

# Treatment of Hidradenitis Suppurativa: What's New?

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Treatment of hidradenitis suppurativa, a chronic, relapsing disease that primarily affects the apocrine sweat gland-bearing skin, remains a challenge for even the most experienced dermatologists. While multiple treatments have been proposed for this disease, its recalcitrant nature makes it difficult to control. Currently, no single therapy has emerged as universally effective. In this article, we review the most recent literature regarding treatments for this disease and also provide recommendations for their use.

**H**idradenitis suppurativa (HS) is a chronic, relapsing disease that occurs mainly in areas containing apocrine sweat glands such as the axillary, groin, perineal, and perianal regions. Its prevalence is estimated to be between 1% to 4%,<sup>1,2</sup> and the disease is 3 times more likely to occur in women than men.<sup>3</sup> The lesions often appear as tender, subcutaneous nodules that can rupture to form chronic, painful abscesses that exude purulent drainage and undergo long periods of inflammation.<sup>4</sup>

While earlier studies suggested the disease pathogenesis to be of apocrine origin,<sup>4,5</sup> later work has shifted the cause towards the direction of follicular occlusion.<sup>3,6</sup> Although the exact initiation of the disease process remains unknown, several contributory factors have been identified, such as smoking,<sup>1</sup> obesity,<sup>7</sup> and genetics.<sup>8</sup> In addition, this disease appears to be highly associated with other disorders where follicular occlusion is the main pathologic event, such as acne conglobata, dissecting cellulitis of the scalp, and pilonidal sinus.<sup>5,9,10</sup>

The Hurley staging system is the most popular system for clinical evaluation of patients with HS, which

classifies patients with HS into 3 groups: stage 1, those with abscesses but no sinus tracts or fistulas (Figure 1); stage 2, those with one or more widely separated recurrent abscesses with tract formation and scars (Figure 2); and stage 3, those with multiple interconnected tracts and abscesses throughout an entire area (Figure 3).

Given the tenacious and recalcitrant nature of the disease, several treatment modalities have been explored, with many of these modalities based on treatments for similar diseases such as acne conglobata, dissecting cellulitis of the scalp, and pilonidal sinus. However, despite the numerous options available, there is no universally effective single therapy for HS; therefore, the treating physician must weigh the risks and benefits of each option based on the patient's disease severity and personal circumstances. This article will focus on relevant new literature regarding treatment methods for this difficult disease. We also will suggest a general treatment approach based upon disease severity.

## METHODS

We conducted a review of the various treatment modalities for HS. "Hidradenitis suppurativa," "acne inversa," "treatment," "tumor necrosis factor alpha," "laser," "retinoid," "surgery," "hormone," "botulinum toxin," and "photodynamic therapy" were the main keywords used, including all possible synonyms. PubMed and bibliographies were reviewed and searched. Articles published in languages other than English were reviewed if English translations were available. Case reports, case series, and observational and interventional human studies with

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participants of any age, sex, or health status also were included. Articles whose main focus was not on the treatment of HS were excluded.

## TREATMENTS

### Antibiotics

Antibiotics are, for many clinicians, the mainstay of therapy for HS. The use of antibiotics to treat HS was initially based on the belief that HS shared a similar pathogenesis with acne conglobata.<sup>6,11</sup> In 1983, Clemmensen<sup>12</sup> conducted a double-blind study on 27 participants with topical clindamycin and numerically compared participants' assessment of disease, number of abscesses, and inflammatory nodules and pustules. He found a statistically significant benefit with clindamycin compared to placebo ( $P < .01$ ).<sup>12</sup> This trial was followed by Jemec and Wendelboe<sup>13</sup> in a double-blind, double-dummy controlled trial that compared the efficacy of topical clindamycin with systemic tetracycline. Interestingly, oral tetracycline was no more effective than topical clindamycin.<sup>13</sup> Buimer et al<sup>14</sup> studied the efficacy of gentamicin sulfate collagen sponges in the surgical treatment of HS in a prospective randomized study. The study found that the gentamicin sponges significantly reduced the number of complications at 1 week postoperation and enhanced wound healing.<sup>14</sup>

Two recent studies further evaluated the efficacy of clindamycin in combination with rifampicin.<sup>15,16</sup> van der Zee et al<sup>15</sup> performed a retrospective study on 34 patients who received clindamycin 600 mg and rifampicin 600 mg daily and found clinical improvement in disease severity.<sup>15</sup> Twenty-eight of 34 patients experienced at least partial improvement, while 16 (47%) had a total remission at 10 weeks. However, 21 (61.5%) experienced disease recurrence within 5 months. Gener et al<sup>16</sup> conducted a retrospective cohort study of 116 patients treated with clindamycin 300 mg twice daily and rifampicin 600 mg daily. Data was only available for 70 of 116 patients, and they found significant improvement ( $P < .001$ ) in Sartorius scale and dermatology quality of life index after 10 weeks of treatment. One problem with both studies was the high rate of diarrhea and other adverse effects. In studies by van der Zee et al<sup>15</sup> and Gener et al,<sup>16</sup> 38.2% and 6.9% of patients, respectively, discontinued therapy due to adverse effects.

### Biologics

The use of tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ) inhibitors to treat HS was first noted as part of the treatment of Crohn disease using infliximab.<sup>17</sup> Since then, various case reports have begun to explore its usage for the



**Figure 1.** A single abscess and no sinus tracts or fistulas, Hurley stage 1 disease (A). Multiple inflammatory nodules in the genital area without sinus tracts or fistulas, also classified as having Hurley stage 1 disease (B).



**Figure 2.** Inflammatory papules and sinus tracts affecting a portion but not the entire axillary vault would be classified as Hurley stage 2 disease.



**Figure 3.** Scarring, sinuses, and fistulas affecting an entire region is considered to have Hurley stage 3 disease.

treatment of HS. A maintenance dose was often used, with treatment intervals of 4 to 8 weeks. A total of 21 papers were identified,<sup>17-37</sup> with most being case reports and case series. The standard treatment involves

infliximab 5 mg/kg given at weeks 0, 2, and 6, except in one case report that used 10 mg/kg.<sup>17</sup> Together, these case reports and case series showed that the majority of the patients studied responded well to therapy and demonstrated improvement from it. In 2010, Grant et al<sup>24</sup> conducted the first prospective double-blind treatment that examined the response of HS to treatment with infliximab in 38 patients. Nine patients (60%) treated with infliximab exhibited a 25% to 50% decrease in the HS Severity Index compared to 1 patient (5.6%) of the placebo group. Similarly 88.9% of the placebo group had a less than 25% decrease in their HS Severity Index from baseline compared to 2 patients (13.3%) of the treatment group ( $P < .001$ ).

Etanercept, a recombinant TNF- $\alpha$ -receptor fusion protein, also has been studied for use in HS patients. Unlike infliximab, which must be administered in an infusion center, etanercept can be injected subcutaneously by the patient at home. A total of 8 papers are identified, with 5 of them being case reports and case series.<sup>38-45</sup> Reported dosages and frequencies varied from 25 mg to 50 mg, once to twice weekly, respectively. Together, these case reports and case series suggest clinical benefits from etanercept therapy. However, 2 prospective clinical trials have not supported the positive results of these initial reports.<sup>38,42</sup> Lee et al<sup>42</sup> conducted an open-label, prospective clinical trial on 15 participants and found that only 3 participants responded to treatment. In 2010, Adams et al<sup>38</sup> conducted a single-center, randomized, prospective, double-blind, placebo-controlled study on 20 patients with HS, and the result showed no statistically significant difference ( $P > .99$ ) in physician global assessment, patient global assessment, and dermatology quality of life index at 12 or 24 weeks between treatment and placebo groups.

Finally, adalimumab, a human monoclonal antibody IgG1 that targets both soluble and membrane-bound TNF- $\alpha$  also has been evaluated. Like etanercept, patients also can administer adalimumab at home with subcutaneous injections. A total of 7 papers are identified, with all of them being case reports and case series.<sup>46-52</sup> Standard dosage for these studies was 40 mg, except for one report<sup>47</sup> that used 80 mg initially, with frequency varying from every week to every other week. Together, the results show a mixed response to adalimumab.

Long-term risks for use of these medications remain to be further defined. Thus far, most studies demonstrate low risks of internal malignancy, but follow-up periods have been limited.<sup>53</sup> Risks of serious infections remain a small but potentially morbid complication with most of these medications.<sup>54</sup>

### Botulinum Toxin

The use of botulinum toxin in the management of HS was first introduced by O'Reilly et al<sup>55</sup> in 2005 in treating a 38-year-old patient with a 10-year history of axillary HS. At the time, 250 units of abobotulinumtoxinA were injected into the bilateral axillae, and the patient was able to achieve short-term remission of symptoms. Feito-Rodríguez et al<sup>56</sup> later administered 40 mouse units of botulinum toxin type A to the suprapubic area of a 6-year-old prepubertal patient. The patient experienced complete remission for 6 months. After a repeat injection, the patient responded as well as with the initial treatment.<sup>56</sup> A prospective controlled study is currently underway to evaluate the role of botulinum toxins in the treatment of HS.

### Hormone and Hormone Modulator

Similar to antibiotics, the introduction of hormone and hormone modulator as therapy for HS came from the association of HS with acne vulgaris and the involvement of androgen in the pathogenesis of acne vulgaris.<sup>57</sup> In 1986, both Sawers et al<sup>58</sup> and Mortimer et al<sup>57</sup> explored this possibility by using cyproterone to manage HS. In their case series, Sawers et al<sup>58</sup> initially started 4 patients on ethinyl estradiol 50 mg for 21 days and cyproterone acetate 100 mg for 10 days in a reverse sequential regimen. After 3 to 7 months, ethinyl estradiol was subsequently decreased to 30 mg per day and cyproterone acetate decreased to 50 mg. The levels of individual patients were later altered at different time periods for various clinical reasons. In the end, all patients exhibited improvement in both subjective and objective clinical measures.<sup>58</sup> Conversely, Mortimer et al<sup>57</sup> performed a double-blind, controlled, crossover trial with 24 patients with HS, where one group initially received ethinyl estradiol 50 µg/cyproterone acetate 50 mg in a reverse sequential regimen while another group received ethinyl estradiol 50 µg/norgestrel 500 µg daily. The groups switched therapies at 6 months, and all groups completed the regimens at 12 months. Four patients eventually dropped out of the trial due to drug intolerance. The result showed no significant difference between the frequency of lumps and boils, quantity of discharge and pain, discomfort, and free androgen index between the 2 groups but did note a significant decrease compared to baseline overall ( $P < .01$ ). A later case report also demonstrated benefit of ethinyl estradiol/cyproterone treatment.<sup>59</sup>

In 2005, Joseph et al<sup>60</sup> explored the usage of finasteride in 7 patients with HS and found that after 8 months to 2 years of monotherapy on 5 mg per day, 6 patients improved substantially with 3 of them experiencing complete healing of lesions.<sup>60</sup>

### Laser and Other Energy Devices

This treatment category holds perhaps the most future potential for effective treatment of HS. Laser therapy for HS first began in the 1990s and 2000s, using various types of devices and wavelengths.<sup>61-69</sup>

The best study thus far for these devices was done by Tierney et al.<sup>61</sup> In their prospective, randomized, controlled, assessor-blinded trial, they examined the efficacy of 1064-nm Nd:YAG laser in 22 participants after a 3-month treatment course. A dramatic 65.3% decrease in overall disease severity as measured by the modified HS-lesion, area, and severity index was demonstrated. Sites with higher hair density appeared to have better responses, supporting the role of follicular occlusion in the pathogenesis of this disorder. Disease severity was diminished by 73.4% for inguinal areas, 62.0% for axillary areas, and 53.1% for inframammary sites ( $P < .02$ ).<sup>61</sup>

Many studies involving carbon dioxide (CO<sub>2</sub>) laser were identified. Early reports of CO<sub>2</sub> laser therapy provided promising results in both patient satisfaction and objective clinical improvement.<sup>63-65,67,68</sup> In a study of 24 patients, Lapins et al<sup>65</sup> found that only 2 patients had recurrences in the treated areas, while 22 patients had no recurrences in the treated areas. Hazen and Hazen found that in 185 sites treated in a total of 61 patients, recurrence within the treated area only occurred in 2 treated sites. It should be noted that Hazen and Hazen<sup>67</sup> used the laser in the focused mode to excise tissue into the subcutaneous plane with an endpoint similar to cold steel surgery.<sup>67</sup> In an earlier study, Lapins et al<sup>64</sup> used a scanner-assisted CO<sub>2</sub> laser and found that only 4 of 34 patients had recurrences at the surgical site.

Other devices, such as nonablative radiofrequency devices and 1450-nm diode lasers have been stated in case reports of single patients to provide efficacy in the treatment of HS. Clearly, more data needs to be collected before conclusions about efficacy can be assessed regarding these techniques.<sup>66,69</sup>

### Photodynamic Therapy

Enhanced accumulation of porphyrin metabolites within hair follicles and sebaceous glands during photodynamic therapy (PDT) has been demonstrated by studies in the past.<sup>70,71</sup> The ability of this procedure to reduce hair and sebaceous gland production has led to the hope that it might be helpful in the treatment of HS. Gold et al<sup>72</sup> reported 4 patients treated with short-contact PDT with 5-aminolevulinic acid (ALA) utilizing blue light for activation with 1- to 2-week treatment intervals for a total of 3 to 4 treatments. At 3-month follow-up after the last treatment, 75% to 100% improvement in all patients

was reported. However, the outcome measures used to arrive at this conclusion were unclear. Rivard and Ozog<sup>73</sup> reported 2 patients who improved with PDT, but again, the outcome measures were unclear, and lesions recurred after cessation of treatment. Other reported series have had less enthusiastic results. Strauss et al<sup>74</sup> reported 4 patients treated with ALA-PDT but found no substantial improvement.

Sotiriou et al<sup>75</sup> reported ALA-PDT treatment in 5 patients, but none had substantial improvement, using validated outcome measures.<sup>75</sup> Passeron et al<sup>76</sup> treated 4 patients using pulsed dye laser-mediated PDT and found that 3 of 4 patients improved after 1 month but noted no difference between treated and untreated areas after 3 months. Most recently, Guglielmetti et al<sup>77</sup> reported successful reduction of inflammation and exudates after 2 PDT treatments in 1 patient with HS, but the patient showed mild relapse in some treated areas after 12 months.

Results regarding the use of PDT for the treatment of HS appear mixed, but the study quality thus far has been limited in terms of numbers of patients and objective outcome measures. More research is clearly necessary before a more definitive role for this procedure in the treatment of HS can be defined.

### Retinoids

The use of retinoids in the treatment of HS was derived from its efficacy in treating the similar disorder of acne conglobata. Many physicians still use them as part of their standard therapeutic armamentarium for patients with severe HS. Unfortunately, data has not been nearly as encouraging as that for cystic acne. Jones et al<sup>78</sup> published reports of its use in 1982 using 13-*cis*-retinoic acid in 3 patients at a dosing of 1 mg/kg body weight or less for 16 weeks. While there was decrease in sebum excretion rate, HS remained unchanged in terms of the amount of discharge, numbers of acute attacks, and resolution of existing lesions.<sup>78</sup> Since then, numerous case reports and case series have documented mixed results on the efficacy of retinoids.<sup>79-82</sup>

In 1999, Boer and van Gemert<sup>83</sup> conducted a retrospective chart review on 68 patients treated with isotretinoin (mean dose of 0.56 mg/kg) for 4 to 6 months. Of the 68 patients, 20 (29.4%) did not complete the minimal 4 months of therapy, with 3 due to side effects, 7 due to poor response, 7 due to a combination of side effects and poor response, and 3 due to loss of motivation. Moreover, only 16 patients (23.5%) achieved clearance while 32 patients reported dissatisfaction with the treatment.<sup>83</sup>

In 2009, Soria et al<sup>84</sup> reported results from another retrospective study with 358 patients with past use of

isotretinoin monotherapy. As before, results were largely disappointing. Only 16.1% stated that the medication resulted in improvement of their condition, 77% reported no effect, and 6.9% reported worsening.<sup>84</sup> Most studies to date seem to demonstrate very poor efficacy using isotretinoin for the treatment of HS.

### Surgery

Surgical excision is one of the oldest treatments for HS. Review of the literature revealed that while there were many published studies on this treatment modality, most of them were case reports and case series.<sup>85-115</sup> Of the larger studies that were done, few were randomized, controlled trials.

In 1978, Thornton and Abcarian<sup>110</sup> published a retrospective study on surgical treatment using wide local excision in 106 patients with perianal and perineal HS. The average hospital stay was 7.2 days with 65% of the patients hospitalized for 5 days or less. Only 4 patients required reoperation for recurrence in the 5-year period of the study.

In 1985, a retrospective study reported that 72 patients who underwent axillary excision and primary closure of their wounds experienced recurrence with incidence as high as 54%.<sup>112</sup> However, when split-thickness skin grafting or excision and local flap cover were used, the recurrence rate dropped down to 13% and 19%, respectively. Subsequently, the author conducted another retrospective study of 106 patients and found the recurrence rate in the primary closure group to be 69.88%, while no recurrence, serious complications, or revision operations were needed in the graft and the flap group.<sup>99</sup> Many feel that recurrence following surgery is more likely related to insufficient excision than closure technique.

Others have looked at recurrence by anatomic location. In a retrospective cohort study by Harrison et al,<sup>93</sup> 82 patients who had undergone radical excisions after surgery had vastly different recurrence rates among anatomical sites 6 to 89 months after surgery. Recurrence rates following axillary and perianal surgery were only 3% and 0%, respectively, while the inguinoperineal and submammary areas were as high as 37% and 50%, respectively. Twenty patients developed lesions at new anatomical sites. In the end, 91% of the patients were pleased with their results upon follow-up.<sup>93</sup>

Jemec<sup>95</sup> conducted a prospective study in 84 patients using wide surgical excisions of localized lesions and primary closure in an outpatient setting. Twelve patients dropped out of the study for various reasons. The post-operative follow-up period ranged from 1 to 11 years, averaging  $4.5 \pm 3$  years. Of the 72 remaining participants, 14.7% achieved complete cure, 7.4% achieved

cure in the region treated but subsequently developed new lesions in another region, and 2.7% stated that the disease had weakened somewhat after surgery. Interestingly, 68% reported that surgery was superior to other types of treatment experienced, while only 6% considered it worse.<sup>95</sup>

Recently, van der Zee et al<sup>115</sup> investigated the surgical technique of deroofing. This technique has been widely advocated in the past with nearly no studies to support it. It entails limited excision of the tissue overlying the sinus tracts followed by curettage of the base of the lesion. The authors used this technique on 44 consecutive patients with Hurley stage 1 or 2 HS with a total of 88 lesions. In the end, 17% of treated lesions recurred after a median of 4.6 months, while 83% did not recur after a median follow-up of 34 months.<sup>115</sup>

### Resorcinol Peels

In 2010, Boer and Jemec<sup>116</sup> reported a retrospective study of 12 female patients with Hurley stage 1 or 2 HS treated with topical resorcinol 15% for a minimum of 12 months. Treatment efficacy was determined via duration of painful lesions in days and the changes in self-reported patient pain, which was evaluated on a visual analog scale. With treatment, patients reported an average duration of pain of 3.7 days (ranging 2–14 days), compared to the range of 5 days to permanent duration of pain observed in the untreated group. In addition, half of the treated patients reported disappearance of pain within only 2 days of treatment. Currently, the drug

is categorized as category C (indicating that animal studies have shown no harm to the fetus, but no well-controlled studies have been performed in humans). Further investigation is clearly necessary before this becomes a generalized treatment recommendation.

### Zinc

In 2007, Brocard et al<sup>117</sup> described a pilot study treating HS patients with 90 mg of zinc gluconate per day in 22 patients primarily with Hurley stage 1 or 2 disease. The average follow-up period was 23.7 months. All patients demonstrated clinical response to the therapy, with 8 complete remissions and 14 partial remissions. Potential side effects of this medication include microcytic anemia and nausea.

## APPROACH TO TREATMENT

It is clear that no single treatment is universally effective. The choice of treatment relies heavily on the patient's presenting condition as well as their tolerance for surgical procedures or risks associated with immunosuppressive agents, such as TNF- $\alpha$  inhibitors. In 2009, a comprehensive review published on HS suggested an approach to treatment based upon disease severity.<sup>118</sup> Here we have simplified the list of treatments to those primarily discussed within the confines of this manuscript (Table 1). No validated approach to therapy has yet been demonstrated for this disease as a whole, so the reader will no doubt recognize that our recommendations are largely based upon our anecdotal experience. For readers who wish to

TABLE 1

## Suggested Treatments For Hidradenitis Suppurativa Based On Hurley Stage

First-Line, Low Disease Severity (Hurley Stage 1)	Second-Line, Moderate Disease Severity (Hurley Stage 2)	Third-Line, High Disease Severity (Hurley Stage 3)
Antibiotics (topical or oral)	CO <sub>2</sub> laser ablation	Biologics
Botulinum toxins	Deroofing procedure	Wide excision
Hormone therapy	Limited excision	
Laser hair removal	Retinoids	
Zinc		

TABLE 2

## Medical Treatment Options

Therapy	Dosage	Intervals	Duration	Adverse Effects
<b>Antibiotics</b>				
Clindamycin/ rifampicin <sup>16</sup>	600 mg/ 600 mg	Daily	10 wk	Candida vaginitis, diarrhea, nausea, dizziness, and glossodynia
Topical clindamycin <sup>12</sup>	solution 1%	Daily	12 wk	Slight burning pain
<b>Biologics</b>				
Adalimumab <sup>46-52</sup>	40 mg	Every other week		Malignancies, infection, hypersensitivity, redness at injection site, nausea, paresthesia, cellulitis,
Etanercept <sup>38-45</sup>	50 mg	Weekly		chest pain, muscle cramps, hypertension, elevated cholesterol
Infliximab <sup>17-37</sup>	5 mg/kg body weight	Initiate on weeks 0, 2, and 6; maintenance therapy was given every 8 wk		
<b>Botulinum toxins</b>				
AbobotulinumtoxinA <sup>55</sup>	250 U	Once		Abdominal pain, muscle weakness, dysphagia
Botulinum toxin type A <sup>56</sup>	40 MU	Once every 6 mo		
<b>Hormone therapies</b>				
Ethinyl estradiol/ cyproterone acetate <sup>57,58</sup>	50 µg/ 50 mg	Reverse sequential regimen	12 mo	Weight gain, headaches, breast soreness, possible depression
Finasteride <sup>60</sup>	5 mg	Daily	Indefinite	Decreased libido, erectile dysfunction, decreased ejaculatory volume, possible hypospadias in male fetus
<b>Peels</b>				
Resorcinol <sup>116</sup>	peel 15%	Daily	12 mo	Category C drug, cold sweats, dizziness, dis- coloration of the urine, hyperthyroidism
<b>Retinoid</b>				
Isotretinoin <sup>81</sup>	1 mg/kg body weight	Daily	4 mo	Mild cheilitis, headache, arthralgia
<b>Zinc</b>				
Zinc gluconate <sup>117</sup>	90 mg	Daily	>4 mo	Nausea, vomiting, epigastric pain, anemia

TABLE 3

### Reported Parameters For Laser and Photodynamic Therapy of Hidradenitis Suppurativa

Type of Therapy	Light Source	Parameters
<b>Laser</b>		
	CO <sub>2</sub> laser	20–30 W, 3- to 6-mm spot size <sup>64</sup> 30 W, 2-mm spot size <sup>65</sup> 8–30 W, 0.22-mm spot size <sup>67</sup> 40 W, 0.1-mm spot size <sup>68</sup>
	Nd:YAG	40–50 J/cm <sup>2</sup> fluence, pulse duration 20 ms, 10-mm spot size for Fitzpatrick skin types I to III <sup>61</sup> 25–35 J/cm <sup>2</sup> fluence, pulse duration 35 ms, 10-mm spot size for Fitzpatrick skin types IV to VI <sup>61</sup>
<b>Photodynamic Therapy</b>		
	Narrowband blue light	3–8 sessions at 1–2 week intervals <sup>72</sup>
	Broadband red light	15 J/cm <sup>2</sup> , 3 sessions at weekly intervals <sup>74</sup> ; 20 J/cm <sup>2</sup> , 50 mW/cm <sup>2</sup> fluence, 4 sessions at 2-week intervals <sup>75</sup>
	Pulsed dye laser followed by blue light	Laser, 7.5 J/cm <sup>2</sup> fluence, pulse duration 10 ms, 7-mm spot size, DCD 30/20, 3 sessions at monthly intervals; blue light 30 min each session <sup>76</sup>
	Narrowband red light	37 J/cm <sup>2</sup> for 8 min, 2 sessions with 10-day intervals <sup>77</sup>

Abbreviations: CO<sub>2</sub>, carbon dioxide; DCD, dynamic cooling device.

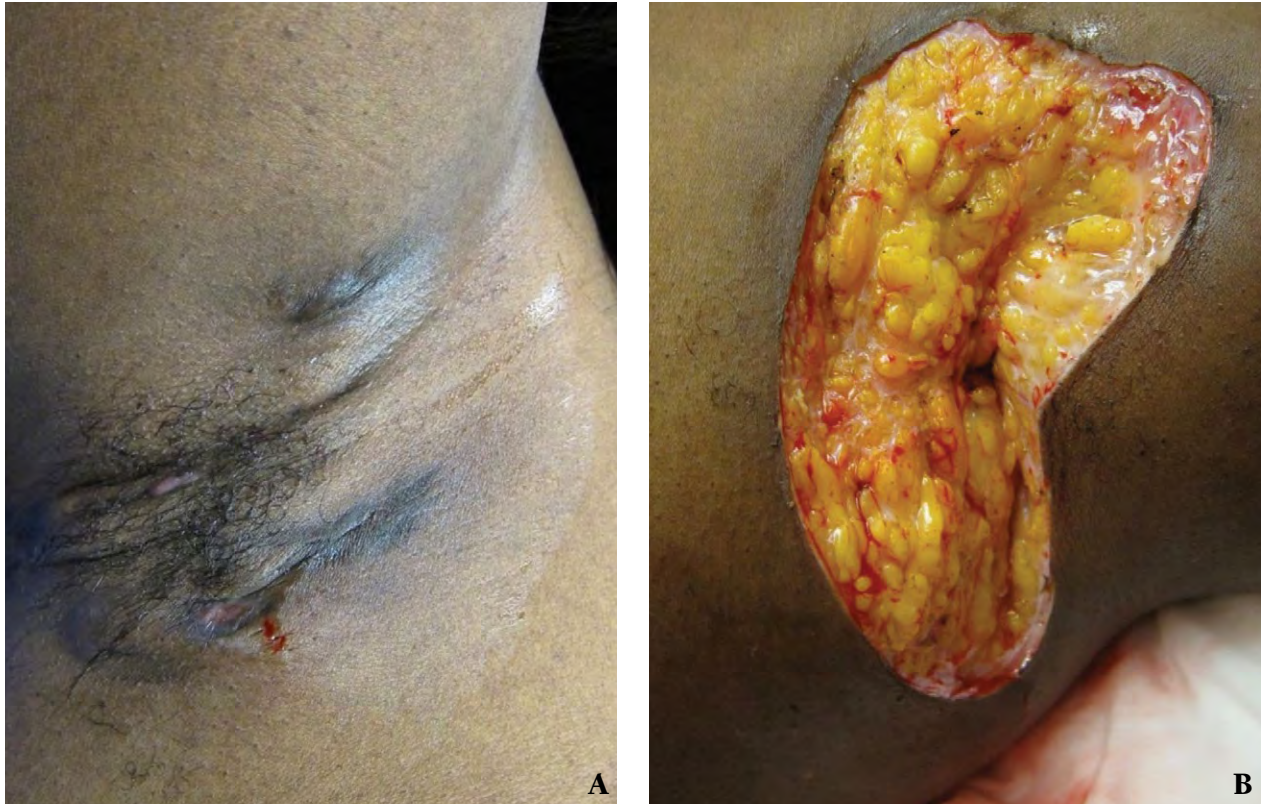
try one of the therapies previously discussed, the treatment regimens from each therapy are listed in Tables 2 and 3.

Our suggested treatment approach is not meant to be a rigid algorithm as every patient is different, and treatments must be tailored accordingly. Clearly, those with more severe disease may be willing to endure more surgical procedures or medications with higher associated risks. In our practice we find topical or oral antibiotics combined with zinc gluconate to be good first-line therapy that can be used for all stages of HS. Though clindamycin and rifampicin are among the best studied for oral ingestion, the adverse effects are more than most

patients will tolerate in our experience, so we employ other agents more often, such as first-generation cephalosporins or tetracyclines. For those who prefer to avoid oral medications, as mentioned earlier, topical clindamycin was found to be just as efficacious as oral tetracycline according to one study.<sup>13</sup> Clearly, more studies will need to be performed before we know which antibiotics provide the most benefit with acceptable side effects.

Similar to antibiotics, we find laser hair removal to be a useful modality in patients with HS regardless of disease severity. Complications from this procedure, in our hands, have been minimal and nearly all patients are





**Figure 4.** This patient with Hurley stage 2 disease suffered from chronic tender abscesses and foul smelling discharge (A). She underwent excision of her axillary skin with tumescent anesthesia (B). Healing by second intention is usually uneventful for most patients. She underwent excision of her other axilla 2 months later.

able to tolerate the mild discomfort encountered during treatment. Though many physicians automatically start patients with moderate to severe HS on oral retinoids, we typically avoid this medication unless it has worked well for the patient in the past. Their low efficacy, frequent adverse effects, and overly stringent prescribing requirements make them unappealing.

Those with more extensive disease often benefit from surgical procedures, specifically wide excision of the entire affected region for patients with Hurley stage 3 disease, or local excision or deroofting for patients with Hurley stage 2 disease. We perform most of these procedures in our outpatient office with tumescent anesthesia (Figure 4), while choosing to refer those with massive body surface area involvement to plastic surgeons with experience in the treatment of this disease (Figure 5). Finding a surgeon who understands both the nature of the disease and extent of excision necessary is imperative for good outcomes.

In our experience, infliximab has been useful for patients with significant disease affecting multiple anatomic regions and where surgery has either failed or

is not desired by the patient. For these patients, their disease can be just as devastating as those with rheumatoid arthritis or psoriasis for whom the long-term risks of this medication have already been justified. Clearly, the potential risks of long-term immunosuppression need to be discussed with every patient prior to starting therapy.

## CONCLUSION

Despite the lack of a universally effective treatment for HS, many new therapies have become available over the past few years. Well-executed studies regarding infliximab and laser hair removal as well as better investigations of past treatments, such as deroofting of sinus tracts, have provided us with more information about potential therapies. Dermatologists are already familiar with most of the treatments discussed in this article and are, thus, ideally suited to treat these patients. By employing more innovative solutions and individualized therapy, patients with this debilitating condition may be able to achieve marked improvement in their disease and quality of life.



**Figure 5.** When patients have massive disease affecting multiple anatomic regions, patients might benefit from treatment by plastic surgeons under general anesthesia. Preoperative view of a patient with Hurley stage 3 disease (A). Intraoperative images (B and C). Patient 1 month following surgery (D). Images courtesy of Michael Wong, MD, Division of Plastic Surgery, University of California, Davis.

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