Perianal Abscess/Fistula Disease

Mark H. Whiteford, M.D.[1,2]

ABSTRACT

Perirectal abscesses and fistulas represent the acute and chronic manifestations of the same disease process, an infected anal gland. They have beleaguered patients and physicians for millennia. A thorough understanding of the anatomy and pathophysiology of the disease process is critical for optimal diagnosis and management. Abscess management is fairly straightforward, with incision and drainage being the hallmark of therapy. Fistula management is much more complicated. It requires striking a balance between rates of healing and potential alteration of fecal continence. This, therefore, requires much more finesse. Many techniques are now available in the armamentarium of the surgeon who treats fistula-in-ano. Although no single technique is appropriate for all patients and all fistula types, appropriate selection of patients and choice of repair technique should yield higher success rates with lower associated morbidity.

KEYWORDS: Abscess, fistula, perianal, perirectal, fistula-in-ano

Objectives: On completion of this article, the reader should be able to summarize the diagnosis and management of acute perirectal abscesses and be familiar with several management options for the treatment of simple and complex anorectal fistulas.

ANATOMY

Evaluation and treatment of perianal abscess-fistula disease require a thorough understanding of anal anatomy. Understanding the anatomy helps to determine the origin and the subsequent course of this disease process and also helps both to direct therapeutic interventions and to risk-stratify outcomes. The inner circular muscle of the rectal wall descends into the anal canal, where it becomes the internal sphincter. This is encircled by an outer funnel of muscular tissue that is composed of the levator, puborectalis, and external sphincter muscles. These two layers are separated by the intersphincteric plane, a fibrous extension of the outer longitudinal muscle layer of the rectum as it extends down into the anal canal. The lower edge of this plane, the intersphincteric groove, can be palpated at the lower border of the sphincter complex. Just distal to this is the anal verge, the true distal margin of the anal canal. The anal verge is the demarcation between the skin of the anal margin and the anoderm. The anoderm is specialized squamous epithelium, which, although devoid of secondary skin appendages such as hair follicles and sweat glands, has a rich vascular supply and is highly innervated. Midway up the anal canal lies the dentate line (pectinate line). This marks the true mucocutaneous junction between somatically innervated squamous epithelium distally and the viscerally innervated columnar epithelium proximally. Seminal work by Parks and Eisenhammer identified anal glands present at the level of the dentate line and showed that these glands are the etiology of most perirectal abscesses and fistulas.[1,2]

When documenting anatomical findings and pathological processes in the perianal region, use of the "clock face" descriptive should be abandoned in favor of

proper anatomical terminology such as "anterior," "posterior," "left," and "right." These terms are more accurate and less susceptible to misinterpretation, as the orientation of the clock face changes with the different positions of the patient and the examiner.

PERIANAL ABSCESS

Etiology

Most perirectal abscesses originate from an infected anal gland. These glands are at the base of the anal crypts and are located at the level of the dentate line. Most people have between six and eight such glands, which extend down into the internal sphincter and up to and including the intersphincteric groove. Obstruction of these glands leads to stasis, bacterial overgrowth, and ultimately abscesses that are located in the intersphincteric groove.[1] These abscesses have several routes of egress, the most common of which are downward extension to the anoderm (perianal abscess) or across the external sphincter into the ischiorectal fossa (ischiorectal fossa abscess). Less common routes of spread are superiorly up the intersphincteric groove to the supralevator space or in the submucosal plane. When the abscess is drained, either surgically or spontaneously, persistence of the septic foci and epithelialization of the draining tract may occur and lead to a chronic fistula-in-ano.

Approximately 10% of perirectal abscesses are thought not to be due to infected anal glands but to be a consequence of more specific causes such as Crohn's disease, trauma, human immunodeficiency virus, sexually transmitted diseases, radiation therapy, or foreign body.

Diagnosis

Perirectal abscesses usually arise with indolent onset of constant, throbbing, acute anal pain associated with localized swelling, erythema and fluctuance. Perirectal abscess can be readily discriminated from other causes of acute anal pain such as anal fissure and thrombosed external hemorrhoid by history and gentle visual inspection. Pain often precludes a thorough digital rectal examination or anoscopic examination; however, neither of these is usually necessary in the acute setting. If the diagnosis is in question, an examination under anesthesia should be considered. The clinician should never attribute acute anal pain to thrombosed internal hemorrhoids or perianal cellulitis as these entities are extremely rare and misdiagnosis may allow occult anal sepsis to progress untreated.

Treatment

A perianal abscess should be treated in a timely fashion by incision and drainage.[3] The drainage should be performed as close to the anus as possible to shorten the length of any possible subsequent fistula tract. In addition to adequate drainage, one should endeavor to prevent acute recurrence of an abscess by either excising the overlying skin, inserting a drainage catheter, or placing a loose seton.[4,5] Most perianal abscesses can be treated in the office setting. Some conditions, such as cellulitis without fluctuance, failed drainage in the office, abscesses with associated systemic signs of sepsis, or extensive abscesses, are more appropriately treated in the operating room, where a thorough examination under anesthesia can ensure optimal diagnostic evaluation and drainage.

After successful drainage of a perirectal abscess, pain relief is usually immediate. Instruct patients to use warm tub soaks, bulk-forming fiber laxatives, and analgesics. Bleeding and drainage usually subside within a few days. The wounds should heal over a matter of a few weeks. Surgical follow-up is encouraged because acute abscess recurrences occur in 10%, and development of chronic fistula-in-ano occurs in up to 50% of patients.[6]

OTHER CONSIDERATIONS

The Role of Breaking Up Loculations

Mechanical disruption of loculations in and around an abscess cavity may be sparingly used to ensure adequate drainage of all collections. Although this practice is frequently taught, loculations are rarely encountered clinically and little evidence exists to support its use. As this maneuver may cause injury to the sphincter complex or pudendal nerve, it should be used selectively.

The Role of Primary Fistulotomy

Fistulotomy performed at the same sitting as incision and drainage of a perirectal abscess is termed a "primary" or "synchronous" fistulotomy. Proponents of this technique purport that, if at the time of abscess drainage, a superficial fistula tract and internal opening are readily identified, a fistulotomy performed at the same sitting may be curative and avoid the need for subsequent fistula surgery. Opponents, on the other hand, believe that two thirds of abscesses never progress to fistulas and that a primary fistulotomy with its potential complications is usually unnecessary. In addition, the patients who are ideal candidates for primary fistulotomy are also the easiest to treat with delayed fistulotomy with subsequent low morbidity. Because there is inadequate evidence from which to draw a clear consensus, the prudent policy would be to defer fistulotomy until the fistula becomes manifest.

The Role of Antibiotics

Antibiotics are an unnecessary addition to routine incision and drainage of an uncomplicated abscess. They

have not been shown to improve healing times or reduce recurrence rate.[7–9] Antibiotics should be considered for patients with high-risk conditions such as immunosuppression, diabetes, extensive cellulitis, prosthetic devices, and high-risk cardiac, valvular, and anatomic conditions.[3,10]

The Role of Packing of the Abscess Cavity

Packing of the abscess cavity is a common, but usually unnecessary, practice following incision and drainage. Packing may be beneficial at the time of abscess drainage by providing hemostasis of the inflamed, hypervascular abscess cavity. A well-drained abscess cavity rarely requires débridement or gauze to prevent premature closure of the skin. In a small randomized trial Tonkin et al compared packing with no packing of perirectal abscess cavities.[11] They demonstrated similar healing, recurrence, and fistula rates and also showed that the pain scores tended to be lower in patients who did not have packing. Routine wound packing results in discomfort and additional expense to the patient and is probably unnecessary.

Horseshoe Abscess

The horseshoe abscess is caused by an abscessed anal gland located in the posterior midline of the anal canal. The presence of the dense overlying anococcygeal ligament prevents the direct downward expression of an abscess. As a result, the suppuration follows the path of least resistance laterally into ischiorectal fossae, hence the term "horseshoe." Treatment requires unroofing of the abscess cavity through the overlying anococcygeal ligament along with counterdrainage of the lateral extensions. Placement of a draining (loose) seton may prevent premature skin closure, avoid an acute abscess recurrence by providing a route of egress for the infection, and facilitate fibrosis of the fistula tract.

FISTULA-IN-ANO

Diagnosis

A fistula-in-ano represents the chronic phase of ongoing perirectal sepsis. A previous history of perirectal abscess, drained either spontaneously or surgically, can usually be elicited. Patients often report a cyclical pattern of pain, swelling, and drainage. Moisture can cause skin irritation, excoriation, and pruritus. Crohn's disease should be excluded in a fistula patient reporting a history of chronic diarrhea or abdominal pain.

Physical examination usually identifies one or more external openings with or without granulation tissue. Occasionally, the external opening may be subtle and appreciated only after closer inspection of an indurated area. Palpation may elicit tenderness, expression of pus, and a fibrotic cord extending in toward the anus.

Classification

Parks et al categorized anal fistulas into four types based on their location relative to the anal sphincter complex: intersphincteric, transsphincteric, suprasphincteric, and extrasphincteric.[12] This system is clinically useful because it helps predict what risk a fistulotomy may pose to fecal continence based on the amount of overlying sphincter that would need to be divided. Anal fistulas are also categorized as "complex" when they have any of the following risk factors: a high tract that traverses more than 30 to 50% of the external sphincter, an anterior location in a female, multiple tracts, and a patient with preexisting incontinence, recurrent fistula, local irradiation, chronic diarrhea, or Crohn's disease.[13–15] Treatment of complex fistulas carries higher risks of recurrence, derangements of fecal continence, and failure of or delayed healing. Most fistulas, however, are considered "simple" in that they do not have any of these risk factors, and treatment of simple fistulas results in a low incidence of fecal incontinence and poor wound healing.

Treatment

Simply stated, the goals in treatment of anal fistula are to eliminate the septic foci along with any associated epithelialized tracts and to do so with the least amount of functional derangement, the lowest recurrence rate, and the shortest healing time. No single technique is appropriate for treatment of all fistulas. Optimal treatment, therefore, must be directed by the surgeon's experience and judgment. There is always a progressive trade-off between extent of operative sphincter division and the postoperative functional detriment.[14] Postoperative functional outcomes can be adversely affected by preexisting incontinence, previous mechanical sphincter injury, the amount of sphincter at risk, anterior location in females, stool consistency, and the patient's tolerance of potential imperfections in continence.[3]

TREATMENT OF A SIMPLE IN FISTULA-IN-ANO

To effect a cure for an anal fistula, one must first carefully identify the fistula tract and categorize its anatomic relationship to the sphincter complex.[12] This begins what can be an occasionally difficult search for the source of the infection, the internal opening. Several techniques have been described to facilitate this search.

In 1900, Goodsall described a simple rule of thumb that uses the location of the external fistula opening to predict the location of the internal opening.

Fistulas with external openings in the anterior half of the anus usually track in a radial fashion directly into the anal canal. Fistulas with an external opening in the posterior half of the anus usually track in a curvilinear fashion to originate from the posterior midline. Palpation around the external opening can also help identify thickened tissues or a cord extending from the external opening in toward the internal opening.

Anoscopy allows direct inspection of the dentate line and usually reveals an internal opening or a focus of purulent drainage implicating an occult internal opening. Passage of a lacrimal duct or fistula probe through the external opening may also track through the fistula and into the internal opening. Probes should be passed gently and not be forced into creating false passage. Traction placed on the external opening may also produce dimpling at the level of the dentate line, suggesting the location of the offending crypt. If these measures are unsuccessful in identifying the internal opening, the external opening can be injected with dilute hydrogen peroxide. The resulting effervescence often opens up a stenotic tract and demonstrates drainage of bubbles through an internal opening into the anal canal. A similar technique using methylene blue injection has also been described. However, excessive staining of the anal canal may hamper efforts to identify the internal opening uniquely. If available, endorectal ultrasonography, with or without instillation of hydrogen peroxide, may also help identify a fistula tract and locate an internal opening. Lastly, the anal and distal rectal mucosa should be evaluated to exclude a noncryptoglandular origin of the perianal sepsis such as Crohn's disease, atypical ulcers, or cancer.

Simple anal fistulas may be treated by lay-open fistulotomy.[3] These incisions heal in a matter of weeks, and derangements in fecal continence are uncommon. Published outcomes following fistulotomy are variable as a result of heterogeneity of the techniques used, the type of fistulas treated, length of follow-up, etiology, and the definitions of incontinence. Furthermore, most of these studies are retrospective and represent the authors' experiences and personal preferences. In general, however, the recurrence rate for treatment of simple anal fistulas with fistulotomy is ~2 to 8% with functional impairment generally between 0 and 17%.[16–18] This derangement tends to improve for up to 2 years after surgery. One small randomized trial reported faster healing and better preservation of anal squeeze pressure when anal fistulotomy wounds were marsupialized compared with simply laid open.[19]

One of the great fears of fistula surgery is the potential for derangements in fecal continence resulting from the need to divide a portion of the anal sphincter to obliterate the source of the ongoing sepsis. The ideal treatment of anal fistulas would include obliteration of the internal opening and all associated tracts without the need to divide any of the sphincter. This concept is the impetus for two recent techniques added to the surgeons' armamentarium for management of anal fistulas: fibrin glue and the anal fistula plug (SurgisisAFP, Cook Medical Inc). Both techniques involve filling the fistula tract with a flexible bioresorbable substance that obliterates the tract and then becomes incorporated by autologous scar with the hope of permanently scarring off the fistula tract, obviating the need for sphincter division.

Fibrin glue was first described for anal fistula use by Abel et al.[20] They created autologous fibrin glue in their laboratory for use in individual patients. This time-consuming and laborious process is now unnecessary with commercially available fibrin glue widely available (Tisseel VH fibrin sealant, Baxter Healthcare Corporation). Fibrin glue is a very appealing concept in that it is very simple to apply, is essentially painless and repeatable, and, because it does not require division of the sphincter complex, carries almost zero risk of fecal incontinence.

The technique for fibrin glue repair of an anal fistula involves a formal bowel preparation and perioperative intravenous antibiotics. An examination under anesthesia is performed, the fistula tracts are identified, and the primary opening is located using conventional techniques. The tract is mechanically deepithelialized using curettes or some form of débridement technique. The internal opening is closed with an absorbable suture. The fibrin glue components are mixed and assembled in the provided dual injection syringe. The plastic catheter is inserted into the external opening and fed down through the fistula to the internal opening. As the fibrin glue is injected, the two components admix at the tip of the syringe and congeal rapidly into the consistency of rubber cement. During the injection, the plastic catheter is withdrawn to ensure even application across the entire fistula tract. Excess fibrin glue that overflows from the fistula openings is trimmed flush. Patients are instructed to avoid heavy lifting and strenuous activities for 1 to 2 weeks postoperatively.[21]

The results of fibrin glue repair for anal fistulas are quite variable.[21] As with most new techniques, the initial results were very promising. However, with broader clinical application, several studies demonstrated more modest results. The average success rate for fibrin glue repair is ~50%. Fibrin glue repair was more successful for cryptoglandular fistulas and less successful for rectovaginal and Crohn's fistulas. Most recurrences were immediate and were noticeable within 2 to 3 weeks. One of the benefits of this procedure is that it is repeatable, and some studies show subsequent success with reapplication.

The anal fistula plug (SurgisisAFP) was also developed as a modality to obliterate the fistula tract using an absorbable material. Surgisis is a bioresorbable

extracellular matrix made from small intestinal submucosa that had been used clinically in other applications for years. It was redesigned into a conical shape specifically for anal fistula surgery. This was theoretically more advantageous than fibrin glue because it was inherently resistant to infection, was able to hold the suture, and can be implanted into nonsterile surgical fields. It was also fashioned into a conical shape allowing the plug to be inserted in a high-pressure area and allowing inherent mechanical stability to avoid extrusion.[22,23]

The technique for this procedure includes a mechanical bowel preparation, oral metronidazole, and a broad-spectrum intravenous antibiotic. The fistula tract is identified and the primary opening identified using conventional techniques. The tract is irrigated with hydrogen peroxide but not débrided. A fistula probe or hemostat is passed through the fistula tract from an external opening and exits through the internal opening. A suture is then passed and tied to the apex of the anal fistula plug cone. This is used to pull the anal fistula plug into the fistula until resistance is encountered. The plug is sutured to the internal opening and anal sphincter muscle using a figure-of-eight 2-0 absorbable braided suture. Excess plug is trimmed, and the plug is buried into the primary opening. At the external opening of the fistula, the excess portion of the plug is trimmed off and the opening left open to prevent a closed space infection.[23]

The first few case series reporting experience with anal fistula plug have been encouraging, showing overall success ranging from 54 to 83%.[24–26] Most failures occurred within the first 30 days, usually the result of plug extrusion. The second most common cause of failure in initial studies was horseshoe fistulas.[25,26] Anal fistula plug repair has already undergone several technical modifications to obtain more consistent results.

TREATMENT OF A COMPLEX FISTULA-IN-ANO

Anal fistulas are considered complex when they cross a significant amount of sphincter (high transsphincteric, extrasphincteric, suprasphincteric) or are associated with high-risk conditions (Crohn's disease, preexisting fecal incontinence, multiple tracts, anterior location in women).

As with simple fistulas, the anatomy of most complex fistulas can be defined during careful examination under anesthesia. However, radiographic evaluation may be a beneficial adjunct to identify an occult internal opening, secondary tracts, or abscesses or to help delineate the fistula's relationship to the sphincter complex.[27–29] In these instances, computerized axial tomography scan and fistulography have been supplanted by magnetic resonance imaging and endorectal ultrasonography as the imaging modalities of choice.

Complex anal fistulas may be treated with fibrin glue injection or anal fistula plug. As mentioned previously, these two techniques are sphincter sparing, easily repeatable, and have low morbidity, making them particularly appealing in the setting where standard fistulotomy would place patients a high risk for alterations in continence.

Prior to the advent of fibrin glue and anal fistula plugs, the most popular sphincter-preserving technique for the repair of complex fistulas was that of an endorectal advancement flap.[30–32] This technique obliterates the internal fistula opening, requires no sphincter division, and results in no external wound. Preparation for the procedure involves a full bowel preparation with intravenous antibiotics. An examination under anesthesia is performed to identify the fistula and its internal opening. Following curettage and débridement of the chronic tracts, a superiorly based endorectal advancement flap is mobilized in a submucosal plane with or without inclusion of a small portion of the internal sphincter. Mobilization continues proximally in a trapezoid shape, increasing its width with a more cephalad progression. The mobilization continues until completion of a tensionless repair of the rectal mucosa beyond the level of the trimmed internal opening.

The success rates for endorectal advancement flaps are between 55 and 98%. Repeated endorectal advancement flaps have been described; however, these can be more challenging in a scarred, reoperative field.[30–34]

Complex anal fistulas may also be treated by use of setons or staged fistulotomy, or both. A seton is a flexible piece of permanent material inserted through the fistula tract. Silastic vessel loops and silk sutures are common materials used as setons. Setons are useful when fistulotomies are undesirable and likely to result in significant incontinence or poor healing. Setons are used in two fashions, draining (loose) and cutting. A draining seton, as the name implies, facilitates long-term drainage of the abscess cavity and fistula tract and thereby reduces the number of subsequent septic events, shrinks down the cavity, and promotes fibrosis of the tract. Draining setons are indicated for perianal Crohn's disease or other fistulas with large abscess cavities or multiple tracts. Setons are placed in the operating room by threading the seton through the fistula and tying it loosely to itself. They are usually removed several months later but can be left in indefinitely. Draining setons alone rarely cure the fistula, and one of the other definitive techniques will need to be employed.

Setons may also be used in a cutting fashion. Once the seton is placed through the fistula and around the sphincter complex, the overlying skin and anoderm between the internal and external openings are cut and the seton is tightened down. The seton causes slow necrosis and gradual transection of the sphincter complex. Cutting setons require frequent tightening until

the sphincter division is complete. Because cutting setons require frequent tightening and are uncomfortable, they are less well tolerated by patients and are a less appealing therapy than other options for complex fistulas. They are also associated with minor incontinence rates ranging from 34 to 63%.[35,36]

Setons are also used during staged fistulotomies of high anal fistulas. The technique involves identification of the tract under anesthesia. A partial lay-open fistulotomy is performed by unroofing the lower portion of the fistula from the internal opening, through the distal internal sphincter and anoderm, and continuing out to the external opening. The external anal sphincter is then encircled with a draining seton, which is left in place. Over the subsequent 6 weeks the site of the internal sphincter division fibroses. The patient is then returned to the operating room for a subsequent fistulotomy of the encircled external anal sphincter. This should complete the obliteration of the fistula tract. Recurrence rates following staged fistulotomy are low (2 to 9%) but do not come without significant risk of minor (54 to 66%) and major (4 to 26%) incontinence.[35–37]

TREATMENT OF FISTULA-IN-ANO WITH CROHN'S DISEASE

The clinical course of perianal Crohn's disease is unpredictable; complete and permanent remission is rare. The recurrent nature of the disease and its attendant potential for chronic diarrhea place a premium on conservative sphincter-sparing management.[3] Surgery for a Crohn's fistula-in-ano may also lead to poorly healing wounds and impaired continence with subsequent need for a stoma. When discussing appropriate outcomes in patients with Crohn's fistula-in-ano, it is important not to focus exclusively on complete healing and continence but also to include patients' satisfaction, reduction of number of septic episodes, and minimizing the risk of proctectomy. In addition, medical management complements surgical management. Despite this, 12 to 39% of Crohn's patients eventually undergo proctectomy for progressive intestinal or intractable perianal disease.[38–41]

Asymptomatic Crohn's fistulas may remain dormant and, therefore, do not require any intervention. It is unnecessary to subject these patients to the potential morbidity of operative intervention.[38,41–43] Active mucosal anorectal Crohn's disease is a contraindication to definitive surgical repair of Crohn's fistula-in-ano. In the setting of active mucosal inflammation, the surgical wounds heal poorly and the increased inflammation may result in greater sphincter damage. In this setting, draining setons should be placed. These can reduce the number of subsequent septic events by providing continuous drainage and preventing premature closure of the external opening. Even with setons, recurrent sepsis is seen in approximately one third of patients.

Simple low Crohn's fistulas may be treated by a fistulotomy. Fistulotomy was previously thought to carry such high morbidity as to be contraindicated in Crohn's patients. Healing rates following fistulotomy of intersphincteric and low transsphincteric Crohn's fistulas, however, are quite acceptable and range from 62% to 100%. Incontinence rates are reported from 0 to 12%.[38,40–42,44–48] These wounds may, however, take 3 to 6 months to heal.[39]

The use of fibrin glue and anal fistula plug repair for Crohn's fistulas has also been reported. Again, these are sphincter-sparing techniques, and even though the healing rates for Crohn's fistula-in-ano are lower than for cryptoglandular abscesses, they are high enough for the techniques to be considered an appropriate and even a desirable sphincter-sparing alternative in the management of these challenging fistulas. Data on success rates for these techniques vary widely in Crohn's patients and are too limited to draw any significant conclusions.[23,49–53]

Endorectal advancement flaps have also been reported in case series. The important contraindication for endorectal advancement flaps is active proctitis. Reported short-term success rates are 42 to 60%[54–56]; however, with longer follow-up, the success rates drop off, probably reflecting the chronic relapsing nature of the disease.

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