 Marsupialization of the edge of the fistula tract at final-stage fistulotomy
Serial fistulotomy in our series was performed at a mean interval of 2.8 months and the extent of serial muscle-cutting sphincterotomy was based on the thickness and length of the sphincter muscle involved and spared by the previous seton. All 21 patients who underwent final fistulotomy were healed at a mean follow-up of 12 months. None of the 21 patients reported fecal incontinence during the follow-up visits.

A weakness of our study is that a formal questionnaire for incontinence, including flatus, for purposes of comparative analysis was not utilized.

5 Conclusion

Serial seton with interval muscle-cutting sphincterotomy followed by complete fistulotomy has been an effective alternative in the management of patients who are either initially seen for low transsphincteric fistula, or referred after failed anorectal surgery for that condition at our clinic. As fistulotomy offers the best chance for cure, we prefer this sequential surgical cutting technique over one-stage fistulotomy or staged cutting setons as it is more predictable with regards to continence. Proper identification of the internal opening, fistulous tract, and sphincter involvement by the fistula is essential for a successful outcome.

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7 Competing interests

The authors declare that they have no competing interest.

REFERENCES