FISSURE, FISTULA, AND ABSCESSES

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Fissure

An anal fissure is a small tear within the anal canal distal to the dentate line. Approximately 90% of anal fissures are located in the posterior anal canal. Anterior fissures are more common in women. Fissures can be characterized as acute or chronic [see Figure 1]. Acute fissures are small tears in the anal mucosa. They usually respond to medical treatment and typically resolve within 4 to 6 weeks. Chronic fissures or anal ulcers have been present for longer periods of time. They are associated with sentinel tags, rolled mucosal edges, and hypertrophic anal papilla at the fissure apex. Chronic fissures are less likely to heal with medical management. Fissures found laterally or in multiple locations within the anal canal may be indicators of other disease processes. Inflammatory bowel diseases such as Crohn disease, syphilis, and tuberculosis and even squamous cell carcinomas can cause ulcers within the anal canal [see Figure 2]. An anal ulcer seen in an aberrant location warrants further investigation.

Etiology

Constipation, diarrhea, straining, and heavy lifting are leading causes of fissures. A small tear occurs in the anal mucosa at the dentate line. The underlining internal anal sphincter muscle is exposed and irritated with further passage of stool. Over time, the internal anal sphincter may become hypertonic from involuntary spasm. The majority of fissures are caused by straining during passage of a constipated stool. Patients with chronic fissure pain may not be able to recall the inciting event.

Symptoms

Acute

There is typically a history of acute pain that began after passage of a constipated stool. This pain may continue even if the bowel movements are soft and is often described as a sharp, tearing, or searing pain that occurs after the passage of stool and lasts a few minutes. Occasionally, patients will complain of hours of throbbing pain and the desire to avoid having a bowel movement. Bleeding is usually minimal and frequently noticed on the toilet paper. The blood is bright red and can occasionally drip into the toilet. Many patients are seen in the physician’s office thinking that these symptoms are hemorrhoids. A thrombosed external hemorrhoid can be painful, but there is usually a visible external thrombosis. Internal hemorrhoids may bleed with bowel movements but rarely cause pain.

Chronic

Anal fissure symptoms that last 8 to 12 weeks are considered chronic. There is frequently a visible external sentinel tag, which may be confused with external hemorrhoids. A

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ACUTE FISSURE

CHRONIC FISSURE

Figure 1 Chronic anal fissures, as opposed to acute fissures, are characterized by hypertrophy of the anal papilla, a sentinel skin tag, rolled skin edges, and exposed internal anal sphincter muscle.

ANTERIOR

Acute and Chronic Anal Fissure

Crohn Disease

Ulcerative Colitis

Syphilis

Tuberculosis

Leukemia

Cancer

HIV

POSTERIOR

Acute and Chronic Anal Fissure

Crohn Disease

Ulcerative Colitis

Syphilis

Tuberculosis

Leukemia

Cancer

HIV

Figure 2 The location of anal fissures suggests their cause.
Approach to the Patient with Fissure, Abscess, or Fistula

**Patient has fissure, abscess, or fistula**

**Anorectal abscess**
Lesions are classified as perianal, ischiorectal, supralevator, or intersphincteric. Clinical manifestations: constant perianal pain, sometimes with fever, chills, or malaise; purulent discharge occasionally occurs, and systemic toxicity rarely develops. Visual inspection usually suffices for diagnosis. Management: surgical drainage, usually in office but sometimes in OR.

**Anal fissure**
Clinical manifestations: pain, minor bright-red bleeding, split in anoderm (usually in midline). Chronic fissure is signaled by hypertrophic anal papilla, sentinel skin tag, and exposed internal sphincter muscle. Visual inspection suffices for diagnosis. Management: for acute fissures, nonoperative measures (e.g., fiber, stool softeners); for chronic fissures, if such nonoperative measures fail, lateral internal sphincterotomy (alternatives: topical NTG, topical nifedipine, topical diltiazem, botulinum toxin injection).

**Fistula in ano**
Lesions are classified as intersphincteric, transsphincteric, suprasphincteric, or extrasphincteric. Clinical manifestations: small opening in perianal skin, surrounding induration, ongoing drainage. Management: surgical unroofing of entire fistula tract (fistulotomy), except in select cases (e.g., anterior fistulas in women) in which partial unroofing is recommended; closure of internal opening with advancement flap is an option. Ligation of intersphincteric fistula tract (LIFT) may be done for patients in whom continence is compromised.
large internal hypertrophic anal papilla may be present, leading to confusion with internal hemorrhoids. Patients with chronic anal fissure continue to complain of anal pain, although they may also complain of difficulty with hygiene and perianal itching. The pain may be described as more of a throbbing, aching pain after bowel movements, and, occasionally, patients will not have pain at all.

EXAMINATION

Patients who are seen for anal fissures typically have a classic history. Physical examination may be difficult because the patient has a tender anal canal and may be fearful of worsening pain. A digital rectal examination is rarely necessary at the initial evaluation. Inspection of the anal canal can be done in the prone jackknife or lateral decubitus position by gentle retraction of the perianal skin. A posterior fissure can often be seen as a simple tear in the anoderm. If there is a posterior sentinel tag, the fissure is usually visible just below the tag. Treatment should be started without further examination. A digital rectal examination is not necessary if a fissure is visualized as it will only worsen the patient’s pain. If a digital rectal examination is possible, spasm of the anal sphincter and increased pain with gentle pressure on the fissure will be noted. Anoscopic and proctosigmoidoscopic examination can be delayed until resolution of the acute pain.

Patients with chronic fissures may not be as tender and may allow a more thorough examination. A chronic fissure has the appearance of a deeper ulcer with fibrosis of the internal anal sphincter and occasionally heaped-up mucosal edges around the fissure. Patients typically have a posterior sentinel tag, which has the appearance of a skin tag. An internal hypertrophic anal papilla may be palpable within the anal canal. Pain on digital rectal examination is generally not as severe, and there is typically less anal spasm.

TREATMENT

Medical

Two thirds of patients can be successfully treated with conservative measures. Increasing the fluid and fiber is generally the first step to managing the patient’s constipation. Fiber supplements, stool softeners, and laxatives may be added to improve bowel function. Patients who have chronic diarrhea need to try to control the watery bowel movements because they act as a chemical irritant. Patients who develop an anal fissure after straining and heavy lifting need to curtail those activities until the symptoms have resolved. Symptomatic relief may be obtained with warm tub soaks after bowel movements. Topical lidocaine is very short acting and does not provide any significant relief. The practice parameters set forth by the American Society of Colon and Rectal Surgeons state that medical management should be the first-line treatment for anal fissures because there are few side effects and patients can be successfully treated in this manner.

Topical nitroglycerin (0.2% NTG) and nifedipine (2%) have been shown to decrease pain, with variable rates. A very small amount is applied to the anoderm every 4 to 6 hours for 4 to 6 weeks. Headache is the primary side effect and is dose related. For patients with cardiac disease and migraine headaches, these topical agents should be used cautiously. Healing rates are variable and range from 48 to 78%, although a recent Cochrane report concluded that topical NTG is only marginally better than placebo. Fissure recurrence after topical treatments is higher when compared with outcomes after surgery. The symptoms of chronic fissures are less likely to resolve with medical management, but nonetheless, medical management should be attempted before surgical intervention.

Patients whose symptoms do not resolve with medical management and who are not candidates for lateral sphincterotomy may improve with injection of botulinum toxin. There is no consensus on the dosage, site of administration, or efficacy of this treatment. Typically, 50 to 100 units of botulinum toxin is diluted with 1 mL of sterile saline and injected in 0.2 mL aliquots. Most reports discuss injection of botulinum toxin into the internal anal sphincter around or near the fissure. The effects of botulinum toxin are not immediate, and patients should be counseled that it can take up to 3 days before the full effects are felt. Healing rates are reported to be between 60 and 80%. The most common side effect is temporary incontinence to flatus, which can occur in up to 18% of patients. Fecal incontinence can occur in up to 5% of patients, but given that the effects wear off in 3 months, this typically improves with time. Recurrent symptoms may occur, but patients can be retreated successfully. Patients in whom symptoms of anal fissure do not improve with botulinum toxin should be referred for surgery.

Surgical

Operative treatment of fissure disease consists of a lateral or anterior sphincterotomy. A lateral internal anal sphincterotomy is preferable to a posterior sphincterotomy to avoid a keyhole deformity. The sphincterotomy can be done in either an open (under direct visualization) or closed fashion. Surgical choice depends on the patient’s symptoms, findings, and the experience of the operating surgeon.

Surgery can be done with local or regional anesthesia. A prone-flexed position is preferable [see Figure 3]. The

Figure 3 Operative management of ulcer/fissure disease. The patient is positioned on the operating table in the prone-flexed position, with a soft roll under the hips.
buttocks are taped apart. Local anesthetic is injected after short-acting intravenous sedation is given to the patient [see Figure 4]. Placement of a medium Hill-Ferguson retractor allows visualization of the fissure and palpation of the hypertrophic internal anal sphincter. The groove between the internal and external anal sphincter should be easily palpated. The anal fissure is typically visible in the posterior or anterior quadrant. If there are any stigmata of Crohn disease, a sphincterotomy should not be performed. The lateral sphincterotomy can be performed as a closed procedure using a No. 11 blade and digital palpation of the muscle [see Figure 5]. An open procedure with clear identification of the internal anal sphincter before transection may be a safer option [see Figure 6]. A 1 cm incision is made in the lateral perianal skin over the intersphincteric groove. A curved hemostat is inserted into the intersphincteric groove, and the lower one third to one half of the internal anal sphincter is elevated into the incision. Division of the muscle is done with the cautery for hemostasis. The internal sphincter is divided, but the external sphincter, anoderm, and longitudinal muscle remain intact. If a rent is made in the anal mucosa, it should be repaired with a dissolvable suture to prevent a potential fistula. Pressure is maintained for several minutes to ensure hemostasis. Digital examination should confirm adequate transection of the hypertrophic sphincter. The sphincterotomy wound is left open.

Excision of an acute fissure is not necessary, nor is it necessary to excise a posterior chronic ulcer. Both acute and chronic fissures will generally heal with simple sphincterotomy. A large hypertrophic anal papilla can be excised, as can a large sentinel tag, if hygiene is an issue. If done, care should be given to avoid additional transection of underlying muscle. A controlled anal stretch has been recommended by some authors. This procedure, done either manually or with pneumatic balloon dilatation, stretches both the internal anal sphincter and the external anal sphincter. Despite the efforts to control the amount of stretch, this procedure causes burst injury to the anal sphincters and may increase the likelihood of posttreatment fecal incontinence. Anal stretch is not a recommended procedure.15

Postoperative care is relatively simple. Patients are instructed to remain on the high-fluid and -fiber diet. It is recommended that they take a stool softener or fiber supplement in addition to laxatives for several weeks after surgery. Pain control can be immediate, and it is recommended that minimal narcotics be used. Soaking in a tub of warm water may help alleviate some postoperative discomfort. Patients should expect to have a slight increase in postoperative discomfort if excision of sentinel tags, hypertrophic anal papillas, or hemorrhoids is done concurrently. Simply showering or soaking after a bowel movement is all that is necessary for anal hygiene. Antibiotics and medicated wipes are not necessary.

Urinary retention is one of the most common complications and can be avoided by decreasing the amount of fluid given in the perioperative period. There should be very little postoperative pain almost immediately after surgery. If the patient does complain of significant pain, especially in the presence of fever or urinary hesitancy, one must assume that the site may be infected. Urgent evaluation, removal of

**Figure 4** Operative management of ulcer/fissure disease. (a) Five milliliters of bupivacaine is injected into subcutaneous tissue. (b) Ten milliliters of local anesthetic is injected deep into the sphincter muscle on each side of the anal canal.

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FOLLOW-UP
Most patients have no pain on their postoperative evaluation 2 to 4 weeks after the procedure. A digital rectal examination should confirm good healing of both the lateral sphincterotomy site and the posterior fissure. A small defect may be palpable in the lateral sphincterotomy site.

Abscesses
Anorectal abscesses most often originate from cryptoglandular infections within the anal canal. It is presumed that the small crypts at the dentate line become obstructed, leading to a localized infection. The infection develops along the ducts leading from the internal crypts and follows the path of least resistance. These abscesses are classified as perianal, ischiorectal, intersphincteric, or supralevator based on the location of the infection [see Figure 7]. Perianal abscesses can also be associated with trauma, malignancy, Crohn disease [see Figure 8], fissure, tuberculosis, and actinomycoses. Infections can also occur after anal surgery for hemorrhoids or fissures.

Perianal and ischiorectal abscesses account for the majority of cryptogenic infections. A perianal abscess is present at the anal verge. Ischiorectal abscesses tend to be larger and more complex. They present as a tender, fluctuant fullness lateral to the anal canal. Supralevator abscesses occur above the levator ani muscles. These rare infections are difficult to diagnose as there is generally not a palpable external mass. Patients with supralevator abscesses present with severe rectal pain and may have a fluctuant intrarectal mass on digital rectal examination.

Symptoms
Patients with anorectal abscesses may present with a variety of symptoms ranging from pain, erythema, fluctuant mass, and fevers. Occasionally, there are no external findings, and patients complain of deep-seated internal rectal pain. The abscess is the acute phase of infection, and most patients present to the emergency department or their physicians with complaints of pain. Spontaneous rupture can occur, which decompresses the infection, relieving some of the symptoms of pain. A patient with a partially drained abscess will present with seropurulent discharge.

Treatment
Once the diagnosis is made, the treatment for anorectal abscesses is drainage. A very superficial abscess may be drained in the office or emergency department. More complex, deeper abscesses and recurrent infections should be drained in the operating room. In general, laboratory evaluation is not necessary unless the patient shows signs of systemic sepsis. It is also not necessary to obtain a computed
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Figure 6 Operative management of ulcer/fissure disease. Shown is the open approach to posterior lateral internal sphincterotomy. (a) The triad of the ulcer complex is visualized. (b) Once the hypertrophied band of internal sphincter muscle is identified, a 1 cm incision is made in the posterolateral aspect of the perianal skin. (c) The hypertrophied band is elevated into the wound and divided with the electrocautery.

Figure 7 Anorectal abscesses are classified according to the space in which they develop.

Figure 8 Operative management of abscess and fistula. Shown are alternatives for treating abscess or fistula associated with Crohn disease. In Crohn disease, multiple perianal and perineal fistulas and abscesses may be seen, often in atypical locations. (a) Abscesses may be drained by placing a small mushroom-tipped catheter as close to the anus as possible. A Malecot catheter should not be used. (b) In some settings, it is appropriate to place a seton between internal and external openings. The seton may then be left in situ for a time for drainage and for prevention of further disease progression.
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**Figure 9** Operative management of abscess and fistula. Shown is a fistulotomy in a patient with cryptoglandular abscess/fistula. (a) The fistula tract is carefully probed, a decision is made about which muscle and how much muscle to cut, and the tract is incised. (b) Once the tract is open, the involved crypt is excised. (c) The defect is marsupialized by sewing skin to the tract.

small No. 10 mushroom catheter into the cavity allows for drainage and avoids unnecessary pain and trauma caused by packing [see Figure 10]. The catheter can be removed several weeks later when the infection resolves. An alternative would be to make an elliptical incision over the fluctuant area decompressing the abscess. The incision should be large enough to decompress the cavity. Packing is not necessary and leads to undue pain. If an internal opening is identified and the fistula tract goes deep to the sphincter, drainage can be maintained with the placement of a seton. A small vessel loop is preferable to a cutting seton. The non-reactive Silastic allows for drainage of the purulent material and is well tolerated by patients.

An intersphincteric abscess is best treated by identifying the internal crypt and dividing the internal anal sphincter within the anal canal. Supralevator abscesses are rare and are the most difficult to identify and treat. If recognized, they are best treated by internal drainage rather than crossing the levator plate. This minimizes the complexity of the fistula tract should one form after drainage.

A deep postanal space abscess may lead to a horseshoe-type abscess with fluctuant areas on either side of the anal canal. Patients present with deep rectal pain or coccygeal pain and complain of difficulty with defecation. A high degree of suspicion and fulness on digital rectal examination helps make the diagnosis. These complex abscesses are best managed in the operating room. Aspiration of the postanal space with a 16-gauge needle may confirm the presence of purulent material within the postanal space. An incision is then made in the perianal skin posterior to the anal verge and opened into the anal canal in the posterior midline. This procedure typically divides the superficial and subcutaneous internal and external anal sphincter.

Counterincisions and drains may be necessary to drain the horseshoe infections in the ischiorectal fossa if they are present [see Figure 11].

Postoperative care is relatively simple. Antibiotics are not necessary except in patients with significant cellulitis. Patients are instructed to use a pad as necessary and that the drainage and pain should decrease in several days. Pain medication, stool softeners, and laxatives are given to patients, and they are instructed to shower or take warm tub soaks for perianal hygiene. Most patients return to the office within 2 to 4 weeks. The mushroom catheter can be removed at that time if the drainage is minimal. If an internal opening is identified, the mushroom catheter should be left in place and the fistula should be addressed.

After drainage of a perianal abscess, one of three things may occur: (1) the abscess may heal spontaneously, and the patient will have no further symptoms; (2) the abscess heals but recurs in the future, most likely due to a recurrent abscess along a fistula tract; or (3) the abscess does not heal, and the patient develops a chronic draining fistula in ano. Unfortunately, there is no definitive way to predict who will develop a fistula. Recurrent abscess rates after incision and drainage can be as high as 50%. The recurrences are most likely due to the formation of fistulae. Horseshoe abscesses are associated with increased rates of fistulization ranging from 18 to 50%.26,27
Fistula

An anal fistula occurs as the chronic form of perianal abscess. It is a communication (tract) from the anal canal to the perianal skin. Patients complain of drainage, swelling, and pain at an external drainage site. Most patients will give any history of prior perianal abscess with either surgical or spontaneous drainage. Fistulas are classified based on anatomic course relative to the anal sphincter (inter-, trans-, supra-, and extrasphincteric) [see Figure 12]. They can also be classified as simple or complex. Simple fistulas are predominantly low trans- or intersphincteric fistulas, which are relatively easy to treat. Complex fistulas are high trans-, supra-, or extrasphincteric abscesses and horseshoe abscesses, which are more difficult to identify and treat. Patients with inflammatory bowel disease and anterior fistulas in woman are considered complex fistulas and deserve special consideration. These patients may already have compromised sphincters from previous injury and are prone to fecal incontinence if aggressive surgery is undertaken.

TREATMENT

In the acute phase, drainage of the abscess is important. This is best done under anesthesia in the operating room. Local anesthesia may be used for simple abscess fistula disease. Regional or general anesthesia is preferable for complex fistulas and patients with multiple or recurrent tracts. A prone-flexed position with the buttocks taped apart is preferable and makes visualization easy. The internal opening may be identified using a combination of probes and injection of saline, hydrogen peroxide, or dye. Goodsall’s rule can be used as a guide to find the internal opening, but it is imperative not to form a false passage if the internal opening is not identified [see Figure 13].

The external opening is identified, and the fistula tract may be palpated heading toward the anal canal. The internal opening may be felt as a small dimple within the anal canal. Anoscopic examination may reveal purulent material or mucus at the internal opening. A small probe can be passed from the external opening toward the internal opening. Occasionally, the probe can be passed from the internal opening more easily. Care is taken to avoid forcing the probe or creating false passages. Sharp angulation of the tract may prevent the probe from passing easily. In this instance, injection of dye, peroxide, or even saline may be done by inserting a 16-gauge angiocatheter through the external opening while visualizing the internal anal canal. Fistulography is rarely necessary and is reserved for more complex and long tracts.

Surgical treatments most commonly consist of unroofing the fistula tract (fistulotomy). The probe is passed through the fistula tract and palpated under the skin. A fistulotomy is performed if the tract is superficial and does not involve a significant portion of the external sphincter. This unroofs the fistula tract and allows it to heal by secondary intention. The chronic granulation tissue is curetted and cauterized. The internal opening should be destroyed with the cautery. It is not necessary to perform a fistulectomy or removal of the epithelialized tract. Fistulectomies are generally avoided to minimize destruction of the external anal sphincter. If the fistula tract involves a significant portion of the external anal sphincter, a partial fistulotomy should be performed. This
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entails division of the fistula tract from the external opening to the anal sphincter. At the level of the anal sphincter, a seton can be placed through the remainder of the fistula tract. This allows the external portion of the fistula to heal and minimizes injury to the external anal sphincter. The seton facilitates drainage and will help guide future surgery.29 The internal and external openings will not heal as long as the seton is in place. An advancement flap or ligation of intersphincteric fistula tract (LIFT) procedure can be done to close the internal opening after removal of the seton. A cutting seton can be used to gradually unroof transsphincteric tracts. The gradual tightening of the seton causes fibrosis and minimal separation of the anal sphincter. Some patients may experience pain caused by tightening the seton, and some reports note an increased risk of fecal incontinence.30 The success rate with superficial fistulotomy ranges from 90 to 97%. Higher recurrence rates are associated with complex fistulas, failure to identify the internal opening, and Crohn disease. Postoperative alterations in continence range from 0 to 70% of patients. Risk factors

Figure 12  Fistula in ano is classified on the basis of its relation to the anal sphincter muscles. Shown are (a) intersphincteric fistula, (b) transspincteric fistula, (c) suprasphincteric fistula, and (d) extrasphincteric fistula.

Figure 13  Goodsall’s rule. An external opening seen posterior to a line drawn transversely across the perineum will originate from an internal opening in the posterior midline. An anterior opening will originate in the nearest crypt (for fistulas within 23 cm of the anus).46
include preoperative incontinence, recurrent disease, previous vaginal deliveries, previous surgical treatment of the anal fistula, and complex fistulas.

Several newer procedures have been devised to treat fistula tracts that are not amenable to fistulotomy. Fibrin glue is a fairly simple concept with low incontinence rates. The internal and external openings need to be identified to ensure that the tract is completely filled with the glue. The glue is injected into the tract using a specialized catheter and allowed to set up prior to moving the patient. Healing rates using fibrin glue are variable and range from 10 to 67%.31,32

Bioprosthetic fistula plugs have been designed for use in chronic fistula tracts. These are typically placed after the infection has been controlled with a noncutting seton. Several configurations of the fistula plug are available. The plug is passed through the fistula tract, and the internal opening is secured with a suture. The internal opening is generally closed with a suture, and the external opening is left open for drainage. The bioprosthetic material acts as a matrix for ingrowth of fibrin, and the procedure can be done with little morbidity. The success rates for closure of fistula tracts range from 50 to 70% and may relate to the length of follow-up.33,34 Dislodgment of the plug is felt to be a primary cause of failure.35

More recently, a surgical procedure called LIFT has been popularized [see Figure 14].36,37 This procedure can be done

Figure 14  Ligation of intersphincteric fistula tract. (a) Identify the fistula tract and probe in the intersphincteric groove. (b) Divide the fistula tract after removal of the probe.

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under local or regional anesthesia on an outpatient basis. A seton is placed first and left in place for approximately 8 weeks to allow the fistula tract to fibrose. At the time of surgery, a probe is passed through the fistula tract. A small incision is made in the intersphincteric groove while palpating the probe. The tract is then isolated, ligated, and divided within the intersphincteric groove. There is no division of the anal sphincter. The internal opening may be sutured closed and the external opening widened for drainage. Small series have been published in the literature, with variable rates. Often the internal opening will close, and a shortened external tract can then be divided at a second procedure.

Advancement flap repair is a sphincter-sparing repair [see Figure 15]. It has a high success rate in the treatment of complex fistula tracts. These repairs are more involved, complex procedures with higher morbidity. A broad-based, thick mucosal and submucosal endoanal flap is created proximal to the fistula opening. Suture closure of the internal opening is done with dissolvable suture. The endoanal flap is then sutured to the anoderm with dissolvable suture. Care is taken to maintain good blood supply to the flap and to create a tension-free repair. Postoperative morbidity is generally due to a subflap hematoma or infection. The success rate ranges from 70 to 90%.38,39 Posterior fistulas, recurrent fistulas, and those related to Crohn disease are less successfully treated with an advancement flap.

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