Hidradenitis Suppurativa: A Frequently Missed Diagnosis, Part 2: Treatment Options

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Editor’s note: This is the second part of this continuing education topic. “Hidradenitis Suppurativa: A Frequently Missed Diagnosis, Part 2: A Review of Pathogenesis, Associations, and Clinical Features” was published in the July 2015 issue.

PURPOSE:
To provide an overview of treatment recommendations for hidradenitis suppurativa (HS).

TARGET AUDIENCE:
This continuing education activity is intended for physicians and nurses with an interest in skin and wound care.

OBJECTIVES:
After participating in this educational activity, the participant should be better able to:
1. Describe current recommendations for treatment of HS.
2. Identify warnings, adverse effects, and implications for patient education.
ABSTRACT
Hidradenitis suppurativa (HS) is a chronic inflammatory disorder of the intertriginous area. Patients with HS have several challenges to their quality of life and activities of everyday living, including malodor, purulent discharge, and discomfort. There is often a delay in diagnosis and appropriate treatment. The need for cosmetically acceptable local treatments and dressing application makes this disease an important challenge for wound care specialists. The choice of optimal treatment varies depending on the disease severity, expert knowledge, the availability of an interprofessional team, and patient factors.

KEYWORDS: hidradenitis suppurativa, inflammatory follicular disorder, wound care

INTRODUCTION
Hidradenitis suppurativa (HS) is a chronic debilitating disease that significantly affects the quality of life of an active, young adult population. The large burden of HS and its comorbidities highlight the need for an interprofessional team approach. Typically, HS is more common in females mainly involving the axilla and groin (Figure 1), whereas the perineum and buttocks are commonly involved in males (Figure 2). Despite multiple studies, a diversity of expert opinion remains on the optimal stepwise management of HS. The US Food and Drug Administration (FDA) has not approved any treatments for HS. The recommendations in this article are based on the scientific literature, expert knowledge of the authors, published consensus documents, and patient experience.

GENERAL MEASURES
Epidemiological data suggest an association of HS with systemic diseases, including metabolic syndrome, psychiatric disorders, and hyperandrogenism. The Mayo Clinic (http://mayoclinic.org/1hZDzm2) defines metabolic syndrome as a cluster of conditions that can be remembered by A-increased blood sugar (hemoglobin A1c), B-increased blood pressure, C-abnormal cholesterol, and D-diet with excess body fat around the waist, all of which increase an individual’s risk of heart disease, stroke, and diabetes. The patient’s body weight and lifestyle choices may contribute to HS. For example, the association of HS and a high body mass index, along with smoking, warrants weight loss counseling and smoking cessation. Current adult obesity guidelines include a lifestyle modification program that ideally involves:
• reduced caloric intake by 500 to 1000 kcal/d,
• 30 minutes of moderate-intensity physical activity 3 to 5 times per week and an eventual increase to 60 minutes or more on most days,
• cognitive-behavior therapy.
If satisfactory weight-loss progress is not achieved, pharmacotherapy and bariatric surgery should be considered. The same lifestyle modifications should be recommended to patients with metabolic syndrome, with the additional option of initiating metformin.5

To help patients with smoking cessation, the clinical approach begins with an assessment of the patient’s willingness to quit, and every tobacco user who accepts treatment should be offered assistance.5 The combination of counseling and smoking cessation medication is more effective than either option alone. It is important to note that although lifestyle modifications (such as weight loss or smoking cessation) have been shown to improve the symptoms of HS, they do not cure the disease.4,5 Friction from clothing increases local pain; thus, patients with HS are advised to avoid wearing tight clothes. In addition, excessive heat and humidity are known triggers. Avoidance of these climate conditions, such as staying indoors in air conditioning when needed, may help relieve symptoms. Other potential triggers, although not causative factors, include the use of deodorants, shaving, and depilation.

Some expert clinicians recommend warm compresses, topical antiseptics, and antibacterial soaps to help soothe HS-involved skin.

**TOPICAL TREATMENTS AND LOCAL WOUND CARE**

Because there are no FDA-approved treatments for HS, clinicians must rely on available evidence to treat patients’ symptoms.

To date, there are very few studies that focus on optimal local wound care in patients with HS. The choice of local dressing is an important part of the management. Dressings with high absor-bency are commonly used. Experts suggest that tubular net bandages or placing superabsorbent pads or materials in the seams of clothing are the best ways to keep the wound dressings in place because of the topography. In general, superabsorbent dressings are best to treat actively draining lesions or postoperative wounds, with extensive and generous application of simple white petrolatum, zinc oxide paste, or film-forming liquid acrylic on the marginal skin to prevent the primary dressing from sticking to the wound. In addition, adhesive tape should be avoided to minimize trauma to inflamed skin.

Daily gentle cleansing of the affected areas may help to reduce odor and the occurrence of secondary infection. Consider gentle antiseptic washes with a lower risk of allergic or irritant contact dermatitis. Some patients have had success with water-based chlorhexidine preparations and were instructed to avoid washcloths, harsh sponges/loofahs, or brushes that may cause unnecessary trauma and skin irritation.

Postoperative wounds were studied by Chen et al10 with a retrospective chart review of HS cases managed surgically between 2005 and 2010. The authors calculated that approximately half of the patients received negative-pressure wound therapy using the vacuum-assisted closure system, followed by delayed closure. The other half received immediate primary closure at the time of their excision. Wound closure averaged 2.2 months with negative-pressure wound therapy and 2.7 months in the control group. The authors also concluded that local excisions may heal with secondary intention, closed at the time of surgery, delayed with direct closure, or with skin grafts.

**PHARMACOLOGIC TREATMENTS**

A variety of pharmacologic treatments have been successfully administered, but as noted, to date, the FDA has not approved any medical treatment specifically for the treatment of HS.7

**Antimicrobials**

Many therapeutic algorithms recommend antimicrobials (often with anti-inflammatory properties) in all severity stages of HS9–30 however, only a few review articles offer specific recommenda-
tions. Many of the antimicrobial agents that are successful in HS may be effective because of their antibacterial and anti-inflammatory properties (eg, tetracyclines, clindamycin). The majority of published reports recommend initial therapy with rifampicin combined with clindamycin or a tetracycline.11–14 Matusiak et al15 found that the most commonly prescribed anti-
microbials (eg, tetracycline, doxycycline, minocycline) were ineffective against cultured isolates.16–18

Topical antimicrobials, including topical clindamycin and topical resorcinol, have been studied.10,11,16,17 Topical clindamycin 0.1% was compared with placebo in 27 patients who completed the study. At the end of the first, second, and third months, the clindamycin-treated subjects had fewer abscesses, inflammatory nodules, and pustules (P < .01). Topical resorcinol 15% cream was a successful treatment when used twice daily in a case study of 12 patients.17 Resorcinol has topical antiseptic and keratolytic properties. The most significant effect of this treatment was noticed in superficial lesions, such as pustules and papules, but not in deep-seated cysts and sinuses.18

In managing patients with HS, clinicians also must consider that the use of topical treatments is associated with the risk of allergic and irritant contact dermatitis to the active agent or components of the vehicle (Figure 3). The authors also suggest that maintenance or long-term oral therapy can be provided with the help of tetracyclines (or erythromycin and related macrolides) due to their anti-inflammatory properties. Oral dapsone has been used in mild cases, but the effect appears to be lower in comparison with the combination of clindamycin and rifampicin.19 In addition, the HS lesions will not promptly respond to systemic antimicrobials without surgical debridement and appropriate...
topical wound care, along with selective intralesional steroid injections for the associated inflammatory response.

**Retinoids.** Two oral retinoid drugs, isotretinoin (13-cis-RA [retinoic acid]) and acitretin have been studied clinically for the treatment of HS. Zouboulis et al studied the effect of these retinoids utilizing an in vitro sebocyte model. The authors concluded that 13-cis-RA was a potent inhibitor of both cell proliferation and lipid synthesis in human sebocytes, but that acitretin decreased only lipogenesis in this model. Blok et al reviewed the results of 174 patients enrolled in 7 studies that evaluated the effect of oral isotretinoin patients with HS. The combined study report concluded that there was

- significant improvement in 18% of patients,
- moderate improvement in 17% of patients, and
- no response in 64% of patients.

In a more recent study, Puri and Talwar compared the effects of oral acitretin combined with surgical excision to oral acitretin alone. There was a low 20% recurrence rate in the group of patients who received both oral acitretin and surgical excision compared with a 40% recurrence rate in the group that received oral acitretin alone. In summary, the results from the use of oral retinoids are disappointing, but may be helpful as adjunct agents in some difficult-to-control patients. Acitretin was viewed as a more promising agent; however, it is often poorly tolerated, especially when doses exceed 20 mg daily.

**Corticosteroids.** An intralesional injection of a topical corticosteroid (eg, triamcinolone 8 to 20 mg/mL, with injections of up to 3 to 6 mL per visit every 3 to 6 weeks) is commonly performed to reduce individual lesion pain and acute erythema/swelling. These injections should be avoided if there is clinical evidence of infection.

Oral prednisone reduces inflammation, facilitates the healing of existing HS lesions, and prevents future lesions from forming. Commonly prescribed prednisone doses for disease control may vary from 20 to 50 mg. The adverse effects of oral steroids (weight gain, diabetes, loss of muscle mass, bone fractures, and so on) must be measured against the therapeutic benefit of using oral steroids compared with other available treatment options. To the authors’ knowledge, no recent, formal studies have been conducted on the efficacy of corticosteroids as part of HS management.

Although the exact role of immune dysregulation in the pathogenesis of HS is unknown, it has been demonstrated to have an impact (see “Immune Dysregulation” in Part 1 of this article series in the July 2015 issue of *Advances in Skin & Wound Care*). Thus, clinicians are increasingly prescribing immunosuppressive agents as part of the management of HS. Anti-TNFα inhibitors, anti-IL17/23, and anti-IL1 inhibitors have been used in the management of HS. Different immunosuppressive medications including methotrexate have been used in case reports.

**Biologics.** Evidence that inhibitors of tumor necrosis factor (TNF) effectively improved HS symptoms in patients who were primarily being treated for Crohn disease led to the investigation of anti-TNF agents as an effective treatment for HS. Serum and skin (lesional, perilesional) TNF-α levels are higher in patients with HS compared with control subjects. A growing number of studies have highlighted the efficacy of infliximab and adalimumab, both anti-TNF agents, in the management of HS. Bahillo Monné et al found favorable outcomes with adalimumab treatment, with improvement somewhat slower than the responses with infliximab. Moriarty et al described the results of using infliximab on a 4-week basis in 11 patients with severe HS. The authors reported that all patients experienced initial disease improvement assessed by visual analog scale, Dermatology Life Quality Index (DLQI), and the physician’s clinical assessment. While on this regimen, the patients experienced secondary infection of HS lesions, respiratory tract infections, tonsillitis, minor weight gain, and lymphoma. Newer biological treatments that inhibit interleukin 1 (anakinra) require further study before they can be recommended for HS patients.

**Antiandrogens.** A hormonal connection with HS has been suggested by several studies (see the “Hormones” section in the Part 1...
The observation of female predominance, premenstrual flare-ups, and improvement of HS during pregnancy suggest that androgens may be a contributing factor. In some women with HS, symptoms often correlate with hormonal fluctuations during the menstrual cycle. Previously reported studies have linked improvement in HS lesions with oral contraceptive pills and spironolactone. Published reports also documented some male HS patient benefits from finasteride. More recently, Randhawa et al investigated finasteride as an effective treatment of HS in children and adolescents. The 3 pediatric patients in this study were treated with oral finasteride in combination with oral contraceptives and/or oral antibiotics. The authors observed decreased disease flare frequency and severity with no significant adverse effects. As a result, the authors suggested that finasteride might be a suitable additive therapy for refractory female HS cases and for judicious use in pediatric patients with clear communication of the risks and benefits of the drug.

Metformin. As an antidiabetic agent, metformin provides some benefit in HS. Arun and Loffeld, who presented a case of a 50-year-old woman with longstanding HS and type 2 diabetes mellitus, first documented the use of metformin in the treatment of HS. The patient was taking metformin 500 mg 3 times daily for more than 5 years until she gained significant control of her hyperglycemic levels and was subsequently taken off of metformin. The authors observed that while on metformin the patient’s HS lesions remained stable and did not require recurrent courses of antibiotic therapy. However, with the discontinuation of metformin, the patient reported a flare-up of her HS lesions. More recently, Verdolini et al reported significant reduction in the Sartorius score, which was described in Part 1, and the number of workdays lost among 25 patients with HS who were treated with metformin. In addition, the DLQI significantly improved in 16 cases. The authors conclude that metformin helps control HS with very few adverse effects. Based on their results, they suggest using metformin as an alternative to current treatments, including long-term antibiotics.

PAIN MANAGEMENT

Despite the painful effects of this chronic, debilitating disease, few studies have documented treatment for the effective pain control of HS. Clinicians should accept the patient’s report of pain. This statement is supported by the findings of a recent study on the correlation and validity of patient and investigator assessment of disease severity and pain. Each of the 20 HS patients graded a single representative inflammatory nodule in terms of tenderness and flare, and the investigator graded the level of erythema. Subsequently, all patients underwent high-resolution ultrasound scanning of their representative nodule, and the diameter of the nodule was measured to reflect the degree of inflammation. The authors found that the patient assessment of flare activity and pain and the investigator assessment of erythema were strongly associated with morphological changes identified by ultrasound, suggesting that patients tend to accurately report flare and pain levels and investigators acutely observed the resulting erythema.

Pain control often starts with grading the severity of pain on a 0-10 point numerical rating scale, with “0” being no pain and “10” slamming the car door on your finger, and “5” representing a bee sting. Nociceptive pain (graving, aching, tender, throbbing) often responds to acetaminophen, with a starting dose of 1 g 3 times per day, and the use of alternative agents such as nonsteroidal anti-inflammatory drugs and aspirin. More severe pain is often treated with opioids, short- and long-acting weaker (codeine), and subsequently, stronger agents (morphine, hydromorphone). A fentanyl patch can be used for resistant pain. Neuropathic pain is often described as burning, stinging, shooting, and stabbing. Treatment of neuropathic pain may include second-generation tricyclic agents, such as nortriptyline or desipramine. Scheinfeld concluded that when treating HS-related pain that is unresponsive to topical analgesics, gabapentin and pregabalin should be first-line therapy because of fewer adverse effects compared with tricyclics or the serotonin and norepinephrine reuptake inhibitors, duloxetine and venlafaxine. Also, gabapentin and pregabalin can be combined with acetaminophen, nonsteroidal anti-inflammatory drugs, and cyclooxygenase 2 inhibitors. In cases of HS accompanied by depression, gabapentin or pregabalin can be combined with duloxetine, which should be tried first and venlafaxine second, if needed.

Scheinfeld also reviewed the use of topical agents in the treatment of HS-related pain. The author summarized that topical 1% diclofenac should be offered first to a patient who presents with HS and complains of pain centered on the skin. Topical ketamine may also be a useful tool for the treatment of pain. Commercially available topical 5% doxepin may cause drowsiness, and some clinicians may order lower-dose compounded formulations.

NEW AND TRADITIONAL SURGICAL APPROACHES

Traditional surgical approaches to HS management have included incision and drainage (I&D), punch debridement, de-roofing, and excision. It has been suggested that I&D of individual nodules should generally be avoided because they provide only short-term relief and tend to recur with no long-term benefit. Margesson and Danby suggested the practice of punch debridement over I&D, which is a mini unroofing procedure. Punch debridement involves deeply excising the acutely inflamed folliculopilosebaceous unit (FSPU) within an inflammatory nodule using a 5- to 7-mm circular punch instrument identical to that used in a punch biopsy. The FSPU is excised with a small amount of tissue.
of the surrounding tissue and is followed by aggressive debridement using digital pressure. The curettage or simple scrubbing is done with gauze wrapped around a cotton-tipped swab. The goal is to remove the “bulge” of the FSPU that contains the stem cells hypothesized to be responsible for inducing growth of the proliferative mass (amorphous material deposited in the dermis) and the sinus tracts.

Surgical excision of the affected skin tissue in HS with adequate free margins is the criterion-standard treatment for prevention of recurrence\(^7\) (Figure 4). The classic deroofing technique and wide excision are regarded as the preferred surgical methods for treated HS Hurley Stage I/II and II/III, respectively.\(^{43,44}\) However, the goal of surgery is to completely remove the lesional tissue, while sparing as much healthy tissue as possible, making Hurley Stage II/III disease a surgical challenge.\(^{45}\)

**Skin-Tissue–Sparing Excision with Electrosurgical Peeling Procedure**

Blok et al\(^{45}\) proposed a new surgical technique for severe HS that combines the advantages of both wide excision and the deroofing technique: skin-tissue–sparing excision with electrosurgical peeling (STEEP) procedure. The STEEP procedure is performed under general anesthesia and involves electrosurgical incision of the sinus roof with a wire loop tip coupled to an electrosurgery device.

All lesional tissue, including fibrosis that is identified by palpation, is removed from the incision on to the deeper skin layers by successive tangential electrosurgical transections or peeling. The epithelialized sinus floors and subcutaneous fat are left intact where possible. Hemostasis is achieved by the coagulation mode of the electrosurgery device, and wounds are left open to heal by secondary intention. Generally, patients can leave the hospital on the day of surgery. Blok et al\(^{45}\) have performed the STEEP procedure on 156 patients with Hurley Stage II/III disease between 2004 and 2013. Patients have reported low recurrence rates, rapid healing, and an improvement in DLQI responses. The authors proposed the STEEP procedure as a promising tissue-saving surgical technique for HS Hurley Stage II/III as an alternative to laser surgery that can be performed by trained dermatological surgeons.

**Split-Thickness Skin Graft**

Axillary HS has been historically treated with excision of the affected tissue, and the surgical defect was left to heal by secondary intention or was grafted with a split-thickness skin graft (SSG).\(^{46}\) Although an SSG can produce satisfactory results in patients with mild to moderate disease, in more severe disease it can predispose to graft contraction, reduced range of movement of the shoulder, restrictive scarring, prolonged recovery, and an increased number of subsequent surgical procedures.\(^{47–49}\) More recently, postexcision HS wounds have been treated with a number of surgical procedures, including local, regional, and free flaps (fasciocutaneous V-Y flap, Limberg flap, and musculocutaneous flaps). In particular, perforator flaps, including the thoracodorsal artery perforator (TDAP) flap, have been reported as advantageous for reconstruction of the soft-tissue defect after excision.\(^{50–52}\) Wormald et al\(^{46}\) conducted a prospective study comparing the use of TDAP flap and SSG for the reconstruction of the axilla following excision of extensive or recurrent axillary HS, with focus on both operative and patient-related outcomes. The authors found a significantly longer length of surgery for the TDAP group, a finding that is supported already in the literature.\(^{53,54}\) The TDAP cohort had a higher rate of revision surgery, whereas the SSG group required a significantly greater number of follow-up appointments in the clinic. The authors summarized that a TDAP flap may provide a more definitive surgical solution compared with the SSG technique, requiring fewer clinic appointments and a shorter period of follow-up and thus is potentially more cost-effective despite the longer length of surgery.

**Genitoperineal HS Resection**

For genitoperineal HS resection in males, partial or total scrotectomy is almost always required with care to avoid causing injury to the...
spermatic cords and testes. Perineal disease is resected with care to avoid injury to the anal sphincter muscles. If both genital-perineal (anterior) and anal and/or buttock (posterior) disease resections are recommended, they should be resected in separate procedures to avoid an arduous and intolerable recovery period. The anterior tissue of the perineum and genitals is treated first, and then a referral to a general surgery or plastic surgery practitioner is suggested for posterior treatment. The complete resection and reconstruction with skin flaps and grafts provide a viable treatment for patients with primary genital HS disease. After surgical debridement of HS, extended soft tissue defects are the usual result, requiring plastic reconstruction in this site.

**Cryoinsufflation**

If surgical treatment is declined, and systemic therapies should be avoided in certain patients, a new technique using cryoinsufflation (CI) was proposed by Pagliarello et al. The authors presented the case of a female patient in her 30s who presented with HS Hurley Stage II. She was being treated with oral contraceptives, topical clindamycin, and monthly intralesional corticosteroids. However, she decided to become pregnant and therefore was searching for an alternative treatment, devoid of teratogenic effects. Effective therapy was necessary because the HS seriously interfered with sexual intercourse and indirectly with her planned pregnancy. Surgical treatment was offered and declined. To control the patient’s HS symptoms and simultaneously discontinue her systemic medical therapy, the authors proposed CI, a modified spray cryotherapy performed by injecting liquid nitrogen (LN) through an ordinary needle directly into the HS tracts. As the LN enters infected sinuses, it boils and vaporizes, and quickly disperses into all communicating pockets because of the large expansion ratio of liquid to gas. The authors suggested delivering the LN in a pulsed method to avoid overexpansion and prevent excessive pain and formation of “iceballs.”

The patient received monthly treatment sessions that allowed focused scarring to replace the sinuses and caused minimal damage to the skin surface. In total, the authors treated the patient with 3 monthly treatment sessions, and they reported that no recurrence was observed after 6 months. Neither hypopigmentation nor scarring was observed, and the patient was very satisfied with the results.

In conclusion, the authors proposed CI as a novel, easily conducted, well-tolerated, and inexpensive alternative as monotherapy or as a useful adjunctive therapy that can be effectively combined with all other treatments to rapidly achieve symptom relief. Although surgery plays an important role in the management of HS, the choice of surgery should be individualized based on patient preference, the Hurley stage, extent of involvement, and location of the disease.

**THE ROLE OF PHOTODYNAMIC AND LASER THERAPY**

**Photodynamic Therapy**

Photodynamic therapy (PDT) is effective against acne vulgaris, which has led to its use against HS. Earlier studies have reported the effective treatment of HS by PDT, but they were small case studies with varying results and variations in the photosensitizers, light sources, and treatment regimens used. The proposed mechanism of action of PDT in HS involves absorption of aminolevulinic acid and an increased production of protoporphyrin IX in hair follicles compared with other tissues. In addition, the main mechanisms suggested for PDT against acne vulgaris, including sebum production and reduced follicular occlusion, may also play a role against HS.

Topical PDT is found to be effective when applied to early superficial HS lesions. Researchers, however, have found that the main limitations of PDT are the low absorption of photosensitizer and low penetration of the light source. For this reason, Valladares-Narganes et al. proposed a new approach by applying intrale- sional PDT using a laser diode attached to an optical cable. The authors suggested that intraleisional PDT is less invasive than surgery, well-tolerated, effective, and less expensive than systemic therapy.

**Carbon Dioxide Laser**

The use of carbon dioxide laser for HS has been reported in 5 studies. Lapins et al. studied carbon dioxide lasers on 24 patients with HS, with 22 of 24 patients having no recurrence after 27 months. Hazen and Hazen treated 185 sites in 61 patients with a carbon dioxide laser and marsupialization technique, with 183 recurrence-free sites during a follow-up period of 1 to 19 years.

**Nd:YAG Laser**

The long-pulsed 1064-nm Nd:YAG laser is an alternative modality for the management of HS. The Nd:YAG laser causes a selective photothermolysis of the follicular units and adjacent inflammations. Tierney et al. studied the Nd:YAG laser on 22 patients with HS Stages II and III and demonstrated a significant decrease in severity of HS in 3 months (65.3%). Xu et al. studied a long-pulsed 1064-Nm Nd:Yag Laser on 19 patients with Hurley Stage II HS disease. The severity of HS significantly decreased for both the axillary site (P = .008) and the inguinal site (P = .001).

**CONCLUSION**

Hidradenitis suppurativa is a chronic inflammatory disorder that commonly involves the intertriginous area. The concerns of malodor, discharge, and discomfort, along with the need for cosmetically acceptable local treatments and dressing application, make this disease an important challenge for wound care specialists. The
lack of randomized clinical trials for most HS therapeutic modalities complicates optimal treatment selection. The choice of treatment varies depending on the disease severity, the expert knowledge of the prescribing healthcare professional, and patient factors (Table). The associated medical and psychological factors significantly affect patient health and adherence to treatment. It is important to approach HS as a systemic disease with an interprofessional team.

**PRACTICE PEARLS**

- **HS** is chronic disorder of the intertriginous area
- Malodor, discharge, and discomfort in HS and lack of standardization among treatment modalities makes this disease an important challenge for wound care specialists
- **HS** is a systemic disease, therefore management of HS should be done by an interprofessional healthcare team and address both medical and psychological patient factors

**REFERENCES**


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