Foreword

This text was developed under the aegis of the American Society of Colon and Rectal Surgeons (ASCRS). It represents an attempt to cover the field of colon and rectal surgery with input from expert surgeons who have, in one way or another, shown special interest or expertise in specific areas of the specialty.

The book will hopefully serve as a source of useful information and perhaps even guidance to surgeons whose practice is confined to the specialty of colon and rectal surgery, and also to general surgeons, surgery residents, and medical students with an interest in surgery.

The finished product represents significant efforts from authors who have taken time from their busy schedules to set into writing their often unique perspectives. I know for certain that no author of any chapter in this book has a light schedule, but that fact validates each author's selection for authorship.

Special acknowledgment is due the editors, Bruce Wolff, David Beck, John Pemberton, and Steven Wexner. This project simply would not have come together without their efforts on many levels.

Finally, Jim Fleshman must be singled out for special recognition. The idea of an ASCRS-sponsored text began with Jim—an idea that he advocated, developed, nurtured, and forced until it became realized in the substance you now hold.

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Pilonidal Disease and Hidradenitis Suppurativa[*]

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Pilonidal Disease

Background and Incidence

"Pilonidal disease" refers to a subcutaneous infection occurring in the upper half of the gluteal cleft. It may

present as an acute "pilonidal abscess," or as an indolent wound, resistant to spontaneous healing, and causing drainage and discomfort. It typically presents in the second decade of life, but also occurs in teenagers and in patients in their thirties.[1] It afflicts men more often than women at a ratio of three or four to one, and is more common in individuals with more body hair.[1] It is not known to be more common in any one racial group. During World War II, soldiers filled up whole hospital wards to convalesce from the large excisional operations used at the time to treat pilonidal disease.[2] It became such a problem that the Surgeon General forbade wide local excision as primary therapy, because this treatment had hospitalized 79,000 soldiers for an average hospital stay of 55 days.[3] Akinci et al.[4] reported an 8.8% incidence of pilonidal disease in Turkish Army recruits and found associations with family history, obesity, being a vehicle driver, and having a history of a furuncle at another site on the body. Sondenaa et al.[5] studied 322 patients with pilonidal disease prospectively and calculated the incidence of the disease at 26 per 100,000 persons. It occurred 2.2 times more often in men than in women. He also found the following significant associations: family history in 38%; obesity in 37%; preceding local irritation or trauma in 34%; and a sedentary occupation in 44%. Since World War II, a paradigm shift has occurred in favor of conservative measures, mainly in the form of shaving and hygiene.

Patients typically present initially with pain, redness, and swelling in the midline gluteal cleft region overlying the sacrum and coccyx. Many patients will spontaneously drain

their abscesses, which will temporarily relieve the symptoms. This may set up a chronic cycle of drainage and recrudescence of the abscess before the patient eventually seeks medical attention. Thus, some patients may already have a chronic condition at the time of their initial presentation. Patients may also present with a history of having had many different surgical procedures performed in the past for their disease. They may have a persistent wound from a midline excision or a failed flap procedure. Those patients with long-standing disease typically have multiple sinuses that usually extend cephalad from where the midline pits lie. Uncommonly, this process can be quite destructive with large sinus cavities extending out into the lateral gluteal regions.

Pilonidal disease first appeared in the medical literature in 1833 when William Mayo published his first descriptions of this problem.[6] The term "pilonidal," which means "hair nest," however, was first used by Hodges in 1880.[7,8] The term pilonidal "cyst" is a misnomer, because no epithelialized wall exists in the cavities this disease creates. Pilonidal "sinus" or "disease" are the more accurate terms. Pilonidal disease itself, and the surgical and medical treatment related to it, can be a source of disability. This disease disables patients primarily because of pain and its inconvenient location in the gluteal cleft.

Pathogenesis

Empiric data currently support the theory that pilonidal disease is an acquired condition. Pilonidal disease has been observed in the hands of barbers and sheep shearers, implying that shed hairs may initiate the condition.[6] In addition, pilonidal lesions appear to have the pathologic characteristics of a foreign body reaction, presumably from burrowed hair and debris.[1] Pilonidal disease likely results from problems that attack epidermis in the gluteal cleft, rather than from a problem in the deep tissues, or problems with midline skin itself.[3] John Bascom believes that the skin in the natal cleft is perfectly normal, but that conditions that exist there may predispose a patient to pilonidal disease.[3,9] Treatment, therefore, should be directed at changing those conditions. Bascom sur

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mises that the natal cleft is probably a hypoxic environment, and cites as empiric evidence the fact that anaerobic bacteria can be cultured from pilonidal wounds and abscesses.[3,10] However, no experiments have directly shown that the natal cleft is hypoxic at all, or even to what degree it may be hypoxic. In addition, Bascom theorizes that vacuum forces and negative suction in the natal cleft draws hair and debris into the midline pits, which are stretched and ruptured hair follicles, resulting in obstruction.[6] These stretched

follicles, he believes, stretch and eventually rupture into the subcutaneous tissue, causing the classic pilonidal abscess.[10] The midline "pits" communicate with chronic abscesses containing trapped hair and debris via sinus tracts. If these sinus tracts become epithelialized, excision is the only option for cure. Presently, the ideas of Bascom and others about the pathogenesis of pilonidal disease are based on empiric evidence. No published experiments exist that directly prove or refute the current theories about how pilonidal disease occurs.

Initial Presentations: Pilonidal Abscess

The presenting symptoms for many patients include pain, swelling, and erythema near the top of the natal cleft, with or without spontaneous drainage. A few definitions at this point are in order. An *acute pilonidal abscess* is no different from an acute abscess in any other location on the body. It requires incision and drainage before considering any other definitive therapy. A *chronic abscess* is really an established pilonidal sinus cavity, which chronically drains and fails to heal because of retained hair and foreign material. A *recurrent abscess* is an acute abscess, which occurs after apparent complete healing of pilonidal disease in the past. Excision in a patient in the presence of acute inflammation and swelling is ill advised. Many times the midline pits will not be visible until after the inflammation subsides. Abscesses should be drained with an incision parallel to the midline and at least 1 cm lateral to it (if possible) to facilitate healing of the wound (Figure 15-1). It is prudent to remove a small ellipse of skin from the wound to prevent the skin edges from sealing and reforming the abscess. Packing of such wounds serves no good purpose, is painful, and potentially interferes with drainage and healing. Antibiotics are only necessary in the patient with significant cellulitis. Simply cover the wound with a dressing and have the patient do sitz baths or use a hand-held shower 2–3 times a day. The patient should return to the office every week or two until the wound heals. Any hair that has grown back within 2 inches of the entire gluteal cleft is shaved at each visit (Figure 15-2).

Initial Presentation: Draining Pilonidal Chronic Abscess

Pilonidal disease has been treated in many different ways, but no treatment has proved completely satisfactory. The ideal treatment would at least meet the following criteria: ease of performance; short or no hospitalization; low recurrence rate; minimal pain and wound care; fast return to normal activity; and cost effectiveness. No current treatment meets all these criteria.
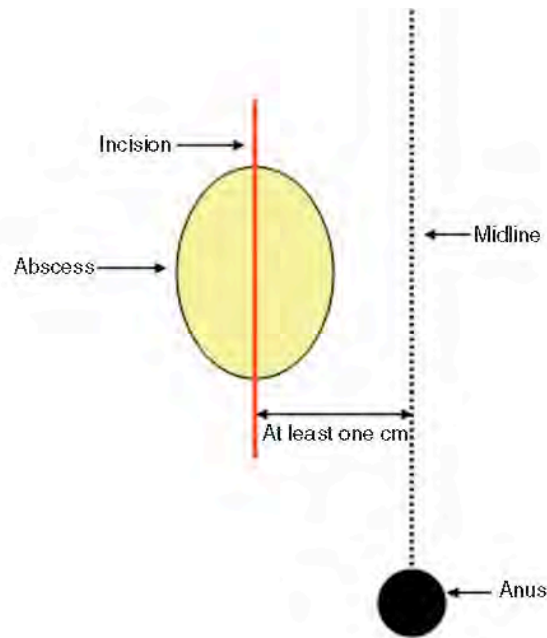
FIGURE 15-1. Incision placement for acute pilonidal abscess.

Nonsurgical Approach

Shaving

For the initial treatment of chronic disease (which can be a chronic sinus that has never been treated or any persistent disease that has failed to heal despite treatment), shaving alone has been advocated as the sole alternative treatment for pilonidal disease. In 1994, Armstrong and Barcia[9] tested the hypothesis that wide, meticulous shaving was equal or superior to surgical therapy of any kind. They performed a pilot nonrandomized cohort study, which also included a follow-up retrospective study, which remains one of the largest studies to date looking at any aspect of pilonidal disease. One group of patients was treated with weekly strip shaving (5 cm circumferentially around the entire gluteal cleft) until healing occurred and the other with surgery (midline excision with or without marsupialization, closure or partial closure, and open packing; rotational flaps; Z-plasty; and skin grafting). The article does not clarify if the patients treated with surgery received one or more of these procedures. They then followed the patients for 3 years, comparing the groups as to the number of occupied bed days and number of operations needed. They found a highly statistically significant difference in favor of the group that received only shaving. This study received criticism for several reasons. First, they did not control for the type of surgery the nonconservative group received, or for the severity of disease. They also did not look at healing or recurrence rates. One might surmise that even though the conservatively treated patients were not occupying hospital beds, they still could have been suffering for long periods from their disease. They may have also sought treatment elsewhere. Despite these limitations, this study provides evidence that conservative nonsurgical treatment, when applied with a dedicated effort, can work. Physicians should consider shaving as the initial therapy in all patients without an acute or chronic abscess and localized disease. However, no one knows how long one should continue shaving in order to prevent recurrence. Currently, we recommend shaving until complete healing has occurred. Recently, several authors have described laser hair removal as an alternative to shaving.[11–13]
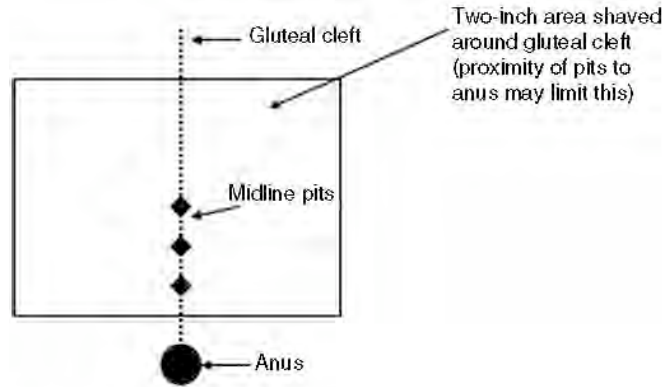
FIGURE 15-2. Shaving technique.

Surgical Approaches

Midline Excision

The most frequently performed operation for pilonidal disease is midline excision, with or without primary closure of the wound, because most chronic or recurrent disease presents while localized to the midline. In this procedure, only the clearly abnormal tissue in the midline is excised. It is not necessary to always excise down to presacral fascia. Surprisingly, the literature contains only four randomized, prospective studies comparing open excision to excision and primary closure. In 1985, Kronborg et al.[14] randomized 88 patients to one of three treatment groups: excision, leaving the wound open; excision and wound closure; and excision and closure with postoperative clindamycin coverage. This article is important because it was the first to look at the utility of using antibiotics after pilonidal excision. The authors then looked at recurrence and healing rates. They followed each patient for 3 years. Healing rates among each of the primary closure groups were not statistically significant, and there was no benefit shown from the addition of clindamycin (14 versus 11 days, $P > .10$). Healing took a substantially longer amount of time in the open group compared with the primary closure

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groups (64 versus 15 days, $P > .001$). Recurrence rates were not significant in any of the groups ($P > .40$); however, there was a tendency toward more recurrences in the primary closure group (7 versus 0 at 3 months and 7 versus 4 at 3 years).

Fuzun et al.[15] randomized 91 patients to either excision without closure or excision with primary closure. The authors then followed the patients for a minimum of 4 months. They primarily looked at infection and recurrence rates. In the two patients who experienced infection in the closed group, this was treated with simple suture removal and healing by secondary intent without the need for further hospitalization. They used no antibiotics. Patients whose wounds were left open had a lower infection rate (1.8% versus 3.6%, $P < .01$) and no instances of recurrence, whereas the recurrence rate for those undergoing wound closure was 4.4% ($P < .01$). They did not specify the duration of healing for either group. The only patients that had delayed healing were those few patients who developed a wound infection. Despite the statistically significant differences in favor of open excision, the authors concluded that either method is acceptable.

Sondenaa et al.[16] randomized 153 patients to midline excision and primary closure with or without cefoxitin prophylaxis. After following the patients for 4 weeks, they found no differences in healing or recurrence. Based on these data, the authors did not recommend cefoxitin prophylaxis. In a fol-low-up article a year later, the same authors published the results of a study that randomized 120 patients to either open excision or excision with primary closure.[17] They followed the patients for a median of 4.2 years. The authors detected no significant difference between the groups, and concluded that either method was acceptable.

Based on the results of these studies, no clear benefit exists for the use of primary closure after midline excision. Proponents of primary closure cite the accelerated healing rate in patients in whom this approach is successful. However, this comes with the price of a significantly increased chance of more wound

infections.

Unroofing and Secondary Healing

Midline excision without primary closure leaves a large wound, which is associated with long healing times. If wound closure is not indicated (i.e., with an associated abscess), a smaller wound with much shorter healing times can be achieved with unroofing or laying open of the pilonidal sinus (Figure 15-3A). Open wounds require dressing changes and wound care, but unroofing is associated with half the healing time of wide and deep excision.[18,19] The recurrence rate is less than 13% with this technique.

Bascom's Chronic Abscess Curettage and Midline Pit Excision (Bascom I)

Bascom bases this procedure on the premise that efforts to help patients with pilonidal disease should be directed at changing the gluteal cleft conditions rather than excising a
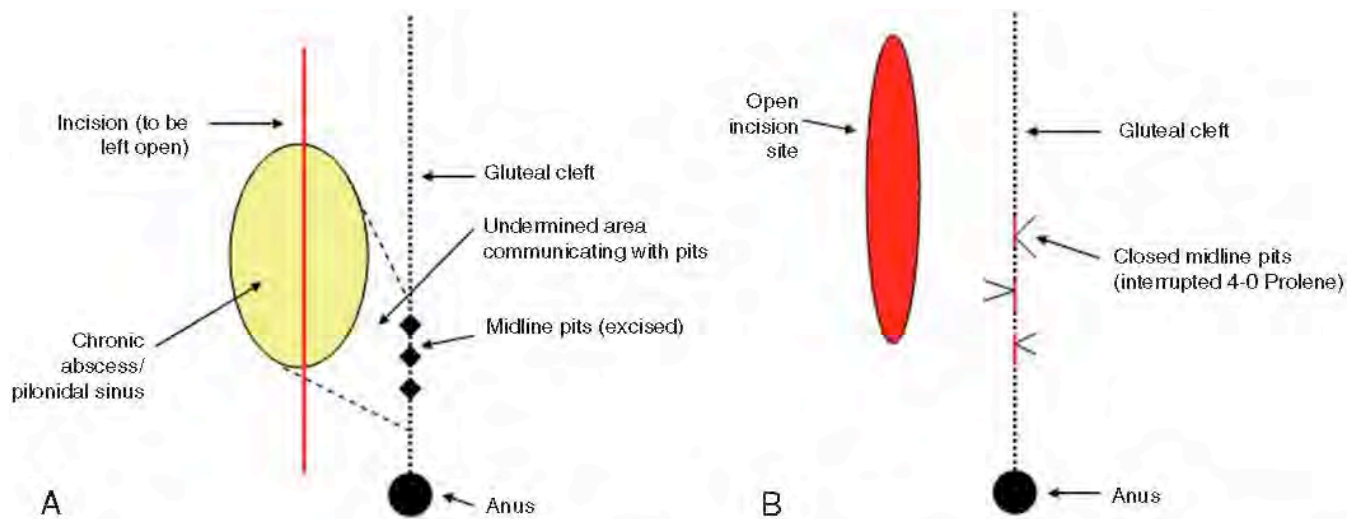15. Pilonidal Disease and Hidradenitis Suppurativa

FIGURE 15-3. A Bascom procedure. Lateral incision and debridement of cavity. B Bascom procedure. Removal of a midline pits with small incisions after lateral debridement, and closure of midline wounds without closure of the lateral incision.

large amount of normal tissue associated with the diseased areas. In patients who present initially with a chronic abscess, this procedure has given excellent results. He does this by making a generous, vertically oriented incision through the site of the abscess cavity more than 1 cm off the midline (in some cases more than one chronic abscess is present) and then curetting it out, without excising the fibrous abscess wall. The connecting tracts to the midline pits are also identified and the overlying skin undermined so that they drain to the site of the incision. The midline pits are then excised using a small diamond-shaped incision to circumferentially remove each of them.[3,10] According to Bascom,[10] the excised pit should be about the size of a grain of rice. The undermined flap of skin, between the incision and drainage site and the excised midline pits, is then tacked down, and the pit excision sites are closed with either subcuticular or vertical mattress, nonabsorbable suture (4-0 or 3-0) (Figure 15-3B). Once this has been accomplished, meticulous shaving of the gluteal cleft should continue at least once a week until the wound has healed. Shaving can be done in the physician's office, or at home by a family member or friend who has been given the proper instruction.

Senapati et al.[20] published a prospective series of 218 patients treated with Bascom's operation described above. The patients had a mean age of 27 years, and a mean duration of symptoms of 2.4 years. The mean duration of follow-up was 12.1 months (range, 1–60). Follow-up consisted of phone calls, office visits, and mailed questionnaires. All but one patient healed his or her pit excision sites. The lateral wound in one patient failed to heal and required further excision. All the other wounds healed after a mean of 4 weeks (range, 1–15 weeks). Four percent of patients experienced bleeding that required either external pressure or

cautery to stop. Eight percent of patients reformed their abscesses when the lateral skin wound healed before the underlying cavity completely healed. This required reopening the lateral wound. Ninety percent of patients healed completely with only 21 patients (10%) ultimately requiring further surgery for recurrent pilonidal disease. Given the overall good results and the fact that patients who failed to heal or recurred were not any worse off than when they initially presented, they recommended the use of this technique. To date, no trials compare Bascom's procedure with another approach to chronic abscess.

Treatment: Recurrent Disease and Severe Disease

Controversy exists over how to treat and follow patients who heal, but continue to present with multiply recurrent disease despite attempts at limited surgery and the other conservative measures discussed above. In addition to midline excision, the surgical options often used today, after initial shaving and hygiene methods have failed, include rhomboid flaps, Z-plasty (Figure 15-5), the Karydakis procedure, Bascom's cleft lift procedure, V-Y plasty, gluteus maximus myocutaneous flaps, and skin grafting (Table 15-1). Some level-one evidence exists regarding flap-based or asymmetric closures off the midline

TABLE 15-1. Complex Pilonidol Procedure Results

Procedure % Healing % Complications % Recurrence (mean) (mean) (mean)

Rhomboid flap[21,22] 100 Karydakis[24] — Bascom cleft lift[3] 100 V-Y plasty[25] 100 Z-plasty[26] 100 Myocutaneous flap[28?] 100 Skin graft[29] 96.6
13.5   4.9 8.5 1 —0 80 —0 100 0 — 1.7

for pilonidal disease, but most data come from patient series reports. The major disadvantages with flaps are longer operative times, greater blood loss, potential flap loss, and infection. However, these flaps do offer a quicker time to healing than midline excision, with no increase in infection rate.

Rhomboid Flap

The rhomboid, or Limberg flap, is a cutaneous rotational flap used to fill soft tissue defects and is ideally suited for this purpose with regard to pilonidal disease (Figure 15-4A–D). One large recent prospective series used the rhomboid flap on 102 patients regardless of the severity of their disease.[21] All of the patients healed eventually, but they did not specify a time frame. They reported a 6% complication rate consisting of three seromas, two partial wound dehiscences, and one wound infection. The recurrence rate was 4.9%. The authors also used the rhomboid flap to treat recurrences. Patients returned to normal activity by 7 days, on average. Although this study is not level-one evidence, it does show us that the majority of patients treated with this method generally do
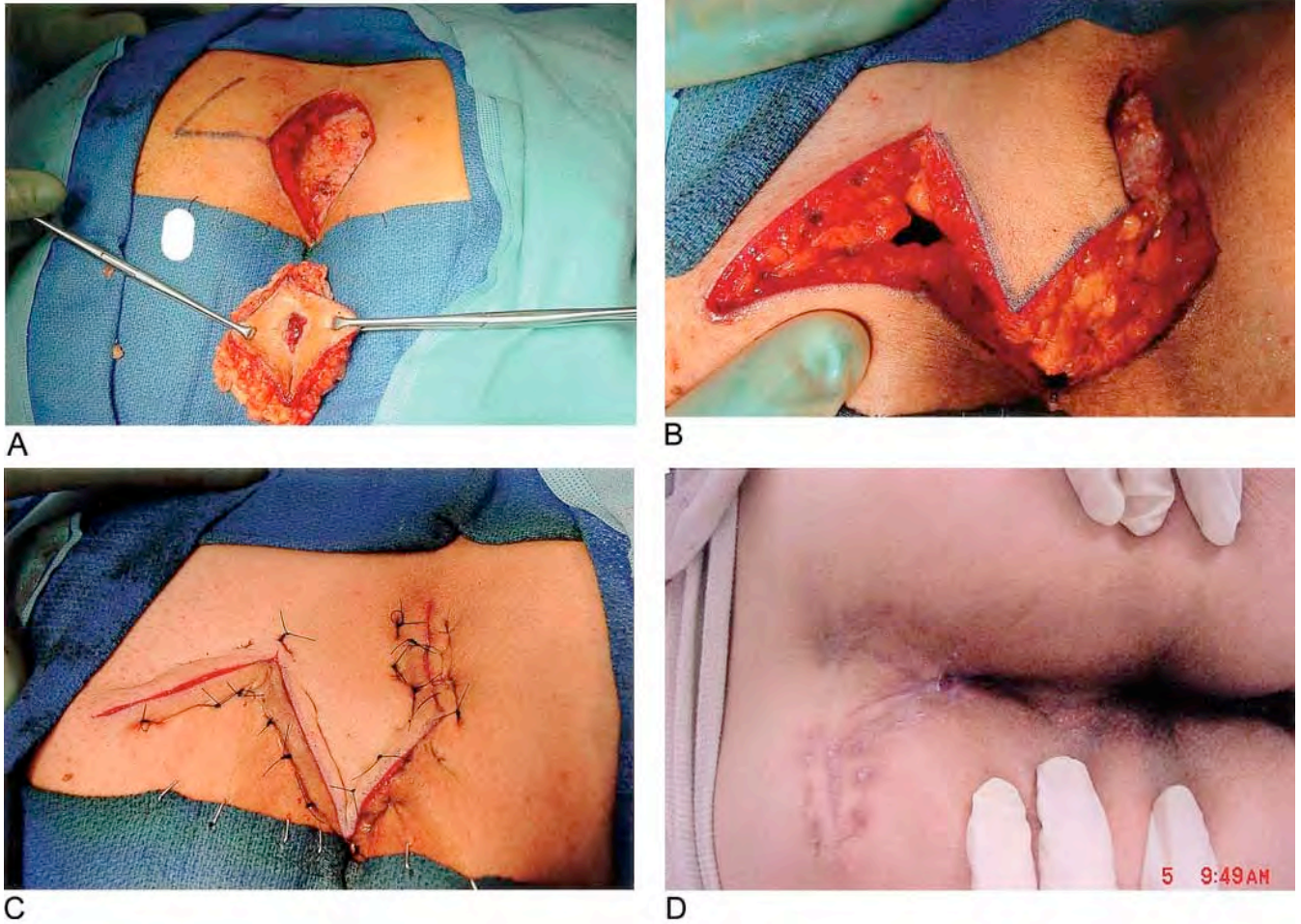
FIGURE 15-4. Rhomboid flap technique for recurrent pilonidal disease. **A** Initial excision of the sinus cavity. Counter incisions are created as shown. **B** Flaps are raised and maneuvered as shown to close defect. **C** Final surgical result. **D** Result at 1 month postoperatively.

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well in the short term. Abu Galala et al.[22] randomized 46 patients with chronic sinuses to either the rhomboid flap, or to midline excision with primary closure, and followed them for healing and recurrence. Patients with acute abscesses or recurrent sinuses were excluded. All of the rhomboid flap patients healed versus only 77% healing in the midline closure group ($P > .02$). After 18 months of follow-up, 9% of the midline suture group had recurred. No one in the rhomboid flap group recurred. Another randomized, prospective trial regarding the rhomboid flap method evaluated the use of drains after surgery. Erdem et al.[23] randomized 40 patients and used a drain in half of them. The study found no difference in wound healing or recurrence ($P > .05$). The drain group, however, had a longer hospital stay ($P < .001$).

Despite the overall good results with use of the rhomboid flap for recalcitrant pilonidal disease, this technique necessitates excision of a large amount of normal tissue and subsequently creates a large scar at the flap site (Figure 15-4D). Also, many patients with chronic abscesses have their abscesses located so lateral and cephalad to the midline area containing the pits, that it makes the use of this technique

B

D
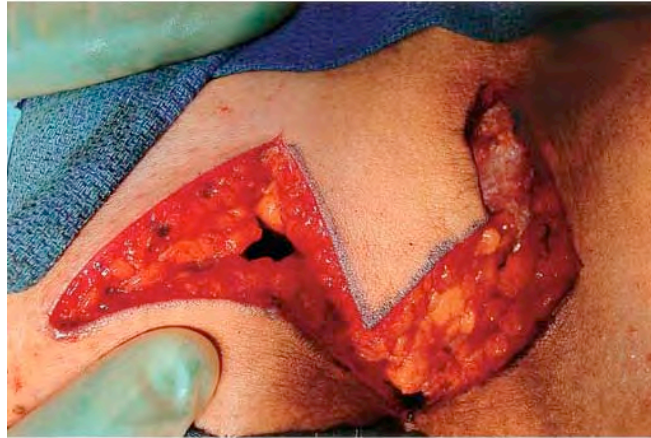
more morbid because of the size of the flap required to cover the excised area. With disease localized more or less to the midline, however, any abscess cavities and all the pits are easily excised. In addition, this technique works particularly well for flap coverage of chronic wounds (as a result of midline excisions) in the gluteal cleft that have failed to heal over a prolonged period of time.

Karydakis Flap

The Karydakis operation has been used by Dr. Karydakis in Athens, Greece since 1965. The two goals of this procedure are: 1) to eccentrically excise "vulnerable" tissue in the midline, or laterally displace it; and 2) to laterally displace the surgical wound out of the midline gluteal cleft. An elliptical incision is made parallel to the midline at a distance at least 1 cm from the midline. Skin and gluteal fat are then excised down to the sacral fascia eccentrically (Figure 15-5). By necessity, some normal tissue needs to be excised to create a flap. This flap is then sutured down to the sacral fascia. The closed incision should be entirely lateral to the cleft.

In 1992 Karydakis reported the results of this approach in 7471 patients over a period of 24 years from 1966 to 1990, which is one of the largest series in the surgical literature.[24] Follow-up ranged from 2 to 20 years, and was possible in 95% of cases. He reported a recurrence rate of 1% in the first 6545 cases, finding that new disease occurred from new midline pits. The overall complication rate was 8.5%, mainly from infections and fluid collections. Antibiotics were not routinely used, but a drain was always placed at the upper end of the wound for 2–3 days.

The large numbers of patients that have received this operation along with the good reported results

make this an attractive option to consider. However, no one else has ever studied this or reported their results, nor are there any comparative trials.
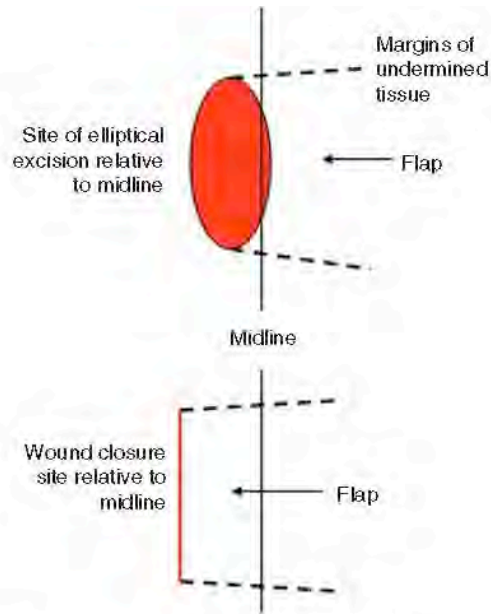

FIGURE 15-5. Karydakis advancing flap operation.

Bascom Cleft Lift (Bascom II)

Bascom developed this procedure, which may be the most technically challenging of all the techniques dealing with multiply recurrent and severe pilonidal disease. It also may prove to be the most revolutionary technique to come along since the Karydakis procedure. The key difference between the cleft lift procedure and other flap-based procedures is that the cleft lift procedure excises no normal subcutaneous tissue. As described above, the Karydakis procedure does excise normal fat to create the flap. The only tissue excised during the cleft lift is a portion of skin. The goal of the cleft lift procedure is to undermine and completely obliterate the gluteal cleft in the diseased area. This procedure detaches the skin of the gluteal cleft from the underlying subcutaneous tissue as a flap. A portion of this flap containing the diseased skin is then excised from the side of the buttocks to which the flap will be sutured (Figure 15-6A). When the flap is pulled across the midline, the gluteal subcutaneous tissue is approximated underneath the flap, thus obliterating the gluteal cleft. Any open chronic wounds or sinus cavities are simply curetted out, but not excised. The raised skin flaps cover these prior wound sites in addition to coapting the normal gluteal fat. The final suture line lies parallel to, but well away from, the midline, and is free from tension (Figure 15-6B). Bascom[3] studied 28 consecutive patients with recurrent, festering wounds who received this treatment. Twenty-two patients healed their wounds immediately and had their sutures removed at 1 week. Six patients took longer to heal because of small wound separations. Three patients required operative revision to achieve healing. Finally, one obese patient took 13 months to heal. The median follow-up was 20 months (range, 1 month to 15 years) and all patients remained healed. This procedure has enjoyed spectacular results in Dr. Bascom's hands, but it awaits duplication elsewhere.
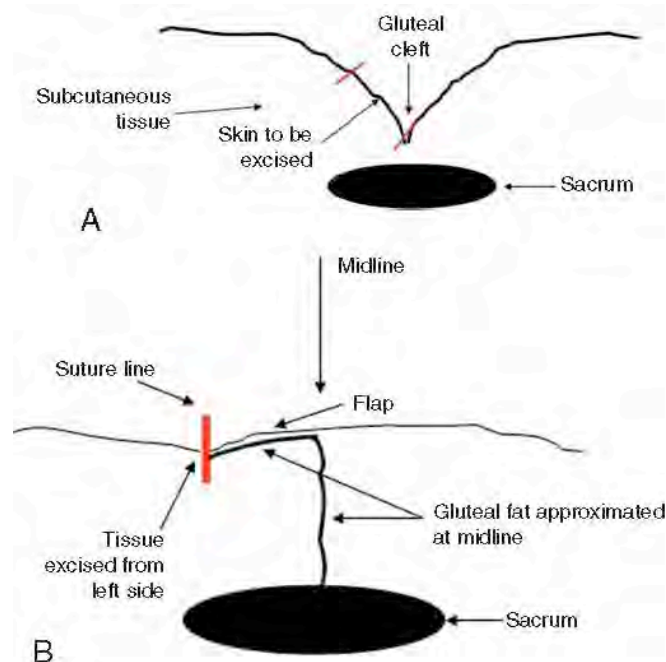
FIGURE 15-6. **A** Cleft-lift technique as described by Bascom for non-healing midline wounds. **B** Final result after flaps are raised and underlying gluteal fat is approximated.

V-Y Plasty

Schoeller et al.[25] retrospectively investigated the use of the V-Y advancement flap in 24 patients with a mean follow-up of 4.5 years. They reported two wound dehiscences, but achieved healing in all cases. They noted no recurrences. Overall, they found the method to be satisfactory, but demanding, and recommended a simpler approach. However, it may have applicability in some situations in which other flaps have failed, such as the rhomboid flap.

Z-plasty

Hodgson and Greenstein[26] published the only other randomized, prospective study on flap closure for pilonidal disease in 1981. This study looked at Z-plasty versus midline excision with or without marsupialization. The Z-plasty group required no further surgery, but 40% of the open excision group did go on to have repeat operations. This study gives us the best available evidence that even open excision, although not prone to wound breakdown, does not completely rectify a patient's wound issues, at least in the short term.

Petersen et al.[27] reviewed these asymmetric closure techniques, which utilize cutaneous flaps, examining the results of 74 articles published in the last 35 years. Wound infections occurred in up to 38.5% of all patients undergoing any surgery for pilonidal disease. However, they found no consistent trend that all flap procedures had significantly lower infection rates than midline excision. Similarly, wound failure occurred in up to 52.4% of all patients. No individual technique showed consistently better results in this regard, compared with all flap procedures as a group. Pilonidal recurrence proved to be the only area in which the flap techniques showed a consistent advantage. Recurrence occurred in up to 26.8% of all the patients. The midline pits recurred less often in the asymmetric closure/flap group compared with midline excision. Overall, they concluded that asymmetric closures and flap techniques were superior to midline excision despite the limitations of the study. Also, they recommended that an asymmetric closure, such as the Karydakis, be considered initially before using the rotational flap procedures, because these may be unnecessarily complex.[27]

Myocutaneous Flaps

Larger areas of disease with large, deep wounds may require myocutaneous flaps. Rosen and Davidson[28] treated five patients with severe disease with gluteus myocutaneous flaps.

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They were all young males and had received an average of six previous procedures. All patients healed with an average fol-low-up of 40 months and 13 hospital days. Most surgeons reserve this technique for the most severe cases, usually after failure of simpler techniques.

Skin Grafting

No study looking at skin grafting for pilonidal disease has been published since 1983 when Guyuron et al.[29] published their retrospective study of 58 patients so treated. Seventy-two percent of these patients initially presented to the authors' institution with recurrent disease. The patients all underwent excision of their pilonidal disease with split-thickness skin grafting. They noted a 1.7% recurrence rate and a 3.4% graft failure rate. The authors recommended use of this method for recurrent or extensive pilonidal disease.

Summary

The algorithm in Figure 15-7 delineates an approach to pilonidal disease based on the evidence presented in this section. Conservative treatment ought to form the cornerstone of therapy—specifically, wide, meticulous shaving and hygiene. The best evidence available suggests that shaving should be done until healing is complete, either in patients treated primarily this way, or those treated with surgery. When patients present initially with simple midline pits, sinuses, and various symptoms, such as pain and occasional drainage, but no acute abscess, shaving can again be offered as the initial treatment. A patient who presents with an acute pilonidal abscess should have incision and drainage, ideally making the incision lateral to the midline whenever possible. At the same time, one should do a 2-inch strip shave circumferentially around the affected area. Anyone familiar with the procedure (doctor, medical assistant, significant other, etc.) repeats the shaving
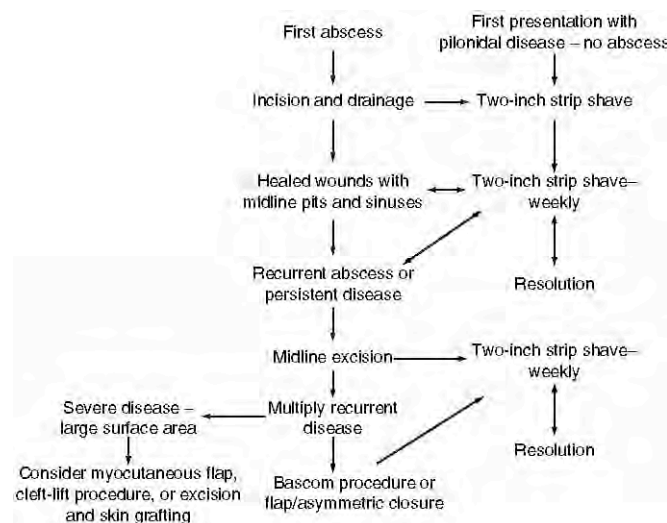

FIGURE 15-7. Pilonidal disease algorithm.

weekly. Continue dressing changes and sitz baths without packing until the wound has healed. If this is the

initial presentation of the patient's pilonidal disease, then simply continue shaving. This shaving must be meticulous and ritualistic to be successful. One single hair protruding from a midline pit will keep it open. The majority of patients do not recur after conservative treatment consisting of incision and drainage and shaving. For these reasons, we do not recommend continued shaving once healing is complete.

Patients who present with multiply recurrent pilonidal disease, meaning disease occurring sometime after healing of prior episodes (i.e., abscesses, new pits) are more challenging. The usual case is the patient with a chronic abscess that persists despite shaving and other conservative measures. Continued shaving in this situation is unlikely to succeed, because the abscess cavity and the epithelialized tracts connecting it to the midline pits will contain a great deal of burrowed hair. In this case, we prefer to move on to the Bascom chronic abscess curettage and midline pit excision, or a cutaneous flap procedure. For the initial management of the chronic abscess, virtually all cases can be done as an outpatient in the operating room under local anesthesia with conscious sedation. Sungurtekin et al.[30] found no benefit to the use of spinal anesthesia over local anesthesia in the outpatient surgical treatment of pilonidal disease. They randomized 60 patients receiving the rhomboid flap operation to either spinal anesthesia or local anesthesia. The local group also received intravenous midazolam for sedation. They found no differences regarding patient satisfaction, side effects, or pain scores. However, two spinal patients suffered urinary retention. In addition, both the amount of time spent recovering before discharge, and the total cost of the spinal anesthetic patients' care were significantly higher ($P < .05$).

Neither antibiotics nor drains have been shown to be helpful on a routine basis. However, when taking on complex flap procedures or skin grafts, antibiotics may be used perioperatively based on evidence from other arenas of surgery proving their benefit. The evidence presented here also shows that more complications and recurrences occur with midline excision and primary closure than with open excision alone. However, time to healing is greater with open excision. Despite the good results reported with the flaps and asymmetric closures for pilonidal disease, midline excision or unroofing does seem to work most of the time, and has the advantage of simplicity. Cutaneous rotational flaps and asymmetric closures may best be reserved for the patient with a laterally located chronic abscess, multiply recurrent disease, a large area of involvement, or a nonhealing wound.

In response to the question, "Which procedure should be tried first for the new pilonidal patient?" the answer is, "It depends." If the patient presents with a draining sinus, alternately known as a chronic abscess, the surgeon first needs to note the location of the sinus relative to the midline. In the case in which all the disease, sinuses, and pits are located near and in the midline, then a conservative midline excision is a reasonable first-line treatment. A Bascom procedure for a chronic abscess/sinus is also reasonable. Many times, however, multiple draining sinuses exist and can be located far enough away from the midline that a simple midline excision becomes impractical because of the larger wound created. In this case, we typically make a choice between a Bascom I and a rhomboid flap. For patients who have failed midline excisions, a rhomboid flap or a Bascom I are our procedures of choice for the patient whose disease is easily encompassed within the rhomboid excision specimen. If this is not the case, then another Bascom I is again a good option for this type of presentation, primarily because it is nonexcisional in nature (except for the midline pits). As always, shaving should continue with the proper vigilance until healing is complete. For a small, chronic nonhealing wound from a prior operation for pilonidal disease, a rotational flap is ideal. We prefer the rhomboid flap for this purpose. For extensive recurrence in the midline with abscesses and multiple non-healing wounds, the Bascom II procedure has shown great promise.

Hidradenitis Suppurativa

Background

Hidradenitis suppurativa is a cutaneous condition that involves skin containing apocrine sweat glands. Areas of the body where this often occurs include the perineum, the axilla, and the groin. It presents initially as an abscess, but is typically multiply recurrent in the affected area and ultimately can lead to severe scarring and disability for the patient. This section will focus on disease that presents perianally.

Velpeau first described this entity in 1839 as an inflammatory process causing superficial skin abscesses affecting the axillary, mammary, and perineal regions. It was not until 1854, however, that Verneuil ascribed this process specifically to sweat glands. Verneuil also named the disease "hidradenitis suppurativa," although it has also been called Verneuil's disease, as well as "the follicular occlusion triad," "acne inverse," and "acne vulgaris." Schieffendecker classified sweat glands as eccrine or apocrine in 1922. He then localized hidradenitis suppurativa to the apocrine glands of the perineal, mammary, axillary, inguinal, and umbilical areas.[31] Finally, Lane in 1933 and Brunsting in 1939, defined the histology of this disorder and implicated luminal obstruction of the apocrine sweat glands as the inciting event.[32,33]

Incidence and Etiology

The exact incidence of hidradenitis suppurativa in general is unknown. However, one in every 300 individuals may be affected in some way.[32] African-Americans seem to be affected more often than Caucasians, and perianal disease seems to be more common in males.[31,32] Almost all patients present after puberty and before the age of 40, implicating

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hormones and the development of secondary sexual characteristics as causative.[32] Other endocrine associations include diabetes mellitus, hypercholesterolemia, and Cushing's disease. It can theoretically occur in any skin that contains apocrine glands, but the most common locations are axillary and inguinal-perineal. Obesity has been implicated as a predisposing factor presumably from shearing forces in the affected areas.[32] In a series from the Lahey clinic, 70% of affected patients were smokers, but no causal relationship could be shown.[32] Perianal hidradenitis affects males twice as often as females, but hidradenitis in all locations may be more common in females and African-American persons.[32] Fortunately for sufferers of perianal hidradenitis, it seems to recur less often after surgical treatment (<0.5%) than does inguinal-perineal disease (37%–74%).[31,33]

Bacteriology

Wound cultures from hidradenitis patients have grown *Staphylococcus epidermidis*, *Escherichia coli*, *Klebsiella*, *Proteus*, alpha *Streptococcus*, anaerobic bacteria, and diptheroids, although negative cultures are common. Lapins et al.[34] showed that *S. epidermidis* was the most frequently cultured bacteria from deep portions of hidradenitis suppurativa lesions in 25 patients. *Chlamydia trachomatis*, often associated with lymphogranuloma venereum, and *Bilophila wadsworthia* infection have also been implicated, but the clinical significance is not known.[31,32]

Pathogenesis

Most authors agree that hidradenitis suppurativa originates from obstruction of apocrine sweat glands by keratin. However, it is unknown why this occurs in some people and not in others (females, African-Americans, etc). Attanoos et al.[35] examined 118 pathologic hidradenitis specimens and found some degree of keratin plugging in all cases along with an active deep folliculitis. They concluded that plugging of the hair follicle itself led to apocrine inflammation making the actual apocrine gland destruction of hidradenitis suppurativa a secondary process. These glands secrete a milky, odorless fluid that only becomes malodorous after it interacts with bacteria on the skin. The apocrine glands secrete into the hair follicle as opposed to directly onto the skin like eccrine sweat glands. The function of apocrine secretion is unknown. Nevertheless, obstruction leads to secondary bacterial infection and rupture of the gland into the dermis and subcutaneous tissue, thus causing cellulitis, abscess, and draining sinuses. This process then leads to the characteristic "pit-like" scars from chronic fibrosis of the destroyed glandular unit. With time, this disease can become not only disfiguring, but debilitating. Microscopically, the pathognomonic serpentine epithelialized sinus tracks with giant cells and granulomas are typically seen.[31,32,36,37]

Differential Diagnosis

Differentiating hidradenitis suppurativa from other inflammatory conditions of the perianal region can be

difficult, and many of them may coexist. Cutaneous infections such as furuncles, carbuncles, lymphogranuloma venereum, erysipelas, epidermoid or dermoid cysts, and tuberculosis can be particularly troublesome. In particular, it must be distinguished from other fistulizing or sinus-forming processes of the perineum. Crohn's disease typically affects the anus and rectum with fistulas arising from the dentate line or higher in the rectum. Ordinary perianal abscesses and fistulas of cryptoglandular origin will arise from the dentate line and traverse the sphincter mechanism. In contrast, hidradenitis does not affect the rectum, because apocrine glands only exist in the lower two-thirds of the anal canal and do not penetrate into the sphincter complex. Thus, patients will not have sinus or fistula tracks to or from the rectum.[31,32] If fistulas are present, then the surgeon should perform anoscopy to rule out the possibility of fistula-in-ano from a cryptoglandular source. Fistulas from hidradenitis should only connect areas of involved skin, and not penetrate the anal sphincters. If they do, then another, or concomitant, diagnosis should be entertained. Several case reports have been published describing the association of Crohn's disease and hidradenitis, but no definitive link between the two conditions has ever been proven.[38–42] Nonspecific granulomas (required for a pathologic diagnosis of Crohn's disease) are seen in pathologic specimens in both diseases and may be confused with one another.

Several cases of squamous cell carcinoma in chronic hidradenitis wounds have also been published.[43–46] A retrospective review of a Swedish database of hospital discharge diagnoses from 1965 to 1997 revealed a 50% increased risk of developing *any* cancer in patients with hidradenitis suppurativa over the general population. Specifically, the authors observed significant increases for nonmelanoma skin cancers, buccal cancer, and primary liver cancer.[47] The association seems to be rare with affected patients, who usually have had untreated disease for longer than 20 years. One report found a 3.2% incidence in 125 patients with perianal hidradenitis lasting 20–30 years.[46] One should at least keep a high index of suspicion for this entity in patients with long-standing disease and extensive scarring in the affected areas.

Treatment: Initial

Hidradenitis suppurativa typically presents with pain, erythema, and swelling in the affected area. Patients with cellulitis and no definable clinical abscess may be successfully treated with antibiotics that cover skin flora, such as staphylococcus species, over 1–2 weeks. The safest course of action with any patient who presents with an obvious abscess is incision and drainage. No evidence exists supporting the use of prophylactic antibiotics beyond the initial treatment course. Jemec and Wendelboe[48] conducted the only double-blinded

randomized, prospective study looking at antibiotic use for hidradenitis suppurativa (or any other aspect of this disease). They evaluated 46 patients with mild hidradenitis (not more than 10 lesions; no extensive sinus tracts) after 3 months of therapy with either systemic tetracycline or topical clindamycin. The patients also received a placebo of the other agent. Patients selected for the study did not undergo incision and drainage. The authors found no benefit of topical clindamycin versus systemic tetracycline for treatment of acute disease. The study did not include a control arm, which received no antibiotics, so we cannot conclude that these topical antibiotics provide no benefit or some benefit versus no topical antibiotic treatment at all.

Sadly, 83% of patients will have recurrent localized sepsis of some sort after initial incision and drainage or limited excision. Our preference is to leave the wounds open to heal by secondary intent, after excising the involved area. Pathologic examination may show apocrine involvement providing histologic confirmation of hidradenitis.[31]

Treatment: Chronic

Chronic disease is simply any hidradenitis disease persisting or recurring after initial treatment. This could present as recurrent abscesses, nodules, sinuses, fistulas, cellulitis, or any combination of these problems. Unroofing of all sinus tracts is a simple method that may control the hidradenitis, but disease remains, by definition, and recurrence is highly likely for this reason. More specifically, unroofing of abscesses does

not control the underlying problem in patients who get hidradenitis. It is a problem with the apocrine glands located in susceptible perianal skin. Unless the surgeon excises all this skin, the patient will technically be at risk for recurrence, although not every patient eventually goes on to radical excision.

Excision with healing by secondary intention is probably the most widely used surgical treatment. The literature reports various recurrence rates after removal of a portion, or all, of the apocrine gland bearing skin. Only the grossly involved apocrine bearing skin (but all of it) in the perianal area should be excised full thickness into the uninvolved gluteal fat. No evidence exists supporting any need for a wide excisional margin, however. This method is simple and almost never requires fecal diversion. It also allows completion of the procedure as an outpatient. Perioperative antibiotics are unnecessary. Patients with large areas of involvement may undergo staged excision. The extent of excision should remain outside the anal verge as long as there is no obvious involvement or history of involvement in the anal canal. If excision is necessary near the anal canal, because of extensive involvement at the anal verge, it should be limited, or staged, in order to prevent a stricture. The major disadvantage of this method is that the wounds take 1 month or much longer to heal, and they require daily wound care. The disability associated with this treatment, however, is minimal. With either of the methods mentioned above, the patient should do sitz baths, or use a handheld shower, at least twice daily along with dressing changes.

Recently, reports on the use of negative pressure dressings have appeared as a way to promote healing and shorten the time to wound closure.[49] The purported benefits of these dressings, which have never been validated, include increased wound oxygen tension, decreased bacterial counts, better control of fluid produced by the wound, increased granulation tissue formation, and decreased shear forces. Negative pressure dressings have been used successfully on open wounds and on skin grafts.[49,50] However, the expense and mechanical difficulties inherent with all dressings placed in the perianal area are rarely justified. These dressings require an air-tight seal at all times, which is difficult to achieve near the anal verge.

Patients with chronic disease, extensive scarring, and sinus tracts rarely respond to conservative measures. The gold standard of care remains wide excision of all skin bearing involved apocrine glands. Reconstruction then can follow a number of paths—unroofing of sinus tracts with or without marsupialization, cutaneous flap closure, myocutaneous flap closure, or excision and simple healing by secondary intent. Cutaneous or myocutaneous flaps are typically taken from the posterior thigh, gluteus muscle, or lumbosacral region. They are analogous to those used for pilonidal disease. Flaps are almost never necessary, however. Which of these options to choose, however, depends on the extent of involvement around the anus and the severity of disease. Patients who might benefit from diversion are those who cannot take care of their wounds long term and those who have both hidradenitis and Crohn's disease, although this is rarely needed.[32,51]

Summary

The algorithm in Figure 15-8 depicts our suggested approach to treating patients with perianal hidradenitis suppurativa. Patients who present initially with an acute abscess, and a history and examination consistent with hidradenitis, should have incision and drainage, ideally in an office setting.[52] Physicians should reserve antibiotics for those patients with a component of cellulitis as discussed above, or those who are immunocompromised. This process can be repeated as many times as is necessary. It is important to rule out other causes of perianal sepsis in the early stages of the disease, such as Crohn's disease or perirectal abscesses from a cryptoglandular source. For those patients with chronic and/or recurring disease, we proceed to definitive excision, as long as the diagnosis is not in doubt and we have exhausted the simpler alternatives. Flap procedures are reserved for patients with extensive scarring and tissue damage out onto skin distant from the anus, such as the buttocks. By the time a patient reaches the point at which they desire surgery, they have usually suffered for many years with recurrent abscesses in the affected area.
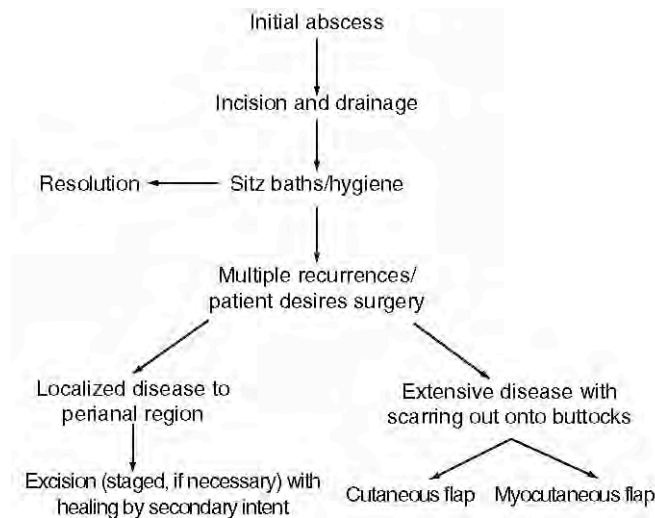
FIGURE 15-8. Perianal hidradenitis suppurativa algorithm.

Even relatively large open wounds around the anus heal remarkably well in the absence of Crohn's disease and other inflammatory, malignant, or infectious processes, compared with how similar wounds typically heal in other areas of the body. Because of this, it is usually not necessary to use flaps after skin excisions for hidradenitis around the anus, especially when using a staged approach. If circumferential disease is present and requires excision, we excise half of the involved perianal skin down to subcutaneous fat and allow the wound to heal by secondary intent, which may take up to 3 months. We excise the other half after complete healing of the first wound. If circumferential excision of perianal skin is considered in a single procedure, we take care not to excise the skin at or inside the anal verge. This diminishes the risk of anal stricture. For patients whose disease does not extend out more than 5 or 6 cm from the anal verge, this approach works very well. We consider a flap-based procedure for those patients with much wider involvement extending out onto the buttocks. Negative pressure dressings are only rarely of potential help.

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