The surgeon's perspective: a retrospective study of wide local excisions taken to healthy subcutaneous fat in the management of advanced hidradenitis suppurativa

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Background: Hidradenitis suppurativa (HS) is a chronic debilitating folliculopilosebaceous disease that affects the skin most commonly in the axilla, groin, inframammary, genital and buttock areas. Surgical intervention may be an appropriate option in selected cases, but there is a risk of recurrence. The purpose of this study was to assess the results of wide local excision (WLE) to healthy subcutaneous fat with secondary intention healing in patients with HS who were under concurrent surgical and dermatologic care.

Methods: We conducted a retrospective review of 192 consecutive HS consultations to a general surgical service, identifying patients treated with WLE. Cases involving minor procedures (deroofing, incision and drainage) were excluded. Data on patient demographics, surgical site, method of closure, complications and recurrence were extracted from patient charts. We also conducted a literature review of surgical procedures in the management of HS.

Results: A total of 66 patients underwent 133 WLE to healthy subcutaneous fat. All patients were under concurrent medical care directed by a dermatologist. No medical therapies, including biological treatments, were interrupted or withheld for surgery. One hundred procedures were closed primarily with rotation or advancement flaps and 33 by secondary intention healing. Local recurrence occurred in 18% of primary closures and 18% of secondary intention closures ($p = 0.98$, χ^2 test, no difference between groups). One patient with secondary intention healing returned to the emergency department for bleeding; 34% of patients with primary closure experienced some dehiscence (23% major, 11% minor separation). Two patients with axillary disease had restrictions in their ability to raise their arm that required physiotherapy. Median follow-up was 14.5 (range 1–55) months.

Conclusion: Resection to healthy subcutaneous fat during WLE provides disease control comparable to that with deeper resections, simplifying care.

Contexte : L'hidradénite suppurée (HS) est une maladie invalidante chronique du follicule pilo-sébacé qui affecte la peau principalement au niveau de l'aisselle, de l'aine, du pli sous-mammaire et du siège. Une intervention chirurgicale pourrait être une option appropriée dans certains cas, mais il y a un risque de récurrence. Le but de cette étude était d'évaluer les résultats d'une excision locale large (ELL) jusqu'aux tissus adipeux sous-cutanés sains suivie de cicatrisation secondaire chez des patients atteints d'HS recevant concomitamment des soins chirurgicaux et dermatologiques.

Méthodes : Nous avons procédé à une revue rétrospective de 192 consultations consécutives pour HS dans un service de chirurgie générale et nous avons recensé les patients traités par ELL. Les cas impliquant des interventions mineures (par incision-drainage) ont été exclus. Les données démographiques, le site chirurgical, la méthode de suture, les complications et les récurrences ont été enregistrés à partir des dossiers des patients. Nous avons aussi procédé à une revue de la littérature sur les interventions chirurgicales pour l'HS.

Résultats : En tout, 66 patients ont subi 133 interventions d'ELL jusqu'aux tissus adipeux sous-cutanés sains. Tous les patients prenaient concomitamment un traitement médicamenteux sous la supervision d'un dermatologue. Aucun des traitements médicamenteux, y compris les agents biologiques, n'a été suspendu ou interrompu pour la chirurgie. Cent interventions ont été refermées principalement par lambeaux de rotation ou d'avancement et 33 par cicatrisation secondaire. Les récurrences

locales ont affecté 18 % des fermetures primaires et 18 % des fermetures par cicatrisation secondaire (*p* = 0,98, test du χ², aucune différence entre les groupes). Un patient soumis à la cicatrisation secondaire est retourné aux urgences pour un saignement; 34 % des patients ayant subi une fermeture primaire ont présenté un certain degré de déhiscence (23 % majeure, 11 % mineure). Deux patients ayant une atteinte axillaire ont connu des restrictions dans leur capacité de lever les bras et ont dû faire de la physiothérapie. Le suivi médian a été de 14,5 (éventail de 1 à 55) mois.

Conclusion : La résection jusqu'aux tissus adipeux sous-cutanés sains durant l'ELL permet de maîtriser la maladie aussi bien que les résections plus profondes, mais simplifie les soins.

Hidradenitis suppurativa (HS) is a chronic disease affecting the folliculopilosebaceous unit.[1] The disease was roughly divided into 3 surgical stages by Hurley, but newer staging systems have been described and apply to the evaluation of medical therapies.[2–4] In its severe forms the disease is a painful, malodorous, socially isolating condition that profoundly affects patients' lives. It typically begins in adolescence or early adulthood. The condition can be exacerbated by obesity and smoking but is not caused by either.[3,5] It is characterized by recurrent inflammatory nodules in characteristic areas, but repeated episodes can create heaped scars and chronic sinuses or tunnels under the skin surface.

As an inflammatory disease HS is managed collaboratively with medical and surgical approaches.[6] Modern evidence-based guidelines address medical care, and surgery can play an important role in both localized and more severe disease.[7] The choice of surgical intervention will depend on presentation. The most common procedure is incision and drainage, performed in the acute setting, such as in emergency departments. Other common procedures include deroofing, steroid injections and limited local excisions, which are typically done as office procedures. Wide local excision (WLE) is another technique in which excision extends beyond the margins of the gross disease and into the subcutaneous layer. It is often done for extensive axillary or groin involvement and can be closed by flaps, grafts or secondary intention healing. However, previous reports have suggested high recurrence rates, between 27% and 100% depending on the procedures performed.[8–12] In recent years, a growing number of reports of surgical interventions for patients with HS have shown more promising results.[13] Even in the setting of local recurrence postoperatively, the disease is usually more manageable and less extensive than preoperatively.

The purpose of this study was to assess the results of WLE with secondary intention healing to healthy subcutaneous fat in patients with HS who were under concurrent surgical and dermatologic care. We focused on WLE specifically to healthy adipose tissue rather than fascia, similar to full-thickness laser ablations, which have been found to produce good results.[14–16] This technique is based on the understanding that HS has a pilosebaceous origin rather than an apocrine gland source. A shallower excision simplifies the procedure and can eliminate the need for complex reconstruction in many cases. This technique also expands the opportunities for secondary intention healing as a closure option.

Methods

A retrospective chart review of 192 consecutive HS consultations to a general surgical service at St. Michael's Hospital in Toronto, Canada, was undertaken to identify patients treated with WLE. Patients who underwent minor procedures (deroofing, incision and drainage) were excluded. Data on patient demographics, surgical site, method of closure, complications and recurrence rate were extracted from patient charts.

This study was approved by the Unity Health Toronto Research Ethics Board of St. Michael's Hospital, University of Toronto.

We also conducted a literature review of surgical approaches to the management of HS. We included only traditional surgical techniques (laser surgery and any other techniques using energy-based devices were excluded). We searched PubMed and EMBASE between 2000 and the end of June 2018 using the following terms: "hidradenitis suppurativa," "acne inversa" and "surgery." The literature search was limited to articles published in English.

Results

Sixty-six patients underwent 134 WLE. The median age of the patients was 37 years (range 18–61 yr). The sites of surgery were the axilla (44 procedures), the inguinal region (40 procedures), the breast and inframammary region (13 procedures), the genitals (vulva, mons, scrotum, 18 procedures), the posterior neck (2 procedures) and the buttocks, perianal and natal cleft areas (17 procedures). All WLE were extended to healthy subcutaneous fat. In all cases we removed gross disease including draining sinuses, obvious nodules and heaped scarring. While performing procedures we were attentive to any tracks or tunnels emanating from the more obvious disease. Our goal was to resect to healthy tissue radially as well as to healthy subcutaneous tissue in terms of depth.

One hundred procedures were closed primarily with rotation or advancement flaps and 34 were closed by secondary intention healing. Local recurrence was defined

as disease appearing within 0.5 cm of the resection site; this definition was based on a previous study.[13] There was local recurrence in 18% of cases (18 of 100) with primary closures and in 18% of cases (6 of 33) in which the wound healed by secondary intention ($p = 0.98$, χ^2 test, no statistically significant difference between groups). One patient with secondary intention healing returned to the emergency department for bleeding, which was controlled with silver nitrate; 34% of patients with primary closure experienced some dehiscence (23% experienced major dehiscence requiring nursing and home care, 11% experienced minor separation). Two patients with axillary disease who underwent primary closure experienced restrictions in their ability to raise their arm that required physiotherapy.

All patients had ongoing dermatology follow-up. Ninety-four percent of patients were taking medication at the time of surgery; we did not discontinue any therapies for the surgery. Fifty-one percent of patients were on oral antibiotics (usually clindamycin/rifampin or doxycycline), 29% were on biologic therapy (anti-tumour necrosis factor α) combined with oral antibiotics, 8% were on biologic therapy combined with intravenous antibiotics (ertapenem) and 6% were on biologic therapy alone. Patients were treated to what we felt was maximal medical benefit, and surgery focused on persistent areas of disease, drainage and flaring.

The median duration of follow-up was 14.5 months (range 1–55 mo). All patients were followed concurrently by dermatologic and surgical services. No patients were lost to follow-up.

Our initial literature search produced 255 articles. When we narrowed the search with the term "wide local excision," we found 30 publications, 8 of which were review articles. Table 1 provides a summary of the 22 articles that remained after we excluded the review articles, including data on patient demographics, type of surgical procedure, location of surgery and recurrence rate.

DISCUSSION

Hidradenitis suppurativa is a chronic, debilitating disease that leads to clinically scarred areas in affected anatomic regions, such as the axilla and genitals, leading to tremendous disability, low self-esteem and substantially reduced body image.[17] The tunnels and ropelike scars in HS may also be a place for growing biofilms as a potential trigger for the recurrence of inflammation in these areas. Almost 70% of chronic lesions were shown to present with biofilms, based on recent studies.[18] Surgical intervention is important for removal of these tunnels and scars. Concerns have been raised previously about the high recurrence rate.[19–21] Much of the surgical literature from 1997 to 2017 recommends extending excisions for HS to the muscular fascia, removing apocrine gland projections into the subcutaneous layer; these studies have reported recurrence rates of 3% to 54%.[19–22] In 2018, Walter and colleagues reported a postoperative recurrence rate as high as 54.2%.[22] In contrast, Deckers and colleagues reported a 38% recurrence rate when WLE was used.[13] Recurrence was defined in their study as a new inflammatory nodule within 0.5 cm of the lesion.[13,23]

Our recurrence rate was 18% for primary closures and 18% for secondary intention closures, and the study included only patients for whom excision was performed to healthy subcutaneous adipose tissue. No patient underwent resection to muscular fascia. The rationale for this approach is the newer understanding of HS as a pilosebaceous unit disease rather than a disease of the sweat glands, meaning that resection does not need to go to fascia but rather simply to healthy tissue. This simplifies the surgery and makes closures less complicated. When compared with the results of earlier studies, our results were not superior, but rather were equivalent to more aggressive approaches. Our results are promising, suggesting equivalent or better local control than most series, despite the purposeful effort to limit the depth of tissue removed. Interestingly, only 2 (3%) of our patients with axillary disease experienced restrictions in their ability to raise their arm that required physiotherapy.

As mentioned earlier, all of our patients were under medical care. Many were receiving combinations of medical care to achieve as much medical control over their inflammation as possible. Surgery (WLE) was reserved for areas of persistent drainage and flaring that had not responded to medical treatment.

The decision whether to close wounds with flaps or with secondary intention healing was made case by case, with patients' input and preferences taken into consideration. Patients were shown photos of previous cases that involved secondary intention closure so that they would know what to expect. Their preference was to use secondary intention closure for larger defects. In our study, 43% of axillary wounds, 13% of inguinal wounds, 23% of genital wounds and 41% of buttock (including perianal, natal cleft) wounds were closed by secondary intention healing. The choice not to use skin grafts is not evidence-based but it reflects our experience. There are a few advantages of secondary intention closure over skin grafting, including the following: the use of a donor site is avoided, no immobilization is required (difficult areas are the axilla and the inguinal regions), the patient is able to move and use the extremity for maximum range of motion as the wound heals, and it is an easier surgical approach.

This series leaves us preferring secondary intention over primary intention closure for many cases. Secondary intention closure seems advantageous for wider areas of excision. It enables us to avoid skin grafting and complex flaps with disease control that is equivalent to that of more involved surgical approaches. Secondary intention closure provided for good range of motion with good cosmesis

Table 1 (part 1 of 2). Summary of articles on surgical interventions in patients with hydratenitis suppuritiva published since 2000

Study and country	No. of patients	Study design	Sex	Age, yr	Location of surgery (%)	Type(s) of procedure(s)	Recurrence rate, %
Walter et al.[22] 2018 Germany	48	Single centre, retrospective				WLE	54.2
Deckers et al.[13] 2018 The Netherlands	84	Single centre, retrospective	48 men (57.1%), 36 women (42.9%)		Axillary (22.1), inguinal/femoral (37.2), genital (12.3), gluteal/anal (25), other (2.8)	WLE with secondary intention closure	38
Kofler et al.[25] 2018 Germany	255	Retrospective, questionnaires	103 men, 152 women,	Median 38 (range 14–66)	Inguinal (62), axillary (54), genital (50), gluteal (41), coccygeal (24), pectoral (17)	WLE with secondary intention closure	69*
Humphries et al.[26] 2016 United States	17	Single centre, retrospective	4 men, 13 women	Mean for all procedures 36.8 (range 18–65)	Axillary, breast, inguinal area, perineum, mons pubis/suprapubis, presacrum, perianus, abdomen, inner thighs, gluteal	WLE with secondary intention closure (including multiple excisions)	11.8
Blok et al.[21] 2015 The Netherlands	113	Retrospective	36 men (31.9%), 77 women (68.1%)	NA	Axilla, inguinal, genital, gluteal, other	Local excision and deroofing	29.2
Wormald et al.[27] 2014 United Kingdom	27	Retrospective, questionnaires	8 men (30%), 19 women (70%)	Mean 34.7	Axilla	WLE Graft, flaps	3.7
van Rappard et al.[28] 2012 The Netherlands	57	Retrospective, questionnaires	10 men (18%), 47 women (82%)	Average 42.5	Axilla, inguinal, genital, perianal	Local excision and primary closure	34
Alharbi et al.[29] 2012 Germany	32	Retrospective	12 men (37.5%), 20 women (62.5%)	Range 17–51	Axilla, inguinal, perianal/perineal, gluteal, inframammary	WLE Primary closure flap, graft	16.75
Büyükasik et al.[30] 2011 Turkey	15	Retrospective		Mean (SD 10.6)	Groin, axilla, buttocks, nuchae, perianal, perineal	WLE Primary closure, with fasciocutaneous flaps and with split-thickness skin grafts	5.5
van der Zee et al.[23] 2010 The Netherlands	44	88 deroofed lesions	41 women, 3 men	Median 35 (range 28–43)	Axillae (44.3), groin (46.6), buttocks (9.1)	Deroofing technique	17
Civelek et al.[31] 2010 Turkey	14	Retrospective	9 women, 5 men	Not provided	Axilla, inguinal	WLE Flap, graft	29
Menderes et al.[32] 2010 Turkey	27	54 sites	19 men, (70%) 8 women (30%),	41.2 (range 24–58)	Axilla (42), gluteal (20), perineal (24), inguinal (12)	Primary closure flap, graft	7.5
Rieger et al.[33] 2009 Switzerland and Austria	8	Retrospective	7 women (87.5%) 1 man (12.5%)	Mean 35 (range 18-49)	Inguinal	WLE, flap	0
Mandal et al.[34] 2005 Scotland	106			Median at onset 36 (range 17–70)	Both axillae (36.2), 1 axilla (21.6), axilla and groin (9.0), groin only (14.6), perineum (9.0), inframammary (5.5), other (3.4)	Primary closure (100 sites), split skin graft (29 sites), flaps (14 sites)	70†
Kagan et al.[35] 2005 United States	57		15 men (26%), 42 women (74%)	Mean 34 (range 19–62)	Axilla (50), perineum (36), inguinal (14)	Local, wide, other Primary, graft, secondary wound healing Excision and primary closure for localized disease (76% of axillary cases) WLE with or without STSG with diffuse disease (86% of inguinoperineal cases)	Not provided
Altmann et al.[36] 2004 Germany	20	Retrospective	6 men (30%), 14 women (70%)	Average 36 (range 20–50)	Axilla	WLE and flaps	15
Kuo and Ohara[37] 2003 Japan	6	Retrospective	4 men (66%), 2 women (33%)	Average 32.7	Gluteal	WLE and grafts	0

Table 1 (part 2 of 2). Summary of articles on surgical interventions in patients with hydratenitis suppuritiva published since 2000

Study and country	No. of patients	Study design	Sex	Age, yr	Location of surgery (%)	Type(s) of procedure(s)	Recurrence rate, %
Bocchini et al.[38] 2003 Brazil	56	Retrospective	52 men (93%), 36 women (64%)	Mean 40	Gluteal, perineal, inguinal	WLE Secondary intention healing, delayed skin grafting‡	1.8
Tanaka et al.[39] 2001 Japan	19	Retrospective		Mean 40.7 (range 30–58)	Axillary, inguinal, gluteal areas, other	WLE Primary flaps, graft	43
Bohn and Svensson[40] 2001 Sweden	138	Retrospective, questionnaires		Average 23	Axilla, inguinal, perineal/perianal, inframammary, other	WLE Primary graft	33
Soldin et al.[19] 2000 South Africa	59		42 women, 17 men	Average 32 (range 16–65)	Axilla	Local excision and WLE Primary closure, flap, graft	26.6§, 7.7¶
Rompel et al.[41] 2000 Germany	106				Inguinal (70.8), axillary (61.3)	WLE	2.5

PMH = past medical history; SD = standard deviation; STSG = split-thickness skin grafting; WLE= wide local excision.

*Reported by patients via questionnaires.

†In the primary closure series.

‡Secondary intention healing in 32 patients (57.1%); delayed skin grafting in 24 patients (42.9%).

§Local excision.

¶Excision of all hair-bearing skin.

after healing, simplified the surgical procedure and is supported by other studies in the literature.[13,24–26] The disadvantage of secondary intention healing is the dressing care required until the wound is closed. This was well tolerated in our patients, who are generally used to dressing care for their active disease. The patients who underwent primary closure experienced dehiscence of more than 30% (minor and major dehiscence) even though they were being maintained on their preoperative medical treatments.

All patients in this series were followed by a dermatologist and had their medical therapy continued in the perioperative and postoperative periods. Seventy-seven percent of patients were on biologic therapies, and these were not discontinued or withheld perioperatively. In this series we were not able to show a difference in outcome for the patients on biologics; however, we emphasize the necessity of continuation of such treatment throughout the management of patients with HS.

Limitations

Our study has some limitations, including patient selection and retrospective design, and therefore the risk of bias. Also, our study is limited by its relatively small sample size.

Conclusion

Wide local excision to healthy subcutaneous adipose tissue provides good control of HS. The 18% local recurrence rate reported here is at the better end of the rates reported in other series in the literature. Wide local excision with secondary intention closure is a useful and practical surgical approach, which is facilitated by not resecting to fascia. It can simplify the surgical procedure while providing equivalent local control and extremity function. Primary closure in HS is associated with a significant dehiscence rate of which surgeons and patients should be aware. Larger studies with a better design and longer follow-up are required to determine the optimal surgical approach and optimal medical control.

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