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Original Research Article

A 10-year retrospective study on primary and recurrent hidradenitis suppurativa

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ABSTRACT

Background: Hidradenitis suppurativa (HS) is a chronic, inflammatory skin disease characterized by follicular occlusion and apocrine gland inflammation. It is often misdiagnosis and delays, resulting in poor quality of life in some cases and severe consequences and poor patient outcomes. Limited literature compares presentation and treatment outcomes of recurrent HS, any information may aid clinicians in prompt diagnosis and treatment to alleviate the various challenges patients face and the complications from disease progression.
Methods: A 10-year (2012-2022) retrospective chart review of the Epic Medisys database that analyzed patients admitted to flushing hospital center with a diagnosis of HS as a primary or secondary diagnosis at our community teaching hospital in Flushing, New York.
Results: In our patient sample, HS was most commonly diagnosed in African-American and female patients under the age of 30 years. Common comorbidities included obesity. Antibiotics had the highest cure rate overall, and surgical interventions were more effective for recurrent disease.
Conclusions: From our study we concluded that most patients were African American and female presenting younger than 30 years with axillary lesions most commonly characterized as nodules and abscesses. Antibiotics had the highest cure rate for both groups; with surgical intervention more effective from recurrent disease.

Keywords: HS, Recurrent disease, Primary disease, Surgical excision

INTRODUCTION

Hidradenitis suppurativa (HS) is a chronic, inflammatory skin disease characterized by follicular occlusion and apocrine gland inflammation. It is a prevalent disease affecting up to 4.1% of the general population and often presents in the 3rd decade of life.[1-4] HS prevalence is higher in women and African Americans.[1,2] Treatment involves antibiotics, biological agents and surgery, depending on severity.[5]

This disease is often misdiagnosed, leading to inadequate treatment, resulting in poor quality of life in some cases and serious consequences such as the development of squamous cell carcinoma due to long-term inflammation.[5-7] With survival rates as low as 33% with malignant transformations of the disease, it is crucial to manage this recurrent disease to improve patient outcomes and quality of life. There is limited literature comparing the clinical presentation and disease course of primary and recurrent HS; thus, any information is valuable to clinicians to aid in diagnosis and management. In this study, we compare the presentation, risk factors, and treatment outcomes of primary and secondary disease to increase clinical awareness of HS and evaluate treatments with the best patient outcomes.

METHODS

This retrospective cohort study included eligible patients admitted to Flushing hospital medical center with a diagnosis of HS from January 2012 to December 2022. A non-probability sampling technique was used, involving the review of all available medical records within the study period that met the inclusion criteria. Patients were classified into two groups: those with a first-time diagnosis of HS (the primary group) and those with a past medical history of HS (the recurrent group). Only patients admitted to Flushing hospital medical center during the study period were included. Patients without a confirmed diagnosis of HS or with incomplete medical records were excluded.

Data were extracted from the Epic Medisys database by trained investigators. Collected patient characteristics included age, sex, ethnicity, comorbidities (e.g., diabetes, obesity), smoking history, and BMI. Clinical presentation was documented, including HS lesion location, lesion characteristics (e.g., abscess, nodule) and any relevant microbiological data. Treatment modalities, classified as conservative management (e.g., antibiotics, biologic agents, steroids)/ surgical intervention (e.g., abscess drainage/excision), were recorded. Cure rates for each intervention were also analyzed.

Ethical approval was obtained from the institutional review board (IRB) of Flushing hospital medical center, ensuring that the study adhered to ethical standards for retrospective research. Descriptive statistics were used to summarize patient demographics, clinical characteristics, and treatment outcomes. Categorical variables were presented as frequencies and percentages. Comparative analyses between the primary and recurrent groups were conducted using chi-square tests for categorical variables and t tests for continuous variables and a $p<0.05$ was considered statistically significant.

RESULTS

We found six hundred sixty-five patients treated for HS as a first-time diagnosis (n=212) or with a past medical history (n=453). Female patients comprised 75% of the primary disease (PD) group and 71% of the recurrent disease (RD) group. 61% and 48% presented at less than 30 years old in the PD and RD groups, respectively. The 39% and 55% were African American for PD and RD, respectively. 36% and 26% were Hispanic for PD and RD, respectively. Smokers comprised 75% of the PD group and 26% of the RD group. 53% of PD and 56% of RD were obese. The 13% of PD and 19% of RD had a diagnosis of diabetes mellitus. For presentation, 62% of PD and 55% presented with axillary lesions; 6% of PD and 8% of RD presented with perineal lesions.

Recurrences occurred in 32%, and treatment included antibiotics (80%), surgery (29%), steroids (8%), and biological agents (3%). The cure rate varied for patients with PD compared to those with recurrent disease based on the treatments used: Antibiotics 87.5% (PD) and 77.1% (RD); steroids 2.7% (PD) and 14.3% (RD); biological agents 3.6% (PD) and 5.7% (RD); elective incision and drainage 5.4% (PD) and 14.3% (RD). Surgical excision was 9.8% (PD) vs. 40% (RD). Emergent incision drainage in the ED had a 12.5% (PD) cure rate vs. 8.6% (RD). The overall cure rate was 22%.

Table 1: Frequencies of sex, age, ethnicity, BMI and comorbidities in patients who presented with primary and recurrent HS.

Category	Overall, (n=665) (%)	PD, (n=453) (%)	Recurrent disease, (n=212) (%)	P value
Sex				
Male	0.26 (176)	0.25 (115)	0.29 (61)	0.41
Female	0.74 (489)	0.75 (338)	0.71 (151)	
Age (in years)				
<31	0.57 (378)	0.61 (276)	0.48 (102)	0.00
31-64	0.34 (229)	0.33 (148)	0.38 (81)	
>64	0.09 (58)	0.06 (29)	0.14 (29)	
Ethnicity				
White	0.05 (30)	0.04 (20)	0.05 (10)	0.00
Black	0.44 (292)	0.39 (175)	0.55 (117)	
Hispanic	0.33 (219)	0.36 (164)	0.26 (55)	
Asian	0.14 (94)	0.16 (74)	0.09 (20)	
Other	0.05 (30)	0.04 (20)	0.05 (10)	
Smoker	0.29 (192)	0.35 (75)	0.26 (117)	0.02
BMI (kg/m^2)				
Underweight	0.02 (12)	0.01 (4)	0.04 (8)	0.07
Normal	0.18 (121)	0.20 (89)	0.15 (32)	
Overweight	0.25 (165)	0.25 (113)	0.25 (52)	
Obese	0.54 (360)	0.53 (241)	0.56 (119)	

Continued.

Category	Overall, (n=665) (%)	PD, (n=453) (%)	Recurrent disease, (n=212) (%)	P value
Comorbidities				
DM	0.15 (100)	0.13 (59)	0.19 (41)	0.05
HTN	0.19 (126)	0.18 (80)	0.22 (46)	0.27
IBD	0.03 (19)	0.02 (11)	0.04 (8)	0.48
Skin disorders	0.34 (227)	0.34 (154)	0.34 (73)	1.00
MSK disorders	0.07 (44)	0.07 (30)	0.07 (14)	1.00
No. of areas affected	2 (2)	2 (2)	3 (2)	0.00

Table 2: Frequency of the location and description of lesions in patients who presented with primary and recurrent HS.

Category	Overall, (n=665) (%)	PD, (n=453) (%)	Recurrent disease, (n=212) (%)	P value
Location				
Axilla	0.60 (397)	0.62 (280)	0.55 (117)	0.12
Inguinal	0.05 (36)	0.05 (22)	0.07 (14)	0.46
Gluteal	0.04 (25)	0.02 (11)	0.07 (14)	0.02
Perineum/perianal	0.07 (44)	0.06 (26)	0.08 (18)	0.24
Combination	0.15 (102)	0.12 (53)	0.23 (49)	0.00
Description				
Nodules	0.36 (239)	0.36 (164)	0.35 (75)	0.90
Abscess	0.58 (385)	0.53 (241)	0.68 (144)	0.00
Fistula/sinus tracts	0.08 (53)	0.05 (24)	0.14 (29)	0.00
Scars/fibrosis	0.12 (77)	0.07 (33)	0.21 (44)	0.00
Erythematous	0.15 (102)	0.16 (71)	0.15 (31)	0.81

Table 3: Frequency of treatment modalities used to treat patients who presented with primary and recurrent HS.

Category	Overall, (n=665) (%)	No PMHx, (n=453) (%)	Yes PMHx, (n=212) (%)	P value
Treatment				
Antibiotics	0.80 (531)	0.79 (356)	0.83 (175)	0.28
Steroids	0.08 (56)	0.06 (25)	0.15 (31)	0.00
Biologics agents	0.03 (23)	0.02 (8)	0.07 (15)	0.00
Surgery excision	0.12 (78)	0.09 (39)	0.18 (39)	0.00
Surgery incision and drainage	0.08 (56)	0.06 (27)	0.14 (29)	0.00
ED excision incision and drainage	0.09 (57)	0.09 (42)	0.07 (15)	0.43
Description				
Recurrence	0.32 (213)	0.22 (99)	0.54 (114)	0.00
Repeat surgery	0.02 (13)	0.01 (3)	0.05 (10)	0.00
Cure/healed	0.22 (147)	0.25 (112)	0.17 (35)	0.02

Table 4: Mean cure rates for the respective treatment modalities for patients who presented with primary and recurrent group.

Treatment	Primary group, N (%)			Recurrent group, N (%)		
	Cured, (n=112)	Not cured, (n=341)	P value	Cured, (n=35)	Not cured, (n=177)	P value
Antibiotics						
No	14 (12.5)	83 (24.3)	0.0118	8 (22.9)	29 (16.4)	0.498
Yes	98 (87.5)	258 (75.7)		27 (77.1)	148 (83.6)	
Steroids						
No	109 (97.3)	319 (93.5)	0.201	30 (85.7)	151 (85.3)	1.0
Yes	3 (2.7)	22 (6.5)		5 (14.3)	26 (14.7)	

Continued.

Treatment	Primary group, N (%)			Recurrent group, N (%)		
	Cured, (n=112)	Not cured, (n=341)	P value	Cured, (n=35)	Not cured, (n=177)	P value
Biologics						
No	108 (96.4)	337 (98.8)	0.208	33 (94.3)	164 (92.7)	1.0
Yes	4 (3.6)	4 (1.2)		2 (5.7)	13 (7.3)	
Excision						
No	101 (90.2)	313 (91.8)	0.739	21 (60.0)	152 (85.9)	<0.001
Yes	11 (9.8)	28 (8.2)		14 (40.0)	25 (14.1)	
OR: incision and drainage						
No	106 (94.6)	320 (93.8)	0.936	30 (85.7)	153 (86.4)	1.0
Yes	6 (5.4)	21 (6.2)		5 (14.3)	24 (13.6)	
ED: excision incision and drainage						
No	98 (87.5)	313 (91.8)	0.242	32 (91.4)	165 (93.2)	0.986
Yes	14 (12.5)	28 (8.2)		3 (8.6)	12 (6.8)	

OR: Operating room, ED: Emergency department.

DISCUSSION

HS, or acne inversa, is a chronic, recurrent, and debilitating illness, and delays in diagnosis and often difficulty in treatment present a significant challenge to patients and providers. HS is a prevalent disease affecting up to 4.1% of the general population; patients often present in the third decade of life.[2-4] The highest proportion of patients in the primary and recurrent disease groups in our studied patient population presented before age 30. Epidemiological studies show women are three to four times more affected than men; within our patient groups, we found three times as many female patients for PD and almost 2.5 more females affected by recurrent disease.[2,3,11-13] In addition, the prevalence has been reported to be two to three times higher for African Americans compared to Caucasian groups.[2] This reflects the racial demographics of our sample group; the highest proportion of patients in both groups were African Americans, and in comparison, to Caucasians, African Americans presented almost five times and more than ten times more frequently for primary and recurrent disease, respectively. Understanding the demographic risk factors can aid in the timely diagnosis of HS, especially with the presentation of HS-like symptoms, especially when the presenting patients are young (below the age of 30), African American, or female.

Timely diagnosis of HS is crucial because HS causes significant physical and psychological challenges to patients. Impairment can be comparable to cancer, cardiovascular disease, diabetes mellitus, and chronic obstructive pulmonary disease.[8] The disease has a considerable impact on the quality of life, posing various challenges to their daily lives, with 95%-97% of patients experiencing significant pain.[2,8] The prevalence of depression has been reported as high as 43% among HS patients, with suicide ideation or attempt rates as high as 12%.[2,9] We found no studies comparing the impact on quality of life and psychological impact between primary and recurrent disease. HS presents a diagnostic challenge for physicians, showing a need for increased clinical awareness. This is reflected in how common delayed diagnosis is: a study of 827 patients found an average of 10.2 years before a diagnosis, and over 60% of patients visited a physician five times before a formal diagnosis of HS.[10] This disease is often misdiagnosed, and patients receive inadequate treatment, resulting in poor quality of life and, in some cases, fatal consequences such as the development of squamous cell carcinoma.[1]

The distribution of lesions is a critical clinical clue in diagnosing HS, because patients often present with lesions in the axilla, inguinal, perianal, and perineal areas.[14] Our data showed that most patients presented with axillary lesions despite having primary or recurrent disease groups, with over half of patients presenting with both. We also found that, in both groups, the lesions were most characterized as nodules and abscesses in both PD and RD. Furthermore, lesions in the perineum are associated with an increased risk of malignant transformation into squamous cell cancer, increasing patient morbidity. We found no significant difference between perineal lesions in primary and recurrent disease. This may suggest that despite a first-time diagnosis, perineal examination and adequate management of HS with disease in the perineum can help reduce rates of disease complications.

The data showing the delays in diagnosis reflect the need for physicians to maintain clinical awareness about primary and recurrent HS presentation, not only to improve the quality of life and psychological burden from the disease for patients but to prevent the progression of sometimes fatal disease complications and to improve patient outcomes.

Smoking is one of the most-studied risk factors linked to HS. The pathophysiology of HS is poorly understood; however, it is proposed that epidermal hyperkeratosis of the hair follicles causes occlusion and dilation of the pilosebaceous unit, follicular epithelial wall rupture, and influx of inflammatory cells.[1,12] Furthermore, in HS patients, perilesional and lesional skin and hair follicles

show elevations in TNF-α, IL-1β, IL-17, and IFNγ.[2,15,16] The contribution of smoking to HS is proposed to be the nicotine excretion in the pilosebaceous unit, which stimulates TNF-α and IL-1β, increasing the production of matrix metalloproteinases. Nicotine also induces follicular hyperplasia, contributing to occlusion and rupture.[2] A retrospective cohort study conducted in 2017 showed that non-smokers were more than 2 times more likely to improve following first-line medical therapy.[3] Most of our patient samples with HS were not smokers, with only 35% of patients in the PD group and 25% in the recurrent disease group having a history of cigarette use. Nevertheless, well-studied association between smoking and HS pathophysiology should warrant physicians to encourage patient abstinence from cigarette smoking when diagnosed with HS, as it may improve treatment outcomes.

Another well-established risk factor for HS is obesity. In our sample, 56% of patients had a BMI above 30 kg/m^2, with over half of patients in both PD and RD groups having clinical obesity. Studies have shown an increased risk of HS with every unit increase in body mass index.[2,12] This is the most common comorbidity affecting patients with HS.[18] Patients with higher BMIs have been found to have increased friction in the intertriginous areas and increased adiposity, promoting a pro-inflammatory state.[12] Similar to demographic risk factors, a history of smoking and obesity has been found to increase the risk of HS in patients, and expanded clinical awareness of both these factors could potentially aid in earlier diagnosis and, when these risk factors are addressed, improve treatment outcomes.

Currently, the treatment of HS does not depend on whether the disease is primary or recurrent; it depends on the Hurley severity staging system: stage I describes HS in which there is abscess formation, stage II describes single or multiple widely separated and recurrent abscesses with sinus tract formation and cicatrization, and stage III refers to diffuse or near-diffuse disease with numerous interconnected sinus tracts and cicatrization.[19] Medical treatment is recommended for stage I disease, a combination of medical and local surgical management for stage II, and comprehensive surgical management for stage III.[5,19] Most of our patients presented with stage I disease, with only 0.08% of the sample group presenting with fistulas or sinus tracts. This aligns with the fact that most patients received antibiotics for treatment, the treatment modality indicated for this stage.

From our sample group, antibiotic therapy had some of the highest cure rates for primary and recurrent diseases and is the most common treatment to address HS. This is likely because one proposed mechanism is that chronic inflammation creates a favorable environment for bacterial infection, adding a microbial component to pathogenesis of HS.[16] The anti-inflammatory properties of antibiotics can optimize lesions for surgical intervention.[18,20] Biofilms are thought to alter inflammatory response by promoting the release of cytokines, reducing bacterial susceptibility to antibiotics, worsening disease progression, and reducing response to treatment.[18] Topical clindamycin is considered the first-line treatment for stages I and II superficial lesions; without adequate treatment response, treatment is escalated to systemic clindamycin and rifampin for up to 3 months.[21,22] A prospective study with 56 patients investigating response rates to clindamycin and rifampicin showed an overall clinical response with a reduction of HSS in 79.6% of patients.[23] This is comparable to cure rates of our patient sample of 87.5% and 77.1% for primary and recurrent disease, respectively.

For those who cannot tolerate antibiotic therapy and patients with stage III disease, biological agents such as adalimumab should be considered as a treatment option.[9,21,22] Infliximab can be used for second-line treatment, and for third-line treatment, ustekinumab and anakinra can be initiated in case of treatment failure or intolerance to alternatives.[20] A randomized placebo trial of 86 patients showed a treatment response to adalimumab of 52% over 168 weeks, suggesting effective long-term management.[23] Biological agents were our patient sample's least frequently used treatment modalities, with the lowest cure rates. Another medical intervention is steroid therapy, which reduces inflammation and serves as rescue therapy for flares and bridges between long-term therapies.[9] Steroids were offered to 8% of our patients; there was a much higher cure rate for recurrent disease, with a cure rate of 14.7% compared with 2.7% for PD. This could suggest the utility of addition of steroid therapy for recurrent disease.

Medical therapies control inflammation, decrease pain, and slow disease progression; however, they take time to achieve clinical improvement and do not address the structural changes to the skin. Consequently, surgical interventions are required for Hurley stage II and III disease, with retrospective studies showing recurrence rates of as low as 2.5%.[21] A study showed that up to 75% of patients achieved prolonged remission of disease after one surgical excision, with patients experiencing prolonged disease-free intervals; in addition, these recurrences were found not to affect patient satisfaction, and recurrence does not reflect failure of surgery but the natural course of the disease.[25] Incision and drainage can address large abscesses; however, recurrence is common, and other approaches include limited excision, deroofing, marsupialization of sinus tracts, and skin-tissue-sparing excision with electrosurgical peeling (STEEP). Furthermore, radical excision should be considered for perineal disease due to the increased risk of malignant transformation into squamous cell carcinoma.[22] In our sample, surgical intervention was the second most frequently used treatment modality, with 39% of our patient population managed with at least one surgical procedure, surgical excision being the most common technique. There was a much higher cure rate for the

recurrent disease when patients were managed with surgical excision and I and D. This could suggest that surgical interventions are more efficacious in managing lesions in a patient with a past diagnosis of HS.

Our studies suggest that an increased clinical suspicion for HS is appropriate in patients who are female, less than 30 years old, or African American presenting with lesions characterized as nodules and abscesses in the axilla. Associated comorbidities that can serve as diagnostic clues and areas of intervention to improve treatment success include smoking status and obesity. Antibiotics had the highest cure rates in PD overall but also had high cure rates out of all the treatment modalities used to address recurrent disease. All surgical interventions had higher cure rates for recurrent disease. These factors could help in timely and early diagnosis to improve patient outcomes. The different cure rates based on treatment modalities reported could help tailor treatment modalities according to disease severity and whether the disease is primary or recurrent.

The strengths of our study included a relatively large sample in Queens, NY, the most ethnically diverse county in the United States, including inpatient and outpatient settings, and a cure rate in primary and recurrent HS. Limitations include the study's retrospective nature and the limited perspective of a single center, specifics on the healing time frame, cure rates based on demographics, and co-morbidities.

CONCLUSION

HS affects young female patients, often with a relentless course. The disease is associated with smoking and obesity, and these comorbid risk factors, in addition to the demographics, can provide interventions to improve treatment success and increase clinical suspicion to ensure timely and accurate diagnosis. Patients often experience a significant impact on their quality of life, and commonly experience delays in diagnosis, increasing the risk of complications and treatment failure. Various treatment modalities, including antibiotics, steroids, and biological agents, can be combined to achieve a successful treatment response. Antibiotics have been found to have the highest cure rates in both primary and recurrent disease, and surgical excision is more effective in recurrent disease than PD. With limited literature comparing the presentation and treatment outcomes of primary and recurrent HS, any information regarding the clinical presentation and treatment success may aid clinicians in diagnosis and treatment to alleviate the various challenges patients face and the complications from disease progression.

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