INVITED ARTICLE

Hidradenitis suppurativa

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Abstract

Hidradenitis suppurativa is a chronic disease characterized by recurrent, painful, deep-seated, rounded nodules and abscesses of apocrine gland-bearing skin. Subsequent suppuration, sinus tracts and hypertrophic scarring are its main features. Onset is usually after puberty, although it is most common during the third decade and may persist in old age. The disease tends to be chronic and may develop to subcutaneous extension leading to indurations, sinus, and fistula having a profound impact on the quality of life. The prevalence is 1% in several studies. Axillary and inguinal involvement is more common in females; perianal and buttocks localizations are prevalent in males. The exact etiology remains unknown. The primary event is a follicular occlusion with secondary inflammation, infection and destruction of the pilo-sebaceo-apocrine apparatus and extension to the adjacent subcutaneous tissue. Infection is common. Smoking may be a triggering factor. Obesity aggravates the discomfort. Differential diagnostic includes Crohn’s disease, nodular acne and furunculosis. The main complications are arthropathy, carcinoma. Treatment depends upon the stage of the disease. Early nodular lesions may be treated by antibiotics for acute stage; long-term antibiotics, zinc salts may be useful as maintenance treatment; anti-TNF drugs have been used in severe cases; systemic steroids, estrogens, anti-androgens, retinoids have been used as options with limited success. Surgical treatment includes incision with or without drainage for limited abscesses; limited excisions are used for locally recurring draining sinuses. Total wide excision and healing with secondary intention or flaps and grafts is the only curative procedure in case of advanced disease.

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Keywords

acne inversa, follicular diseases, hidradenitis suppurativa, treatment

Conflicts of interest

None declared.

Historical background

Hidradenitis suppurativa (HS) was first described during the year 1854 by a French surgeon Aristide Verneuil; the original paper was ‘Etudes sur les tumeurs de la peau; de quelques maladies des glandes sudoripares’.

The word ‘tumeur’ at that time did not mean tumour but enlargement. From the beginning, HS was linked to the sweat glands but in fact apocrine sweat glands were only described in 1921. From the beginning, debates took place about the precise location of the initial phenomenon; in 1955, Shelley after an experiment of occluding the axillary skin concluded that the primary event was a keratinous plugging of the apocrine sweat duct. Later, Yu showed that follicular occlusion was the most constant feature of HS and probably the primary event. Kligman and Plewig had already considered that the follicular occlusion was the main event and drew this conclusion by grouping together HS, acne conglobata, dissecting folliculitis of the scalp and later pilonidal cyst, naming this association ‘follicular tetrad’ and renaming HS to ‘acne inversa’.

Definition

Hidradenitis suppurativa (HS) is defined only by its clinical features and its chronicity; there is no biological or pathological test to help. It is recognized by the presence of recurrent, painful, deep-seated, rounded nodules usually ending in abscesses and sinus tracts with suppuration and hypertrophic scarring of apocrine gland bearing skin.

A consensus definition was adopted by the second congress organized by the Hidradenitis Suppurativa Foundation (San Francisco March 2009):

‘HS is a chronic, inflammatory, recurrent, debilitating, skin follicular disease that usually presents after puberty with painful deep seated, inflamed lesions in the apocrine gland-bearing area of the body, most commonly, the axillary, inguinal and anogenital regions’.
Epidemiology

Prevalence
Despite the reputation of HS as a rare disease, a global prevalence of 1% in the general population has been reported in several studies reviewed by Naldi. A recent study performed by a poll institute has confirmed this very high prevalence. The discordance with the apparent rarity in clinical experience could be explained by the prevalence of mild forms, the weariness of patients discouraged by the results of treatments and by the poor knowledge of HS in the medical community, which is revealed by the diagnostic delay (usually several years).

A peak prevalence of 4% of self-reported cases in a population of young female adults in Denmark was recorded and was likely due to a high prevalence in young adults. This was objectively confirmed by examination of patients in another study of the same team. Although not rare, HS is an 'orphan' disease due to the lack of HS knowledge in the medical community and to the poor results of most therapeutic interventions.

The sex ratio is 1/3.3.

Risk factors
Risk factors have been reviewed by Naldi. A recent case control study of factors associated with HS in 302 patients has confirmed that smoking and overweight are the two main factors associated with HS. Smoking was significantly more common (more than 70%) in HS patients than in controls: a strong association – in multivariate analysis – with current smoking was demonstrated [OR = 12.55, (8.58–18.38)]. No temporal relationship, no dose effect has been demonstrated; thus, smoking while highly associated with HS cannot be considered as a true risk factor. Furthermore, no specific mechanism to explain this association has been provided and the effect of smoking cessation is not documented. Association with overweight and obesity was observed in the same study with a high risk: [OR = 1.12, (1.08–1.15) for each increase of one unit of body mass index]; as there is dose/effect relationship, overweight and obesity may be true risk factor. Yet a clear demonstration would rely on a temporal relationship and an effect of reducing weight on the evolution capacity of the disease.

Among non-genetic factors, uses of antiperspirants, talc and deodorants, hair removal by a safety razor have been ruled out. Tight clothing may contribute to discomfort. Genetic and hormonal factors are considered below.

Diagnostic criteria (adopted by the Congress of the HSF Foundation March 2009)

The diagnostic relies on the presence of:
1. Typical lesions, i.e. deep-seated painful nodules: ‘blind boils’ in early lesions; abscesses, draining sinus, bridged scars and ‘tombstone’ open comedos in secondary lesions.
2. Typical topography, i.e. axillae, groin, perineal and perianal region, buttocks, infra and inter mammary folds.
3. Chronicity and recurrences.

These three criteria must be met for establishing the diagnostic.

Clinical description

The onset of disease is usually after puberty, usually during the second and third decades. There is frequently a long delay before the diagnostic is established, particularly in ‘mild’ intermittent cases: a nodule or an abscess is surgically treated by incision and packing and the chronic and relapsing nature of the disease is not considered. Moreover, there is a paucity of knowledge of this disease among general practitioners, surgeons and even dermatologists.

Primary lesions

The early lesions are solitary, painful nodules that may persist for weeks or months without any change or with occasional episodes of inflammation (Fig. 1). Early isolated lesions are not characteristic and frequently considered as boils or common abscesses. This may explain why the diagnostic is frequently delayed. The shape of these nodules, round rather than pointed, without central necrosis, and their topography should help to differentiate them from common boils and lead to a correct diagnostic. The deep situation in the hypodermis makes them sometimes barely visible (Fig. 3). They are extremely painful. Approximately 50% of all patients experience subjective prodromal symptoms such as burning, stinging, pain, pruritus, warmth and/or hyperhidrosis, 12 to 48 h before overt nodule occurs. Mean duration of a single painful nodule is 7–15 days. The nodules may remain blind, i.e. fail to burst and may resolve spontaneously or persist as a ‘silent’ nodule with inflammatory recurrences. The most frequent evolution, at least in severe cases, is the evolution toward abscesses (Fig. 2), and an external rupture, spontaneously or after incision, draining purulent material. Rupture of abscesses into the neighbouring structures is exceptional.

Secondary lesions

The repetition of attacks may lead to chronic sinus formation, with intermittent release of serous, purulent, or bloodstained discharge, frequently foul odours from anaerobic colonization. It persists for months, sometimes years, unless properly excised. Ulcerations, pyogenic granulomas (Fig. 2), sometimes occur. A characteristic secondary lesion is constituted by hypertrophic scars:
healing occurs with dense fibrosis, which may appear as indurate plaques, or as linear rope-like bands (Fig. 4). Multiporous or uniporous ‘tombstone’ open comedos are frequently observed usually as tertiary lesions in burnout regions (Fig. 5). Closed comedos are not observed within HS lesions.

There is no regional lymphadenopathy. Pathological specimens are usually not taken from patients with HS as histopathology is not helpful for diagnostic and/or therapeutic purposes.

**Associated lesions**

Follicular papules and pustules are frequent in area of HS as well as in other areas; they do not constitute a diagnostic clue for HS. On the buttocks, folliculitis can leave round, slightly depressed scars.

Epidermal cysts are prominent in some patients: round smooth elastic nodules, 1–6 cm in diameter, located on external genital organs, on the face or on the thorax.

**Topography**

The affected sites are, by order of frequency: groins including inner thighs, pubic region, scrotum, vulva; armpits; perianal and perineal regions; intermammary and inframammary folds, buttocks. These locations are along the ‘milk line’ of apocrine and mammary tissue which have the same embryonic origin. Groin and submammary region are most commonly affected in females; buttocks and peri-anal skin in males; the anal canal is usually spared. Figure 6 shows the respective frequency of involvement in both sexes. Several sites usually symmetric may be simultaneously affected; recurrences occur in and around the original site. Atypical locations are sometimes observed: waist, abdomen, specially peri-umbilical region, and thorax. In retro-auricular fold, there are frequently epidermal cysts usually non-inflammatory. The nape of the neck may be involved in a way similar to what is observed in severe acne and/or in the so-called ‘acne keloidalis nuchae’ which would be better called fibrosing folliculitis. These atypical locations are more frequent in males.

A pilonidal sinus is extremely frequent (30%, more frequent in males) either as a true nodular and suppurating lesion which requires excision (frequently already excised when HS appears) or as a little midline developmental depression of the intergluteal furrow.

**Clinical course and severity grading**

Chronicity is the hallmark of HS. The mean age at the beginning of the disease is 22.1 years (± 8.2); prepubertal cases are exceptional. For patients with pre-existing acne, the disease frequently starts after acne has disappeared. The mean duration of the active diseases was 18.8 years in a questionnaire survey of Von der Werth. The disease begins earlier for patients with family history of HS. The disease tends to become less active among females in their 50s and is usually in complete remission after menopause. Premenstrual flares are commonly reported. Pregnancy and breast feeding are usually periods of complete or partial remission. In males, HS may continue to be active in old age (Fig. 7).

Severity is roughly defined by the classical, yet still useful, classification of Hurley (Table 1). Most practitioners (specially the surgeons) only know the most dramatic picture of severe disease. In fact, a better knowledge shows that the ‘mild’ forms are more frequent. In a personal series of 302 patients, the ‘mildest’ grade (Hurley I) constitutes 68.2% of the patients, intermediate severity (Hurley II) 27.6%, and the most severe and dramatic HS (Hurley III) 3.9%. Hurley’s grades are helpful to classify a patient (or rather a localization, i.e. armpit, groin) in a category of severe or mild involvement. However, it is not really a severity index helpful for managing patients.

**Intermittent benign course.** This ‘mild’ – yet chronic and painful – disease (Hurley’s stage I) may be relentless and progressive or with periods of acute exacerbations – frequently as premenstrual flares (33/65 women experienced premenstrual flares according to Jemec) – and remissions; complete spontaneous remissions of several weeks, or even months are experienced. These patients are very frequently misdiagnosed as ‘furunculosis’ or considered to have recurring abscesses which are incised in emergency ward without a more precise diagnostic. Some of these patients are able to ‘predict’ the occurrence of a new attack 24 h before due to specific premonitory symptoms like pain, itching, malaise.

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<th>Grade</th>
<th>Description</th>
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<tr>
<td>I</td>
<td>Abscess formation, single or multiple without sinus tracts and cicatrization</td>
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<tr>
<td>II</td>
<td>Recurrent abscesses with tract formation and cicatrization. Single or multiple, widely separated lesions</td>
</tr>
<tr>
<td>III</td>
<td>Diffuse or near-diffuse involvement, or multiple interconnected tracts and abscesses across entire area</td>
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The severity in these cases may be evaluated by the number, intensity and duration of painful episode per year.
• Continuous intermediate course. This may correspond to Hurley I or II. The disease is continuous; the number of locations involved, the extent of lesions in each area, the intensity of pain, number of days per month with pain and suppuration are the main factors of severity. There is an extreme variety of clinical pictures. In a defined area, a new attack may be the re-occurring inflammation of a pre-existing fistula or the burst of one or several new nodules/abscesses. The way to manage the patients is not the same in these two situations.
• Severe course. Two different types of severe disease may be observed:
  • A permanent involvement of an area, which forms an infiltrated, painful, suppurating mass with coalescent nodules, fistulas, abscesses, draining sinuses and fibrous scars (Fig. 8). No normal skin exists between the lesions. The patient experiences pain, discomfort, swelling, malodorous discharge, limitation of motility. It is the typical Hurley’s grade III. Radical surgery is the only reasonable treatment.
  • Alternatively the patient may have a multitude of nodules and abscesses separated by normal skin; each lesion has duration of 10 to 30 days but with overlapping evolution and new lesions appear on place where there was no previous lesion. In this case surgery is unhelpful and medical treatment should be given.
When assessing the global severity of a patient, one has to take into account the facts that:
  • The severity of involvement is not parallel between various locations: groin may be in grade III and armpit free of disease.
  • Evolution from one grade to another, e.g. from I to II or III is seldom observed: patients with mild disease remain mild and most severe cases seem to be severe since the start.

Quality of life impairment
A profound alteration of the quality of life is observed even in ‘mild’ cases. A study of 114 patients with HS using the DLQI index recorded a very high score particularly for question 1 measuring the level of pain, itching and soreness.15 A recent study of 61 patients with HS using several quality of life questionnaires showed that the impairment of quality of life in each ‘dimension’ was statistically higher ($P < 0.001$) than for neurofibromatosis, urticaria, psoriasis and atopic dermatitis.16 This was particularly dramatic for self-perception, daily living activities, mood state, social functioning and physical discomfort. Time spent, delay in diagnostic, loss of work was observed in a series of patients by Jemec et al.17

Complications
• Acute infectious complications such as cellulitis or systemic infection are very unusual.
• Lymphatic obstruction and lymphedema,18 (Fig. 9) scrotal elephantiasis may complicate long-standing inflammation.
• Squamous cell carcinoma may arise (Fig. 10). It is quasi exclusively observed in men in buttock localizations after several decades of evolution. It often starts in deep situation; thus, the diagnostic is tardy and the prognostic usually very bad.19 An epidemiological survey found an elevated incidence of skin and visceral cancers in HS.20
• The complications of long-standing untreated disease: fistulæ formation into the urethra, bladder, rectum, or peritoneum as well as the consequences of chronic suppuration such as anaemia, hypoproteinemia, amyloidosis are historical complications which have become exceptional today. Peripheral or axial arthropathy, a classical complication, and SAPHO syndrome, are not frequently encountered.
• Chronic malaise and depression are frequent.

Associated diseases
Acne and ‘follicular tetrad’
Histopathological studies demonstrate that a striking feature of HS is a follicular occlusion from unknown mechanisms. This histological picture is considered by many pathologists as the initial event of HS. Early biopsy of HS in normal-looking skin, however, has not been performed; hence, this ‘early’ follicular occlusion may in fact be a secondary phenomenon. The controversy is open. Association of HS with severe nodular acne (acne conglobata) and/or with dissecting cellulitis of the scalp and pilonidal cysts has been reported. Pilonidal cyst is frequently associated with HS: 30% if both true sinus and midline intergluteal dimple are taken into account.21 Moreover, comedones are frequent in both acne and HS. According to these findings, some authors have proposed to rename HS ‘acne inversa’ and to include the above-mentioned diseases in an ‘acne tetrad’.4 In fact, concomitant acne is not frequent in HS (20% in males, 10% in females); a past history of significant acne (long lasting, leaving scars) is recorded in 44% of males 23% of females.12 Dissecting folliculitis of the scalp is exceedingly rare (1%).15 Association of the four components of the so-called acne tetrad was never encountered in 500 patients (personal observation). A prospective study of 70 females with HS and 100 controls failed to find any difference in the prevalence of acne, hirsutism or irregular periods between the two groups.8 Contrary to the initial lesions of acne, comedos in HS are never closed; they are a secondary ‘tomstone comedo’ frequently double-ended open comedos, i.e. ‘blackheads’. Elevated sebum excretion, which is a major pathophysiological feature of acne, is absent in HS.21 Moreover, effective treatments of acne, isotretinoin and anti-androgens, are not effective in HS (see below). Hence, if hidradenitis suppurativa is not a good denomination of the disease, ‘acne inversa’ is not better and should be discarded until a better knowledge of the pathophysiology may help to find a better name.
**Dowling Degos’ & Kitamura’s disease**

Reticulate pigmentation of the flexures may be sometimes associated with HS. It is difficult to say if this is a significant association as usually people do not seek advice for these pigmented changes which are discovered during examination of groin and armpits of HS patients.22

**Crohn’s disease**

It is both a differential diagnostic and an associated disease. Cutaneous Crohn’s disease must be differentiated from HS in its perianal location and the clinician should always be aware of the possibility of Crohn’s disease mimicking HS in case of perianal lesions and eventually perform the necessary investigations. Atypical condyloma-like lesions seen in Crohn’s disease are not observed in HS; conversely, specific Crohn’s lesions outside the peri-anal regions are unusual, but it is impossible to differentiate them on clinical grounds only. The presence of epithelioid granulomas in the dermis away from the site of active inflammation may alert, but biopsies are not frequently performed in patients with HS. Whether a doubt persists, a colonoscopy has to be performed even in the absence of overt digestive symptoms. True association does exist including cases of axillary HS. Several case reports and a few series of this association have been reported.24 The efficacy of anti-TNF drugs in HS was discovered serendipitously because of this association. Both diseases may be the result of abnormal host-microbial interactions involving pattern recognition receptors such as Toll-like receptors and NODs.25

**Differential diagnosis**

Common abscess, carbuncles and furunculosis (recurring common boils) are the main sources of diagnostic failure of recognizing early lesions. Infected Bartholin’s gland, infected or inflamed epidermal cysts (improperly called sebaceous cysts), lymphogranuloma venereum, scrofuloderma, Actinomycosis, developmental fistulae, nodular acne and pilonidal cyst, Crohn’s disease are classical sources of error. In fact, HS is ignored, not mistaken for another disease; as soon as the physician thinks of it, the diagnostic is usually obvious.

**Aetiology**

The causes of HS are unknown; numerous hypothesis concerning tobacco, infection, genetics, immunity have been raised and discussed.26

**Pathology and gross morphology**

HS was initially described as a disease of the apocrine gland; histologic studies reveal that the earliest lesion observed in lesions excised was a follicular event with infundibular keratinization, leading to a histological image compatible with occlusion; inflammation (early lymphocytic infiltration then chronic inflammatory infiltrate containing histiocytes and giant cells related to keratin fragments) and necrosis of the sebaceous and/or sweat gland are secondary phenomena.27 However, Jemec et al. recorded that a further histopathological examination reveals a primary apocrinitis in 5% of all cases.28 Keratin expression in non-infundibular keratinized and non-keratinized epithelium of HS lesions has been shown to be similar to that observed in the outer root sheath suggesting its participation in the pathogenesis of HS.29

An echographic study of hair follicles of healthy skin of HS patients highlighted their wide diameter and distorted shape and their deep location.30 Magnetic resonance imaging has been used in some case; it may help to differentiate HS from Crohn’s disease or from subcutaneous infection and may be helpful prior to large excisional surgery.31

**Genetic factors**

A family history is given by 30% to 40% of patients.12 This figure may be an underestimation as HS is usually concealed by a sufferer even to close relatives. An autosomal dominant pattern has been reported and a linkage to a locus at chromosome 1p21.1–1q25.33,34 has been reported in a family but with no linkage to other families. HS appears to be a genetically heterogeneous disease with several mutations at various locations. No association was found with CARD15 which is linked to Crohn’s disease.35 Specific genetic studies yielded to conflicting results. HLA association is not significant.37 Patients with a family history have usually a milder disease with an earlier onset; this raises the question of heterogeneity of HS. A prerequisite to good genetic studies in the future relies on the improvement of clinical description and definition of clearly defined subsets of patients.

**Infection**

Traditionally, bacteria have been implicated in HS and they play an important role in most overt clinical manifestations but they are not the initial causative factor. Furthermore, the absence of serious infectious complications, i.e. cellulitis, the absence of abnormal lymph nodes,39 rules out a major direct role for bacterial infection. A large variety of bacteria can be found: streptococci, staphylococci, and *Escherichia coli* in the early stages. But superficial sampling is frequently sterile or finds bacteria from the normal flora. Deep sampling is difficult and may be contaminated by superficial flora. Thus, it is not possible to rely on culture of lesions to adapt antibiotic treatment. During the chronic relapsing stages, anaerobic bacteria and *Proteus* species are commonly present. This deep flora may be responsible for the destructive and extensive process which leads to the dramatic Hurley’s III features.
Hormonal factors
Premenstrual flare-ups, female preponderance, frequent occurrence after menarche, improvement during pregnancy drew the attention toward hormonal factors and hypothesized hyperandrogenic syndromes. The usual absence of clinical signs of virilism, the normality of circulating androgens, the absence of hyperseborrhea, and the limited effect of anti-androgen treatments, rule out a key role of hyperandrogenism. Signs of virilization are unusual in HS. Most case series indicate no significant change in serum hormone levels in HS patients. The relationship between HS and hyperandrogenism is largely based on the finding that the free androgen index is increased because of a low level of sex-hormone-binding globulin, which is influenced by body weight. As body mass index is usually increased in HS, this finding is common and does not indicate hyperandrogenism. No significant difference in androgen metabolism was noted in apocrine glands isolated from HS patients compared with matched controls. Some facts, however, remain unexplained, such as the high prevalence in females, the frequent improvement during pregnancy, and the usual termination of the disease in postmenopausal women.

Immunological and other host factors
There is no gross anomaly of the adaptive immune system. Yet the association with Crohn’s disease and the successes obtained with anti-TNFα biologics has focused attention on possible alteration of the innate immune system. Minor alterations of NK cells have been found. An enhanced expression of TLR2 by infiltrating macrophages and dendritic cells has been shown in the diseased skin of patients with HS. The wide range of possible pathogenic mechanisms suggested by different studies may imply that HS is associated with host mechanisms rather than exogenous factors.

Taking into account the paradox that both anti-infectious (antibiotics) and pro-infectious (anti-TNF, corticosteroids, immunosuppressive drugs) therapies may be helpful, HS may appear as an auto-inflammatory disease based on a defect in the hair follicle innate immunity. Future investigations should target the Toll receptors, cytokine network and anti-microbial peptides in the hair follicle and more specifically in the apocrine follicle.

Drugs
HS is not usually related to medications. It has been reported to be exacerbated by lithium; some patients receiving sirolimus after transplantation have experienced the onset of a ‘de novo’ HS.

Treatment

Severity grading
The classical three clinical stages have been defined by Hurley (Table 1).

This classification is useful at least as a guide to choose between medical or limited surgical treatment (stage I) and large excisional surgery (stage III). A more precise scoring system i.e. ‘Sartorius’ score’ is being used to follow-up patients as an outcome measure. (Table 2). This score has not been formally validated but it has been useful in several therapeutic studies and has been shown to be highly correlated to Hurley’s classification, intensity and duration of pain and suppuration which are good markers of inflammation and of the burden of the disease, as well as the quality of life impairment. Pain scale (visual analogue scale or numerical scale) may also be used as patient-oriented outcome measures. Skin-disease-specific quality of life questionnaire is also useful: using Skindex-France, an important impairment of quality of life has been shown in comparison with other skin diseases and a very good correlation with therapeutic results and Sartorius’ score evolution has been demonstrated. DLQI may also be useful. Frequency of flares/attacks also plays a role in the severity assessment of intermittent cases and may be analysed as number of flares during a 3-month period.

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<th>Table 2 Sartorius score modified by J Revuz</th>
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<tr>
<td>Number</td>
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<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>1 Anatomical region involved: armpit, breast, inguino-femoral, perianal and perineal</td>
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<tr>
<td>2 Lesions: – Nodules</td>
</tr>
<tr>
<td>– Abscess or fistulas</td>
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<tr>
<td>– Hypertrophic scars</td>
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<tr>
<td>– Others (folliculitis, pustules ...)</td>
</tr>
<tr>
<td>3 The longest distance between two relevant lesions or size if only one lesion. &lt; 5 cm = 2; &lt; 10 cm = 4; ≥ 10 cm = 6; if no active lesions = 0</td>
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<tr>
<td>4 Are all lesions clearly separated by normal skin? Yes = 0; No = 6</td>
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<td>TOTAL</td>
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Therapeutic strategy: medico-surgical management

Treatment depends on the stage (Hurley’s classification), frequency of exacerbation and on the goal of the patient. A permanent cure can only be obtained by wide surgical excision but such a procedure is to be considered only in case of advanced disease, i.e. stage III or severe stage II. Alternatively, early disease may benefit from medical and medico-surgical approaches.

Medical and surgical treatments are not mutually exclusive. On the contrary combination, simultaneously or successively, is often necessary.59

Acute stage treatment options

Some patients suffer from recurrent painful nodules but also experience periods of remission. They may benefit from the following options:

- Topical treatments including antiseptics and antibiotics are advocated by some authors; topical clindamycin has been claimed to be effective50 and as effective as tetracycline in a clinical trial.51 As a rule, they are poorly effective due to the depth of the lesions.
- A short course of antibiotic may be tried for an acute, painful nodule to shorten the pain duration and to ‘abort’ it, avoiding evolution of the lesion toward an abscess. Various antibiotics have been used for that purpose: amoxicillin, cephalosporine, clindamycine, rifampicin, M-type penicillin. Amoxicillin + clavulanic acid may be the more effective regimen provided that it is taken very early: within 1 h of first signs or of premonitory symptoms. This means that the patient has to carry the drug every time. A loading dose should be swallowed immediately (i.e. 3 g for a bodyweight of 70 kg) and followed by the same dose divided up over the course of the day for the next few days.
- Intralesional steroids (e.g. triamcinolone (5–10 mg) has been advocated. Rapid involution (12–24 h) of early lesions may be obtained.52
- High doses of systemic steroids may be used to reduce inflammation and pain. They can be used as an alternative to high-dose antibiotics to ‘abort’ a lesion, i.e. prevent its evolution toward an overt abscess or as an association with antibiotics. They have to be tapered rapidly.53

Emergency surgical incision

For an abscess, i.e. when the lesion is fluctuating, full of liquid, the medical ‘abortive’ therapy is ineffective and it should not delay the required surgical drainage (incision) procedure.

Incision of a fluctuating abscess is frequently performed in an emergency ward. Usually the diagnostic of HS is missed; acute abscess is the diagnostic. Incision is usually followed by packing; nursing in the following days and renewal of packing is painful and usually a nightmare for the patient. A limitation of the number of incisions and avoiding packing most of the time should improve the patients’ quality of life. Some simple statements are to be written and some simple rules are to be followed:54

- Non-abscessing nodules must never be incised.
- Fluctuation of a superficial lesion must be established before incision is contemplated.
- The aim of an incision is to evacuate a collection of pus (i.e. an abscess) in order to alleviate pain.
- The goal of this incision is purely an immediate analgesic effect, pain relief, without affecting the development or course of the illness, and without full clearance of the lesion incised.
- Some abscesses (the more superficial ones) open to the surface spontaneously; these do not require surgical ‘care’ as this may worsen scarring.
- Distinguishing between a nodule and an abscess:
  - Superficial abscesses can be easily recognized by: heat from the area + whiteness of skin at the centre of the red area + fever + insomnia or patient awakened in the night by shooting pain. Palpating the area will indicate if it is fluctuant (i.e. it contains free fluid). An incision is not always required, but is a simple technique to relieve some of the pain (a desirable effect). Packing is not necessary in this case.
  - Deep abscesses (an essential characteristic of HS lesions) are slightly more complicated:
    - Signs of local inflammation and more general signs are the same for abscessed and non-abscessed nodules, although the intensity of the pain is less if not abscessed. Pdifficult to evaluate when the nodule is deep.
    - The damage caused by inappropriate incisions, particularly in the case of ‘exploratory’ incisions to find a non-existent mass, can be significant. Such incisions are extremely painful, either primarily or secondarily, and may worsen the lesions.

Thus, a deep, tense abscess that is too painful to bear must be incised; the decision to pack the wound depends on whether spontaneous drainage will continue, the risk of premature closure and the location of the wound. Packing is necessary in case of very deep cavity, concave area, narrow incision or incomplete immediate evacuation. Then, it
Drug therapy. Various drugs have been used long-term; the goal is to stop the evolution, reduce the relapse rate and avoid pain and chronic suppuration. Due to a probable heterogeneity of the disease, one particular patient may benefit from a drug which is useless for others.

- **Antibiotics.** For severely affected patients with a high level of inflammation, pain and discharge, a 10-week regimen of the association of clindamycin and rifampicin is very useful. Patients with Hurley’s stage I or II can benefit from this regimen. A complete remission, sometimes lasting as long as 1 year, is obtained in some patients.
- In less severely affected patients or after the 10 weeks of clindamycin–rifampicin treatment, when inflammation and pain are reduced, a maintenance treatment can be used to prevent or at least alleviate new attacks of nodules and abscesses. Long-term administration of tetracycline may be helpful. No data are available on this use of tetracycline despite the fact that they are widely used.
- High doses of zinc salts (90 mg of Zinc gluconate = 3 times what is used in acne) has proved to be effective in short open series. It helps in maintaining the remission in a significant number of patients.
- Metronidazole particularly in case of bad odour may be helpful.

When surgery is indicated for stage III or severe stage II disease, a 1-month course of antibiotics prior to surgery is potentially useful to prevent infectious complications. In addition, this may better delineate and identify the lesions to be excised, and effectively ‘downsize’ the area to be excised.

- **Antiandrogens.** Cyproterone acetate-2 mg/day – associated with estrogens as a contraceptive pill has been compared with a ‘classical contraceptive pill’; no difference was observed between the two products. It may exceptionally be useful at very high doses, i.e. 100 mg/day in a very limited number of patients. A retrospective study of 64 females treated with cyproterone acetate claimed to have demonstrated superiority upon antibiotic treatment. This result deserves at least a ‘second look’. Finasteride has been used in about 10 female patients with claimed good results.

- **Retinoids.** Isotretinoin is ineffective in contrast to what is observed in acne. The absence of hyperseborrhea in HS may explain the difference. Some reports of successful treatment with etretinate or acitretin have been published (reviewed).

- Dapsone has been used with good results. Such a drug should be used with caution owing to its very serious side effects.

- **Anti-TNF drugs.** Several case reports and short series have claimed a dramatic efficacy of Infliximab, Etanercept, and Adalimumab in severely affected patients. Long-term efficacy has been claimed for both Infliximab and Etanercept. Beyond the initial enthusiasm for new ‘magic pills’, the real risk/benefit ratio remains to be determined as the usual bias toward positive publication is clearly at work, and that conflicting results have been published: only transient efficacy was observed with Infliximab in a series of seven patients with two patients having sustained results and three having severe side effects. In a prospective open study of 15 patients treated with Etanercept 50 mg weekly, only three were considered as responders. Thus, the question is now raised: are tumour necrosis factor-alpha blockers the ultimate alternative? It is obvious that these drugs may be helpful, and sometimes have a dramatic efficacy. Today, they are to be used in case of failure of the ‘standard’ very effective antibiotic association of clindamycin and rifampicin. A face-to-face comparison of anti-TNF drugs and this antibiotic association is highly desirable.

Radiotherapy. Several series of patients have been treated with radiotherapy. Doses up to 8 gray have been delivered with good results. Considering the spontaneous high risk of cancer, especially skin cancers in gluteal and intergluteal locations, this potentially carcinogenic treatment should be considered with caution. Despite this risk, there are still advocates of radiotherapy in HS.

Surgical treatment

It has to be performed by an experienced surgeon, aware of the difficulties and failures which may occur in HS. The proper identification of the entire lesion is important as remnant tissue may facilitate recurrences. High-frequency ultrasound examination of the skin and/or magnetic resonance imaging may be helpful. The major clue to a good and permanent result is the mapping of sinus tracts and fistulas, usually done during the surgical intervention.

Minor procedures. Local excisions and primary closure: When the extent of skin involvement is limited, especially in case of relapsing abscess and suppuration at the same location, a local excision can be done. In patients with Hurley’s stage I and a permanent or recurring draining sinus, it is extremely helpful with a minimum of distress for the patient as it can be done under local anaesthesia and as ambulatory patient. It is unhelpful in cases of many burrowing abscesses or in case of new lesions appearing regularly in different locations.

Exteriorization and deroofing of tracts may be an alternative therapy.

Radical excision and healing with secondary intention or graft. It is the best option, in fact the only option, in stage III. Such a wide excision should be performed by a surgical team with a good knowledge of HS. The extent of excision must be wide and deep enough to remove all suppurative lesions and tracts, and also if possible, all apocrine gland bearing skin to avoid recurrence.
Mapping of sinus tract with methyl blue intra-operatively is of utmost importance. Spontaneous healing is frequently the best solution. Primary closure is possible in the axilla but may lead to limited mobility of arms. Secondary closure is done by graft or flaps. Transillocational colic derivation may be necessary to allow healing in peri-anal location. Recurrences may occur either because of insufficiently wide excision or because of the presence of subclinical predisposing structural or functional abnormalities, i.e. apocrine follicles in aberrant locations. The recurrence rate after wide excision is less than 30%. A study of 72 patients treated by excisional surgery of localized lesions reported a high satisfaction of patient despite recurrences. Wide surgery does not modify the spontaneous evolution of the disease which may appear in another location not previously involved; it is not a recurrence.

Lasers. CO₂ laser excision is used in mild to moderate disease with secondary healing. Superiority in comparison with a classic surgery is a matter of debate. Laser depilation to prevent new lesions is an investigative procedure in early mild HS.

Photodynamic therapy has been disappointing. The deep lesions of HS do not seem to be good targets for this kind of superficial treatment.

Conclusion
HS is an orphan disease not because of its rarity – it is frequent – but because of the absence of knowledge from physicians. Treatments are not curative – except wide surgery which can be done only for very severe cases – but entail good management; using ‘classical’ well-known treatments is often more useful than the so-called ‘innovative treatments’, the balance of risk/benefits of which are unknown today.

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Information on author

Jean Revuz was nominated intern of the Paris Hospitals in 1964. He did his resident medical studentship in Paris, particularly in the Saint Louis Hospital as a student of Robert Degos.

In 1970, under the authority of René Touraine, Revuz co-founded with Touraine the dermatology department of the Henri Mondor Hospital in Créteil. Henceforth, Revuz started to develop his expertise in the area of serious dermatosis and drug reactions. He was nominated to a PhD in 1977 and became a titular professor in 1990. In 1989, he became the head of the hospital’s dermatology department.

He is a member of numerous societies, e.g. the American Dermatology Academy, and was president of the French Dermatology Society in 1995. Jean Revuz was also the president of the 20th World Congress of Dermatology held in Paris 1-5 July 2002.

He is the author of more than 300 original publications and has likewise written a great number of book chapters. Since 1971, he has been the prime mover of a team studying the secondary cutaneous effects of medication. A great number of publications on serious drug reactions, in particular the Lyell syndrome (Toxic Epidermal Necrolysis) and the organization of two congresses on this subject have increased the reputation of his Créteil team.

For 10 years, he has been involved in taking care of patients with hidradenitis suppurativa and has published several papers about epidemiology and treatment of this disease. Now retired from the hospital, he has opened a private office in Paris devoted to this common but often ignored disease.

Figure 1 Axillary nodular superficial lesion with an abscess formation.
Figure 2 Sinus tract and pyogenic granulomas.
Figure 3 Deep-seated nodular lesion.
Figure 4 Hypertrophic ‘rope-like’ scar.
Figure 5 Open comedos in burn out lesions.
Figure 6 Locations prevalence in both sexes; the statistical differences between men and women are shown (data from 302 patients; ref 11).
Figure 7 Age and sex repartition of HS patients at first visit.
Figure 8 The terrible Hurley grade III.
Figure 9 Lymphedema of the pubis: a complication of HS.
Figure 10 Squamous cell carcinoma on HS: always on the buttocks in men; bad prognostic.