Hidradenitis Suppurativa

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Opinion statement
Hidradenitis suppurativa (HS) is a chronic fistula- and abscess-forming disease of the cutis and subcutis of unknown etiology. Disease recurrence is frequent and may cause severe complications. This article reports on the information in the literature regarding epidemiology, pathogenesis, clinical manifestations, and treatment options of HS. HS occurs mainly in the third to fourth decade of life and seems to be associated with obesity, smoking, chemical irritants, and hyperandrogenism; bacterial involvement is secondary. Although acute intermittent lesions of early HS often respond to conservative therapy, such treatment most likely does not alter the clinical course of the disease. Patients may occasionally derive symptomatic benefit from long-term antibiotics, but relapse is almost inevitable when treatment is withdrawn. Therefore, surgery is the only effective therapy for severe HS, especially in view of possible complications after long-standing disease. Incision and drainage of each lesion and abscess may temporarily improve symptoms but do not cure the underlying sinuses and infected apocrine glands. Drainage procedures and limited resections lead to an unacceptable rate of recurrence with an unnecessary risk of life-threatening complications such as squamous cell carcinoma. Recurrence is mostly due to limited resection and inadequate eradication of sweat glands. Radical wide excision of the HS-affected cutis is associated with the lowest recurrence rate. In general, HS recurs the earlier the less infected and abscess-containing skin is resected. Obesity, local pressure, and skin maceration are important promoting factors. Approximately 20% to 25% of HS progresses to a previously unaffected area, which cannot be influenced by therapy options. Patients with HS need to be followed up and treated over a long period of time to exclude late-developing recurrences and to detect a malignant degeneration in an early stage by histopathologic examination of suspicious areas.

Introduction
Hidradenitis suppurativa (HS) was first described as a clinical entity by Velpeau in 1839 as a peculiar inflammatory process with superficial abscess formation, affecting tissues of the axillary, mammary, and perianal regions. In 1864, the French surgeon Verneuil was the first to associate HS with the sweat glands [1–3]. In 1922, Schiefferdecker classified sweat glands in eccrine or apocrine and subsequently localized HS to the apocrine glands because those areas rich in these glands (such as axillary, inguinal, genital, perianal, and perineal regions) are affected by the disease [4••,5].

The prevalence of HS is unknown. Jemec [6] reported a point prevalence of 4.1% based on objective findings in a younger adult population. The disease develops mainly in men in the third and fourth decades of life, which coincides with postpubertal increases in androgen levels [1,4••,7]. Onset before puberty is rare. In women, HS sometimes persists into the climacteric; onset after menopause is rare. HS in the perianal region is 10 times more common in men than in women, whereas axillary disease is more prevalent in women [2,4••,6–8]. Some authors believe that HS is more
common in the black population, but some report no racial predilection [6–8].

Although its exact etiology is unknown, HS seems to be associated with obesity, proneness to acne, excessive sweating, endocrine disorders such as Cushing’s syndrome or diabetes, poor personal hygiene, and smoking [4••,8,9]. Many authors consider chemical irritants such as deodorants, mechanical irritation, depilation, and shaving to be factors. Morgan and Leicester [10] retrospectively compared 40 patients who had HS with 40 age-matched controls and found no significant difference in the use of these items. Since Schiefferdecker, the disease has been considered a disorder of apocrine glands. This theory was supported by an experimental model that induced poral occlusion by manual skin depilation and application of atropine-impregnated tape. This resulted in dilation, inflammation, and bacterial invasion of the apocrine duct. However, the lesions did not progress to the characteristically chronic condition of HS [11]. More recent studies have identified HS as a disorder of follicular rather than apocrine occlusion. Attanoos et al. [5] studied the skin biopsies of patients with HS and reported a consistent finding of follicular occlusion in all specimens when compared with controls. They discussed that inflammation of the apocrine glands did not occur in the absence of an adjacent folliculitis. Thus, apocrine gland involvement seems to be secondary to the primary involvement of the terminal hair follicle [12]. In addition, several reports in the literature link HS to a single gene transmission. Fitzsimmons et al. [13,14•] reported a pattern of autosomal dominant transmission in their study of three families with 21 affected members.

The disease onset is insidious, with early symptoms of pruritus, erythema, and local hyperhidrosis. Later, a firm pea-sized nodule appears and may rupture spontaneously, yielding a purulent discharge. Gland rupture spreads the infection to surrounding tissues. The cycle is repeated in the adjacent tissue, leading to localized abscesses, chronic draining sinuses, and finally scarring and fibrosis. The disease course is characterized by exacerbations and remissions, with the extent of affected skin gradually increasing [4••,5,7,12]. There are numerous reports of severe complications in chronic HS, including anemia, intestinal keratitis, osteomyelitis, fistulous communications to pelvic organs, and even death [15•,16]. It remains unclear whether radical excision can prevent some of these complications. Squamous cell carcinoma (SCC) is a dreaded but rare complication with only 26 reported cases since the first description by Anderson in 1958 [16,17]. SCC tends to occur in patients with perianal and gluteal disease and is less frequent in axillary cases. In a review of all the published cases by Perez-Diaz et al. in 1995 [18], the average age at diagnosis was 47 years with a male predominance. The mean duration from the onset of HS to SCC was 20 years. Only four patients had a history of fewer than 10 years. Treatment varies from wide local excision to abdominoperineal resection, sometimes combined with radiotherapy or chemotherapy. According to follow-up data, 30% of the patients were alive and recurrence free at 1 year and 41% developed recurrent cancer [16–18].

## Treatment

- Controversy exists regarding the appropriate treatment for HS. Consequently, there is no standard treatment and most studies lack a long-term follow-up after initial therapy. However, the care and observation of patients with HS remains an important factor because the disease can recur even years after initial therapy [16,19]. Conservative management ranges from antiseptic cleaning or topical steroid creams to systemic antibiotic therapy [1–3,4••,19,20,21•]. Combined anti-androgen and estrogen therapy in women has been reported to control HS. Acute intermittent lesions of early HS often respond to conservative therapy, but it is unlikely that such treatment alters the long-term clinical course of the disease [19,20,21•,22,23]. Patients may occasionally derive symptomatic benefit from long-term antibiotics, but relapse is almost inevitable when treatment is withdrawn. Therefore, surgery is the only effective therapy for severe HS, especially considering the possible complications after long-standing disease [24••,25]. Selection of a treatment approach is facilitated by preliminary clinical staging (Table 1). All patients, irrespective of the stage or extent of their HS, require proper maintenance care of the involved areas with emphasis on avoidance of local frictional trauma to prevent new outbreaks or recurrences. Thus, continued medical surveillance is usually necessary, even in most patients with definitive surgery for stage III disease.
Because of the required extensive nature of surgical treatment, patients are often first administered medical treatment. Patients may have symptomatic relief with a long-term course of antibiotics. Antibiotics are not curative but may diminish unpleasant odor and discomfort in the patient. Conservative medical treatment is applied mainly in stage I disease (Table 1). In general, after withdrawal of conservative treatment, relapse of HS is almost inevitable. The topical use of clindamycin has been favored in the literature. Hormonal therapy is of no value in HS. Isotretinoin or 13-cis-retinoid acid administered in 1 mg/kg daily doses is helpful in some patients with stage II or III disease but is not as beneficial as it is in acne vulgaris [12,19,27]. Anti-androgens such as spironolacton and cyproterone acetate have been recommended to help prevent recurrent HS but are not routinely helpful.

**Systemic antibiotics**

| Standard dosage | Tetracycline (1–1.5 g/day), minocycline (100–200 mg/day), or ciprofloxacin (250–500 mg/day) should be administered only in patients with early lesions with signs of local inflammation. The treatment should be maintained until all signs of the inflammation are gone, usually for 7 to 10 days. |
| Contraindications | None. |
| Special points | Bacterial culture with antibiotic sensitivity testing should be performed on available drainage material. Alternative antibiotic therapy should be based on the results of these studies [20]. Tetracycline and ciprofloxacin can be administered orally for 7 to 10 days in patients with early stages of the disease and does not require surgical incision or drainage. Treatment should be adapted according to antibiotic sensitivity testing. |
| Complications | High recurrence rate after withdrawal of therapy, complications of antibiotic treatment (i.e., diarrhea). |

**Local treatment**

| Standard procedure | Gentle daily cleaning with a germicidal soap such as chlorhexidine gluconate is advised, as is daily application of a topical antibiotic (2% clindamycin). |
| Contraindications | None. |
| Special points | Systemic therapy with tetracyclines did not show better results than topical therapy with clindamycin in patients with HS. |
| Complications | None. |

**Surgery**

Surgery is the basis for successful treatment of HS, especially in cases of chronic or recurrent disease (stages II and III). Radical surgery is considered the only curative therapy for HS, although the particular area excised can be cured. HS can recur in patients in remote or untreated regions because it
may affect any apocrine gland-bearing area. Patients should be appropriately cautioned [16, 21••, 24••, 25, 28]. Curettage and electrofulguration can be used in the base of the exteriorization wounds to destroy residual disease epithelial elements or for hemostasis but are not routinely necessary. Because of the thick fibrotic scarring in these areas, satisfactory anesthesia may be difficult or impossible to achieve with local anesthetics. The surgical strategy can be subdivided into drainage procedures, limited regional excision, and radical wide excision.

**Incision and drainage**

Defined as simple abscess incisions or drainage of the affected area, this procedure can temporarily improve symptoms and offers a transient benefit. However, it does not cure the underlying sinuses and infected area. It is a simple surgical method with a low complication rate, but acute infection recurs within 1 to 3 months in nearly all patients (Figs. 1 and 2) [16, 24••, 29].

**Contraindications**

This procedure can be performed easily under local anesthesia on an outpatient basis in almost every patient without contraindications. The patient needs to be informed about the partial and temporary improvements of this procedure.

**Complications**

High recurrence rate.

**Limited excision**

Defined as resection of the infected abscess and fistula containing cutis in the affected region. This procedure carries a high risk of local recurrence in 40% to 50% of patients, occurring after a median of 9 to 11 months [16, 24••, 25]. We found no advantage to limited regional excision of the affected skin (Figs. 1 and 2).

**Contraindications**

None.

**Complications**

High recurrence rate.

**Radical wide excision**

Radical wide excision includes all hair-bearing skin (with or without signs of HS) of the affected region down to soft normal tissue with margins well beyond the clinical borders of activity (>1 cm). This procedure is considered to be most effective in treating HS, with a recurrence rate of 20% to 30%. Most authors agree that radical wide excision of the affected skin minimizes recurrence. In a series of 82 patients with wide excision and a mean follow-up of 47 months, Harrison et al. [30] found a 26% recurrence rate in all cases, which is comparable to the 27% recurrence rate in our series of radical wide excision [16].

![Figure 1. Number of recurring hidradenitis suppurativa in relation to the initial surgical procedure (Courtesy of the Surgical Department, University Hospital Benjamin Franklin, Berlin, Germany).](image)
Standard procedure
Excision of the involved areas down to soft, normal tissue with clear margins of at least 1 cm in the clinically unaffected skin under general anesthesia.

Contraindications
Patient must tolerate general anesthesia, postoperative immobilization, and long-term follow-up.

Complications
Acceptable recurrence rate. Contracture (1%–2%), bleeding, long-term wound healing, vascular/nerve injury.

Skin closure
Controversy exists regarding closure of the skin defect. Primary closure and rotation flaps are rarely used because of the extensive nature of the excisions. The method of wound management may influence the course of the disease. In a surgical series, reoperation was necessary in 54% of the cases with primary wound closure, in 19% after flap repair, and in 13% after grafting [29]. This confirms our experience, which indicated that primary skin closure may inadvertently compromise the excision margin and increase the risk of recurrence. Immediate or delayed split-skin grafting offers the advantage of rapid healing with complete wound closure in 2 to 4 weeks. Grafting is most successful in axillary disease. Healing by granulation is associated with a predictable result that is as good as or superior to that obtained by skin grafting. However, complete wound closure may take up to 2 to 3 months [31].

Standard procedure
Open wound healing by granulation in affected areas. Delayed skin grafting in selected patients with axillary HS 1 to 2 weeks after excision to avoid missing infected skin not completely excised.

Contraindication
Grafting in perianal, anal, or perineal affection of HS.

Complications
Unsightly cosmetic results and poor cosmesis at the donor site. Immobilization of the affected limb for 5 to 7 days. High failure rate in the perianal and perineal area. Grafts in the anal area may contract and lead to anal stenosis.

Radiotherapy
- X-irradiation in doses sufficient to produce temporary epilation (single doses of 0.5 to 1.5 Gy up to total doses of 3.0 to 8.0 Gy) appears to be less effective than the approaches cited previously [32].
**Lifestyle factors and prevention**

- An essential part of treatment includes avoidance of tight garments such as T-shirts, body-shirts, snug-fitting blouses, blue jeans, panty hose, and the straps and seams of undergarments and athletic equipment, all of which produce frictional trauma and exacerbate the disease. Whenever possible, women may have to forego wearing a brassiere in favor of a cotton under-shirt. The patients must maintain this approach throughout their lives to sustain a quiescent state.

- Generally, the local application of adhesive tape, which can promote poral occlusion and is irritative, should be avoided in these patients or used for a limited time. Shaving of regional hair, as in the axillae, is permissible but must be done gently and carefully with a clean sharp razor with prior cleansing of the area. Antiperspirant-deodorant formulations, preferably the liquid or spray varieties (not the roll-on, mat applicators, or stick types) may be used in the axillae. Several reports found a clear correlation between HS and nicotine intake, thus patients should quit smoking.

**References and Recommended Reading**

Papers of particular interest, published recently, have been highlighted as:

- Of importance
- • Of major importance


Very interesting review article that gives a complete overview on HS with information regarding its epidemiology, pathogenesis, clinical manifestations, complications, evaluation, and treatment.


This article discusses the familial form of HS with autosomal inheritance, reviewing 14 probands and their families. The authors’ findings support the concept of a familial form of HS.


This article reports on the quality of life, morbidity, and long-term results of 160 patient with HS.


Double-blinded controlled trial comparing topical use of clindamycin with systemic tetracycline in the treatment of HS in stage I and stage II. Systemic therapy did not have better results than topical therapy.


This review encompasses the pathogenesis, clinical manifestations, and management options for patients with HS.


Good overview on the surgical treatment in a large series of patients with HS. The results confirm early radical excision as the treatment of choice for HS.


