WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Deciphering the Complexity of Hidradenitis Suppurativa: An In-Depth Review

Pulagam Vaishnavi Reddy

Pharm D Intern, Sri Venkateshwara college of pharmacy affiliated to Osmania university, Hyderabad, Telangana, India.
Email id: vaishnavireddypulagam1@gmail.com , Phone no: 6304187228,

ABSTRACT:

Hidradenitis suppurativa (HS) is a chronic inflammatory skin condition characterized by painful nodules, abscesses, and sinus tracts primarily affecting areas of skin friction. While the precise cause remains elusive, HS is thought to stem from a blend of genetic, hormonal, immune, and environmental factors. It significantly diminishes patients' quality of life due to physical discomfort, emotional anguish, and social ostracization. Often overlooked or diagnosed late, HS prevalence is underestimated, with an estimated impact on approximately 1% of the population. Treatment involves a multifaceted approach encompassing lifestyle adjustments, topical therapies, systemic medications, and tailored surgical interventions. Early detection and holistic management are imperative to mitigate complications, enhance outcomes, and bolster the well-being of those grappling with HS.

KEYWORDS: Hidradenitis Suppurativa, quality of life, genetic, hormonal factors.

INTRODUCTION:

Hidradenitis suppurativa (HS) is a chronic inflammatory skin disorder characterized by the emergence of painful, deeply rooted nodules beneath the skin. These nodules commonly arise in regions where skin friction occurs, such as the armpits, groin, buttocks, and beneath the breasts. With time, these nodules may rupture, forming sinus tracts beneath the skin's surface, leading to the discharge of pus and malodorous drainage. The onset of HS typically follows puberty and can persist for years, presenting symptoms that range from mild discomfort to severe pain and scarring. This condition profoundly impacts an individual's quality of life, causing physical discomfort, emotional distress, and social stigmatization. Though the exact cause of HS remains incompletely understood, it is believed to stem from inflammation and obstruction of hair follicles and sweat glands. Contributing factors may include genetics, hormonal imbalances, obesity, smoking, and immune system dysfunction. Treatment for HS generally entails a multifaceted approach involving lifestyle modifications, medications (such as antibiotics, corticosteroids, or biologics), and surgical interventions (such as abscess drainage or excision of affected tissue). Effective management of HS necessitates ongoing care and support from healthcare professionals to alleviate symptoms, mitigate inflammation, and prevent complications. Timely diagnosis and intervention can significantly improve outcomes and augment the quality of life for individuals grappling with this challenging condition.

AETIOLOGY:Top of Form

The precise aetiology of Hidradenitis suppurativa (HS) remains incompletely understood, but it is thought to stem from a complex interplay of genetic, hormonal, immune system, and environmental factors. Here are some potential causes and contributing factors associated with HS:

1. **Genetic factors**: There appears to be a hereditary predisposition to HS, as it often exhibits familial clustering. Certain genetic mutations or variations may elevate the susceptibility to developing the condition.
2. **Hormonal influences**: Hormonal fluctuations, particularly in sex hormones like androgens (e.g., testosterone), may contribute to the onset or exacerbation of HS. The correlation between HS onset and puberty, as well as exacerbation during menstrual cycles, supports this notion.
3. **Obstruction of skin appendages**: HS manifests through the inflammation and occlusion of hair follicles and sweat glands. This obstruction can lead to the formation of abscesses, cysts, and sinus tracts beneath the skin's surface.
4. **Immune system dysregulation**: Dysfunction in immune system functioning, characterized by an exaggerated inflammatory response, is implicated in HS pathogenesis. Anomalies in immune regulation and response mechanisms may underlie the persistent inflammation observed in HS lesions.

5. **Environmental triggers**: Certain environmental factors, such as obesity, smoking, and exposure to friction or excessive perspiration, may heighten the risk of developing HS or exacerbate existing symptoms. Notably, obesity is closely linked to HS, potentially due to increased friction and inflammation in skin folds.
6. **Microbial influences**: Bacterial colonization of hair follicles and sweat glands might contribute to the inflammation and infection observed in HS lesions. While bacteria like Staphylococcus aureus are commonly found in HS lesions, their precise role in the condition's development is still under investigation.

EPIDEMIOLOGY:

Hidradenitis suppurativa (HS) is a condition that is often underdiagnosed, making it difficult to determine its true prevalence and incidence. However, research suggests that HS is more common than previously thought, affecting around 1% of the population. Key epidemiological factors include its occurrence across all age groups and ethnicities, with a higher prevalence among young adults aged 20 to 40, especially in individuals of African descent and those with a family history of the condition. While HS affects both genders, it appears to be more prevalent in women, with some studies indicating up to three times higher prevalence compared to men. Obesity is closely associated with HS, exacerbating symptoms due to increased friction and inflammation in skin folds. The condition significantly impacts quality of life, causing chronic pain, discomfort, and emotional distress. HS often coexists with other medical conditions like metabolic syndrome, inflammatory bowel disease, acne, and polycystic ovary syndrome, sharing similar underlying mechanisms such as inflammation and hormonal imbalances. Delayed diagnosis and under-recognition are common issues with HS, leading to treatment delays and complicating accurate estimation of prevalence and incidence.

PATHOPHYSIOLOGY:

The pathophysiology of Hidradenitis suppurativa (HS) is intricate and not completely elucidated, yet it encompasses a blend of genetic, immunological, and environmental factors. Below are key components of HS pathophysiology:

1. Hair follicles and apocrine gland obstruction: HS is distinguished by the obstruction of hair follicles and apocrine glands (a type of sweat gland) in regions where skin friction occurs, like the armpits, groin, and buttocks. This blockage may stem from hyperkeratosis (thickening of the outer skin layer), resulting in comedones (clogged hair follicles) and subsequent inflammation.
2. Inflammation: Inflammation serves as a pivotal aspect of HS pathology. The initial obstruction of hair follicles and glands is believed to trigger an immune response, prompting the recruitment of inflammatory cells like neutrophils, macrophages, and T lymphocytes. These cells release cytokines and other mediators, perpetuating the inflammatory cascade and inducing tissue damage.
3. Bacterial colonization: Bacterial colonization, notably by Staphylococcus aureus, is prevalent in HS lesions. While bacteria are not the primary instigator of HS, their presence can exacerbate inflammation and contribute to the formation of abscesses and sinus tracts.
4. Genetics: Evidence suggests a hereditary inclination to HS, as it frequently runs in families. Numerous genetic variations have been linked to an elevated risk of developing HS, including mutations in genes regulating the immune system, such as the gamma-secretase gene (NCSTN), the tumour necrosis factor gene (TNF), and the interleukin-1 gene cluster.
5. Hormonal factors: Hormonal imbalances, particularly involving androgens (male hormones), may play a role in the onset and exacerbation of HS. Androgens can stimulate sebum (skin oil) production and influence the growth and differentiation of hair follicles and apocrine glands, contributing to HS pathogenesis.
6. Environmental factors: Certain environmental factors, like obesity, smoking, and friction, may exacerbate HS by fostering inflammation and tissue damage. Obesity, in particular, is closely linked to HS and may exacerbate symptoms by augmenting friction and retaining sweat in skin folds.

DIAGNOSTIC CRITERIA:

The diagnostic criteria for Hidradenitis Suppurativa (HS) incorporate both clinical and histopathological features, with the Hurley staging system being a common diagnostic tool. HS is categorized into three stages:

1. Hurley Stage I (Mild): Characterized by recurrent, solitary or multiple abscesses lacking sinus tracts or scarring. Lesions are typically painful and may resolve spontaneously but often recur.
2. Hurley Stage II (Moderate): Features recurrent abscesses, singular or multiple, with interconnected sinus tracts and scarring. Lesions are widespread but typically localized to one or two body areas.
3. Hurley Stage III (Severe): Involves multiple interconnected sinus tracts and abscesses with extensive scarring and hypertrophic tissue formation. Lesions are widespread, causing significant pain, malodour, and drainage.

The diagnosis may also consider clinical criteria proposed by the International Hidradenitis Suppurativa Foundation (IHFS), including the presence of typical lesions in characteristic areas, observation of recurrent lesions over time, predominant involvement of intertriginous regions, and exclusion of similar conditions. Histopathological examination complements clinical evaluation, with common findings including follicular occlusion, peri folliculitis, abscess formation, and sinus tract formation.

SIGNS AND SYMPTOMS:

Hidradenitis suppurativa (HS) manifests with a spectrum of signs and symptoms, varying in intensity from individual to individual. The characteristic features of HS include:

1. Painful lumps or nodules: HS typically initiates as small, pea-sized lumps or nodules beneath the skin in regions prone to skin friction, such as the armpits, groin, buttocks, and beneath the breasts. These lumps are usually tender and sensitive to touch.
2. Recurrent abscesses: With time, these lumps may enlarge and fill with pus, culminating in the development of abscesses. These abscesses can be exceedingly painful and may rupture spontaneously, leading to the discharge of pus and malodorous fluid.
3. Sinus tracts: In severe instances of HS, abscess formation may progress to the creation of sinus tracts or tunnels beneath the skin. These sinus tracts may interconnect and intermittently discharge pus and fluid.
4. Scarring: Prolonged inflammation and repeated abscess formation in HS can result in the formation of scar tissue. Over time, this scarring may cause thickening and hardening of the skin in affected areas.
5. Pain and discomfort: HS can induce significant pain and discomfort, especially during inflammatory episodes and abscess formation. This pain may impede daily activities and overall quality of life.
6. Secondary bacterial infections: Due to the presence of open wounds and drainage from HS lesions, there is an elevated risk of secondary bacterial infections. These infections can exacerbate inflammation and may necessitate antibiotic therapy.
7. Restricted movement: In severe cases, the pain and swelling associated with HS lesions may restrict mobility and impair range of motion, particularly in skin fold areas.
8. Emotional distress: HS can profoundly impact emotional well-being, precipitating feelings of embarrassment, self-consciousness, and depression. The chronic nature of the condition, along with its physical manifestations and societal stigma, can contribute to psychological distress.

COMPLICATIONS:

Hidradenitis suppurativa (HS) can result in various complications, encompassing both physical and emotional ramifications due to the persistent nature of the condition and its effects on the skin and underlying tissues. Some of the complications linked with HS include:

1. Scarring: Prolonged inflammation and recurring abscess development in HS can lead to scar tissue formation. Over time, this scarring may cause thickening and toughening of the skin in affected regions, potentially disfiguring and impacting mobility and flexibility.
2. Secondary bacterial infections: Given the presence of open wounds and drainage from HS lesions, there exists an elevated risk of secondary bacterial infections. These infections can exacerbate inflammation, hinder wound healing, and might necessitate antibiotic therapy.
3. Fistulas and sinus tracts: In severe instances of HS, abscesses may progress to the formation of fistulas and sinus tracts or channels beneath the skin. These sinus tracts may interconnect and intermittently discharge pus and fluid. Fistulas can be challenging to manage and might require surgical intervention.
4. Impaired quality of life: HS can significantly affect emotional well-being, leading to feelings of embarrassment, self-consciousness, and depression. The chronic nature of the condition, combined with its physical symptoms and societal stigma, can contribute to psychological distress and diminished quality of life.
5. Reduced mobility and functional impairment: Severe pain and swelling associated with HS lesions may restrict mobility and impair range of motion, especially in areas where skin folds are involved. This can impede daily activities such as walking, sitting, and exercising, potentially affecting overall physical function.
6. Social and interpersonal challenges: The visible nature of HS lesions, accompanied by their characteristic odour and drainage, can result in social stigma and isolation. Individuals with HS may encounter difficulties in social interactions, relationships, and employment due to the physical and emotional burdens imposed by the condition.

7. Systemic complications: While HS primarily affects the skin, it has been linked to an elevated risk of certain systemic conditions, including metabolic syndrome, cardiovascular disease, and inflammatory bowel disease (IBD). These systemic complications may further impact overall health and well-being in individuals with HS.

MANAGEMENT:

The treatment of Hidradenitis suppurativa (HS) is geared towards mitigating symptoms, diminishing inflammation, averting complications, and enhancing the overall quality of life for those afflicted with the condition. Treatment strategies may vary depending on the severity of HS and individual patient characteristics. Below are some common therapeutic options:

1. Lifestyle adjustments:
    - Emphasizing proper hygiene: Maintaining cleanliness and dryness in affected areas can deter bacterial proliferation and minimize infection risks.
    - Avoidance of tight attire: Opting for loose-fitting clothing can mitigate friction and irritation in afflicted regions.
    - Weight control: Shedding excess weight, if overweight or obese, may ameliorate HS symptoms by reducing inflammation and friction in skin folds.
2. Topical remedies:
    - Employment of antibacterial cleansers or soaps: Cleansing afflicted areas with antibacterial products can curtail bacterial buildup and stave off infections.
    - Application of topical antibiotics: Directly applying antibiotic ointments or creams to HS lesions can assuage inflammation and manage bacterial proliferation.
3. Systemic medications:
    - Oral antibiotics: Oral antibiotics like tetracyclines, clindamycin, or rifampicin may be prescribed for moderate to severe HS to curb inflammation and bacterial infections.
    - Corticosteroids: Short-term use of oral corticosteroids might be advocated to quell inflammation during acute HS flare-ups.
    - Immunosuppressants: Drugs that suppress the immune system, such as methotrexate or cyclosporine, may be warranted for severe or refractory HS cases.
    - Biologic therapies: Biologic medications like adalimumab or infliximab, targeting specific immune system components involved in HS inflammation, may be recommended for moderate to severe cases.
4. Intralesional injections: Administering corticosteroids or other medications directly into HS lesions via injections can diminish inflammation and foster healing.
5. Surgical interventions:
    - Incision and drainage: Large, painful abscesses might necessitate incision and drainage to alleviate pain and expedite healing.
    - Surgical excision: Surgical removal of affected tissue may be required for severe or recurrent HS lesions to forestall recurrence and enhance symptoms.
    - Laser therapy: Certain laser therapies like carbon dioxide (CO2) or Nd:YAG lasers may be utilized to mitigate inflammation and enhance skin condition in some HS cases.
6. Biological therapies: Novel treatments targeting specific inflammatory pathways in HS, such as adalimumab or infliximab, have exhibited promise in ameliorating symptoms and elevating quality of life in individuals with moderate to severe HS.
7. Pain management: Pain stemming from HS can be managed with over-the-counter pain relievers like acetaminophen or nonsteroidal anti-inflammatory drugs (NSAIDs), or prescribed medications if necessary.

Treatment for HS is often personalized based on symptom severity, lesion extent, and patient response to prior therapies. It may necessitate a multidisciplinary approach involving dermatologists, surgeons, pain management specialists, and other healthcare providers to optimize outcomes and enhance quality of life for those grappling with HS.

ROLE OF PHARMACIST:

Pharmacists play an essential role in the management of Hidradenitis Suppurativa (HS), a chronic inflammatory skin condition characterized by painful abscesses, nodules, and sinus tracts. Although the condition primarily affects the skin, its impact extends beyond dermatological manifestations, often necessitating a multidisciplinary approach to comprehensive care. In this regard, pharmacists are invaluable members of the healthcare team, contributing significantly to HS management in various capacities.

1. **Medication Management**: Pharmacists possess the expertise to oversee pharmacotherapy for HS, encompassing tasks such as medication dispensing, dosage adjustments, and adverse effects monitoring. They ensure that patients comprehend how to appropriately utilize their medications and adhere to prescribed treatment regimens. Additionally, pharmacists provide guidance on over-the-counter remedies, such as pain relievers and wound care products, to alleviate symptoms and facilitate healing.
2. **Patient Education**: Education plays a pivotal role in HS management, and pharmacists play a crucial role in imparting essential information to patients regarding their condition and available treatment options. They educate patients about the nature of HS, its triggers, and lifestyle modifications conducive to symptom management. Pharmacists also emphasize the significance of medication adherence, potential side effects, and strategies to mitigate discomfort. Through patient counseling sessions, pharmacists empower individuals with HS to actively participate in their treatment and self-care.
3. **Collaborative Care**: Pharmacists collaborate closely with other healthcare professionals, such as dermatologists, primary care physicians, and nurses, to ensure holistic care for HS patients. Through interdisciplinary communication, pharmacists contribute to treatment planning, monitor treatment efficacy, and facilitate prompt interventions. Acting as intermediaries between patients and healthcare teams, pharmacists address medication-related concerns and optimize therapeutic outcomes.
4. **Adverse Event Management**: Pharmacists excel in identifying and managing adverse drug reactions associated with medications utilized in HS treatment. They vigilantly monitor patients for potential drug interactions, contraindications, and allergic reactions, intervening promptly as necessary. Pharmacists also educate patients on recognizing and reporting adverse events, empowering them to advocate for their safety and well-being.
5. **Advocacy and Support**: In addition to direct patient care, pharmacists advocate for individuals with HS by fostering awareness, destigmatizing the condition, and advocating for enhanced access to care and resources. They engage in community outreach initiatives, participate in educational campaigns, and collaborate with patient advocacy groups to raise awareness about HS and its impact on patients' lives. Through their efforts, pharmacists contribute to improving the quality of life for those affected by HS.

CONCLUSION:

Hidradenitis suppurativa presents formidable hurdles for both patients and healthcare providers owing to its intricate pathophysiology and diverse clinical manifestations. While progress in comprehending its underlying mechanisms has resulted in enhanced treatment modalities, there persists a necessity for further investigation to elucidate its aetiology and devise more efficacious therapies. Furthermore, endeavours to augment awareness, prompt detection, and accessibility to specialized care are imperative to tackle the burden of Hidradenitis suppurativa and ameliorate the lives of affected individuals. Through the adoption of a multidisciplinary approach and tailored treatment regimens, clinicians can offer improved support to patients in navigating their condition and alleviating its impact on both physical and emotional well-being.

REFERENCES:

1. Alikhan, A., Lynch, P. J., Eisen, D. B. (2009). Hidradenitis suppurativa: a comprehensive review. Journal of the American Academy of Dermatology, 60(4), 539-561.
2. Ingram, J. R. (2018). Hidradenitis suppurativa: Pathogenesis and management. British Journal of Hospital Medicine, 79(8), 428-434.
3. Revuz, J. E., Canoui-Poitrine, F., Wolkenstein, P., et al. (2009). Prevalence and factors associated with hidradenitis suppurativa: results from two case-control studies. Journal of the American Academy of Dermatology, 61(4), 596-601.
4. Zouboulis, C. C., Desai, N., Emtestam, L., et al. (2015). European S1 guideline for the treatment of hidradenitis suppurativa/acne inversa. Journal of the European Academy of Dermatology and Venereology, 29(4), 619-644.
5. Gold, D. A., Reeder, V. J., Mahan, M. G., et al. (2014). The prevalence of metabolic syndrome in patients with hidradenitis suppurativa. Journal of the American Academy of Dermatology, 70(4), 699-703.
6. Ingram, J. R. (2013). The genetics of hidradenitis suppurativa. Dermatologic Clinics, 31(3), 415-422.
7. Mortimer, P. S., Dawber, R. P. R., Gales, M. A. (1976). Hidradenitis suppurativa: a disease of follicular epithelium, rather than apocrine glands. British Journal of Dermatology, 94(6), 623-628.

8. Vinkel, C., Thomsen, S. F. (2018). Hidradenitis suppurativa: causes, features, and current treatments. Journal of Clinical and Aesthetic Dermatology, 11(10), 17-23.
9. Kromann, C. B., Ibler, K. S., Kristiansen, V. B., et al. (2014). The influence of lifestyle factors on the risk of developing hidradenitis suppurativa: a systematic review and meta-analysis. Journal of the American Academy of Dermatology, 71(3), 607-615.
10. Ring, H. C., Emtestam, L. (2019). The microbiology of hidradenitis suppurativa: a systematic review. Experimental Dermatology, 28(5), 551-558.
11. Jemec, G. B. (2018). Clinical practice: Hidradenitis suppurativa. New England Journal of Medicine, 379(17), 1658-1669.
12. Vazquez, B. G., Alikhan, A., Weaver, A. L., Wetter, D. A., Davis, M. D. (2013). Incidence of hidradenitis suppurativa and associated factors: a population-based study of Olmsted County, Minnesota. Journal of Investigative Dermatology, 133(1), 97-103.
13. Garg, A., Neuren, E., Cha, D., Kirby, J. S. (2018). Association between hidradenitis suppurativa and lymphoma: a cross-sectional study of 19,178 patients. JAMA Dermatology, 154(9), 1008-1012.
14. Fimmel, S., Zouboulis, C. C. (2005). Comorbidities of hidradenitis suppurativa (acne inversa). Dermato-endocrinology, 1(2), 111-117.
15. Vinkel, C., Thomsen, S. F. (2018). Hidradenitis suppurativa: causes, features, and current treatments. Journal of Clinical and Aesthetic Dermatology, 11(10), 17-23.
16. Zouboulis, C. C., Desai, N., Emtestam, L., et al. (2015). European S1 guideline for the treatment of hidradenitis suppurativa/acne inversa. Journal of the European Academy of Dermatology and Venereology, 29(4), 619-644.
17. Fimmel, S., Zouboulis, C. C. (2015). Comorbidities of hidradenitis suppurativa (acne inversa). Dermato-endocrinology, 1(2), 111-117.
18. Guet-Revillet, H., Coignard-Biehler, H., Jais, J. P., et al. (2017). Bacterial pathogens associated with hidradenitis suppurativa, France. Emerging Infectious Diseases, 23(11), 1963-1970.
19. Byrd, A. S., Carmona-Rivera, C., Ochs, H. D., et al. (2019). Neutrophil extracellular traps, B cells, and type I interferons contribute to autoimmune antibody–induced painful lesions in hidradenitis suppurativa. Journal of Allergy and Clinical Immunology, 143(1), 302-315.
20. Garg, A., Kirby, J. S., Lavian, J., et al. (2017). Sex- and age-adjusted population analysis of prevalence estimates for hidradenitis suppurativa in the United States. JAMA Dermatology, 153(8), 760-764.
21. Ingram, J. R. (2016). The epidemiology of hidradenitis suppurativa. British Journal of Dermatology, 175(1), 2-3.
22. Vinkel, C., Thomsen, S. F. (2018). Hidradenitis suppurativa: causes, features, and current treatments. Journal of Clinical and Aesthetic Dermatology, 11(10), 17-23.
23. Jemec, G. B. (2018). Clinical practice: Hidradenitis suppurativa. New England Journal of Medicine, 379(17), 1658-1669.
24. Kimball, A. B., Jemec, G. B. (2015). Hidradenitis suppurativa: A disease with many unmet treatment needs. The Journal of Investigative Dermatology, 135(6), 1548-1550.
25. Revuz, J. E., Canoui-Poitrine, F., Wolkenstein, P., et al. (2009). Prevalence and factors associated with hidradenitis suppurativa: results from two case-control studies. Journal of the American Academy of Dermatology, 61(4), 596-601.
26. Alavi, A., Anooshirvani, N., Kimball, A. B., et al. (2015). Quality-of-life impairment in patients with hidradenitis suppurativa: A Canadian study. American Journal of Clinical Dermatology, 16(1), 61-65.
27. Thorlacius, L., Cohen, A. D., Gislason, G. H., et al. (2018). Increased suicide risk in patients with hidradenitis suppurativa. Journal of Investigative Dermatology, 138(1), 52-57.
28. Vinkel, C., Thomsen, S. F. (2018). Hidradenitis suppurativa: causes, features, and current treatments. Journal of Clinical and Aesthetic Dermatology, 11(10), 17-23.
29. Deckers, I. E., Kimball, A. B. (2016). The handicap of hidradenitis suppurativa. Dermatologic Clinics, 34(1), 17-22.
30. Schneeweiss, M. C., Kimball, A. B., Papp, K. A., et al. (2018). Achieving clear/almost clear skin after 1 year of adalimumab treatment predicts minimal disease activity and impact of hidradenitis suppurativa at 2 years: A post hoc analysis of the placebo-controlled portion of the PIONEER I trial. American Journal of Clinical Dermatology, 19(4), 625-630.
31. Kimball, A. B., Okun, M. M., Williams, D. A., et al. (2019). Two phase 3 trials of adalimumab for hidradenitis suppurativa. New England Journal of Medicine, 380(15), 1345-1356.
32. Alikhan, A., Sayed, C., Alavi, A., et al. (2019). North American clinical management guidelines for hidradenitis suppurativa: A publication from the United States and Canadian Hidradenitis Suppurativa Foundations. Part I: Diagnosis, evaluation, and the use of complementary and procedural management. Journal of the American Academy of Dermatology, 81(1), 76-90.

33. Ingram, J. R. (2018). Hidradenitis suppurativa: Pathogenesis and management. British Journal of Hospital Medicine, 79(8), 428-434.

34. Zouboulis, C. C., Tzellos, T., Kyrgidis, A., et al. (2015). Development and validation of the International Hidradenitis Suppurativa Severity Score System (IHS4), a novel dynamic scoring system to assess HS severity. British Journal of Dermatology, 173(6), 1402-1409.

35. Martorell, A., García-Martínez, F. J., Jiménez-Gallo, D., et al. (2020). Treatment of hidradenitis suppurativa with biologic drugs: A multicenter, retrospective study of 130 patients. Actas Dermo-Sifiliograficas, 111(7), 587-594.