Review Article

Surgical Options in Hidradenitis Suppurativa

Sree S. Kolli[1], Adrian Pona[1], Abigail Cline[1], Malcolm Marks[1], Steven R. Feldman[1,2,3], Rita O. Pichardo[1]

[1]Department of Dermatology, Center for Dermatology Research, Wake Forest School of Medicine, Departments of [2]Pathology and [3]Public Health Sciences, Wake Forest School of Medicine, Winston-Salem, North Carolina, USA

Abstract

Hidradenitis suppurativa is a chronic, debilitating disease managed by both medications and surgical therapies. The purpose of this study is to determine the indications for surgical therapies and compare the various surgical options for the treatment of hidradenitis suppurativa. A PubMed search found 32 articles on surgical therapies for hidradenitis. Search terms included hidradenitis suppurativa, cryoinsufflation, laser therapies, reconstructive surgery, and surgical therapies. About 88.9% of patients with Hurley Stage II/III are referred to surgery. Wide excision is superior to local excision based on consistently lower recurrence rates and high patient satisfaction. Healing by primary closure is inferior to skin graft and flap. Recurrence rate is most dependent on disease severity rather than the type of surgical procedure. Surgical options are offered alongside medical therapies as part of the treatment protocol. Procedures range from minimally invasive to aggressive therapies with variable recurrence rates. Minimally invasive surgeries produce better results in Hurley Stage I/II and aggressive options, such as wide excision, are superior to other options in patients with the more severe disease. Poor surgical candidates include those with comorbidities such type 2 diabetes mellitus which limits the use of more aggressive surgical interventions.

Keywords: Cryoinsufflation, deroofing, hidradenitis suppurativa, laser, local excision, wide excision

Introduction

Hidradenitis suppurativa (HS) is a chronic, debilitating disease affecting 0.05% of the US population, but this number is an underestimation of true prevalence due to delay in diagnosis.[1] It is characterized as inflammation of hair follicle and apocrine glands. HS is predominantly found in the axillae, inguinal, and perineal regions. The severity of HS is categorized by Hurley staging: Stage I (mild), Stage II (moderate), and Stage III (severe). Due to extensive pain and scarring, HS has a significant impact on quality of life, with the prevalence of depression ranging from 6% to 32%.[2]

Medical therapies include topical clindamycin, oral clindamycin and rifampin, tetracycline, adalimumab, spironolactone, finasteride, and dapsone. About 59% of hidradenitis patients taking oral clindamycin and rifampin alone relapse.[3] Only 14.3% of patients on tumor necrosis factor-alpha inhibitors achieve remission.[4] About 88.9% of patients with Hurley Stage II/III are referred to surgery.[5] Surgical therapies are an important part of the treatment protocol and used alongside medical therapies to manage the disease. Surgical therapies include incision and drainage (I and D), deroofing, cryoinsufflation (CI), skin tissue sparing excision and electrosurgical peeling (STEEP), laser surgeries, and local or wide excision with or without reconstructive surgery.

Data regarding surgical therapies come from numerous retrospective studies, limited randomized control trials, and case reports. Therefore, quality comparisons of surgical options are lacking, and there are no clear guidelines for surgical indications. This paper aims to review the indications for each surgical therapy and compare the effectiveness of surgical therapies.

Methods

A PubMed search on the therapeutic options for hidradenitis suppurativa generated 32 articles. Search terms included hidradenitis suppurativa, CI, surgical therapies, lasers, and recurrence rates. Studies were divided to compare the surgical options used in patients with HS.

Address for correspondence: Ms. Sree S. Kolli, Department of Dermatology, Center for Dermatology Research, Wake Forest School of Medicine, Winston-Salem, NC 27157-1071, USA.
E-mail: skolli@wakehealth.edu

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Results

Surgical options

Surgical options in acute disease

If patients are in the acute phase with active inflammation, I and D is typically used for fluctuant abscesses.[6] I and D is not typically used in the chronic stage because of the high recurrence rate.[7] Other surgical options are contraindicated during active inflammation.

Surgical options in chronic disease

Deroofing and curettage

Just like its moniker, this procedure removes the "roof" of an abscess or sinus tract.[6] Curettage of the sinus tract is concurrently done with deroofing. Deroofing is more effective than I and D because it removes the subepidermal mass full of inflammatory debris.[8] It can be done with scissors and curettage, electrosurgery, or CO_2 laser.[8] It typically heals with secondary wound healing. It is effective with only 17% of deroofed lesions recurring after a median of 4.6 months and 90% of patients recommending the procedure.[9] Early deroofing may decrease the need for systemic therapies because 86% of lesions are cured with deroofing.[10] Due to the minimally invasive and effective nature, deroofing is considered an early intervention for Hurley Stage I/II.

Cryoinsufflation

CI is spray cryotherapy that injects liquid nitrogen with a needle directly into HS tracts.[11] It is an inexpensive and safe option that can be used in any HS patient.[11,12] An HS patient with Hurley Stage II received 3 monthly treatment sessions of CI with no recurrence after 6 months.[11] Another HS patient with Hurley Stage III and myelodysplastic syndrome received CI and achieved control of disease without the use of systemic drugs.[11] More data are required to compare its effectiveness to other surgical therapies.

Skin tissue sparing excision and electrosurgical peeling

Patients with Hurley Stage II or III involving a great extent of the skin may benefit from STEEP. Fat is spared during the process of successive tangential excisions with the removal of fibrotic tissue.[13] STEEP has high patient satisfaction with faster healing time and lack of residual contractures. In a case series of 16 patients receiving STEEP, the mean time to complete wound closure was 53.1 days and patient satisfaction was high for both functional (8.7) and cosmetic outcome (7.2) on a 10-point scale. All 16 patients recommended the procedure.[13] The recurrence rate of HS is high at 50%. A commonly reported complication was hypergranulation which resolved with topical corticosteroid cream. Currently, STEEP is recommended primarily in the skin folds of Hurley Stage II and III because they are prone to postoperative contractures.

Laser therapies

There is no clear indication whether they should be offered before or after surgical options. Neodymium-doped yttrium aluminum garnet laser resulted in a 65.3% reduction in HS severity assessed by the HS Lesion, Area and Severity Index scale (HS-LASI) over a 3-month period ($P < 0.02$) at areas treated with laser.[14] Patients treated with CO_2 laser had complete remission for 12 months and high levels of patient satisfaction even in patients with recalcitrant HS.[15] An important consideration is a high cost and lack of insurance coverage which limits the use of these therapies for many HS patients. Unfortunately, when patients are unresponsive to laser therapies, or report dissatisfaction and poor quality of life, more invasive and aggressive options are indicated.

Local excision

Local excision is the removal of each individual lesion. In a retrospective study of 118 operations, only 59% of patients achieved complete remission as defined by the absence of new HS lesions at a 2-year follow-up compared to digital camera images of affected areas taken before surgery.[16] The efficacy outcome was dependent on the number of body areas affected ($P = 0.02$) with three or more body areas having only transient or minimal improvement.[16] In patients with a complete response, the mean number of body areas affected was 2.3 compared to 3.7 in those with no or transient improvement ($P = 0.07$).[16] Local excision using primary closure in patients with mild-to-moderate HS had a 23% recurrence after an average of 10 months with high patient satisfaction. About 84% of patients were open to undergoing the same procedure in the future and 89% were willing to recommend to others.[17] Local excision had a recurrence rate of 22% compared to 13% with wide excision and 27% with deroofing.[18] Local excision should be considered for less severe cases, while wide excision is preferred for extensive disease.

Wide excision

Wide excision is the removal of the entire region containing lesions. Wide excision is considered the superior option given that the recurrence rate is lower than local excision and higher patient satisfaction, especially in those with severe disease. Comparison between a variety of procedures is limited and relies mainly on retrospective data. In a retrospective study of 363 operations on 113 patients, the remission rate for wide excision was 36% with a complication rate of 16%.[5] In 31 patients undergoing a variety of procedures including I and D, limited excision, and radical wide excision, 100% had recurrence after I and D, 42.8% had recurrence after limited excision, and 27% has recurrence after radical excision after a mean follow-up of 72 months.[19] Wide excision had better remission rates to limited excision and I and D.[20] The most common postoperative complication was pain, which occurred in 30% of patients.[16] In a 20-year retrospective study of 138 patients who had 363 wide area excisions, 33% of the excised areas having recurrence of some degree.[21]

The anatomic location of wide excision can have variable recurrence rates. Wide excision had zero recurrence compared to 27% recurrence rate with local excision in the axillary region.[22] Removing all hair-bearing regions in the axillary region had a significant reduction

in recurrence (P = 0.04).[22] In patients with HS in the sub-mammary area, the management can be different depending on the size of the breast. Individuals with smaller breasts typically have a wide excision, and skin graft and those with larger breasts have great results with a breast reduction that removes the diseased areas.[23] Breast reduction provides a good cosmetic result and leads to high patient satisfaction.[23] Other areas such as the perineum may prove to be more difficult when doing wide excisions which may lead to a less favorable response.

Although wide excision is thought to be more efficacious based on recurrence rates, the recurrence rate may be more dependent on the severity of the disease as opposed to the procedure type. Local recurrence depends on the extent of disease (P = 0.048) where recurrence was higher in severe disease as opposed to limited disease.[24] A retrospective analysis of 52 operations showed a local recurrence rate of 18.7% after 24 months and dependence on the severity of disease instead of the type of procedure.[25]

Reconstruction

Following excision, healing may or may not involve reconstructive surgery. Secondary intention healing may be effective, but adherence to daily dressings affects the healing process. After a mean 1-year follow-up, 67% of patients with secondary intention healing had recurrence.[26] In 253 wide excision procedures with secondary intention healing, 91.7% would recommend the procedure to others, 67% were satisfied with the cosmetic results after the procedure, and 50% remarked that the surgery had a medium to major impact on their daily lives.[27] Primary closure is inferior to skin graft and flap, as primary closure has a higher recurrence rate (54%) compared to graft (13%) and flap (19%).[28] In a 10-year retrospective study of 106 cases, the recurrence rate was 69% with primary closure while there was no recurrence with either graft or flap.[29] This is consistent with another study where primary closure has a higher recurrence (15%) compared to skin flap (8%) and skin graft (6%).[18]

Comparison between skin flap and graft is limited. In one study, patients with axillary HS either had a skin flap or graft after the operation. The skin flap group had fewer complications compared to graft (P < 0.0005).[30] About 90% of patients who had complications including delayed wound healing and restricted range of motion of the shoulder were treated with a graft.[30] Patients also reported increased improvement in the quality of life with a decrease in Dermatology Quality of life Index from 23.1–19.3 (P = 0.02).[30] Skin flaps do require longer operating times, but have a shorter recovery and better postoperation results; therefore, patients with the more extensive disease should be considered. In another study, patients with severe HS treated with a split skin graft or musculocutaneous flap had no difference in local recurrence rates (44% vs. 40%, respectively).[24] This conflicting evidence signals the need for more quality prospective data before clear recommendations can be made.

Poor surgical candidates

Hidradenitis patients have a high rate of comorbidities including smoking, hypertension, diabetes, and obesity.[31] Poor surgical candidates are especially those with uncontrolled blood sugars which limits the use of the more aggressive surgical interventions like wide excisions which concurrently have lower recurrence rates. Treatment regimens for these patients are limited to less extensive surgical interventions and medical therapies. Otherwise, surgical intervention may be delayed until the comorbidities are under control.

Discussion

Management of HS is difficult given the limitations of current therapies in providing adequate long-term clinical response and a good quality of life. High recurrence rates when using medical therapies alone make it difficult to achieve long periods of remission. Surgical therapies are an important aspect of the treatment regimen and used alongside medical therapies to achieve an optimal clinical response.

Different surgical therapies are more beneficial for less severe cases of HS and can be effective interventions early in the disease course [Figure 1]. Laser surgeries should be initiated before more invasive, aggressive surgical therapies, but it is unclear whether they are offered before or after other surgical interventions. Deroofing is another minimally invasive surgery that is effective in patients with mild disease. CI is a safe, inexpensive option that can be used in any HS patient but more studies need to be done to determine its effectiveness compared to other surgical therapies. STEEP works well in patients with more extensive disease, primarily in the skin folds, because it prevents contractures. These options should be offered initially because of their minimally invasive nature and good results.

More invasive procedures include local and wide excision with or without reconstructive surgery [Figure 1]. Local excision is inferior to wide excision because it excises disease skin only. It is a viable option when patients present with limited disease. Numerous studies find that recurrence rates depend on the extent, number of body areas affected and the mean number of years diagnosed with HS. The group that achieved complete recovery, defined as the absence of new HS lesions 24 months after surgery, had a mean duration of disease of 9.8 years compared to a mean of 13.3 years in a group that showed transient or no recovery.[16] Wide excisions have low recurrence rates, but sustained clinical responses have not been observed given the paucity of long-term prospective data. Reconstructive options have consistently shown that skin graft and flap are superior to primary closure. However, conflicting data exist between choosing the flap or graft technique.

Evidence supporting the indications and comparison of different surgical procedures is insufficient given that much of the data comes from case reports, retrospective studies, and limited number of randomized control trials. Recurrence rates are also not well defined. Accounting for the variability in recurrence rates among different studies makes it difficult

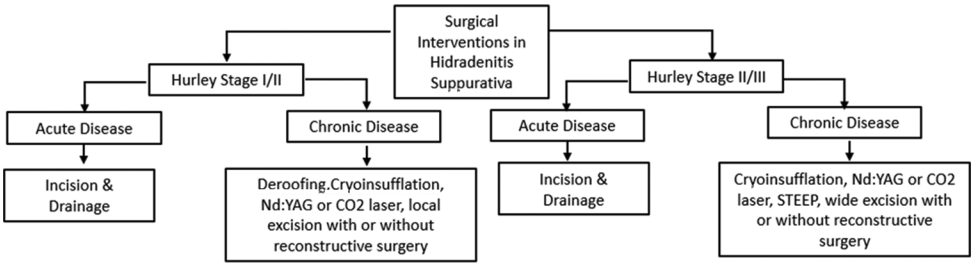

Figure 1: Surgical interventions in Hidradenitis suppurativa

to compare the different options. In addition, patient comorbidities affect the surgical candidacy, outcome of the surgeries, and clinical response. Poor surgical candidates, especially include those that uncontrolled Type 2 diabetes mellitus which limits the use of more extensive surgeries. One review reported 30% of patients undergoing surgery had type 2 diabetes affecting the healing process.[32] Dermatologists agree that surgical options should be offered alongside medical therapies; however, uncertainty remains over particular surgical indications. More comparative data are needed to make stronger recommendations.

Conclusion

HS is a chronic disease that warrants a surgical evaluation at some point in the natural course of the disease. Uncertainty arises when choosing a particular surgical option and the timing of the intervention in the disease course to produce optimal results. Increased disease severity affects surgical efficacy and correlates to higher recurrence rate. Therefore, initiating surgery earlier in the disease course may lead to better health outcomes, increased patient satisfaction, and a better quality of life. Minimally invasive options such as deroofing procedures are more effective in patients with minimal disease, while more aggressive options, such as wide excisions with reconstructive surgeries, produce the maximal clinical response in patients with severe disease compared to other options. Although surgical options are helpful in managing the disease, not every HS patient is a good surgical candidate given the high rate comorbidities limiting more aggressive options such as wide excisions.

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Conflicts of interest

Dr. Feldman is a speaker for Janssen and Taro. He is a consultant and speaker for Galderma, Stiefel/GlaxoSmithKline, Abbott Labs, Leo Pharma Inc. Dr. Feldman has received grants from Galderma, Janssen, Abbott Labs, Amgen, Stiefel/GlaxoSmithKline, Celgene and Anacor. He is a consultant for Amgen, Baxter, Caremark, Gerson Lehrman Group, Guidepoint Global, Hanall Pharmaceutical Co Ltd, Kikaku, Lilly, Merck and Co Inc, Merz Pharmaceuticals, Mylan, Novartis Pharmaceuticals, Pfizer Inc, Qurient, Suncare Research and Xenoport. He is on an advisory board for Pfizer Inc. Dr. Feldman is the founder and holds stock in Causa Research and holds stock and is majority owner in Medical Quality Enhancement Corporation. He receives Royalties from UpToDate and Xlibris.

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