Operative Management of Hemorrhoids

The frequency of hemorrhoid surgery continues to diminish. More patients seem to be achieving adequate symptomatic relief by means of bowel control medications and improved diet (e.g., increased intake of fiber, fruit, vegetables, and grain) [see 5:17 Benign Rectal, Anal, and Perineal Problems]. It is probable that both for these reasons and because more and better patient information is available, fewer patients today have hemorrhoids that progress to a stage advanced enough to necessitate operative treatment for relief of symptoms.

OPERATIVE PLANNING

It is important to distinguish between internal and external hemorrhoids [see Figure 1]. Internal hemorrhoids are treated to relieve specific symptoms, including prolapse and bleeding, not simply because hemorrhoidal tissue was seen on routine examinations. Prolapsing tissue occasionally results in maceration of the perianal skin that may not be clearly evident at the time of examination, especially if the patient is in the prone position. External hemorrhoids are treated because they thrombose and cause pain. There are no other symptoms of the anorectum that should be attributed to the presence of hemorrhoids [see Table 1]; in particular, difficulties with bowel movements (e.g., straining, the need for digital evacuation of the rectum, and cramping abdominal pain) must not be ascribed to hemorrhoids.

Accordingly, the ability to recognize and diagnose the spectrum of pelvic floor abnormalities (of which rectal prolapse is the most florid manifestation), especially obstructed defecation, is critical to the decision whether to correct hemorrhoids surgically. Attempting to alleviate nonhemorrhoidal symptoms by means of hemorrhoid surgery is likely to yield unsatisfactory results for both patient and surgeon. It is not uncommon for anal fissure/ulcer disease to coexist with hemorrhoids, in which case the chances of a good operative result can be increased by performing a posterior lateral internal sphincterotomy at the time of hemorrhoid surgery.

Before embarking on the surgical treatment of hemorrhoids, one must always rule out neoplastic disease, compromise of the immune system, and defective clotting mechanisms. Patients with a personal or family history of colorectal cancer and those 50 years of age or older should undergo colonoscopy to eliminate the possibility of polyps or cancer before surgical treatment of hemorrhoids is initiated. The patient’s general health status and ability to tolerate pain and an operative procedure should also be taken into account. The postoperative response to anorectal surgery varies enormously among patients. For example, young men tend to strain to have bowel movements after anorectal procedures, and this tendency can lead to bleeding and disruption of postoperative healing. These patients often benefit from the administration of parenteral pain medication for the first 12 to 24 hours after operation, which usually requires hospitalization. Elderly patients, on the other hand, prefer not to be in the hospital. For these patients, single elastic ligation of individual clusters of internal hemorrhoids is performed in the outpatient office.

The next step is to determine the appropriate procedure for the patient. The options include (1) elastic ligation of internal hemorrhoids, (2) excision of thrombosed external hemorrhoids, (3) complete excisional hemorrhoidectomy, and (4) elastic ligation of internal hemorrhoids combined with excision of external hemorrhoids. One should always consider whether complete sigmoidoscopy, rigid or flexible, will be necessary at the time of the procedure and

Figure 1  Operative management of hemorrhoids. A key issue is the differentiation of internal hemorrhoids from external hemorrhoids. Internal hemorrhoids (left) originate from the internal hemorrhoidal plexus, above the dentate line. External hemorrhoids (right) originate from the external hemorrhoidal plexus, below the dentate line.
Table 1 Anal Symptoms Mistakenly Attributed to Hemorrhoids

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Cause</th>
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<tbody>
<tr>
<td>Pain and bleeding after bowel movement</td>
<td>Ulcer/fissure disease</td>
</tr>
<tr>
<td>Forceful straining to have bowel movement</td>
<td>Pelvic floor abnormality (paradoxical contraction of anal sphincter)</td>
</tr>
<tr>
<td>Blood mixed with stool</td>
<td>Neoplasm</td>
</tr>
<tr>
<td>Drainage of pus during or after bowel movement</td>
<td>Abscess/fistula, inflammatory bowel disease</td>
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<tr>
<td>Constant moisture</td>
<td>Condyloma acuminatum</td>
</tr>
<tr>
<td>Mucous drainage and incontinence</td>
<td>Rectal prolapse</td>
</tr>
<tr>
<td>Anal pain with no physical findings</td>
<td>Caution: possible psychiatric disorder</td>
</tr>
</tbody>
</table>

whether anal sphincterotomy will be indicated, especially in young men with a history of straining. This second consideration is important because many patients are treated for hemorrhoids when in fact their primary disease is anal ulcer/fissure disease, the symptoms of which are pain and some bleeding at defecation. These are not symptoms that can be attributed to hemorrhoids. If a patient undergoes hemorrhoid surgery when the primary disease is anal fissure, proper healing will be impeded.

Finally, one should explain the procedure and its attendant risks to the patient in the outpatient office because in most cases, given the restrictions imposed by health care insurers and managed care administrators, one will not see the patient again until arriving at the day of operation. Specific complications to be discussed preoperatively include urinary retention, bleeding, and infection. In the event that several symptomatic hemorrhoids are present, surgeon and patient should jointly decide between multiple small procedures done in the office and a single larger procedure done in the OR. Individual economic concerns, as well as employment and lifestyle, should be considered.

Special Situations

Acute thrombosed external hemorrhoids This condition is signaled by acute pain and a swelling blood clot within the skin-covered external hemorrhoid. Often, the clot is eroding through the skin, causing bleeding that may be frightening to the patient but is typically insignificant. If I encounter this problem days after its onset, I generally treat it with bowel control and topical medications as the process resolves. If the hemorrhoid is acutely painful or the clot is eroding, the best therapy is surgical excision of the external hemorrhoid, with the anoderm left intact; this is best done with the patient under adequate local anesthesia. Mere evacuation of the clot is rarely appropriate.

Postpartum hemorrhoids The postpartum rosette of acute thrombosed external (and, often, prolapsed internal) hemorrhoidal tissue is appropriately treated with hemorrhoidectomy (see below), carried out as soon after delivery as is convenient. The risk of infection is minimal, and I know of no good reason to send a new mother home with hemorrhoids in addition to a new baby and a healing episiotomy.

Figure 2 Operative management of hemorrhoids. The patient is positioned on the operating table in the prone-flexed position, with a soft roll under the hips.
Step 5: Treatment of Hemorrhoids

**Elastic ligation of internal hemorrhoids** This is a very safe operation because by the nature of the banding procedure [see Figure 4], bridges of normal mucosa are maintained between treated clusters of hemorrhoids. Any clusters of tissue with squamous metaplasia and obviously friable internal hemorrhoids can be treated in this manner. I find that these tissue clusters are not always confined to the three classic positions identified for hemorrhoids and that in many cases it is necessary to band three or four clusters. If the bands do not stay on, then the tissue probably need not be treated and no further action need be taken.

I use two rubber bands on each cluster. If one of them breaks, bleeding is unlikely to occur, because the tissue rapidly becomes edematous and necrotic. It is important that the placement of the rubber band be proximal to the mucocutaneous junction; if it is not, the procedure will be too painful, given the extensive innervation of the skin. On the other hand, the band should not be placed so proximally as to incorporate the full thickness of the rectal wall; to do so can be risky for patients in whom difficulties with bowel movements indicate the presence of intussusception or some other pelvic floor abnormality. Occasionally, the friable tissue gives rise to a suspicion of cancer. If this is the case, rub-
ber bands may be placed at the base, and the tip may be excised for biopsy.

**Excision of residual external hemorrhoids** Residual external hemorrhoids are rarely treated as a primary problem: true symptoms are few, and the main indication for treatment is maintenance of hygiene. In addition, I find that much of the external tissue is pulled in when the internal hemorrhoids are ligated. Accordingly, I do the internal ligation first and then excise any residual symptomatic external tissue. An elliptical incision is made in the perianal skin, with care taken to protect the underlying sphincter muscle and avoid the previously placed elastic band [see Figure 5a]. Although the perianal skin is very forgiving, it is essential to protect the anoderm; this is achieved through careful placement of the rubber band. The elliptical defect is then closed with a continuous absorbable suture in a three-point placement to obliterate the underlying dead space [see Figures 5b and 5c]. The suture is tied loosely to allow for swelling. There is no need for separate ligation or coagulation of the small bleeding vessels; this problem is obviated by the continuous suture. It is important not to use slowly absorbable suture material, because it may give rise to infection in this highly susceptible tissue. I prefer to use 3-0 chromic catgut on an exaggeratedly curved needle.

**Complete excisional hemorrhoidectomy** This procedure is indicated in patients who have large combined internal and external hemorrhoids, patients who are receiving anticoagulants, and patients who have massive edema and thrombosis, as seen in the postpartum rosette of tissue [see Figure 6]. I find that even massive edema generally resolves after the local anesthetic is injected and the muscle is allowed to relax. Resolution of edema then permits identification of the specific clusters of hemorrhoids, which can be isolated with a forceps and excised via an elliptical incision. Care must be taken to preserve the underlying muscle, especially in the anterior region in women. I use 3-0 chromic catgut with a deep stitch at the apex and a continuous three-point suture that is extended on the perianal skin [see Figure 5b]. It is important to preserve a bridge of anoderm between the areas of excision. I know of no indications for a radical circumferential procedure (the so-called Whitehead procedure); in fact, I see numerous patients who are seeking a remedy for the stenosis and ectropion that frequently occur after this radical operation [see Figure 7].

A newer technique, in which a circumferential band of anorectal mucosa is excised with a special circular stapler, is currently under investigation. This technique is intended for patients who have profound prolapsing internal hemorrhoids without much of

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**Figure 5** Operative management of hemorrhoids. Shown is an excisional hemorrhoidectomy. *(a)* An elliptical incision is made in the perianal skin. *(b)* A continuous suture is used in a three-point placement in such a way as to incorporate skin edges and muscle. *(c)* The elliptical defect is closed and the dead space obliterated.

**Figure 6** Operative management of hemorrhoids. Massive edema and thrombosis, as seen in the postpartum rosette of tissue, can be reduced after a local anesthetic is injected and the muscle is allowed to relax.
Figure 7 Operative management of hemorrhoids. Stenosis and ectropion often result from radical circumferential (Whitehead) procedures.

an external component. Its proponents claim that it results in minimum postoperative discomfort; however, special training with the instrument is required. European centers have reported excellent success rates, and trials have now been completed in the United States. There appears to be some advantage to this procedure, in that patients tend to experience less immediate postoperative pain; however, the long-term results seem no better than those achieved with more conventional approaches, and the rate of recurrent tissue prolapse may in fact be higher than that noted after standard excisional hemorrhoidectomy. In addition, the circumferential stapling procedure has not yet been compared with rubber band ligation, which is now used almost routinely. Perhaps the greatest disadvantage of the new procedure is the finding that there is a significant incidence of serious postoperative complications. At present, given the results available to date, it is difficult to advocate routine use of this modality.

There also exist various forms of nonsurgical treatment for grade 1 and early grade 2 internal hemorrhoids. These entail some form of local tissue destruction (e.g., with infrared coagulation or injection of a sclerosing agent). I do not use these modalities myself, because I find that the symptoms they are used to treat can be managed just as easily, and more safely, by means of dietary changes, bulk-forming agents, and stool softeners.

**Step 6: Postoperative Care**

Immediately after the procedure—in fact, after any anorectal procedure—antibiotic ointment and a gauze pad are applied. Pressure dressings are unnecessary. Only a very small amount of adhesive tape should be used, so as to prevent traction avulsion of the perianal skin, an event for which we surgeons too often avoid responsibility by ascribing it to a “tape allergy” on the part of the patient.

**TROUBLESHOOTING**

The most fundamental way of preventing problems is to make an accurate diagnosis. Surgical treatment of hemorrhoids in a patient whose main disease process is Crohn’s disease, a pelvic floor abnormality, or ulcer/fissure disease inevitably yields inferior results. It is especially important to recognize the anal pain and spasm of ulcer/fissure disease because in patients with this condition, excision of hemorrhoidal tissue without sphincterotomy leads to increased postoperative pain and poor wound healing.

I prefer to operate with the patient in the prone-flexed position, using local anesthesia supplemented by I.V. medication. I have found over the years that with this approach, patients retain no unpleasant memories of the OR experience, and good pain control is achieved in the immediate postoperative period.

In the postoperative period, efforts must be made to minimize straining on the part of the patient. To accomplish this, pain must be kept at a low level. I prefer to give only parenteral pain medication, in relatively high doses, on the first night. The patient and the nursing staff must be cautioned that the first sensation of pain, especially after elastic ligation of hemorrhoids, is the urge to defecate. This urge is an indication that pain medication should be given. The patient must not sit on the toilet and strain; to do so is likely to result in extrusion of the recently ligated tissue.

At least 20% of patients experience some degree of urinary retention. If this occurs, an indwelling catheter should be placed. In-and-out straight catheterization is contraindicated. No bladder stimulants should be given: such agents encourage straining and increase the risk of complications.

Bulk-forming agents and stool softeners are started in the immediate postoperative period. I encourage patients to take warm soaks, either in a bathtub or in a shower, rather than try to squeeze into the disposable sitz-bath mechanisms provided by the hospitals, which are often too small. I also encourage patients to sit on soft cushions rather than the rubber rings marketed for postoperative care; the rings seem to cause more dependent edema and pain.

**COMPLICATIONS**

**Bleeding**

Either immediate or delayed bleeding may occur after hemorrhoid surgery. Bleeding within the first 12 to 24 hours after the operation represents a technical error. The only management is to return the patient to the OR, with good anesthesia and adequate visualization, so that the bleeding site can be suture ligated. Frequently, spinal or epidural anesthesia is necessary because the patient is too uncomfortable, and the tissue perhaps too edematous, to allow local anesthesia. Bleeding within 5 to 10 days after the operation usually results from sloughing of the eschar created by suturing or elastic ligation. This delayed bleeding is usually minimal, and the patient is encouraged to rest and to take stool softeners. If the bleeding is significant, examination with adequate anesthesia is indicated to allow cauterization or suture ligation of the bleeding site.

It is important to discourage patients from taking aspirin-containing compounds in the postoperative period, and it is especially important to follow patients taking systemic anticoagulants closely. I prefer to treat these patients with excisional hemorrhoidectomy so that sutures can be placed; in this way, I avoid the risk that the elastic-ligated tissue will slough after 5 to 10 days.

**Infection**

Infection is unusual after hemorrhoidectomy because perianal tissue is normally well vascularized and extremely resistant to infection despite constant bombardment by bacteria. When it does occur, it is most likely to be in an immunocompromised patient—that is, one who has a blood dyscrasia, diabetes, or AIDS or has recently undergone chemotherapy. In my view, it is imperative to obtain at least a complete blood count and a chemistry profile before embarking on anorectal procedures; if the results are abnormal, elective hemorrhoid surgery is contraindicated.
Any local focus of infection noted in the postoperative period must be drained. I have seen this complication only when slowly absorbable suture material was used, which is the reason why I have returned to using 3-0 chromic catgut. Postoperative perianal infection can be severe and life-threatening, and it is therefore critically important to be familiar with its symptoms and to treat it intensively. Frequently, such infection is initially manifested by pain that is greater than anticipated, urinary retention, and fever. These symptoms have occasionally been reported after elastic ligation of hemorrhoids. In this event, it is critical that the patient be seen on an emergency basis, the elastic bands removed, the patient hospitalized, and parenteral administration of antibiotics begun. In retrospect, I find all such patients whom I have seen had preoperative symptoms of a pelvic floor abnormality with difficulty in defecation—not clear symptoms of hemorrhoids.

Urinary Retention

Urinary retention is apparently caused by reflex spasm of the pelvic musculature, which may not become evident until the local anesthesia wears off. Often, a patient still under the influence of local anesthesia seems to be doing exceedingly well for the first few hours after operation, only to go into urinary retention later that night. It may be helpful to reduce the fluid load in the perioperative period. When a patient has trouble urinating, an indwelling urinary catheter should be placed and left in place for at least 12 hours. This, in my view, is one of the major reasons for in-hospital observation after treatment of more than one cluster of hemorrhoids. Placement of the indwelling catheter is of particular importance for the patient's well-being, even if it is not looked on with favor by managed care administrators. Urinary retention is a frightening experience for the patient to undergo at home. What is more, if placement of an indwelling catheter is postponed for 12 to 24 hours, recovery may be delayed. Again, it is important to remember that urinary retention may be an early sign of pelvic infection.

Stricture

Stricture, with or without ectropion, results from circumferential excision of hemorrhoids. I mention this point only to discourage the performance of this procedure.

OUTCOME EVALUATION

Because hemorrhoids are treated only when symptoms—bleeding, prolapse, pain, and difficulty with hygiene—are present, success is determined simply by the extent to which the symptoms are alleviated. If other symptoms were present before operation and persist after the procedure, the primary diagnosis should be called into question. Many elderly patients with a single prolapsing hemorrhoid that causes bleeding or maceration of the perianal skin are well served by outpatient ligation; occasionally, there is a second cluster that requires treatment some months later.

The basic point is that any patient treated surgically for hemorrhoids should experience symptomatic relief. With newer surgical techniques and improved methods of postoperative management, there is no reason for the patient to experience the severe pain described by those who have undergone extensive excisional procedures.

Operative Management of Abscess and Fistula

The conditions that cause suppurrative processes in the anorectum are cryptoglandular abscess and fistula, Crohn's disease, and hidradenitis suppurativa [see 5:17 Benign Rectal, Anal, and Perineal Problems]. Accurate diagnosis is essential for proper surgical management. Although these conditions may appear similar at times, each one is managed somewhat differently.

OPERATIVE PLANNING

The most important initial step is to determine the activity and severity of the disease process and the immune status of the patient. For example, a large, fluctuant abscess surrounded by erythema, induration, and superficial necrosis of the skin in an insulin-dependent diabetic is a surgical emergency. On the other hand, a chronic abscess or fistula that drains periodically over a matter of months is not nearly as urgent a problem. Multiple fistula tracts to the perineum in a patient with Crohn's disease require that one perform an adequate study of the intestinal tract and the sphincter mechanism before attempting definitive surgical treatment. It is important to determine the etiology of the process whenever possible. Unfortunately, the determination cannot always be made without examination under anesthesia, during which treatment as well as
diagnosis could be accomplished, and this complicates the obtaining of informed consent and the choice of anesthesia.

It is also important to gain as accurate a picture as possible of the complexity of the disease process; this facilitates the planning of the procedure, the choice of anesthesia, and the selection of the information given to patient and family before treatment. For example, in the absence of other significant health problems, a small, well-localized, low intersphincteric abscess often can be easily drained with the patient under local anesthesia if an internal opening can be seen preoperatively on anoscopy, although on occasion even this procedure calls for spinal or epidural anesthesia. (It should be remembered that use of the prone-flexed position [see Figure 2], which is my preference, makes general anesthesia more difficult.) Multiple infected tracts associated with undrained infectious foci in a case of rectal Crohn’s disease necessitate examination with the patient under spinal or epidural anesthesia. The treating surgeon should perform careful anoscopy and sigmoidoscopy and conservative temporary drainage procedures until consultation with a specialist can be arranged. Severe destruction and suspected deep tissue necrosis, especially in immunocompromised patients, may necessitate extensive resection of tissue and perhaps a completely diverting colostomy.

Bowel preparation should include mechanical cleansing and antibiotics but may not be possible when the situation is urgent (as is most often the case). Appropriate antibiotic coverage (i.e., agents effective against gram-negative organisms and anaerobes) is indicated for all but the simplest cases, with special consideration given to patients who require prophylaxis because of cardiac disease or the presence of prosthetic material. Usually, a urinary catheter should be inserted before operation, especially if the infectious process is located in the anterior region in a man, where the urethra is at risk for injury.

OPERATIVE TECHNIQUE

Many technical elements are common to all operations for conditions that cause suppurative processes in the perineum. The patient should be in the prone-flexed position, with the buttocks taped apart. Conduction anesthesia (spinal, caudal, or epidural) is usually required. The perineum should be examined carefully with an eye to areas of abscess or external drainage sites. Endoscopic examination of the anus, the rectum, and the vagina should be undertaken to search for primary inflammatory bowel disease, internal openings of the fistula, or vaginal openings of the fistula.

Cryptoglandular Abscess and Fistula

The abscess must be located and characterized because drainage will depend on the location of the abscess, the course of the fistula tract, and any related infectious processes [see Figure 8]. It is important not to create a fistula through the levator plate of the pelvic floor. This means that an abscess with a low origin must be drained low, with care taken to avoid iatrogenic perforation of the rectum, and an abscess with a high origin (e.g., a high intersphincteric abscess) must be drained high by incising the mucosa and the longitudinal (internal sphincter) muscle of the rectal wall (not a procedure for the occasional rectal surgeon). The internal opening—that is, the crypt where the abscess originated—must be sought; this is best done by means of anoscopy, very careful probing, and sigmoidoscopy to rule out a high source (e.g., Crohn’s disease). If the internal opening is found, the abscess can be drained or a fistulotomy can be performed [see Figure 9]. With a fistulotomy, determination of safety is a paramount concern. Careful consideration must be given to which muscle—and how much of the muscle—is to be cut. The anterior location in a woman is especially precarious. If the fistula involves a significant amount of muscle, or any muscle in the anterior region of a woman, either a seton should be placed or a drain should be placed without disruption of the muscle, in preparation for advancement flap closure of the internal opening.

If the internal opening is not found, one should not make one by probing. The abscess should be drained with a mushroom-tipped catheter [see Figure 10]; in my experience, this is preferable to unroofing and eliminates painful packing. The catheter can be left in place for an extended period, and it permits subsequent injection of dye or contrast material. Once the mushroom catheter is in place in the OR, the surgeon can inject diluted methylene blue to search again for internal openings, which, if found, allow one to consider fistulotomy. The drain is usually sutured in place. The patient should be seen a few days after the operation to confirm that the abscess is adequately drained.

After 2 weeks, the patient is seen in the office, and povidone-iodine is injected through the drain while the inside of the anal canal is inspected via an anoscope. If an internal opening is seen, then fistulotomy is planned. If no internal opening is seen (as is the case in about 50% of patients), the drain should be removed 1 week later. This allows any irritant effect of the povidone-iodine to resolve and prevents the abscess from recurring.

If the fistula tract is known to have an external opening and fistulotomy is planned, the following approach should be considered. First of all, fistulectomy is never indicated. Fistulotomy is
performed rarely and with great caution in the face of Crohn’s disease. To perform the fistulotomy, one must first find the internal opening. In this regard, Goodsall’s rule is often helpful: external fistula openings anterior to the midanal line are usually connected to internal openings via short, straight tracts, whereas external openings posterior to this line usually follow a curved course to internal openings in the posterior midline. Dilute methylene blue is injected through the external opening, often via a plastic I.V. catheter.

Careful probing, perhaps with a lacrimal duct probe, is then carried out. If the internal opening still cannot be found, a drain is placed so that the surgeon can return at another time to search for the internal opening. If the internal opening is found, a probe is passed and an effort is made to determine how much muscle and which muscle must be transected to accomplish the fistulotomy and how much muscle will remain to maintain continence [see Figure 11].

If the surgeon is not sure of the extent of muscle involvement or of how safe a fistulotomy would be, the infectious process should be drained, and either the patient should be referred to a specialist, or plans should be made for an advancement flap procedure to close the internal opening. If a fistulotomy is done, a biopsy specimen should be obtained from the infected tract, and the tract should be marsupialized to prevent premature healing of the superficial aspect.

It is important to keep in mind that the sphincter mechanism is innervated by a branch of the pudendal nerve that enters the sphincter from the posterolateral aspect. Accordingly, extreme caution must be exercised when a deep fistulotomy is required in the posterolateral perianal quadrants.

There is a growing body of evidence suggesting that injection of commercially available fibrin glue is effective for treatment of fistulas in perianal tissue. Longer tracts appear to respond better to this modality than shorter tracts do. The long-term efficacy of this approach remains to be proved.

**Special problems** A cryptoglandular abscess that extends into the posterior anal and posterior rectal spaces is often missed as a source of infection. Diagnosis of such abscesses typically involves bidigital examination, often with the patient under anesthesia; needle aspiration may be required as well. Fistulotomy in this area often

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**Figure 10** Operative management of abscess and fistula. Shown is drainage of an ischiorectal abscess. Such abscesses may be palpated above the anorectal ring, even though their location is more inferior. (a) The abscess is incised. (b) A mushroom-tipped catheter is placed.

**Figure 11** Operative management of abscess and fistula. Shown are examples of the different types of fistulotomies indicated for some of the many types of fistulas: intersphincteric fistula with a simple low tract (a), intersphincteric fistula with a high blind tract (b), uncomplicated transsphincteric fistula (c), and transsphincteric fistula with a high blind tract (d). In each image, the left half of the drawing shows the disease process, and the right half illustrates the recommended operation.
necessitates opening large amounts of tissue, including partial transection of the sphincter muscle; the tract may also have to be marsupialized. If one is unsure of the anatomy or has never done the procedure before, the abscess should be drained as simply as possible and the patient referred to a specialist.

The so-called horseshoe abscess [see Figure 12] results from an undiagnosed posterior-space abscess that has dissected laterally and may have been drained several times through the lateral extension into one or both ischiorectal fossae. This condition is cured by opening the posterior space and placing a long-term lateral drain, after which healing proceeds by secondary intention (the so-called Hanley procedure). The drain should not be removed until there is solid healing in the posterior midline; this may take weeks or even months.

**Abscess and Fistula Associated with Crohn's Disease**

The goals of treatment are to drain and control the focus of infection, to preserve sphincter function, to plan and implement a staged approach to preservation of anorectal function, and to make the correct diagnosis. To these ends, careful identification of the location and course of the abscess and any associated fistulas is essential; this is accomplished via endoscopic dye injection, probing, and vaginoscopy.

The safest approach, in my view, is to place mushroom catheters in abscesses and complicated fistula tracts or, in some cases, to use setons to allow drainage of the fistulas (not to cut through the tissue, which is often the intended result of seton placement) [see Figure 13]. For optimal resolution of inflammation at the site of the internal opening in anticipation of a possi-

![Figure 12](image1.png)

**Figure 12** Operative management of abscess and fistula. Shown is the surgical treatment of a horseshoe fistula. (a) The main posterior tract of the fistula is identified by probing. (b) The posterior tract is opened, and drains are placed laterally. (c) The posterior tract is marsupialized.

![Figure 13](image2.png)

**Figure 13** Operative management of abscess and fistula. Shown are alternatives for treating abscess or fistula associated with Crohn's disease. In Crohn's 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. This seton may then be left in situ for a time for drainage and for prevention of further disease progression.
ble advancement flap procedure, perirectal mushroom catheters are preferable to setons placed through the internal opening. Superficial fistula tracts may occasionally be managed with fistulotomy if the Crohn’s disease is otherwise inactive. Sphincterotomy is never indicated in a patient with Crohn’s disease if severe infection is present or the disease is active. When a patient is known or believed to have Crohn’s disease, biopsy of the edematous external skin tags that are often present can be a good way of finding granulomatous tissue to confirm the diagnosis.

The newer forms of medical treatment of Crohn’s disease, in which a monoclonal antibody to tumor necrosis factor (infliximab) is given either by itself or in combination with immunosuppressive agents, seem to display some of their most beneficial results in patients with complicated anorectal fistulas. In my view, a good way of managing abscess and fistula associated with Crohn’s disease is for the surgeon to drain and control the suppurative process and for the gastroenterologist then to employ the latest medical regimen to force the disease into remission.

**Hidradenitis Suppurativa**

Patients with infected fistula tracts or abscesses secondary to hidradenitis suppurativa must be positioned in such a way as to allow visualization of and access to all tracts. This is crucial because some of the tracts may extend into the scrotum, the labia, the inguinal areas, or the suprapubic area. Conduction anesthesia is important in that it covers broad areas of the perineum; adequate local anesthesia is impossible unless one is dealing with very small, isolated tracts.

The definitive therapeutic surgical procedure is incision (rather than excision) of these often extensive inflammatory tracts [see Figure 14]. The surgeon should do as much as possible at one time, with the understanding that it is not unusual to leave a few tracts undrained or to return later to address new areas of dissection. Because the primary disease process does not involve the sphincter, intestinal diversion is rarely indicated. Biopsy is indicated because on rare occasions, these long infected tracts exhibit malignant changes or result from an anal malignancy. The perineal skin can tolerate the extensive incisions necessary to cure the process. Special precautions must be taken not only to preserve the sphincter itself but also to avoid damaging the neurovascular bundle that enters the anus from the posterolateral aspect. In male patients, efforts must be made to avoid the urethra during incision in the anterior midline; to this end, a Foley catheter should always be placed before the surgical procedure is begun. Because so many incised skin edges remain after treatment of extensive hidradenitis, it is imperative to achieve adequate hemostasis. The disposable suction cautery units currently available can be especially helpful for this purpose. The wounds may be either left open or loosely packed until good granulation tissue forms.

Bathing the perineum, especially after a bowel movement, is helpful. Often, showers are better for this purpose than the portable minuscule sitz baths commonly used. For patients who have undergone extensive procedures, twice-daily trips to a whirlpool bath (often located in the physical therapy department) are helpful. Despite the multiple lengthy incisions, there is usually little pain, and most of the postoperative care can be done at home. Adequate follow-up is necessary to treat residual or new areas of disease before the dissection becomes extensive again. Care must be taken, especially in the OR, to search for the infected tracts, which may contain little pus and may be apparent only as indurated cords within the perineal skin.

**TROUBLESHOOTING**

Most of the important steps for avoiding problems have already been described in the course of addressing preoperative planning and operative technique (see above). The goals in the treatment of all of the processes associated with anorectal abscess and fistula in ano are to preserve sphincter function, to control acute infection, and to eliminate the source of the infection. If it is likely that sphincter function will be compromised at all, a baseline level of sphincter function (including the status of muscles and nerves) must be determined before any surgical procedure is initiated. One should never hesitate to perform an examination with the patient under anesthesia and to inject dilute methylene blue to delineate the extent and location of the infectious process.

Anyone embarking on surgical management of such processes must keep in mind the option of performing an advancement flap procedure by perirectal mushroom catheters.
procedure to close the internal opening, especially in the anterior region and most particularly in women. If such a procedure is planned, initial drainage should be done external to the rectum with a mushroom catheter rather than through the internal opening with a seton. Simple 3-0 chromic catgut should be used to marsupialize fistula tracts because employing the newer, less quickly absorbable materials may lead to a chronic nidus that gives rise to ongoing infection. Patients should be watched closely in the immediate postoperative period to ensure that all infection is controlled. Not uncommonly, a superficial collection is drained, but a deeper abscess remains that must be sought more aggressively.

One should always take into account the risk of anoperineal infection in immunocompromised patients. Given that the anatomy of the anal tissue planes is complex and can be rendered even more so by multiple surgical procedures, one should not venture beyond one’s level of expertise. One should never hesitate to drain an infectious focus with a simple mushroom-tipped catheter and, if appropriate, refer the patient to a colon and rectal surgical specialist who is trained to manage complex anoperineal suppurative processes safely and definitively.

COMPLICATIONS

Complications occur if one or more of the goals just mentioned (see above) have not been achieved. Persistent or recurrent infection is seen with some frequency. In patients with cryptoglandular abscess or fistula, infection usually results from failure to locate the internal opening or to discover a deep posterior midline abscess; such failure is often seen in patients with a horseshoe abscess, in whom repeated lateral drainage procedures may have been undertaken without the primary cavity in the posterior anal or posterior rectal space being discovered and dealt with.

In patients with Crohn’s disease, infection can persist if a deeper pocket or extension has gone undiscovered or if the disease has recurred, leading to further penetration and infection in the anorectum or the perirectal tissue. Extensive examination with the patient under anesthesia, including transrectal ultrasonography or CT scanning, may be required to determine the source and extent of the infection. It is always possible that the infection derives from a superlevator abscess secondary to intestinal disease; consequently, a detailed evaluation of the intestinal tract is indicated in patients with Crohn’s disease.

Figure 15 Operative management of ulcer/fissure disease. Anal fissure (left) and anal ulcer (right) are, respectively, the acute aspect and the chronic aspect of a single disease process.

In patients with hidradenitis suppurativa, the most common problems are residual undrained tracts and recurrent disease. Again, examination with the patient under anesthesia and repeated drainage are called for. Because this disease process does not originate in the rectum, care must be taken not to enter the rectum or to cut any of the nerves entering the anus from the posterolateral aspect. It has been reported anecdotally that very chronic or persistent fistula tracts may eventually exhibit malignant changes (squamous cell carcinoma); for this reason, such tracts should be biopsied.

OUTCOME EVALUATION

No sophisticated surveillance is necessary: if drainage persists or some degree of incontinence develops, the patient usually will volunteer the information freely. Either of these complaints could be an indication for a detailed examination, including a sophisticated evaluation of sphincter function.

Operative Management of Ulcer/Fissure Disease

Ulcer and fissure are two aspects of a single anorectal disease process with an unclearly defined pathophysiology [see Figure 15]. Accurate diagnosis is crucial [see 5:17 Benign Rectal, Anal, and Perineal Problems]. Not uncommonly, patients are treated for hemorrhoids when the true primary condition is ulcer/fissure disease.

OPERATIVE PLANNING

Fundamental concerns in planning the operation—besides confirming the diagnosis—are to verify that there are no other conditions that could threaten complete healing of an incision in the anal tissue and to make sure that there is no significant incontinence before the sphincterotomy.

For example, a history of diarrhea compatible with the presence of inflammatory bowel disease indicates the need for further evaluation to eliminate the possibility of Crohn’s disease; if Crohn’s disease is present, the risk of poor healing is greater, and it will be necessary to preserve all of the available sphincter function of the anus for a long period. As another example, a woman who has borne children by vaginal delivery and has any degree of incontinence should undergo manometry, ultrasonography, and perhaps electromyography to confirm that the sphincter is not compromised by a mechanical or neurologic deficiency. Yet another example is a patient with irritable bowel syndrome or a pelvic floor abnormality who experiences a multitude of difficulties with bowel movements. It is important to recognize such conditions and to advise the patient of the need for special attention to maintain adequate bowel function in the postoperative period.

It is essential to clearly explain the nature of the operative procedure (i.e., the incision of a portion of the internal sphincter mechanism) to the patient and to warn him or her that minor incontinence or flatus may persist for as long as a few months postoperatively. To be fair, significant incontinence is highly unusual: in fact, most patients experience very rapid relief of their often distressing symptoms. One should also advise the patient that any other anal procedures that may be indicated (e.g., elastic ligation of internal hemorrhoids or excision of symptomatic external hemorrhoids) can and should be accomplished at the time of sphincterotomy, with or without excision of the anal ulcer, and that he or she should take 3 to 5 days off from work. The risk of urinary retention, pain, and bleeding must also be discussed. In planning the operative procedure and immediate postoperative care, one must take into account the
Operative Treatment of Ulcer/Fissure Disease

Operative treatment of ulcer/fissure disease consists of a posterior lateral internal anal sphincterotomy, in which the internal sphincter is divided but the external sphincter, the anoderm, and the longitudinal muscle remain intact. I generally prefer to place the patient in the prone-flexed position with the buttocks taped apart and adequate local anesthesia in place. The operation can then be performed in one of three ways: (1) as a closed procedure involving the use of a No. 11 blade and digital palpation of the muscle [see Figure 16], (2) as an open procedure without direct visualization of the muscle, or (3) as an open procedure with clear identification of the muscle before its transection. The third option is the one I prefer.

An open procedure with visualization of the muscle is done as follows [see Figure 17]. The first step is anoscopy, preferably with a medium Hill-Ferguson instrument. The hypertrophied band of the lower third of the internal sphincter muscle is clearly identified. If this band is not a distinctly identifiable entity, sphincterotomy should not be performed. The ulcer or fissure itself need not be present, because the disease may be in a relatively inactive state at the time of surgery.

Rigid or flexible sigmoidoscopy should then be performed if it was not done in the immediate preoperative period. The primary purpose of this step is to make sure that no features of Crohn’s disease are visible in the rectum. When the endoscopic examination is complete, I usually repeat the preparation of the anal opening.

A 1 cm incision is made in the posterior lateral aspect of the perianal skin, hemostasis is obtained, and a delicate dissection is done with a curved hemostat in the intersphincteric plane. The posterior midline is avoided because healing in this position may result in scar tissue that interferes with perfect continence (the so-called keyhole deformity). The white hypertrophied band of muscle is then elevated into the wound with a curved hemostat. If a rent is made in the anal mucosa, it must be repaired with 3-0 chromic catgut. The band of muscle is then incised with the electrocautery, and pressure is maintained for a few minutes to ensure hemostasis. Digital examination confirms adequate transection of the band. The skin is left open.

Attention is then directed to the ulcer, which may be excised sharply in an elliptical fashion so as to incorporate the entire triad of the ulcer (i.e., the ulcer itself, the sentinel hemorrhoidal tag, and the hypertrophied anal papilla) while avoiding additional transection of the underlying muscle. If I excise the ulcer complex, I usually close the wound with a continuous three-point suture of 3-0 chromic catgut to obliterate any dead space and thus to lower the risk of postoperative infection.

Any additional anal surgery required is then completed, the surgical site is covered with antibiotic ointment, and a very light gauze bandage is applied with a minimum of tape and traction on the perianal skin.

Troubleshooting

To perform this simple procedure well, one must have a clear understanding of the surgical anatomy of the anal canal and must be able to clearly identify the internal sphincter, the intersphincteric groove, and the external sphincter muscle. The hypertrophied band of muscle must be accurately identified and cleanly transected. No attempt should be made to extend or amplify the procedure by stretching the anal canal and thus bursting the muscle. Although the procedure and anatomy are simple, the best way of learning the operation is to watch an experienced surgeon perform it. I do not believe this procedure can be learned through reading alone.

Complications

Because the internal sphincter muscle is responsible for resting, involuntary continence, injury to this structure can lead to nocturnal incontinence. Again, special caution is advised with respect to the anterior aspect of the anoperineum in women. On the other hand, incising the posterior midline can also lead to the keyhole deformity, which may cause prolonged anal seepage because of the configuration of the scar tissue; a good analogy is a bent rim on a tubeless tire. It is tempting to close the tiny skin incision at the site of sphincterotomy, but I think it should be left open to reduce the already low risk of infection.

There should be very little postoperative pain. If the patient does complain of significant pain, especially in the presence of fever or urinary hesitancy, one must assume that infection is present in the anoperineum, a structure that is normally highly resistant to microbial invasion. Urgent evaluation, removal of sutures, antibiotic therapy, bowel rest, placement of a urinary catheter, and very close observation in the hospital are indicated.
The major causes of complications are incorrect diagnosis of the disease process (especially overlooking the presence of Crohn’s disease) and failure to fully understand the anatomy of the continence mechanism of the anal canal. If too much of the internal sphincter muscle is cut, if this muscle is already compromised, or if the external sphincter muscle is transected by mistake, the patient will be rendered incontinent. On the other hand, if not enough of the internal muscle is transected, the ulcer will not heal and the symptoms will persist.

Overall, the single most common cause of complications that I have observed is the failure even to suspect, much less diagnose, ulcer/fissure disease as the source of a patient’s symptoms. I frequently see patients who seem to have failed to heal months after a hemorrhoidectomy. When their symptoms are reviewed and a thorough examination performed, it becomes apparent that the underlying disease process was always ulcer/fissure disease rather than hemorrhoids and that the hemorrhoidectomy only intensified the anal pain and bleeding. These patients are finally cured when an adequate sphincterotomy is performed.

In very rare instances, drainage continues at the site of the sphincterotomy. If drainage persists for weeks, the patient should be examined under appropriate anesthesia, and the focus of infection should be opened. This is essentially equivalent to a very superficial fistulotomy.

OUTCOME EVALUATION

Again, no sophisticated surveillance is necessary: when the patient returns 2 weeks after the procedure, free of pain and bleeding and able to have bowel movements without difficulty, one may be sure that an acceptable outcome has been achieved. Digital rectal examination should confirm good healing and normal sphincter tone (both while resting and while contracting). For additional confirmation, I have patients continue to take bulk-forming agents and stool softeners and then examine them 1 month later to verify that healing is complete.

Figure 17  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.