

Recommendations for Empiric Antibiotic Therapy in Hidradenitis Suppurativa

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PRACTICE POINTS

- The inflammation seen in patients with hidradenitis suppurativa (HS) is initiated and sustained by bacteria; therefore, reducing the number of bacteria may alleviate some of the symptoms of HS.
- For HS involving the axillae or buttocks, tetracyclines should be recommended as first-line empiric therapy.
- Patients with HS with multiple sites affected that include the inframammary or groin regions should receive empiric antibiotics that cover both *Staphylococcus aureus* and Gram-negative bacteria, such as trimethoprim-sulfamethoxazole or tetracycline plus ampicillin.

Hidradenitis suppurativa (HS) is a chronic inflammatory skin condition of the follicular epithelium that impacts 1% to 4% of the general population. It manifests clinically as inflamed nodules that typically are located in intertriginous areas of the body and frequently recur. The nodules can become infected and lead to abscesses, pain, and scarring—all of which can have debilitating consequences for a patient's quality of life. This study aimed to improve HS outcomes by analyzing what pathogens most frequently grow in HS wound cultures. We conducted a retrospective medical chart review of 485 patients with a diagnosis of HS from January 2006 to December 2021 comprising 600 visits at the University of Texas Medical Branch at Galveston. We also provide recommendations for empiric antibiotics based on the anatomic location of HS lesions and culture sensitivity profiles. Utilizing tailored antibiotic therapy following initial clinical evaluation may increase early disease control and improve morbidity and disease outcomes, thereby improving patient quality of life.

Hidradenitis suppurativa (HS) is a chronic scarring inflammatory skin condition of the follicular epithelium that impacts 1% to 4% of the general population (eFigure).¹⁻³ This statistic likely is an underrepresentation of the affected population due to missed and delayed diagnoses.¹ Hidradenitis suppurativa has been identified as having one of the strongest negative impacts on patients' lives based on studied skin diseases.⁴ Its recurrent nature can negatively impact both the patient's physical and mental state.³ Due to the debilitating effects of HS, we aimed to create updated recommendations for empiric antibiotics based on affected anatomic locations in an effort to improve patient quality of life.

Methods

An institutional review board–approved retrospective medical chart review of 485 patients diagnosed with HS and evaluated at the University of Texas Medical Branch in Galveston from January 2006 to December 2021 was conducted. Males and females of all ages (including pregnant and pediatric patients) were included. Only patients for whom anatomic locations of HS lesions or culture sites were not documented were excluded from the analysis. Locations of cultures were categorized into 5 groups: axilla; groin; buttocks; inframammary; and multiple sites of involvement, which included any combination of 2 or more sites. Types of bacteria collected from cultures and recorded included *Escherichia coli*, *Enterococcus* species, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, coagulase-negative staphylococci (CoNS), and other Gram-negative species. Sensitivity profiles also were analyzed for the most commonly cultured bacteria to create

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The eFigure and eTables are available in the Appendix online at <https://www.mdedge.com/cutis>.

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recommendations on antibiotic use based on the anatomic location of the lesions. Data analysis was conducted using descriptive statistics and bivariate analysis.

Results

The analysis included 485 patients comprising 600 visits. Seventy-five percent (363/485) of the study population was female. The axilla was the most common anatomic location for HS lesions followed by multiple sites of involvement. In total, 283 cultures were performed; males were 1.1 times more likely than females to be cultured. While cultures were most frequently obtained in patients with axillary lesions only (93/262 [35%]) or from multiple sites of involvement (83/179 [46%]) as this was the most common presentation of HS in our patient population, cultures were more likely to be obtained when patients presented with only buttock (32/38 [84%]) and inframammary (20/25 [80%]) lesions (Table).

Staphylococcus aureus was the most commonly cultured bacteria in general (53/283 [19%]) as well as for HS located the axilla (24/56 [43%]) and in multiple sites (16/51 [31%]). *Proteus mirabilis* (29/283 [10%]) was the second most commonly cultured bacteria overall and was cultured most often in the axilla (15/56 [27%]) and inframammary region (6/14 [43%]). These were followed by beta-hemolytic *Streptococcus* species (26/283 [9%]) and *Enterococcus* species (21/283 [7%]), which was second to *P mirabilis* as the most commonly cultured bacteria in the inframammary region (6/14 [43%]) (eTable 1).

eTable 2 shows the sensitivity profiles for the most commonly cultured bacteria: *S aureus*, *P mirabilis*, and *Enterococcus* species. *Staphylococcus aureus* located in the axilla, buttocks, and groin was most sensitive to rifampin (41/44 [93%]), TMP/SMX (41/44 [93%]), and tetracycline (39/44 [89%]) and most resistant to erythromycin (26/44 [59%]) and oxacillin (24/44 [55%]). *Proteus mirabilis* in the inframammary region was most sensitive to ampicillin (27/27 [100%]), gentamicin (27/27 [100%]), levofloxacin (27/27 [100%]), and TMP/SMX (26/27 [96%]). *Enterococcus* species were most sensitive to vancomycin (20/20 [100%]) and ampicillin (19/20 [95%]) and most resistant to gentamicin (5/20 [25%]).

Comment

To treat HS, it is important to understand the cause of the condition. Although the pathogenesis of HS has many unknowns, bacterial colonization and biofilms are thought to play a role. Lipopolysaccharides found in the outer membrane of Gram-negative bacteria are pathogen-associated molecular patterns that present to the toll-like receptors of the human immune system. Once the toll-like receptors recognize the pathogen-associated molecular patterns, macrophages and keratinocytes are activated and release proinflammatory and anti-inflammatory cytokines and chemokines. Persistent presentation of bacteria to the immune system increases immune-cell recruitment and worsens chronic

TABLE. Study Population Demographics and HS Lesion Culture History

Characteristic, n (%)	Culture was performed during the patient visit ^a	Culture was not performed during the patient visit ^a
Sex		
Female	205 (45)	248 (55)
Male	78 (53)	69 (47)
Total ^a	283 (47)	317 (53)
Location of HS lesions		
Axilla	93 (35)	169 (65)
Inframammary region	20 (80)	5 (20)
Buttock	32 (84)	6 (16)
Groin	46 (53)	40 (47)
Multiple sites	83 (46)	96 (54)

Abbreviation: HS, hidradenitis suppurativa.

^aTotal patient visits for females were 453 and total patient visits for males were 147.

inflammation in patients with HS. Evidence has revealed that bacteria initiate and sustain the inflammation seen in patients with HS; therefore, reducing the amount of bacteria could alleviate some of the symptoms of HS.⁵ It is important to continue learning about the pathophysiology of this disease as well as formulating tailored treatments to minimize patient discomfort and improve quality of life.

Based on the findings of the current study and the safety profile of the medication, tetracyclines may be considered for first-line empiric therapy in patients with HS involving the axilla only, buttocks only, or multiple sites. For additional coverage of *P mirabilis* in the axilla or inframammary region, TMP/SMX monotherapy or tetracycline plus ampicillin may be considered. For inframammary lesions only, empiric treatment with ampicillin or TMP/SMX is recommended. For HS lesions in the groin area, coverage of *Enterococcus* species with ampicillin should be considered. Patients with multiple sites of involvement that include the inframammary or groin regions similarly should receive empiric antibiotics that cover both *S aureus* and Gram-negative bacteria, such as TMP/SMX or tetracycline and ampicillin, respectively; if the multiple sites do not include the inframammary or groin regions, Gram-negative coverage may not be indicated. Based on our findings, standardization of treatment for patients

with HS can allow for earlier and potentially more effective treatment.

In a similar study conducted in 2016, bacteria species were isolated from the axilla, groin, and gluteus/perineum in patients with HS.⁵ In that study, the most prominent bacteria in the axilla was CoNS; in the groin, *P mirabilis* and *E coli*; and in the gluteus/perineum, *E coli* and CoNS. These results differed from ours, which found *S aureus* as the abundant bacteria in these areas. In the 2016 study, the highest rates of resistance were found for penicillin G, erythromycin, clindamycin, and ampicillin.⁵ In contrast, the current study found high sensitivities for clindamycin and ampicillin, but our results support the finding of high resistance for erythromycin. These differences could be accounted for by the lower sample size of patients in the 2016 study: 68 patients were analyzed for sensitivity results, and 171 patients were analyzed for frequency of bacterial species in patients with HS.⁵

Our study is limited by its relatively small sample size. Additionally, all patients were seen at 1 of 2 clinic sites, located in League City and Galveston, Texas, and the data from this geographic area may not be applicable to patients seen in different climates.

Conclusion

Outcomes for patients with HS improve with early intervention; however, HS treatment may be delayed by selection of ineffective antibiotic therapy. Our study provides clinicians with recommendations for empiric antibiotic treatment based on anatomic location of HS lesions and culture sensitivity profiles. Utilizing tailored antibiotic therapy on initial clinical evaluation may increase early disease control and improve morbidity and disease outcomes, thereby increasing patient quality of life.

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APPENDIX

eFIGURE. A and B, Clinical photographs of hidradenitis suppurativa demonstrating chronic scarring and nodules in the groin and axilla.



eTABLE 1. Culture Results by Anatomic Location of HS Lesions

Bacteria type	Location (no. of positive cultures) ^a				
	Axilla (n=56)	Buttocks (n=18)	Groin (n=26)	Inframammary (n=14)	Unspecified (n=51)
<i>Escherichia coli</i>	2 (4)	3 (17)	3 (12)	1 (7)	8 (16)
Other Gram-negative species (<i>Citrobacter</i> , <i>Klebsiella</i> , <i>Morganella morganii</i>)	6 (11)	0	1 (4)	1 (7)	4 (8)
<i>Enterococcus</i> species	6 (11)	1 (6)	6 (23)	3 (21)	5 (10)
<i>Proteus mirabilis</i>	15 (27)	1 (6)	2 (8)	6 (43)	5 (10)
<i>Pseudomonas aeruginosa</i>	0	0	1 (4)	2 (14)	0
<i>Staphylococcus aureus</i>	24 (43)	8 (44)	3 (12)	2 (14)	16 (31)
Coagulase-negative staphylococci	4 (7)	0 (0)	1 (4)	2 (14)	7 (14)
Beta-hemolytic <i>Streptococcus</i> species	2 (4)	8 (44)	7 (27)	1 (7)	8 (16)

Abbreviation: HS, hidradenitis suppurativa.

^aSome cultures grew multiple types of bacteria.

eTABLE 2. Sensitivity Profiles for Most Commonly Cultured Bacteria

Antibiotic	Bacteria, n (%)					
	<i>Staphylococcus aureus</i> (n=44)		<i>Proteus mirabilis</i> (n=27)		<i>Enterococcus</i> species (n=20)	
	Sensitive	Resistant	Sensitive	Resistant	Sensitive	Resistant
Ampicillin	N/A	N/A	27 (100)	N/A	19 (95)	1 (5)
Cefazolin	N/A	N/A	26 (96)	1 (4)	N/A	N/A
Cefotaxime	N/A	N/A	26 (96)	N/A	N/A	N/A
Clindamycin	31 (70)	11 (25)	N/A	N/A	N/A	N/A
Ertapenem	N/A	N/A	20 (74)	N/A	N/A	N/A
Erythromycin	18 (41)	26 (59)	N/A	N/A	N/A	N/A
Gentamicin	N/A	N/A	27 (100)	N/A	N/A	5 (25)
Levofloxacin	N/A	N/A	27 (100)	N/A	1 (5)	N/A
Oxacillin	20 (45)	24 (55)	N/A	N/A	N/A	N/A
Rifampin	41 (93)	N/A	N/A	N/A	N/A	N/A
Tetracycline	39 (89)	5 (11)	N/A	N/A	N/A	N/A
TMP/SMX	41 (93)	3 (7)	26 (96)	1 (4)	N/A	N/A
Vancomycin	37 (84)	N/A	N/A	N/A	20 (100)	N/A

Abbreviations: N/A, not applicable; TMP/SMX, trimethoprim-sulfamethoxazole.