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Surgical Management of Hidradenitis Suppurativa: Factors Associated with Postoperative Complications and Disease Recurrence

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Background: Hidradenitis suppurativa (HS) is a chronic inflammatory skin disorder. Treatment of HS remains challenging, and surgical procedures commonly follow attempts of conservative therapy. To date, a consensus regarding the optimal surgical technique has not been reached, and the implications of conservative therapy on future surgical outcomes have yet to be studied.
Methods: A retrospective cohort study of 65 patients surgically treated for HS at a tertiary care center was conducted. Patients' medical records were screened for demographical, clinical, and surgical characteristics. Statistical analysis was conducted to determine associations with postoperative complications and disease recurrence.
Results: Fifty patients (75.8%) were treated with systemic antibiotics before opting for surgical resection. Previous treatment with systemic rifampicin was associated with higher rates of postoperative complications (P = 0.029); however, systemic cephalexin and topical clindamycin were associated with a lower rate of complications (P = 0.007 and 0.040, accordingly). Medical history of smoking and surgical management with split-thickness skin grafts were associated with higher rates of postoperative complications (P = 0.012 and 0.014, accordingly). Patients with a greater number of lesions, and those treated with split-thickness skin graft, had higher rates of disease recurrence (P = 0.0018 and 0.003, accordingly).
In a multivariate analysis a greater number of lesions (P = 0.0498) and the use of autologous split-thickness skin graft (P = 0.022) were independently associated with higher rates of disease recurrence.
Conclusions: Previous conservative medical therapy bears the potential to modulate postoperative outcomes in HS patients, and should be taken into consideration. Despite reports of reliable results with split-thickness skin grafts, we found them to be associated with increased rates of diseases recurrence and postoperative complications. *(Plast Reconstr Surg Glob Open 2023; 11:e4752; doi: 10.1097/GOX.0000000000004752; Published online 18 January 2023.)*

INTRODUCTION

Hidradenitis suppurativa (HS) is a chronic inflammatory disorder of the pilosebaceouseapocrine unit. Typical manifestations include chronic nodules, abscesses, fistulae, sinus tracts and scars in the apocrine gland-bearing areas of the body, most commonly the axilla, inguinal area, and inframammary folds.[1]

Although the incidence of HS is low, at approximately 1%, the disfiguring condition results in substantial physical discomfort, emotional distress, and impaired quality of life.[2] The treatment of HS remains a clinical challenge due to the limited understanding of the etiology and pathogenesis of the condition.

Various combinations of systemic and topical antibiotics are considered the first line of treatment, in attempt to decrease inflammation and bacterial colonization. Patients with unsatisfactory response to antibiotic therapy

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often progress to systemic retinoids, hormonal therapy and immunosuppressive agents.[3]

Despite the wide array of medical therapy options, surgical excision of the lesions remains the only potential curative treatment in severe and refractory diseases.[4]

The wide armamentarium of surgical methods used to treat HS, allows for the optimal tailoring of the procedure to the patient's disease stage, the lesion's size, and the anatomical location. However, previous studies investigating the surgical management of HS, have demonstrated inconclusive results in regard to the optimal surgical strategy.[4]

We conducted this retrospective study in attempt to better understand the implications of various surgical interventions used for the treatment of HS patients admitted to a single tertiary care center in Jerusalem, Israel.

Takeaways

Question: What factors are associated with postoperative complications and disease recurrence in patients undergoing surgical resection of hidradenitis suppurativa (HS)?

Findings: Medical files of patients undergoing HS surgery were reviewed and analyzed for associations with postoperative complications or disease recurrence. Chronic preoperative use of topical-clindamycin and systemic cephalexin was associated with lower rates of postoperative complications, as opposed to rifampicin, which was found to be positively associated with postoperative complications. Surgical management with STSG was associated with postoperative complications and disease recurrence. STSG and a large number of disease lesions were independently associated with increased disease recurrence.

Meaning: Preoperative antibiotics, and choice of surgical procedure, can affect postoperative outcomes and disease recurrence.

PATIENTS AND METHODS

This retrospective cohort study was performed after receiving approval from the local ethics committee and was conducted according to the Helsinki declaration.

Data were collected from the medical files of all patients with a history of HS, who underwent surgical intervention for their disease in the Hadassah Medical Center Department of Plastic and Reconstructive Surgery between the years 2000 and 2021. Patients with incomplete medical records, or those lost to follow up before 90 days postoperatively, were excluded from the study.

After reviewing the medical files of patients included in the cohort, demographical, clinical, and surgical characteristics were collected. Demographical characteristics included patients' age, body mass index, comorbidities, and smoking history. Clinical and surgical characteristics included previous forms of medical therapy for the management of HS, surgical procedure that the patients underwent, postoperative antibiotic therapy, surgery-related complications, disease recurrence, number of surgeries, and disease recurrence. Minor complications were defined as those resolving with conservative therapy (Clavien–Dindo grades 1 and 2) and major complications as those requiring surgical intervention under local or general anesthesia (Clavien–Dindo grade 3).

Disease reoccurrence after surgical therapy was defined as the appearance of a new, biopsy-confirmed HS lesion at the previously resected lesion site or congruently overlapping with it.

Information regarding study participants was gathered and analyzed for factors associated with postoperative complications or disease recurrence. Analysis was carried out until the end of follow-up or first confirmed disease recurrence. Any auxiliary procedure occurring after disease recurrence was documented, but not included in the analysis to avoid possible selection bias.

Patients were analyzed for complications and disease recurrence only until its first incidence. Once the study outcome was met for the patient (development of complication or first disease reoccurrence), further procedures performed on the patient were listed but not analyzed. This exclusion criteria has been applied to avoid selection bias, assuming that patients who experienced a disease reoccurrence are more likely to have a more complicated disease and thus, are not representative of the general study population.

STATISTICAL ANALYSIS

Statistical analysis was performed using the commercial software Statistical Package for Social Science (SPSS Version 24.0, IBM Corp, Chicago, Ill.); descriptive statistics analysis was computed for each sample size. Continuous variables were expressed as mean ± SD, and categorical variables were expressed as frequencies.

Categorical variables were tested using the χ^2 test or Fisher exact test, as appropriate. Continuous variables were examined using the student t test if normally distributed, and Mann–Whitney U test if not. To identify variables associated with the primary outcome measure, univariate analysis was performed. Variables that were significantly associated (defined as $P < 0.05$) with the primary outcome measure were entered into the multivariate logistic regression model in a stepwise fashion.

Results

During the period of our study, 65 patients underwent a total of 77 surgical interventions for the management of HS in the Department of Plastic and Reconstructive Surgery at Hadassah Medical Center. (**See figure, Supplemental Digital Content 1,** which shows the demographical, clinical, and surgical characteristics of cohort patients. **http://links.lww.com/PRSGO/C339**.)

Median age of study participants was 34.8 + 15.2 years, 29 were men (44.6%), and the average body mass index was 29 + 5.5. On average, patients in this cohort had a disease stage of 1.9 (range 1–3) on the Hurley classification system.

Median number of lesions in a single patient was 2, with an average largest diameter lesion size of 5.81 + 5.49 cm (range 1–36 cm). The most common locations of lesions were the groin (41%), axilla (39.0%), and inframammary fold (6.5%).

Before surgical intervention, 50 patients (75.7%) were treated with systemic antibiotics, most commonly rifampicin (33.3%), clindamycin (36.9%), and dapsone (7.1%). Twenty-six patients (39.4%) were treated with topical antibiotics either as monotherapy or in addition to systemic therapy. In addition, 26 patients (39.4%) opted for lesion drainage.

Of the total 77 surgical procedures performed on the cohort patients, 45 (58.4%) were resection of lesion and primary closure, 20 (30.8%) were lesion resection and defect closure with a split-thickness skin graft (STSG), five (7.7%) were surgical debridement, and five (7.7%) constituted lesion resection and flap advancement for closure of defect.

Fifty patients (76.9%) received postoperative systemic antibiotics, most commonly cephalexin (70%) and clindamycin (20%) Fifty-three patients (81.5%) received postoperative topical antibiotics, 36 (67.9%) received fusidic acid, and the remainder received mupirocin. Complications were encountered in 11 patients (16.9%), with the most common being surgical site infection (66.7%). Recurrence was observed in 32 patients (49.2%) with a median time to first recurrence of 420+234 days (range 15–878.6)

In order to determine the association between patients' characteristics and preoperative medical treatment modalities on the development of postoperative complications, a univariate analysis was conducted (Table 1).

Smoking history was found to be associated with the development of postoperative complication, with statistical significance ($P = 0.012$).

Table 1. The Association of Preoperative Nonsurgical Treatment Modalities on the Risk for Complications

Variable	Complications, N (%)	No Complications, N (%)	Univariate Analysis, *P*
Gender			0.71
– Women	5 (13.5%)	32 (86.5%)	
– Men	6 (21.4%)	22 (78.6%)	
Smoking history			**0.012**
– Yes	10 (27%)	27 (73%)	
– No	1 (3.6%)	27 (96.4%)	
Diabetes mellitus			0.515
– Yes	2 (25%)	6 (75%)	
– No	9 (15.8%)	48 (84.2%)	
Hypertension			0.315
– Yes	3 (27.3%)	8 (72.7%)	
– No	8 (14.8%)	46 (85.2%)	
COPD			0.656
– Yes	1 (25%)	3 (75%)	
– No	10 (16.4%)	51 (83.6%)	
Hurley stage			0.185*
– 1	1 (7.1%)	13 (92.9%)	
– 2	7 (16.3%)	36 (83.7%)	
– 3	3 (37.5%)	5 (62.5%)	
Systemic antibiotics			0.505
– Rifampicin			**0.029 (+)**
o Yes	8 (28.6%)	20 (71.4%)	
o No	3 (8.1%)	34 (91.9%)	
– Clindamycin			0.617
o Yes	6 (19.3%)	25 (80.7%)	
o No	5 (14.7%)	29 (85.3%)	
– Dapsone			0.260
o Yes	2 (33.3%)	4 (66.7%)	
o No	9 (15.2%)	50 (84.8%)	
– Doxycycline			0.656
o Yes	1 (25%)	3 (75%)	
o No	10 (16.1%)	51 (83.9%)	
– Augmentin			0.656
o Yes	1(25%)	3 (75%)	
o No	10 (16.7%)	51 (83.3%)	
– Cephalexin			**0.007 (-)**
o Yes	4 (50%)	4 (50%)	
o No	7 (12.3%)	50 (87.7%)	
– Minocycline			0.99
o Yes	1 (16.7%)	5 (83.3%)	
o No	10 (16.9%)	49 (83.1%)	
Topical antibiotics			0.312
– Clindamycin			**0.040 (-)**
o Yes	0 (0%)	16 (100%)	
o No	11 (22.4%)	38 (77.6%)	
– Zindaclin 1%			0.99
o Yes	1 (16.7%)	5 (83.3%)	
o No	10 (16.9%)	49 (83.1%)	
Oral retinoids			
– Isotreationin			0.99
o Yes	1 (16.7%)	5 (83.3%)	
o No	10 (16.9%)	49 (83.1%)	

*In a linear-by-linear association analysis, *P* value = 0.092.
Values in boldface indicate statistical significance at $P < 0.05$.

Table 2. The Association of Surgical Procedures on the Risk for Complications

Procedure	Complications	No Complications	Univariate Analysis (*P* value)
Resection and primary closure			0.062
o Yes	3 (7.3%)	38 (92.7%)	
– Surgical site infection	1		
– Hematoma	1		
– Hypertrophic scarring	1		
o No	8 (22.2%)	28 (87.8%)	
Resection and split-thickness skin graft			**0.002(+)**
o Yes	7 (35%)	13 (65%)	
– Surgical site infection	4		
– Graft failure	2		
– Hematoma	1		
o No	4 (7%)	53 (93%)	
Debridement			0.529
o Yes	1 (25%)	3 (75%)	
o No	10 (13.7%)	63 (87.3%)	
Resection and secondary closure			1.000
o Yes	0 (0%)	2 (100%)	
o No	11 (14.7%)	64 (85.3%)	
Abdominoplasty			1.000
o Yes	0 (0%)	2 (100%)	
o No	11 (14.7%)	64 (85.3%)	
Inner-thigh lift			1.000
o Yes	0 (0%)	2 (100%)	
o No	11 (14.7%)	64 (85.3%)	
Flap advancement			0.580
o Yes	0 (0%)	5 (100%)	
o No	11 (15.3%)	61 (84.7%)	

Values in boldface indicate statistical significance at $P < 0.05$.

The use of rifampicin before opting for surgical management of HS was associated with a higher rate of complications ($P = 0.029$). On the contrary, preoperative use of systemic cephalexin and topical clindamycin was associated with a lower rate of complications ($P = 0.007$ and 0.040, accordingly).

In order to investigate the potential association between the choice of surgical modality and the development of postoperative complications, a univariate analysis was conducted (Table 2).

The surgical management of patients with hidradenitis suppurative lesion resection, and subsequent defect closure with an autologous STSG were associated with a higher rate of complications ($P = 0.002$). Other surgical modalities were not found to be statically associated with the development of postoperative complications.

In attempt to distinguish if selection bias, in terms of disease severity, could be responsible for the higher rate of complications in the STSG group, we compared disease severity in the STSG group to the other reconstruction modalities (Table 3). Our analysis demonstrated no statistically significant differences between the group throughout the Hurley classification subgroups.

Table 3. Comparison of Subgroups of Disease Severity (Using the Hurley Staging System), between Patients Treated with STSG versus other Reconstructive Modalities

Hurley Disease Stage	Split-thickness Skin Graft (N = 20)	Other Reconstruction Modalities (N = 45)	*P* Value
1	3 (21.4%)	11 (78.6%)	0.73
2	12 (27.9%)	31 (72.1%)	0.49
3	5 (62.5%)	3 (37.5%)	0.09

To determine whether certain patient characteristics are associated with postoperative disease recurrence in the follow-up period, a univariate analysis was conducted (Table 4).

Patients with a greater number of lesions, and those treated with surgical resection and defect closure with autologous STSG, had higher rates of disease recurrence in the follow-up period ($P = 0.0018$ and 0.003, accordingly).

In a multivariate analysis, a greater number of lesions (adjusted OR 2.08, $P = 0.0496$) and surgical resection with defect closure using autologous STSG (adjusted OR 4.22, $P = 0.022$) were independently associated with higher rates of disease recurrence.

DISCUSSION

Despite the constant advances in the conservative therapy of HS, surgical intervention is often required to improve the aesthetic appearance and decrease disease recurrence.[5–7] The surgical intervention of choice depends on the areas affected by the disease, the disease severity, previous treatment modalities, surgical capabilities of the facility, and the patient's preference.[8,9] Radical excision of lesion and surrounding tissue is considered to be the most promising option for decreasing recurrence rates[10–13]

After performing the radical excision of the affected area, closure of the remaining defect must be performed, using primary or secondary closure, STSGs, or flaps. The use of primary closure is often disregarded, as the remaining defect could be large in size and not feasible to be covered by the surrounding tissue without generating tension.[13] Secondary closure is possible; however, the healing process could result in disfiguration and unsatisfactory aesthetic appearance.[14]

Table 4. Univariate and Multivariate Analysis of Factors Associated with Disease Recurrence

Variable	Recurrence	No Recurrence	Univariate Analysis (*P* value)	Multivariate Analysis (*P* value)	Adjusted OR
History of smoking			0.009		
o Yes	21 (56.8%)	16 (43.2%)			
o No	11 (27.5%)	29 (72.5%)			
Number of lesions (mean, STD)	2.31, 1.15	1.65, 0.81	**0.0018**	**0.0496**	**2.08**
Average lesion size (mean, STD)	7.7, 6.7	6.7, 4.1	0.964		
Hurley stage:			0.19		
– 1	4 (28.6%)	10 (71.4%)			
– 2	23 (53.5%)	20 (46.5%)			
– 3	5 (62.5%)	3 (37.5%)			
Procedure:					
– Resection primary closure			0.542		
o Yes	20 (44.4%)	25 (55.6%)			
o No	12 (37.5%)	20 (62.5%)			
– Resection and split-thickness skin graft					
o Yes	15 (75%)	5 (25%)	**0.003**		
o No	17 (29.8%)	40 (71.2%)		**0.022**	**4.22**
– Resection secondary closure					
o Yes	1 (50%)	1 (50%)			
o No	31 (41.3%)	44 (58.7%)	0.806		
– Debridement			0.071		
o Yes	4 (80%)	1 (20%)			
o No	28 (38.9%)	44 (61.1%)			
– Abdominoplasty			0.493		
o Yes	0 (0%)	2 (100%)			
o No	32 (42.7%)	43 (57.3%)			
– Inner thigh lift			0.239		
o Yes	0 (0%)	3 (100%)			
o No	32 (43.2%)	42 (56.8%)			
– Flap advancement			0.311		
o Yes	1 (20%)	4 (80%)			
o No	31 (43%)	41 (57%)			
–Unroofing			1.000		
o Yes	0 (0%)	1 (100%)			
o No	32 (42.1%)	44 (57.9%)			
Postoperative antibiotics (systemic)			0.415		
o Yes	26 (52%)	24 (48%)			
o No	6 (40%)	9 (60%)			
Postoperative antibiotics (topical)			0.561		
o Yes	27 (50.9%)	26 (49.1%)			
o No	5 (41.7%)	7 (59.3%)			

Values in boldface indicate statistical significance at $P < 0.05$.

STSG remains a useful option for the closure of large defects, as it is a common procedure that can be easily performed and does not require microvascular expertise.[5,15,16]

Maeda et al[17] reported the use of reused skin grafts obtained from the overlying skin of disease affected areas. They report a retrospective cohort of 18 men with a median follow-up period of 5 years. The authors reported no recurrence of disease throughout the follow-up period. The main limitation of this study was the almost exclusive application of the reused skin graft on patients with a low disease stage, as only one of the cohort patients was classified with Hurley disease stage 3. It is fair to assume that in patients with a more severe disease, the overlying skin could be affected as well, and thus, is not suitable for use as a skin graft.

Alharbi et al[18] report their experience with wide surgical resection and various methods of reconstruction and defect closure, through a retrospective cohort study of 32 patients, with an mean follow-up period of 24 months. Patients included in this cohort were those classified with Hurley disease stages of 2 and 3. Recurrence occurred in five of the patients, of whom one patient had his defect closed with a STSG. This study is similar to ours in its substantial length of follow-up period and in the severity of the patient's disease. However, our study introduces statistical analysis of factors associated with disease recurrence in the form of a univariate and multivariate analysis, and therefore can more substantially assert the effect of various factors on this outcome. Alharbi et al reported a higher incidence of disease recurrence in smoking patients, yet a statistical analysis was not carried out. In our cohort, statistical analysis demonstrated that smoking history was not significant for disease recurrence ($P = 0.129$). Additionally, the authors reported a higher recurrence rate in patients with Hurley disease stage 3. However, our statistical analysis did not find a statistically significant association between a more advanced disease stage and its postoperative recurrence ($P = 0.146$), although a nearly-significant trend of increased reoccurrence was observed in a linear-by-linear association analysis ($P = 0.092$).

The findings of our study suggest that the use of STSGs is associated with a higher rate of disease recurrence and surgical complications, regardless of the number of disease lesions and their severity. These findings are supported by a multivariate analysis demonstrating independent associations.

Findings of our study contradict previous meta-analyses that concluded that the use of STSGs for the closure of HS defects carries a lower rate of disease recurrence in comparison with other surgical methods.[19,20]

However, the authors of this meta-analyses report poor quality of evidence in the included studies and heterogeneous or improper reporting of results.

Steele et al[21] studied patients surgically treated for HS lesions in a single institution over a 12-year period. Among the 101 cohort patients, four patients were surgically treated with STSG. Although their thorough statistical analysis did not correlate STSG with development of complications, it is important to note that all patients treated with STSG experienced related complications. In addition, the authors report an overall recurrence rate among the STSG group of 50%. Interestingly, despite being only the second most common technique to be associated with recurrence in their cohort, it was the one most commonly requiring re-operations for disease recurrence.

Although the specific cause of high recurrence rate encountered with STSG in our study, as well as the study conducted by Steele et al is unclear, several factors can be suspected. First, under-recognition of the extent of the disease can cause insufficient resection at the time of surgery and therefore contribute to higher rates of disease recurrence. In the advanced disease stages, tunneling sinus tracts and numerous draining abscesses are typical manifestations of the disease. These findings often make the recognition of the disease borders difficult, and lead to inadequate resection with no disease-free margins.

Additionally, patients treated with STSG were observed for a substantial period of time. Recurrence among this subgroup varied, and was found to be after 530 days on average. In a meta-analysis conducted by Mehdizadeh A et al,[22] the authors found that the length of follow-up has a strong positive association with HS recurrence after surgical reconstruction. Therefore, the prolonged follow-up time in our study could have contributed to the high disease recurrence rate observed in our patients. Distinguishing disease reoccurrence after resection from novel lesion is difficult, especially after a long follow-up period.

Moreover, patients requiring STSGs are often those with a larger body surface affected by the disease, and therefore potentially a more severe or a widespread disease. Although in our analysis, disease stage and total body surface area affected by the disease did not statistically differ between the various reconstruction methods, nor were they associated with disease recurrence after surgery, those are possible confounding factors that should be considered.

The majority of STSG-related postoperative complications in our cohort were surgical site infections and graft failures. More extensive debridement and lesion dissection can contribute to lowering the rate of infections. However, the degree of dissection is often underestimated in higher disease stages, as previously discussed.

To evaluate the adequacy of dissection as a root factor in postoperative wound dissection, we assessed the associations between a high disease stage and infection-related complications and did not find a statistically significant association ($P = 0.57$).

Moreover, wound dehiscence and graft failure are to be expected when opting for STSG in patients with a more advanced HS disease stage. Following wide excision of the lesions, the remaining tissue at the recipient site is the relatively poorly-vascularized exposed fat. The lack of vascular tissue to support the reception of the graft could potentially be responsible for the development of complications.[23,24] To overcome these limitations, Chen et al[24] suggest vacuum-assisted closure therapy to stimulate angiogenesis of the exposed fat before application of skin grafts. In addition to improving the vascularity of the recipient site, the use of VAC allows for decontamination of the high bacterial load expected at the lesion's site before application of STSG, which could potentially decrease associated complications.

In this cohort, we did not evaluate the outcomes of patients treated with VAC in addition to STSG. The introduction of an intermediate step in the process can allow the surgeon to perform a more extensive dissection with larger disease-free margins, thus directly improving the wound conditions before application of skin grafts.

The introduction of flap reconstruction for HS has drastically improved surgical outcomes and quality of life. The surgical use of flaps for the coverage of defects after wide excision carries several inert advantages. The use of flaps increases the potential field of excision and allows for a more radical disease resection.[25,26] When compared with skin grafts, they provide faster wound healing, shorter hospital stays, improved quality of life, and lower rates of disease recurrence or functional impairments of involved areas.[27,28]

In addition, flap reconstruction is associated with improved quality of life and patient satisfaction over STSG.[9,16] Wormald et al[16] compared the thoracodorsal artery perforator flap and STSGs in coverage of defects after excision of HS. The authors report that patients who were managed with flap reconstruction experienced faster recovery, fewer complications, and required less procedures, when compared with those managed with skin grafts. Although all patients reported improved quality of life after the operation, a more significant improvement was reported by patients managed with the TDAP flap reconstruction.

Antibiotics are frequently prescribed to patients with HS to decrease secondary bacterial infections and, in some cases, aid in using their immunomodulatory properties.[29,30] Combination regimens of oral clindamycin and rifampicin have reported to have beneficiary effects in several prospective studies;[31,32] however, the effect seemed to be short lasting and of limited evidence. The findings of our study suggest that use of rifampicin, alone or as part of a combination therapy, before opting for surgical management, is associated with increased postoperative complication rates.

Although recent studies advocate early use of rifampicin in combination therapy, it is often considered to be a second-line treatment, after previous conservative management options have failed. It is possible that patients treated with rifampicin are those with a more severe disease at baseline, and therefore a higher risk for postoperative

complications. However, patients opting for surgical management are already presumed to have a more resistant disease, failing to respond adequately to conservative lines of treatment. The various systemic antibiotics, and the combinations of treatments, demonstrate the complexity of tailoring a conservative treatment program. It is therefore fair to assume that all patients had extensive diseases, with various degrees of resistance to medical therapy, not only those treated with rifampicin.

However, on the contrary, the use of cephalexin or topical clindamycin before opting for surgical management has decreased postoperative complication rates. The exact reasoning behind the decreased complication rate is not fully understood. A plausible explanation could be associated with the antimicrobial activity spectrum of the antibiotics. The main pathogens found in patients with HS are coagulase negative *Staphylococcus* and anaerobic bacteria, both of which fall under the antimicrobial spectrum of clindamycin and partially of cephalexin. The potentially decreased microbial load could play a role in the lower rate of complications encountered.

Our study does not come without limitations. First of all, it is difficult to determine a direct association between previous conservative medical treatment modalities on the surgical outcomes, as the majority of patients were treated with a wide array of agents simultaneously before seeking surgical solution. Additionally, this study is a retrospective single-center cohort study on a small number of patients. Therefore, findings and associations found in this analysis could have a lower external validity on patients of different medical background. This research did not take into consideration patients' quality of life following the surgical procedures, an interesting variable that can be evaluated in future studies.

In conclusion, surgical management of HS is often considered at a late stage of management, when previous conservative options failed to produce satisfactory outcomes. Choice of conservative therapy bears the potential to modulate postoperative complications in future surgical procedures. In this cohort, rifampicin increased postoperative complications, whereas cephalexin and topical clindamycin had the opposite effect.

Despite the reputation of STSGs as reliable options for the surgical management of HS, we found them to be contributing factors with postoperative complications and disease recurrence. Further research is required to determine the optimal surgical modality for HS patients.

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