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REVIEW

Towards a Paradigm Shift in Delivering Hidradenitis Suppurativa Care: a Narrative Review

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ABSTRACT

Hidradenitis suppurativa (HS) is a chronic inflammatory skin disorder characterized by deep-seated nodules, recurrent painful abscesses, and draining tunnels in the intertriginous skin areas that may lead to irreversible tissue damage and scarring. This disfiguring and debilitating disease is also associated with several systemic comorbid disorders, mental health issues, and reduced quality of life. Recent research has significantly advanced our understanding of HS pathogenesis, thereby opening doors to novel treatments. However, challenges persist, such as disease underreporting, diagnostic delays, and a scarcity of evidence-based treatments. Owing to diagnostic delays, the therapeutic "window of opportunity" is often missed, contributing to suboptimal outcomes, with the patient receiving treatment only at advanced stages of the disease. The heterogeneity in outcome measures and the relative lack of well-defined disease phenotypes and biomarkers further complicates the management of the disease. Strategies aimed toward early treatment initiation, identifying patient phenotypes or risk factors for rapid

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disease progression, and timely intervention with biologic therapy could enhance treatment outcomes. This article presents a review of these critical areas and the potential measures that could improve patient care leading to a better quality of life.

Keyword: Hidradenitis suppurativa; Patient care; Management; Biologic therapy

Key Summary Points
Hidradenitis suppurativa (HS) is a chronic inflammatory skin disease associated with physical and psychosocial impairment significantly affecting the quality of life
The complex pathogenesis, disease-related stigma, underreporting of the disease, delay in diagnosis, and limited evidence-based treatments contribute to a high disease burden and an unmet clinical need
This review aims to identify the challenges in the diagnosis and treatment of HS and discuss strategies towards better management of the disease, ultimately improving the quality of life of people living with HS
The review emphasizes the importance of well-crafted educational programs for patients and clinicians, an interdisciplinary approach, advanced treatment protocols, and the establishment of competence centers to accelerate patient journey, thereby improving the diagnosis and treatment of the disease
Establishment of competence centers will facilitate a multidisciplinary, proactive treatment approach, which, in turn, may ensure that the "window of opportunity" for HS management is not missed; identifying phenotypes and initiating early treatment including timely biologic therapy can enhance outcomes

INTRODUCTION

Hidradenitis suppurativa (HS) is a chronic, inflammatory, recurrent skin disease affecting the hair follicles, characterized by painful, deep-seated inflammatory nodules, abscesses, dermal tunnels, and scarring, most commonly occurring in the axillary, inguinal, and anogenital regions [1, 2]. This disfiguring and painful condition usually starts in late puberty or early adulthood, and can lead to anxiety, depression, social stigma, and isolation, having a profound impact on patients' quality of life (QoL) [1, 3–6]. Depression, anxiety, and suicidality are about twofold more likely in patients with HS than in the general population [7]. The unsightly skin appearance, severe pain, purulent secretions with unpleasant odor, and movement restrictions due to scarring are major barriers preventing the individual from leading a professionally and socially productive life [2, 4, 8, 9]. HS is also associated with several systemic comorbid disorders, including metabolic syndrome and cardiovascular disease, which may contribute to the reduced life expectancy of people with HS, further adding to the disease burden [10–13]. Despite being a relatively common disease, the reported global prevalence is 0.3–1%, which is estimated to be lower than the actual prevalence of HS due to the underreporting and underdiagnosis of the disease [14–16].

Although the precise pathogenesis of HS is not yet completely understood, research has shown it to be an autoinflammatory disorder associated with follicular occlusion [17]. Multiple factors are involved in the pathogenesis of HS, including genetic predisposition, epithelial dysfunction, immune dysregulation, as well as lifestyle factors such as obesity and smoking [17–20]. To date, several genetic variants associated with HS susceptibility have been reported, but a genotype/phenotype correlation and genetic markers predicting disease progression and treatment response are still lacking [21, 22].

Mechanisms driving the pathogenesis of HS are complex and include immune activation and progression to chronic inflammation. Numerous inflammatory cytokines are involved, with tumor necrosis factor (TNF)-α, interleukin

(IL)-17, and IL-1 α/β playing key roles [15, 20]. Hyperkeratosis of the hair follicle orifice and immune activation (involving proinflammatory cytokines such as TNF, IL-1β, and IL-17) around the terminal hair follicles occur in the intertriginous areas of the body [15, 23]. Although HS is not an infectious disease, bacterial propagation in the intertriginous skin, particularly within the blocked hair follicle units, can contribute to immune activation and inflammation. The inflammation then leads to pus formation, which progresses to irreversible tissue destruction causing scar development [15].

HS poses significant challenges for dermatologists, which include managing a patient with advanced lesions due to the long delay in diagnosis, limited number of evidence-based therapies available, and lack of curative drug treatments [15]. As a result, treatment is inadequate and unsatisfactory for many patients. A survey-based study showed that patients with HS experience a high disease burden despite being actively treated by a dermatologist [24].

With a complex pathogenesis, disease-related stigma, underreporting, delay in diagnosis, and complicated therapeutic decision-making, HS is a disease with clear unmet medical as well as socioeconomic needs [24, 25]. This article reviews the ongoing efforts towards improving the understanding, diagnosis, and management of HS and discusses the potential measures that can bring a paradigm shift in patient care, which involves moving from traditional approaches to new methods that are more effective, ultimately enhancing the QoL of people living with HS.

This article is based on previously conducted studies and does not contain any new studies with human participants or animals performed by any of the authors.

DELAYED DIAGNOSIS IN HS

Despite being considered as one of the dermatological conditions with the greatest impact on patients' QoL, HS is often underrecognized and misdiagnosed, resulting in a delay in appropriate treatment [26]. An average delay of 7–10 years has been reported between the onset of symptoms and the diagnosis of HS [25, 27, 28]. Patients with HS are hesitant to actively seek medical care and may defer consulting a clinician for several years. The disease itself, with its devastating symptoms and with comorbid disorders such as obesity, is associated with internalized stigma, causing a significant barrier for the patient to access healthcare in a timely manner [29].

Furthermore, when the patient presents to the clinician, diagnosing HS may not be straightforward. The diagnosis is primarily made based on the medical history and clinical presentation of the typical recurrent lesions [30]. Thus far, no biological or pathological tests or specific serological markers are available for HS diagnosis [2]. Therefore, correct diagnosis of HS is mainly dependent on the ability of the treating physician to accurately recognize the signs and symptoms of HS. For instance, rather than focusing on a single lesion, such as a furuncle, it is important to recognize the pattern of multiple skin lesions occurring over time. Moreover, the clinical presentation of HS is heterogeneous, with several distinct subphenotypes of HS, and numerous other conditions may clinically resemble HS [15]. Furthermore, clinicians may overlook HS due to issues such as the need to expose intimate flexural areas. For instance, a colorectal surgeon treating a pilonidal sinus might not expose other flexural areas, such as the axilla, which may be necessary to diagnose HS [31]. Thus, lack of disease awareness, delay by the patient in consulting a physician, and the overlooking of the diagnosis by the consulting physician are some of the potential reasons for the delay in diagnosis [27, 32].

DISEASE SEVERITY SCORING IN CLINICAL TRIALS VERSUS CLINICAL PRACTICE

The scoring of HS lesion counts is complex due to the heterogeneity of the disease, the availability of several scoring instruments, and the lack of a standardized instrument. While more than 30 instruments exist, only a few are relevant, validated, and widely used. Recent publications

have provided a detailed review of the more commonly used scoring systems, describing their merits and limitations [33–36].

The scoring systems used for clinical trials may not always be suitable for use in clinical practice. While a simple, easy-to-use instrument that is not time-consuming and indicates disease severity is ideal for routine clinical practice, instruments that offer more comprehensive evaluation and can accurately measure therapeutic response are preferred in clinical trials [34, 35, 37]. Hurley staging is not a dynamic measure of disease severity and is better suited to preoperative assessment, its original purpose. The refined Hurley system offers a more nuanced stratification of patients, distinguishing between inflammatory and noninflammatory elements of HS [38]. Hidradenitis Suppurativa Clinical Response (HiSCR) has been used as the primary outcome in HS phase 3 randomized controlled trials; however, it does not quantify the number of draining tunnels [39]. This is an important factor to be considered, as failing to account for draining tunnels can significantly affect the outcomes of clinical trials and the development of new therapies [40, 41]. The International HS Severity Scoring System (IHS4) assigns a score of one for each inflammatory nodule, a score of two for each abscess, and a score of four for each draining tunnel (Fig. 1) [42]. IHS4 has been considered as the HS outcome measure of choice in both the new German and European guidelines [43, 44]. In addition to IHS4, the validated Severity Assessment of Hidradenitis Suppurativa (SAHS) score has been recommended in the recent German guidelines and includes the patient-related outcomes, pain and flares [45, 46].

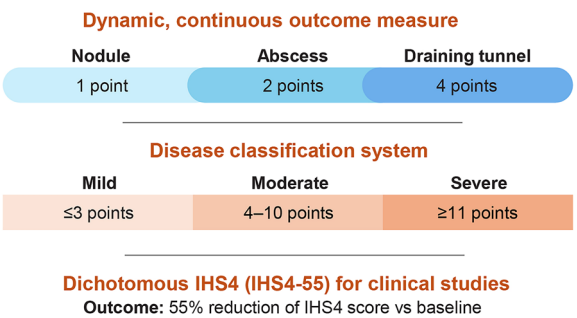

Fig. 1 International Hidradenitis Suppurativa Severity Score System (IHS4): three measures in one

Currently, patient-reported outcome measures (PROMs) are included as secondary outcomes in clinical trials and are frequently used to monitor treatment response in clinical practice. They can be completed by patients in the waiting room, providing clinicians with an immediate assessment of HS disease impact and any need to consider treatment escalation. These instruments also have the potential for patient self-monitoring. While generic PROMs, particularly the dermatology quality of life instrument (DLQI), were commonly used previously, HS-specific instruments, particularly the Hidradenitis Suppurativa Quality of Life (HiSQoL) instrument, which was developed by the HIdradenitis SuppuraTiva cORe outcomes set International Collaboration (HiSTORIC), is now used [47, 48].

MANAGEMENT OF HS

Management of HS poses challenges due to the heterogeneous nature of the disease, which includes variations in the location, severity, and level of inflammation of individual HS lesions, as well as the patient's medical history and coexisting conditions. The goals of treatment are to manage the symptoms of active lesions, prevent disease progression and formation of new lesions, and improve patients' QoL [2, 49]. The current treatment recommendations suggest clindamycin 1% solution as the first-line treatment of mild disease, with the possibility of intralesional corticosteroid injections for individual lesions (Fig. 2) [1, 44, 46, 50]. Systemic antibiotics remain an important element of HS treatment currently, with oral tetracyclines such as doxycycline 100 mg twice a day (bid) orally as initial therapy. The combination of clindamycin and rifampicin (each 300 mg bid orally) is recommended as the second-line treatment for mild-to-moderate disease or as a first-line or adjunctive treatment in severe disease. Antibiotics are recommended to be used for 12 weeks in the first instance [44, 46, 50, 51].

Biologics are recommended for the treatment of moderate-to-severe HS unresponsive

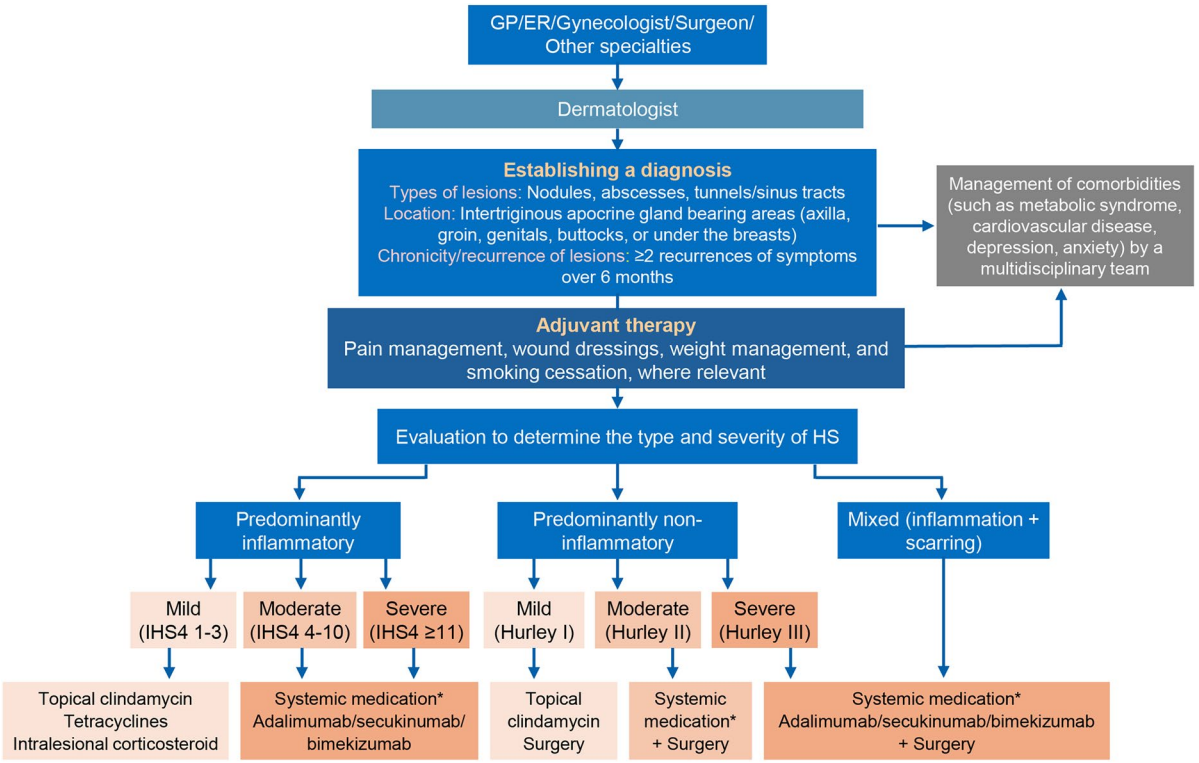

Fig. 2 Management of a patient with hidradenitis suppurativa. *Tetracycline, clindamycin, rifampicin. *ER* emergency room, *GP* general practitioner

to systemic antibiotics [50]. Currently, three biologics are approved for the treatment of HS: adalimumab, secukinumab, and bimekizumab. Adalimumab, a fully human, immunoglobulin (Ig)G1 monoclonal antibody specific for TNF-α, was approved by both the European Medicines Agency (EMA) and the US Food and Drug Administration (FDA) in 2015 for the treatment of patients with moderate-to-severe HS [52, 53]. The efficacy and safety of adalimumab have been demonstrated in two phase 3 trials (PIONEER I and II) [54, 55]; HiSCR rates at week 12 were higher in the adalimumab group versus placebo group (PIONEER I: 41.8% versus 26.0%; PIONEER II: 58.9% versus 27.6%) [54, 55]. Adalimumab has also shown efficacy and safety in real-world studies [56, 57]. In 2023, secukinumab, a fully human monoclonal antibody that selectively neutralizes IL-17A, was approved by the EMA for the treatment of patients with active moderate-to-severe disease who have an inadequate response to conventional systemic HS therapy [58]. It has also been approved by the US FDA for the treatment of adults with moderate-to-severe HS [59]. In two phase 3 trials (SUNSHINE and SUNRISE) of patients with moderate to severe disease, secukinumab showed rapid symptom relief with higher HiSCR rates versus placebo at week 16 (SUNSHINE: 45% in the secukinumab every 2 weeks group and 42% in the secukinumab every 4 weeks group versus 34% in the placebo group; SUNRISE: 42% in the secukinumab every 2 weeks group and 46% in the secukinumab every 4 weeks group versus 31% in the placebo group). The efficacy was sustained to 52 weeks with a favorable safety profile and improved QoL [60]. Recently, bimekizumab (IL-17A and IL-17F inhibitor) demonstrated clinically meaningful improvements versus placebo in two phase 3 studies (BE HEARD I and BE HEARD II). In both studies, higher HiSCR50 rates were observed with bimekizumab versus placebo at week 16 (BE HEARD I: 48% versus 29%; BE HEARD II: 52% versus 32%) and were

sustained to week 48. Based on these data, bimekizumab was approved by the EMA and FDA for the treatment of active moderate-to-severe HS in adults with an inadequate response to conventional systemic HS therapy [61–64]. Furthermore, several other biologics are currently being assessed for their efficacy and safety in HS. The IL-36 receptor antagonist spesolimab, IL-17A/F nanobody sonelokimab, the Janus kinase (JAK1) inhibitors povorcitinib and upadacitinib, and the Bruton tyrosine kinase inhibitor remibrutinib are being evaluated in phase 3 clinical trials and several other molecules in phase 2 trials (Table 1) [65].

Surgery is also an important treatment option for patients with HS. The need for surgical treatment is determined according to the Hurley staging, and the choice of surgery depends on various factors including specific characteristics of the disease and the type and extent of lesions [38]. For acute abscesses, incision and drainage may provide temporary pain relief but does not alter the natural history of disease [46]. Recurrent nodules and tunnels may be best treated with deroofing or excision [66]. Wide surgical excision, CO_2 laser, or electrosurgical excision (with or without reconstruction) is suitable for chronic scarred lesions. Wound healing following surgery may be through secondary intention (generally preferred to reduce the risk of recurrence), primary closure, delayed primary closure, flaps, or grafts [50, 67, 68].

Table 1 Targeted therapies for the treatment of hidradenitis suppurativa: approved and in phase 2/phase 3 clinical trials

Drug name	Target	NCT identifier/references
Drugs approved[a] for the treatment of hidradenitis suppurativa		
Adalimumab	TNF-α	[52, 53]
Secukinumab	IL-17A	[58, 59]
Bimekizumab	IL-17A, IL-17F, and IL-17A/F	[62, 64]
Key drugs in phase 3/phase 2 clinical trials		
Spesolimab	IL-36	NCT05819398
Sonelokimab	IL-17A/F	NCT06411899
Povorcitinib	JAK	NCT05620823 and NCT05620836
Upadacitinib	JAK	NCT05889182
Remibrutinib	BTK	NCT06799000 and NCT06840392
Lutikizumab	IL-α/β	NCT05139602
Iscalimab	CD40	NCT03827798
Ianalumab	BAFF-R	NCT03827798
Eltrekibart	CXCL1-3 and CXCL5-8	NCT06046729
BDB-001	C5a	NCT05093855
Vilobelimab	C5a	NCT03487276

[a]Approved by the EMA and the US FDA

BAFF-R B-cell-activating factor receptor, *BTK* Bruton tyrosine kinase, *CD* cluster of differentiation, *C5a* complement fraction 5a, *CXCL* C-X-C chemokine ligand, *EMA* European Medicines Agency, *FDA* Food and Drug Administration, *IL* interleukin, *JAK* Janus kinase, *TNF* tumor necrosis factor, *US* United States

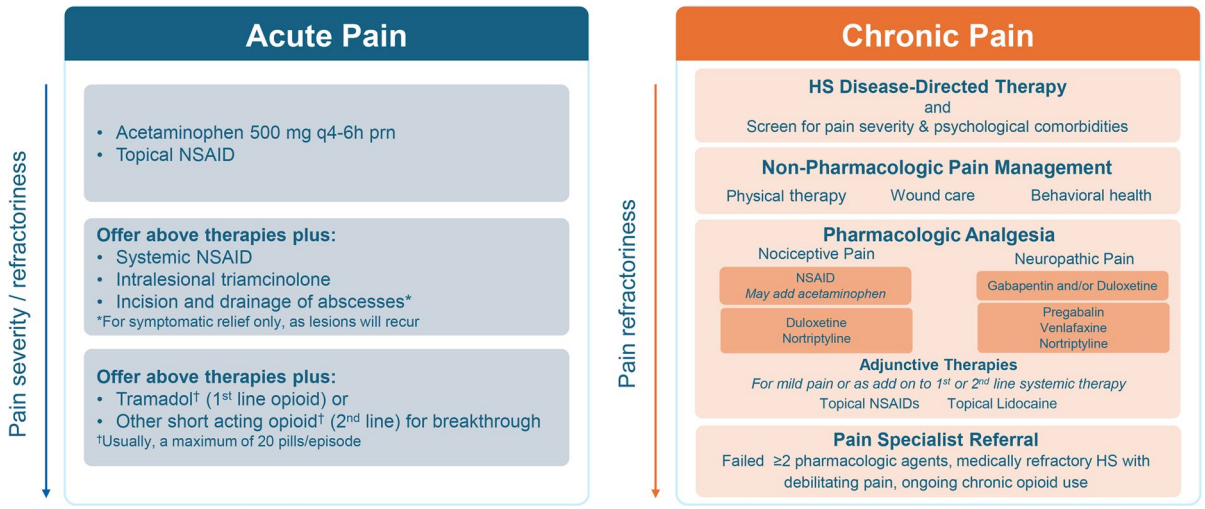

Fig. 3 A proposed treatment algorithm for pain management in HS. Reprinted from *J Am Acad Dermatol*, 85, Savage KT, Singh V, Patel ZS, Yannuzzi CA, McKenzie-Brown AM, Lowes MA, Orenstein LAV, Pain management in hidradenitis suppurativa and a proposed treatment algorithm, 187–199, Copyright (2021) with permission from Elsevier. *HS* hidradenitis suppurativa, *NSAID* nonsteroidal antiinflammatory drugs

For pain management, topical analgesics and nonsteroidal antiinflammatory agents are recommended as first-line modalities and a short course of opioids for severe pain that is uncontrolled with first-line therapies. Figure 3 shows the algorithm proposed by Savage et al. for the treatment of acute and chronic pain in HS [69]. These treatment approaches are complemented by lifestyle modification (smoking cessation and weight loss), provision of wound dressings for suppurative disease, and provision of patient education [50].

BRINGING ABOUT A PARADIGM SHIFT IN HS CARE

Accelerating Patient Journey

Patients often delay seeking medical attention, which is followed by prolonged cycles of consultations and being misdiagnosed prior to receiving an accurate diagnosis, appropriate treatment, and appropriate referral to a dermatologist [70–72]. Educating both patients and healthcare professionals (HCPs) is essential to facilitate an early and accurate diagnosis, which will, in turn, ensure timely initiation of appropriate treatment. Patient-focused programs that are designed to normalize and destigmatize HS may encourage seeking timely help. Increasing awareness among clinicians in primary care can accelerate the identification of patients with HS, leading to timely referrals to dermatologists. The key is to recognize the occurrence of multiple inflammatory skin lesions over time, rather than providing only immediate management for a single lesion that may have prompted the consultation. Oral tetracyclines can be initiated as the first line of treatment in nondermatology settings. Dermatologists can then establish a diagnosis, assess the disease severity, and administer appropriate treatment based on the disease stage (Fig. 2).

Most patients have associated symptoms and comorbid disorders for which they need integrated care. Implementing an interdisciplinary approach, involving collaboration between HCPs from various specialties, such as a dermatologist, surgeon, gastroenterologist, rheumatologist, cardiologist, psychiatrist, pain management specialist, and dietician (and, occasionally, urologist and gynecologist), can streamline the disease management process and provide comprehensive care for patients. Additionally,

competence centers for HS that offer holistic care by an experienced multidisciplinary team, capable of providing evidence-based treatment including the full range of biologics and HS surgery, as well as providing patient education and lifestyle modification interventions, can act as hubs for HS care. Establishment of such HS competence centers will help integrate advanced treatment protocols with specialized care and would bring about a paradigm shift in the delivery of healthcare, aiming to improve outcomes and patient satisfaction. Additional activities can include establishing patient support groups and online resources to provide information on the disease and support to patients.

The assessment instruments used for HS may also have an influence on the patient journey. Complicated measures for lesion counts can be difficult [73] and time consuming; therefore, simple, reproducible, and quick objective outcome measures, such as the IHS4 and IHS4-55 may be used (Fig. 1) [40, 42]. PROMs may also be very helpful for routine care as discussed above. Similar to measuring the QoL (for example, with the HiSQOL questionnaire), it is important to measure pain, typically with a numerical rating scale (NRS) from 0 to 10 or the pain index [74]. Quantifying pain helps to prompt HCPs to provide adequate analgesia, while a drainage NRS score helps determine whether wound dressings are needed for pus-producing, suppurative disease.

Window of Opportunity

Delay in treatment initiation has been shown to be associated with a lack of clinical response in HS, highlighting the existence of a "window of opportunity" for treatment [75]. Therefore, it is imperative to target this "window of opportunity" in the management of HS to ensure that treatment is received at a stage when it is most effective, that is, when the lesions are still reversible prior to the formation of scarring (Fig. 4) [76, 77]. Once draining tunnels are formed and undergo epithelialization, they cannot be reversed by medical therapy, and surgery is the only option.

All attempts must be made to avoid missing the "window of opportunity" when treating HS; educating both clinicians and patients can play a vital role in achieving this goal. However, the concept of fully reversing HS disease pathology to achieve normal unscarred skin is similar to the treatment paradigms for Crohn's disease. In an ideal scenario, this would involve clinical presentation with only nodules and abscesses without the presence of scars or tunnels, which are indicators of irreversible damage.

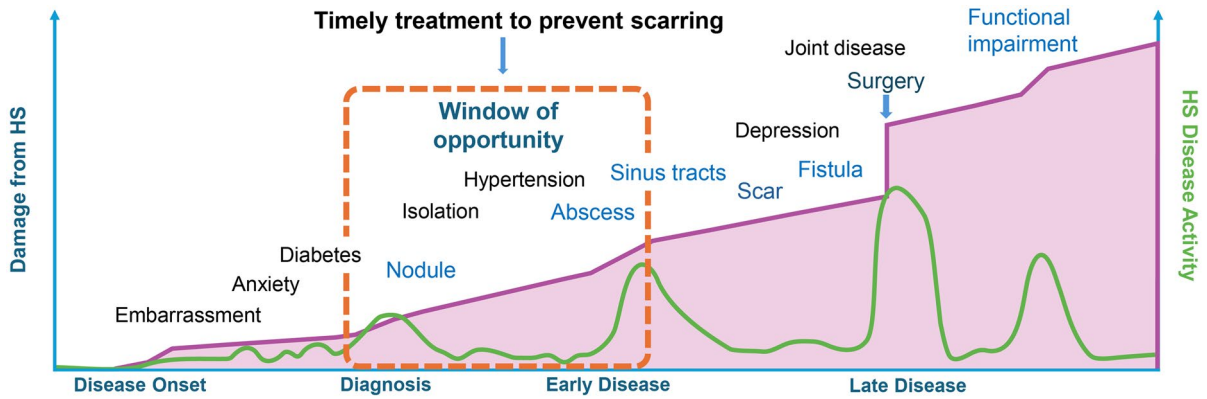

Fig. 4 Window of opportunity in hidradenitis suppurativa. This is adapted from a figure published in *Actas Dermosifiliogr*, 107, Martorell A, Caballero A, González Lama Y, Jiménez-Gallo D, Lázaro Serrano M, Miranda J, Pascual JC, Salgado-Boquete L, Marín-Jiménez I, Management of patients with hidradenitis suppurativa, 32–42, Copyright Elsevier (2016) *HS* hidradenitis suppurativa

Identification of Patient Phenotypes in HS

HS demonstrates high variability, not only in the types and sites of lesions but also in the treatment response. While researchers have attempted to classify HS phenotypes, the utility of the proposed classification systems remains limited [78–81]. In particular, for the phenotypic subtypes to be useful and have practical applicability, they should be able to guide outcomes such as treatment response or rate of disease progression [82, 83]. Ongoing research on identifying specific clinical and molecular phenotypes may aid therapeutic decision-making and improve treatment outcomes [82, 84]. Beyond phenotypes, the identification of molecular endotypes for each patient could also help improve treatment strategy in HS in the future.

Identification of Risk Factors for Rapidly Progressive/Severe Disease

Identifying risk factors, both demographic and disease-related, can facilitate prompt treatment in patients with HS. Clinical studies have revealed several risk factors associated with disease severity, including male sex, longer disease duration, high body mass index, and smoking [85–87]. Certain risk factors may influence the treatment choice, and, therefore, these patients should be closely monitored and, when warranted, advanced treatment should be considered [85]. Furthermore, it has been suggested that a relatively rapid disease progression from Hurley stage I to Hurley stage II is a predictive factor for development of Hurley stage III HS [88]; adequate treatment and a close follow up should also be considered in these patients.

Additionally, other possible phenotypic markers of disease severity may include diffuse genital involvement [89] (i.e., multiple tunnels coalescing into plaques), atypical locations (e.g., head and neck with aspects of dissecting cellulitis of the scalp) [90], extreme follicular hyperkeratotic phenotype [91] (mostly observed in Arabic and Asiatic populations), and the inflammatory phenotype [92]. The incorporation of imaging techniques, particularly ultrasound, plays an important role in the severity classification of HS, especially where clinical examination alone may not be adequate [93]. Ultrasound has shown promising results as complementary tests in enhancing disease characterization by identifying imaging markers such as tunnel subtypes and signs such as the "railway sign"; long-wave medical infrared thermography (MIT) is useful for detecting subclinical severity [94–97]. These markers may help in more accurately defining prognostic risks and therapeutic outcomes but are not currently part of routine clinical practice.

Use of Biologics in HS

In the context of HS, the utilization of biologics represents a paradigm shift in patient care [98]. By directly targeting immune dysregulation, and inflammatory processes underlying the disease, biologics offer new hope for patients and have the potential to transform the landscape of HS care [99]. Early intervention with biologic treatment decreases disease severity and may slow HS disease progression [70, 75]. However, most current treatment guidelines for HS recommend the use of biologics towards the end of the treatment pathway, rather than encouraging proactive treatment in the "window of opportunity" [50].

Evidence indicates that biologics, when used in combination with surgery, improve the results achieved through medical therapy or surgery alone for mixed inflammatory and noninflammatory disease. Adalimumab is an effective and safe adjunct to HS wide excision surgery when continued during the perioperative and postoperative periods, reducing HS recurrence in the wound bed and controlling HS in other skin regions [100].

Thus, biological and small-molecule therapies can play a crucial role in the treatment of HS. Notably, several novel therapies including inhibitors of the JAK/signal transducer and activator of transcription (STAT) pathways are currently being explored and have shown promising results in early phase development [8].

Treatment of HS versus Other Dermatological Conditions—Setting Realistic Expectations

The past several years have seen rapid development in the management of inflammatory dermatological conditions. Specifically, with the advent and approval of biological therapies for multiple dermatological diseases such as psoriasis or atopic dermatitis, both clinicians and patients have witnessed positive outcomes with high efficacy and an acceptable safety profile [101, 102]. However, at the present time, most patients with HS develop substantial scarring and have quite widespread skin involvement before they are referred and considered for biologic therapy. As a result, the combination of both biologic therapy and surgery for residual scarring may be required in HS for some time to come.

Artificial Intelligence (AI) in the Management of HS

In recent years, encouraging efforts have been made to utilize AI in various capacities, encompassing evidence generation as well as better management of HS [103, 104]. These include exploring the use of AI for improving symptom understanding [105], for early detection and diagnosis of the disease [106, 107], and for identifying undiagnosed and misdiagnosed patients with HS [108]. In addition, promising efforts have been made to utilize AI for classifying HS disease severity using calibrated clinical images [109] and for developing novel tools to assess severity such as the automated IHS4 [110]. Machine learning has also been utilized to identify HS phenotypes and treatment response, highlighting the potential impact on personalized treatment approaches [111].

We are entering a promising phase where AI could bring significant changes to the medical field, including dermatology, particularly in terms of data generation, patient care, and treatment [112]. However, it is crucial to be aware that the use of AI, especially in the medical field, is associated with challenges and ethical issues including data privacy, the impact of algorithm bias on accuracy, interpretability of AI systems, and transparency in AI decision-making [107]. Therefore, any use of AI should be carried out with the healthcare professionals actively overseeing the process and decision-making. AI tools offer promising support in the diagnosis and management of HS, and their optimal use lies in complementing and enhancing the clinical expertise and judgment of clinicians.

SUMMARY

HS is a debilitating disease that affects both mental and physical well-being, leading to a significant impact on QoL. The pathogenesis of HS involves immune dysregulation with inflammatory cytokines, specifically TNF-α and IL-17, playing a key role. This understanding has guided the development of targeted biological agents for the treatment of HS. Overcoming issues such as lack of awareness and delayed diagnosis remains a challenge and requires well-designed educational activities for clinicians and more support for patients. This will also ensure that the "window of opportunity" for HS management is not missed. To accelerate the patient journey, it is essential to promptly recognize the diagnosis of HS and adopt an interdisciplinary approach, which will reduce the delays in disease management. While the last decade has brought several improvements in HS care, targeting the "window of opportunity" to prevent disease progression and scarring with effective therapy remains the next step to take in HS care.

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Declarations

Conflict of Interest. Falk G. Bechara received honoraria for participation in advisory boards, in clinical trials, and/or as a speaker from AbbVie, Acelyrin, Boehringer Ingelheim, Celltrion, Dr. Wolff, Incyte Corporation, Inflarx, Janssen Cilag, Merck, Mölnlycke, MoonLake, Novartis, Sanofi, Sitala, and UCB. Angelo V. Marzano reports consultancy/advisory board disease-relevant honoraria from AbbVie, Boehringer Ingelheim, Novartis, Pfizer, Sanofi, Incyte, Bristol Myers Squibb, and UCB. Antonio Martorell has received honoraria and/or travel grants and/or has acted as an advisory board member for Novartis, AbbVie, Janssen Cilag, UCB, Lilly, LEO Pharma, L'Oreal, Sanofi, Boehringer Ingelheim, Almirall, Bristol Myers Squib, Sandoz, and Amgen. He has also worked as a principal investigator in clinical trials supported by AbbVie, UCB, Jansen, Bristol Myers Squibb, Lilly, Galderma, Sanofi, Moonlace, Incyte, and Novartis. Hessel H. van der Zee reports personal fees from AbbVie, InflaRx, Novartis, Galderma, and Incyte. Valeria Jordan M. is an employee and shareholder of Novartis. Nicolas Thomas is an employee and shareholder of Novartis. Ivette Alarcon is an employee and shareholder of Novartis. Axel P. Villani reports personal fees from Abbvie, personal fees from Almirall, personal fees from Amgen, personal fees from BMS, personal fees from Eli Lilly, personal fees from Janssen, personal fees from Leo pharma, personal fees from MSD, personal fees from Novartis, and personal fees from UCB during the conduct of the study. Christos C. Zouboulis has received advisory board and consultation fees from Almirall, Biogen, Boehringer-Ingelheim, CLS Behring, Eli Lilly and Company, Estée Lauder, Idorsia, Incyte, Leo, L'OREAL, MSD, NAOS-BIODERMA, Novartis, PPM, Sanofi, ShiRhom, Takeda, UCB, and ZuraBio and lecture honoraria from Almirall, Amgen, Biogen, BMS, NAOS-BIODERMA, L'Oréal, Novartis, Pfizer, and UCB. His departments have received grants from Astra Zeneca, Boehringer-Ingelheim, BMS, Brandenburg Medical School Theodor Fontane, EADV, European Union, German Federal Ministry of Education and Research, GSK, Incyte, Inflarx, MSD, Novartis, Relaxera, Sanofi, and UCB for his participation as clinical and research investigator. He is president of the EHSF e.V., the Deutsches Register Morbus Adamantiades-Behçet e.V., coordinator of the ALLOCATE Skin group of the European Reference Network for Rare and Complex Skin Diseases (ERN Skin), chair of the ARHS Task Force group of the EADV, and board member of the International Society for Behçet's Disease. He is editor of the EADV News and co-copyright holder of IHS4 on behalf of the EHSF e.V. John R. Ingram is a consultant for AbbVie, Boehringer Ingelheim, Cantargia, ChemoCentryx, Citryll, Incyte, Insmed,

Kymera Therapeutics, MoonLake, Novartis, UCB Pharma, UNION therapeutics, and Viela Bio. Until recently, he was the editor-in-chief of the *British Journal of Dermatology* and receives an authorship honorarium for two UpToDate HS chapters. He is the co-copyright holder of HiSQOL and the Investigator and Patient Global Assessment instruments for HS. His department receives income from the copyright of the Dermatology Life Quality Instrument (DLQI) and related instruments. The Department of Dermatology, Erasmus University Medical Center, Rotterdam, The Netherlands and the Departments of Dermatology, Venereology, Allergology and Immunology, Staedtisches Klinikum Dessau, Brandenburg Medical School Theodor Fontane, Dessau, Germany are healthcare providers of the European Reference Network for Rare and Complex Skin Diseases (ERN Skin).

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