Evaluation and Management of Pilonidal Disease

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ETIOLOGY AND DIAGNOSIS

The history of pilonidal disease dates back to the early 1800s, and it continues to be a significant health issue today. Herbert Mayo was the first to describe a disease that involved a hair-filled cyst at the base of the coccyx in 1833.[1] In 1880, Hodge coined the name "pilonidal" from the Latin *pilus* that means hair and *nidus* that means nest.[2] During World War II, over 80,000 soldiers in the United States Army were hospitalized with the condition. It was termed "Jeep riders' disease" because a large number of soldiers who were being hospitalized for pilonidal disease rode in jeeps and long journeys on rough terrain were felt to cause the condition because of pressure on and irritation of the coccyx.[3]

Currently, pilonidal disease is a fairly common condition that affects many patients worldwide. In the United States alone, nearly 70,000 patients are diagnosed with this potentially morbid condition each year.[4] The disease itself and many of its treatments often result in time lost from work or school, and it burdens patients and caregivers with wound care and frequent trips to the office or hospital.

Initially thought to be congenital in origin,[2] pilonidal disease is now thought to be an acquired condition related to the presence of hair in the natal cleft.[5] This loose hair causes a foreign body reaction that leads to midline pit formation (**Fig. 1**).[6,7] Pilonidal disease can present as a simple cyst, an acute abscess with or without cellulitis, or a chronic draining sinus. Treatment, therefore, is also highly variable and can include observation and hair removal, incision and drainage, or excision with sometimes complex surgical reconstruction.

Diagnosis begins with a focused history and physical examination to include symptoms, risk factors, and presence of active infection. Patients may present with complaints of a tender, fluctuant sacrococcygeal mass in the case of secondary infection or may report midline drainage and discomfort in the case of a chronic sinus. On

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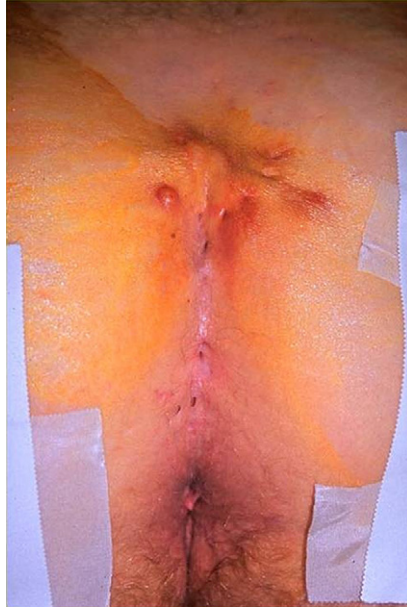*E-mail address:* James.Duncan@med.navy.mil (J.E. Duncan).

Fig. 1. Typical midline pits and underlying sinus tracts.

examination, the patient will almost always have the characteristic midline gluteal cleft pits located approximately 5 cm cephalad to the anus. Additionally, they may have a tracking sinus or multiple sinuses. Anorectal examination should be performed to rule out other disease processes. The differential for pilonidal disease is wide and includes perianal abscess, hidradenitis, skin furuncle, Crohn disease, and syphilitic, tubercular, and actinomycotic infection.[7,8] Risk factors for the development of pilonidal disease, although not found to be directly causative, should be considered: obesity, sedentary lifestyle, family history, hirsute body habitus, and trauma or irritation to the gluteal cleft skin. Lifestyle changes can be implemented if risk factors are identified.[4,9]

MANAGEMENT OPTIONS: PRIMARY PILONIDAL DISEASE
Nonoperative Management and Adjuncts to Operative Strategy

Because the cause of pilonidal sinus disease is widely attributed to hair follicle ingrowth and subsequent foreign body reaction, local hair control, whether by shaving or laser epilation, has been used as a primary treatment and as an adjunctive strategy.[5,6,8,10–14] Compared with various surgical techniques, shaving and improved hygiene have been demonstrated to decrease total hospital admission days and surgical procedures and has resulted in faster return to work or school.[15] The frequency and extent of shaving, however, has not been clarified, and, depending on rate of hair growth and hair volume, can affect the quality of life of the patient and caregiver. Laser epilation, therefore, has been examined on a smaller scale as an alternative to shaving in the treatment and adjunctive roles. The results of these studies are encouraging for recurrence prevention.[12–14]

Phenol or fibrin glue injection into the pilonidal sinus is an additional nonoperative adjunct to treatment. Both methods are typically used after all hair and debris have been removed or curetted from the sinus, and they help to eliminate granulation tissue

and further debris formation. The injection is followed by hair control and strict hygiene. The use of phenol (1–2 mL of 80% phenol solution) causes an intense inflammatory reaction which destroys the epithelial lining, and care should be taken to protect surrounding skin. Pain is intense and may require inpatient admission for pain control but success rates have been reported to range from 60% to 95%.[16–18] Fibrin glue has been used similarly as an adjunctive treatment in chronic or recurrent sinuses and following various interventions. Success rates are high (90%–100% in small series) and morbidity is low.[19,20]

Cleansing and curettage of the midline pilonidal pits is an alternative treatment to excision, although primarily of historical value. Described in 1965 by Lord and Millar, this therapy involves brushing the sinus with a thin bottle brush to cleanse the sinus of hair and debris. This treatment is labor intensive and must be accompanied by continued strict hair removal and hygiene.[21]

Antibiotic use in pilonidal disease has a limited role. The most common organisms isolated in chronic pilonidal sinus are aerobes, whereas anaerobes such as bacteroides predominate in associated abscesses. Antibiotic therapy has been evaluated in the perioperative prophylactic, postoperative treatment, and topical roles. Preoperative, single-dose, intravenous antibiotic before excision of a chronic sinus has not been shown to decrease wound complications, healing, or recurrence, whereas varying courses of postoperative therapy have remained controversial. Overall, the use of antibiotics in this role has shown no benefit in reducing wound infection rates.[22–26] Topical therapy evaluated in the setting of pilonidal disease primarily involves antibiotic or abrasive solution-soaked sponge or dressing being packed into an abscess cavity or excised sinus. As with most outcomes of antibiotic use in this disease process, there is no conclusive evidence to support this practice because there has been no demonstrable benefit.[27,28] There has been no strong data to support antibiotic use in acute or chronic pilonidal disease, although expert opinion has suggested a role in the setting of cellulitis, underlying immunosuppression, or concurrent systemic illness.[6–8,10,29]

Asymptomatic, incidentally discovered pilonidal sinus is a rare presentation of this disease. A retrospective study, performed by Doll and colleagues,[30] evaluated the presence of hair and inflammation within asymptomatic pilonidal sinuses and found the presence of both in most cases. The conclusion of this study was that asymptomatic pilonidal sinus is actually subclinically inflamed and that hair and chronic inflammation are often present. However, prophylactic surgery in this small patient population did not demonstrate benefit over surgical intervention for symptomatic disease. Therefore, nonoperative strategies, such as hygiene, hair control, and observation, are recommended in this group.

Operative Management

There are many options for the surgical management of chronic pilonidal disease. These options range widely and encompass simple excision with or without primary closure to complex flap reconstruction. Most advocate adjunctive hair removal and strict hygiene, and no single operative intervention has been proven superior to another in overall healing, time away from work, or recurrence.

Pilonidal disease can present acutely as an abscess with or without associated cellulitis. In the acute setting, the appropriate therapy is simple incision and drainage. The majority (approximately 60%) of those presenting with abscess at initial episode and treated in this way will heal without further intervention.[31] The remainder of patients will need a more definitive excision to address hypertrophic granulation tissue before closure. Even after complete healing, 10% to 15% of patients will have

recurrence.[31] Curettage of the cavity at time of incision and drainage is controversial, and only one study has demonstrated greater complete healing (96% vs 79%) and lower incidence of recurrence (10% vs 54%) as compared with no curettage.[32] Another issue at acute presentation is whether to excise the midline pits at time of incision and drainage, the theoretical benefit being the elimination of future disease. This practice, however, has not been shown to increase rate of healing, decrease hospital stay, or decrease rate of recurrence.[33]

Pilonidal sinus excision with or without primary closure can be performed in many different ways. Complete sinus excision, which involves removal of the pilonidal sinus while sparing normal tissue, can be approached through a midline or lateral incision. For sinus removal through a midline approach, the wound can be primarily closed, marsupialized, or left open and allowed to heal by secondary intention (**Fig. 2**). Several studies have demonstrated faster median healing rates[22,34–38] and more rapid return to work with primary closure,[35,36] but they have also shown higher recurrence rates with this intervention as compared with healing by secondary intention.[39–41] Marsupialization entails suturing the skin edges to the wound base after debridement and acts to decrease the overall wound volume and prevent premature epithelialization. Should this repair break down, the wound can continue to heal by secondary intention without requiring further procedures. Comparison of primary closure versus marsupialization in healing time and recurrence remains conflicted.[7,10,41–43]

Incision from the midline, or lateral incision, is another alternative to sinus excision. Theoretical advantages include a richer blood supply; dryer, a less bacteria-rich environment; and less sheer with ambulation as compared with incision in the gluteal cleft. This approach has demonstrated faster healing time, decreased wound complications, and decreased recurrence rates.[44] One technique involves lateral incision with sinus cavity curettage and pit removal either separately or en bloc (**Fig. 3**), whereas an alternative approach is sinus removal through lateral incision with removal of the midline pits through this lateral incision (**Fig. 4**). Lateral incisions can be closed primarily, left open to heal by secondary intention (although a reported advantage of

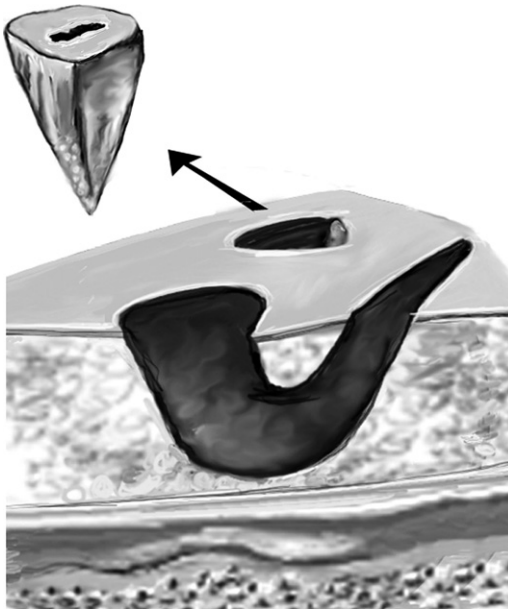**Fig. 2.** Midline approach to pilonidal pit and sinus excision.

Fig. 3. Lateral incision and curettage with separate or en bloc pit excision.

the lateral approach is that this is typically avoided), or closed via flap reconstruction if the excision is extensive.[45–48]

There are many types of flap-based options that can be used in the treatment of chronic pilonidal disease. Often, chronic disease presents with complex or extensive sinus tracts, which, after excision, can leave a sizable defect. The theory behind flap-based reconstruction is to excise disease and cover the defect with healthy tissue that has rich blood supply.

The Karydakis flap involves midline excision of the pilonidal sinus tracts followed by soft tissue coverage in the form of mobilized fasciocutaneous tissue that is sutured laterally to the sacrococcygeal fascia to avoid midline tension. (**Fig. 5**) In his own

Fig. 4. Lateral incision with pit and sinus removal. A small incision around the pits allows en bloc removal with the underlying sinus through the lateral incision.
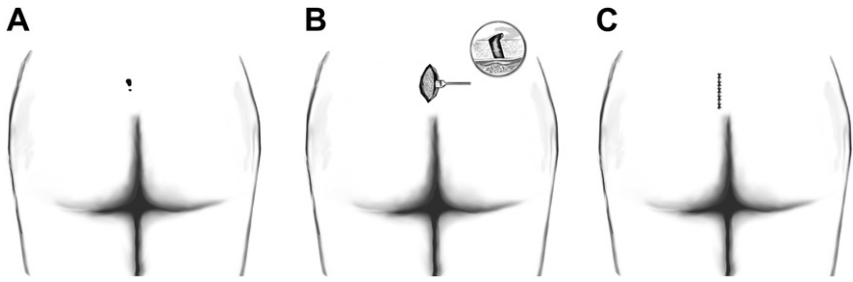
Fig. 5. Karydakis flap. (*A*) An off-midline incision is made and the sinus excised to the sacrococcygeal fascia. (*B*) Raise a full-thickness flap on one side. (*C*) Slide the flap to the opposite side and close primarily lateral to the midline.

review of more than 6000 cases, Karydakis[5] demonstrated a wound complication rate of 8% and recurrence rate of 2%. Subsequent studies have reproduced similar results.

The rhomboid or Limberg flap has similar principles to the Karydakis flap in that it involves midline excision of the pilonidal disease to the presacral fascia and involves fasciocutaneous coverage.[45,46,49,50] However, the flap in this instance is rotational and results in flattening of the gluteal cleft (**Fig. 6**). The potential downfall of this surgical option includes the large area of tissue mobilization, the increased risk of hematoma/seroma, and wound dehiscence, although these complications are rare (0%–6%).

An additional flap option is the Bascom, or cleft-lift, technique. This technique involves the excision of all diseased tissue with the creation of flap-based coverage lateral to the midline. This completely obliterates the cleft. A triangular incision is performed with the apex located above and lateral to the cleft apex, and all disease is excised. Hair and granulation tissue are debrided and a skin flap is raised toward the midline. Excess skin is then removed and the flap sutured closed over a drain (**Fig. 7**), Bascom and Bascom[51] reported healing rates in the 80% to 95% range and recurrence rates as low as 4%, confirmed by subsequent studies.[51–53]
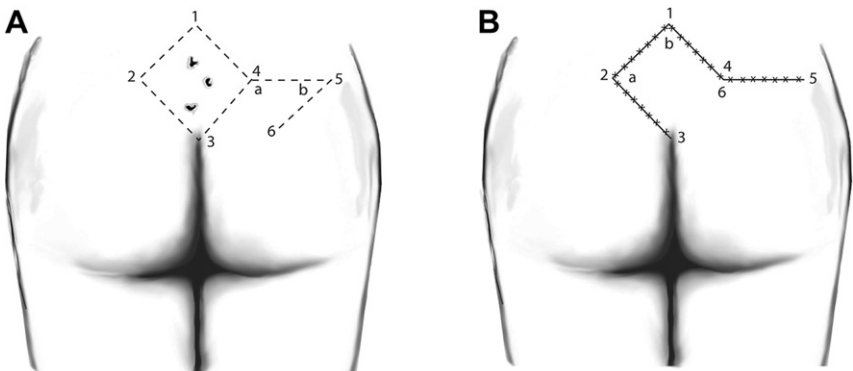

Fig. 6. Rhomboid (Limberg) flap. Excise the pilonidal sinus in a diamond shape. (*A*) Incise flap as demonstrated, including skin and subcutaneous tissue. (*B*) Rotate flap into place and close donor site primarily.
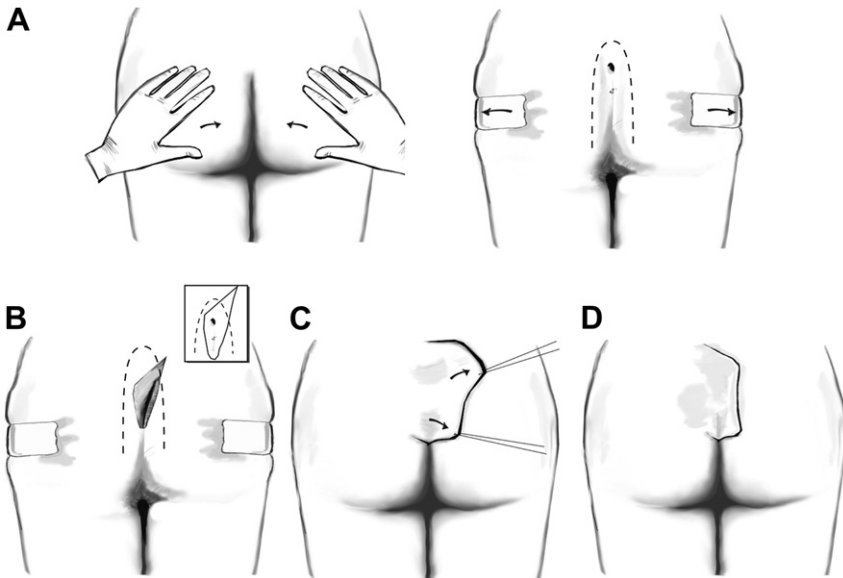
Fig. 7. Bascom (cleft-lift). (*A*) Mark the buttock contact lines and then tape the buttocks apart for visualization. (*B*) Excise the nonhealing wound or pilonidal pits/sinus tracts in a triangular shape off-midline. (*C*) Raise a skin flap to the previously marked line and release the tape. Position the skin flap. (*D*) Excise excess skin and close. A drain can be used.

Two additional local advancement flaps that have been used to provide tissue coverage in other areas of the body have also been applied to the management of pilonidal disease. The V-Y advancement flap is composed of skin, fat, and gluteal fascia and can cover defects 8 to 10 cm in size. This flap eliminates the gluteal cleft and can be used unilaterally or bilaterally. The final suture line is midline, which some consider a drawback, and drains are often used. (**Fig. 8**) Case series have demonstrated good
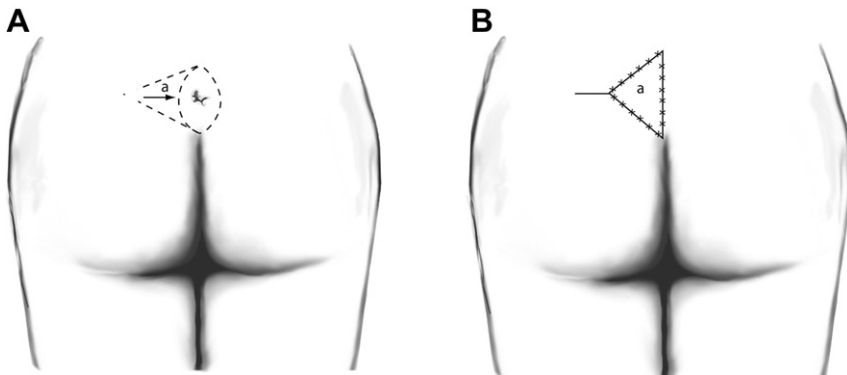

Fig. 8. V-Y advancement flap. Use an elliptical incision to excise pits and sinus tracts to the level of the sacrococcygeal fascia. Using the apices of the ellipse, extend the incision laterally in a V shape and include skin, fat and gluteal fascia in this flap. Advance the flap toward the midline and primarily close, creating a Y shape. This flap can be used unilaterally or bilaterally.

healing and minimal wound complication and recurrence rates.[54] Another local flap is the Z-plasty, which involves sinus excision and Z limbs that are marked at a 30-degree angle to the long axis of the wound. Flaps of skin and subcutaneous tissue are raised, transposed, and sutured, obliterating the gluteal cleft. (**Fig. 9**) Although this technique has been described in many studies, it is generally reported to have higher wound complication and recurrence rates.[55]

When larger, deeper wounds are encountered after excision, they may require more complex flap reconstruction. The gluteus maximus fasciocutaneous or myocutaneous rotational flap is an option in this setting. The flap is raised and rotated into place, thus filling the defect with vascular-rich tissue and obliterating the remaining dead space and gluteal cleft. (**Fig. 10**) Drawbacks to this procedure include longer operative duration, operative complexity, and higher morbidity with flap failure.[56]

Vacuum-assisted closure (V.A.C., Kinetic Concepts, Inc, San Antonio, TX, USA) devices use a negative pressure to wound beds and have been used for the management of various complex wounds and as adjuncts to skin grafting. This system has been used as the primary treatment following wide excision or as the bolstering mechanism for skin grafts following a wide excision.[57,58] These concepts have been extrapolated to include treatment of pilonidal disease at National Naval Medical Center, Bethesda, where a small, nonpublished series is examining the use of V.A.C. as a bridge to delayed primary closure (Forrest Sheppard, MD, Bethesda, personal
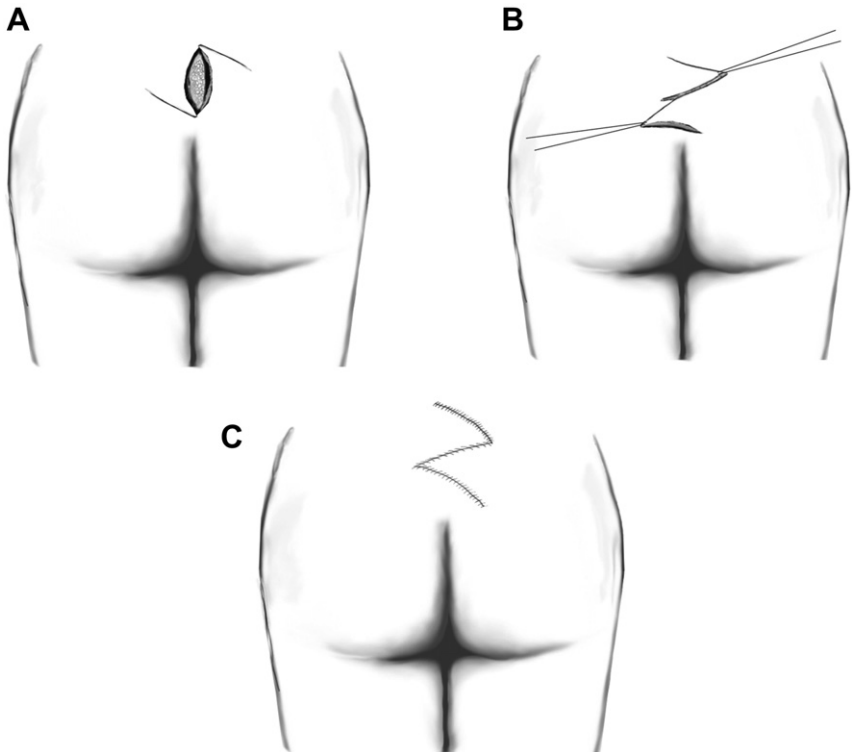

Fig. 9. Z-plasty. Excise the pilonidal pits and underlying sinuses using a midline elliptical incision. (*A*) Mark the Z limbs at a 30-degree angle from the apices of the excised ellipse. (*B*) Raise full-thickness flaps and transpose. (*C*) Primary wound closure.
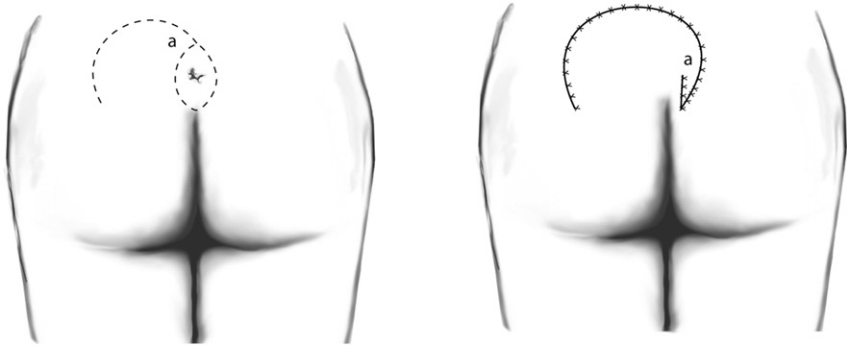
Fig. 10. Gluteus maximus fasciocutaneous or myocutaneous flap. Excise pilonidal pits and sinuses in the midline and rotate flap for off-midline coverage.

communication, May 2009). V.A.C. devices are well tolerated by patients and smaller home systems are readily available. A strong recommendation does not exist for V.A.C. application in pilonidal disease but may be considered in selected cases as primary or adjunctive therapy.

MANAGEMENT OPTIONS: RECURRENT PILONIDAL DISEASE

Recurrence rates for pilonidal disease vary widely and have been reported to be as high as 50% following primary intervention, and as high as 10% to 30% after subsequent interventions.[10] These rates indicate that many patients will continue to have treatment failure despite the type of management chosen. The cause of these failures is not completely known, although wound complications at primary intervention were shown to be predictive.

Management of recurrent disease is similar to that of primary disease. Thorough examination should be performed and other processes excluded, such as inflammatory bowel disease, malignancy, and other differential diagnoses as discussed earlier. Recurrent disease treatment includes nonoperative adjuncts, such as hygiene and hair control. If an abscess is present, an incision and drainage should be performed and associated cellulitis treated with antibiotics. The operative strategy for recurrent disease varies widely, and, depending on the extent of disease, can range from wide excision with primary closure to the use of more complex flap closure.

CARCINOMA IN PILONIDAL SINUS

Carcinoma arising from a pilonidal sinus is rare, occurring in approximately 0.1% of patients with chronic untreated or recurrent pilonidal disease. It is believed that the process involves the release of oxygen free-radicals by activated inflammatory cells, similar to carcinoma arising in other ulcerating and chronically inflamed disorders. The first case was reported by Wolff in 1900, and less than 100 cases have been reported in the literature since that time. The cell-type is usually well-differentiated squamous. These tumors will classically present as an ulcer with rapidly progressing fungating margins, and computed tomographic imaging is an often useful adjunct to determine extent of disease. Treatment is wide, en-bloc excision and often requires flap reconstruction or grafting. Involvement in locoregional lymph nodes is a poor prognostic indicator and, in the case of palpable inguinal lymph nodes, excision versus radiotherapy should be considered. Pilonidal sinus carcinoma behaves more aggressively

than squamous cell carcinoma at other sites and recurrence rate approaches 50%. Adjunctive radiotherapy can decrease local recurrence but overall survival is poor.[59,60]

SUMMARY

Pilonidal disease is a fairly common condition that is associated with significant morbidity. It exists in many forms: asymptomatic, acutely infected with associated cellulitis and abscess, and chronic in nature, presenting a management dilemma because of its location. There are a multitude of described interventions, surgical and nonsurgical, and, thus far, no treatment modality has proven to be superior. The general principles of therapy include good hygiene practices, hair control, and excision of all disease with primary closure or soft tissue coverage. Recurrence is not uncommon and may require extensive excision and flap closure. Malignancy arising in the setting of chronic pilonidal disease is extremely rare but should be considered when ulceration or fungating mass is present.

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