Wide Excision with Secondary Intention Healing: Proper Procedure for Nonextensive Gluteal Hidradenitis Suppurativa

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Purpose. Hidradenitis suppurativa (HS) is a chronic disease that presents with abscesses, odoriferously draining sinus tracts, and scarring. It arises most commonly, but not exclusively, from apocrine-gland-bearing areas. Because many patients do not respond to medical therapies, with progressive disability, we undertook to determine the most appropriate operation for gluteal HS.

Methods. We studied 152 patients with gluteal HS who had undergone surgical treatment from August 1996 to August 2006. Charts were reviewed for demographic, treatment, and outcome data. The operative procedures were divided into drainage procedures (n = 56), excision with primary suture (n = 42), and wide excision with secondary intention healing (n = 54). The extent of surgery was examined in terms of clinical course and lesion size.

Results. The mean age at presentation was 29.6 years. At a mean follow-up of 36 months, local recurrent HS had developed in 32.2% of patients. There was 57.1% recurrence after drainage, 19% after excision with primary suture, and 16.6% after wide excision with secondary intention (p < 0.05). The wound-healing period was 1.1 weeks after drainage, 2.4 weeks after excision with primary suture, and 7.3 weeks after wide excision with secondary intention healing (p < 0.05).

Conclusions. Gluteal HS is a chronic relapsing disease that frequently causes disabling pain, significant morbidity, and social isolation. In our study, inadequate excision was the main reason for recurrence, and wide excision with healing by secondary intention provided a good prognosis in most cases. [J Soc Colon Rectal Surgeon (Taiwan) 2007;18:1-8]

Gluteal hidradenitis suppurativa (HS) is an acute, subacute, or chronic infection that affects the sudoriparous, apocrine, eccrine, or pilosebaceous apparatus of the affected area. Although its pathophysiology is poorly understood, it is generally believed that obstruction of the apocrine pores results in glandular dilatation and bacterial superinfection, with subsequent gland rupture disseminating the infection throughout the subcutaneous tissue plane. Consequently, HS is associated with chronic painful abscesses, multiple

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odiferously draining sinus tracts, and chronic fibrosis with range-limiting scar formation. Therefore, it causes intense suffering that results in physical, psychological, familial, and professional dysfunction.\(^1\)

Historically, multiple treatment regimens have been available, including antibiotics, retinoids, corticosteroids, incision and drainage, local wound care, local excision, radiation, and laser therapy. However, no single treatment has proved effective in all patients. Radical excision of the defective tissue is the most definitive treatment and early referral for surgical treatment may limit the extent of this debilitating disease.\(^2\) We present our 10-year experience in treating gluteal HS and propose a proper surgical treatment.

**Materials and Methods**

We identified all patients with gluteal HS who had undergone surgical treatment at a tertiary medical center from August 1996 to August 2006. Charts were reviewed for demographic, treatment, and outcome data after approval for the study was obtained. Patients presenting to either the emergency or outpatient clinic with an acute infection with or without abscess formation were included in the study.

The primary surgical strategies were divided into drainage procedures, excision with primary suture, and wide excision with secondary intention healing. Drainage procedures were defined as simple abscess incision and drainage if HS was greater than 6 cm. Excision with primary suture was defined as resection of the infected abscess and fistula-containing cutis in the affected region and closure if the skin and soft tissue could be mobilized adequately. Wide excision with secondary intention healing was defined as radical excision of all the hair-bearing skin of the affected region with a clear margin of at least 1 cm. If HS was smaller than 6 cm, we performed excision with primary suture or wide excision with secondary intention, depending on the tension of wound closure.

To assess the clinical course after discharge, all patients and their general practitioners were interviewed by questionnaire, and the patients underwent a physical examination that documented the signs, location, therapy, and clinical course of their persistent or recurrent HS. Recurrence was defined as persistent or newly developed signs of HS appearing in the same area, which made a reoperation necessary. Body mass index (BMI) was calculated as weight (kg)/height (m\(^2\)). Obesity was defined as BMI \(\geq 30\) kg/m\(^2\). Old age was defined as more than 65 years old. The wound-healing period was defined as the time until there was no skin defect at the site of the wound after the operation. The continuous variables were tested with Student’s \(t\) test and the categorical variables were tested with the \(\chi^2\) test. Statistical significance was defined as a \(p\) value of < 0.05.

**Results**

We identified 152 patients who had undergone surgical treatment for gluteal HS during a 10-year period. Patient demographics are shown in Table 1. One

| Table 1. Comparison of sex in patients undergoing surgical treatment of chronic HS |
|---------------------------------|------------------|------------------|-------|
|                                  | Male             | Female           | \(p\) value |
| Number                          | 135 (88.8%)      | 17 (11.2%)       |       |
| Age (years)                     | 28.3 ± 12.6      | 40.0 ± 22.1      | 0.0013 |
| Duration of symptoms (months)   | 10.3 ± 22.8      | 12.4 ± 29.2      | NS    |
| Interval of recurrence (months) | 5.9 ± 10.5       | 6.8 ± 8.2        | NS    |
| Body mass index                 | 23.7 ± 4.0       | 22.5 ± 5.4       | NS    |

Results are expressed as means ± SD or percentages, as appropriate. NS, not significant.
hundred and thirty-five (88.8%) of the patients were men. The mean age at the time of presentation for surgical treatment was 29.6 years (range, 0–79 years) and the average duration of symptomatic disease was 10.6 months (range, 0.1–121.7 months). Although there was no association between sex and the duration of symptoms ($p = 0.72$), females had a mean age of 40.0 years at presentation compared with 28.3 years at presentation in men ($p < 0.05$). There was no association between sex and the interval of recurrence. Overall, the patients had a mean BMI of 23.6 kg/m$^2$ and there was no difference in BMI between the sexes.

The numbers and types of procedures are listed in Table 2 according to complications and recurrence. The total postoperative complication rate was 10.5%, with 13 hemorrhages, two cases of wound dehiscence, and one case of abscessed stitches. The type of procedure had no significant effect on the complications after surgery. However, patients who underwent excision with primary suture tended to have a higher complication rate involving wound dehiscence ($p = 0.07$).

Of the 152 patients, 49 (32.2%) developed recurrent HS. The type of procedure had a significant effect on the recurrence rate. HS recurred in 32 pa-

| Table 2. Numbers and types of procedures according to complications and recurrence |
|-----------------------------------------------|-------------------------|--------------------------|-----------------------------|---|
|                                              | Incision and drainage   | Excision with primary suture | Wide excision with secondary intention | $p$ value |
| Number                                       | 56 (36.8%)             | 42 (27.6%)                | 54 (35.5%)                   |   |
| Complications                               |                         |                          |                             |   |
| Hemorrhage                                   | 5 (8.9%)               | 4 (9.5%)                  | 4 (7.4%)                     | NS |
| Wound dehiscence                             | 0                      | 2 (4.8%)                  | 0                            | NS |
| Abscessed stitches                           | 0                      | 1 (2.4%)                  | 0                            | NS |
| Recurrence                                   | 32 (57.1%)             | 8 (19.0%)                 | 9 (16.7%)                    | < 0.0001 |
| Wound-healing period (weeks)                 | 1.1 ± 2.3              | 2.4 ± 2.5                 | 7.3 ± 3.1                    | < 0.05 |

NS, not significant.

Fig. 1. Disease-free intervals in recurring HS according to the time and type of initial surgical procedure.
patients (57.1%) who had undergone a drainage procedure only, which was higher than the rate after excision with primary suture (19.0%) or wide excision with secondary intention (16.7%) ($p < 0.001$). The wound-healing period was 1.1 weeks (range, 0–3 weeks) after drainage, 2.4 weeks (range, 1–5 weeks) after excision with primary suture, and 7.3 weeks (range, 6–9 weeks) after wide excision with secondary intention healing. HS recurred after a median interval of 5.3 months after abscess drainage (range, 0–61 months), 5.0 months (range, 0–12 months) after excision with primary suture, and 7.9 months (range, 4–23 months) after wide excision with secondary intention healing. Patients who underwent wide excision with secondary intention healing seemed to have less recurrence in the short term after surgery (Figure 1).

We have clarified the comorbidity between nonrecurrent and recurrent HS patients in Table 3. Bilateral HS had an effect on recurrence in patients with HS. Bilateral involvement was observed in 30.6% of patients with recurrent HS and in 12.6% of patients with nonrecurrent HS ($p < 0.05$). Diabetes mellitus (DM) also had an effect on HS recurrence. Of patients with recurrent HS, 10.2% had DM, whereas only 4.8% of patients with nonrecurrent HS had DM ($p < 0.05$). There was no difference in recurrence and nonrecurrence among HS patients due to old age, unilateral involvement, perianal fistula, acne, or smoking.

All 49 patients with recurrent HS underwent a reoperation, which included 42 wide excisions with secondary intention healing, three split-thickness skin grafts, and four local advanced flaps. No recurrence has been noted after surgery up to the present time, but the loss of two partial grafts (66.7%) was noted after excision with split-thickness skin grafts.

**Table 3. Distribution of associated conditions in patients with nonrecurrent and recurrent HS**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Nonrecurrent HS patients (n = 103)</th>
<th>Recurrent HS patients (n = 49)</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comorbidity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old age</td>
<td>4 (3.9%)</td>
<td>3 (6.1%)</td>
<td>NS</td>
</tr>
<tr>
<td>Bilateral involvement</td>
<td>13 (12.6%)</td>
<td>15 (30.6%)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Unilateral involvement</td>
<td>90 (87.4%)</td>
<td>34 (69.4%)</td>
<td>NS</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>5 (4.8%)</td>
<td>5 (10.2%)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Perianal fistula</td>
<td>9 (8.7%)</td>
<td>2 (4.1%)</td>
<td>NS</td>
</tr>
<tr>
<td>Acne</td>
<td>7 (6.8%)</td>
<td>2 (4.1%)</td>
<td>NS</td>
</tr>
<tr>
<td>Smoking</td>
<td>89 (86.4%)</td>
<td>33 (67.3%)</td>
<td>NS</td>
</tr>
<tr>
<td>Obesity</td>
<td>6 (5.8%)</td>
<td>2 (4.1%)</td>
<td>NS</td>
</tr>
</tbody>
</table>

NS, not significant.


Velpeau first described HS as a clinical entity in 1839. Later, Vemeuil was the first to associate HS with the sweat glands. The disease develops mainly in men between the third and fourth decades of life. HS is rare before puberty or after menopause and may be androgen dependent. In our study, the women were statistically significantly older than the men. Furthermore, most patients in our hospital were soldiers. Therefore, our patients with HS were predominantly young and male.

The cause of HS remains unknown, and obesity, DM, a genetic tendency to acne, and cigarette smoking have been identified as predisposing factors. These have been hypothesized to inhibit glandular function, leading to obstruction of the glandular ducts. Ten (6.6%) patients with HS in this study had DM and five (10.2%) patients with recurrent HS had DM. DM has a more significant effect in patients with recurrent HS than in patients with nonrecurrent
HS. HS may involve one or more sites and is frequently bilateral. Although most patients (81.6%) in our study had unilateral involvement, bilateral involvement had a significant effect on HS recurrence. In our opinion, patients with DM or bilateral involvement should receive radical excision, with more and close attention paid to the affected areas.

Medical treatment for mild and acute HS is often limited because of the indolent and recurrent nature of the disease. Therefore, surgical intervention for HS may be necessary if medical therapy fails. Factors that influence the surgical approach include the affected site, the extent of skin and soft-tissue involvement, the formation of abscesses, the chronicity of the disease, and the patient’s comorbid condition.

The incision and drainage of individual lesions and abscesses may temporarily improve the symptoms, but do not cure the underlying sinuses and infected apocrine glands. In our study, acute infection recurred in 32 (57.1%) patients who had undergone this procedure. This minimal procedure had a higher recurrence rate than those of the other procedures, which may be attributable to the limited resection and the inadequate eradication of the sweat glands. In general, HS recurs earlier if less-infected and abscess-containing skin is resected. Another cause of recurrence is an unusually wide distribution of apocrine glands. No HS progressed to a previously unaffected area in our study. Therefore, the aforementioned cause of recurrence is the most likely in our patients who underwent incision and drainage. Because it is hard to diagnose the severity of HS in clinical practice or to anticipate a higher recurrence rate, this procedure may be used as an initial treatment instead of a definitive treatment. We suggest elective surgery, such as excision with primary suture or wide excision with secondary intention healing thereafter.

In some HS, skin involvement is limited. Therefore, local excision and primary closure, resulting in lower morbidity, is the method advocated by some authors. However, Watson reported that patients who had primary closure had the poorest outcomes, even though they had the least severe disease, and theorized that this was attributable to the compromised excision of the hair-bearing and glandular area. Although they did not experience higher recurrence, our patients who underwent excision with primary suture tended to have a higher rate of complications involving wound dehiscence and abscessed stitches than did those who were treated with the other two procedures. Early excision of localized HS with primary closure to minimize pain and disability is possible, but further complications should be considered.

Most authors agree that radical wide excision of the whole compromised area to a sufficient depth to reach healthy tissue is preferable. In the literature, the overall recurrence rates range between 0% and 74%, and follow-up after surgery in these studies varies between 0 and 47 months. In a series of 82 patients with wide excision and a mean follow-up of 47 months, Harrison et al. found a 23.1% recurrence rate for all cases, which is higher than the 16.7% recurrence rate in our series after radical wide excision. However, because of the larger skin defect after this procedure, the wound-healing period is longer than that after the other procedures, consistent with the findings of other studies. Although it involves pain, discomfort, and delayed wound closure, wide excision with secondary intention is the proper treatment for HS. Furthermore, if wound closure is tension free and adequate, excision with a primary suture may be a suitable alternative.

Some authors advise the use of split-thickness skin grafts when large areas are affected. The use of skin grafts has several drawbacks, including the morbidity rate of the technique, either at the wound graft or donor site, an unsightly cosmetic result, and the possibility of functional changes depending on the region affected, especially the axilla or buttock. High rates of graft failure of up to 45% have been reported. Three patients with recurrent HS underwent wide excision with split-thickness skin grafts and two of them (66.7%) suffered partial graft loss. Because skin grafts are frequently unsuccessful in the perineal and
perianal areas, where secondary infection may be significant, some authors do not generally recommend grafting in these regions. Therefore, split-thickness skin grafts for wound closure may not be suitable for gluteal HS.

Some authors have advocated closure of the wounds with skin flaps, depending on the extent and location of the skin defect. With flaps, the cosmetic and functional results are better. However, when the area affected is large, multiple large flaps are required, which increases the surgical time, blood loss, post-operative pain, and the possibility of infection. Therefore, flaps are not suitable for limited and unilateral HS. Four patients with previously recurrent HS received local advanced flaps with no subsequent recurrence. In our opinion, skin flaps may be a proper treatment for recurrent HS with bilateral involvement.

Forty-two patients underwent reoperation with a wide excision with secondary intention, and four patients received local advanced flaps after recurrence. No further recurrence has been noted at this time. Therefore, we advocate wide excision with secondary intention for nonextensive HS, and local advanced flaps for more widespread and recurrent disease to minimize postoperative complications and recurrence. The disease-free interval was not significantly different between these procedures, which may be attributable to the shorter follow-up period or lower patient numbers. Although wide excision with secondary intention healing seemed to entail less recurrence in the short term, patients with HS should be followed-up regularly for a long period after surgery to exclude late-developing recurrences.

**Conclusions**

Although the character of HS is benign, the recurrence rate with subsequent complications is high. Factors influencing this rate are the location of the lesion, the type of wound treatment, and the extent of surgery. Incision and drainage leads to a higher recurrence rate and excision with primary suture tends to more complications. Although it involves a longer wound-healing period, we favor wide excision with secondary intention healing to treat nonextensive HS of the gluteal area.

**References**


廣泛切除併二級癒合：
一種對臀部大汗腺炎適當的治療方式

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目的  大汗腺炎是一種慢性疾病，通常表現出膿瘍、瘻管、及結疤。它好發於身體有大汗腺的部位。因為許多病人對內科治療無效且長期為此病痛所苦，我們試圖找出治療大汗腺炎較好的手術方法。

方法  從 1996 年 8 月到 2006 年 8 月，152 位臀部大汗腺炎病人接受手術治療。我們從病歷資料來統計分析病人之手術治療方法及結果。本院之手術方法分為三種，包括 56 位病人切開引流、42 位病人切除併縫合、54 位病人廣泛切除併二級癒合。手術的範圍根據病人之臨床狀況及病兆大小而定。

結果  病人平均年齡為 29.6 歲。平均追蹤時間為 36 個月，我們發現有 49 病人復發 (32.2%)。切開引流後有 32 位病人復發 (32.2%)，切除併縫合後有 8 位病人復發 (19.0%)，廣泛切除併二級癒合後有 9 位病人復發 (16.7%)。切開引流後平均傷口癒合時間為 1.1 個週，切除併縫合後平均傷口癒合時間為 2.4 個週，廣泛切除併二級癒合後平均傷口癒合時間為 7.3 個週。

結論  臀部大汗腺炎是一種慢性、易復發的疾病，而且常引起疼痛、嚴重合併症及自我孤立。我們的研究顯示不完全切除大汗腺炎是造成復發的主因，而且廣泛切除併二級癒合對大部分病人有較好的預後。

關鍵詞  膿瘍、大汗腺、大汗腺炎、傷口癒合、廣泛切除。