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## Extent of surgery and recurrence rate of hidradenitis suppurativa

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**Abstract** Hidradenitis suppurativa (HS) is a chronic fistula- and abscess-forming disease of the cutis and subcutis of unknown etiology. Disease recurrence is frequent and may cause severe complications. We analyzed patients with HS who underwent surgery between 1976 and 1997. The operative procedures were divided into drainage procedures ( $n=6$ ), limited regional ( $n=14$ ), and radical wide excisions ( $n=11$ ). The extent of surgery was examined in terms of the clinical course and late postoperative sequelae of HS. At a mean follow-up of 72 months, we found developed locoregional recurrent HS in 45% of patients. There was 100% recurrence after drainage, 42.8% after limited, and 27% after radical excision ( $P<0.05$ ). HS recurred after a median interval of 3 months for drainage, 11 months for limited excision, and 20 months for radical excision ( $P<0.05$ ). The disease-free interval continued up to 35 months. Long-term sequelae included penile amputation and a case of fatal squamous cell carcinoma. Although radical wide excision of the HS-affected cutis is associated with the lowest recurrence rate, it is still considerable and warrants long-term follow-up.

Hidradenitis suppurativa (HS) is a chronic fistula- and abscess-forming disease of the cutis and subcutis of unknown etiology. The disease affects mainly skin areas rich in apocrine glands, such as the inguinal genital, perianal, and axillary regions. The gluteal region and the medial thighs are also frequently affected. Although many cases of HS show a mild course, recurrence is frequent and usually accompanied by a variety of complications. Possible consequences of long-standing, recurrent disease are multiple surgery and considerable social stigma caused by chronic infection, with purulent drainage, unpleasant odor, and constant pain. In addition, there is a potential risk of developing a squamous cell carcinoma.

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There is still controversy regarding the appropriate treatment for HS. Although most studies recommend surgical therapy with wide excision of the affected area, some authors support conservative therapy or minimal procedures as limited excision or abscess drainage only. In addition, most reports in the literature lack a long-term follow-up and exact information about the recurrence rate of HS. In this study we reviewed our patients in detail and analyzed the prognostic relevance of extent of surgery in HS. Furthermore, we present a patient with a 45-year history of HS who developed an extensive squamous cell carcinoma.

### Patients and methods

Medical records, including outpatient files, of all patients who underwent surgery in our Department between 1976 and 1997 were analyzed retrospectively. Surgical strategy was divided into drainage procedures, limited regional, and radical wide excision. Drainage procedures were defined as simple abscess incisions and drainage, limited excision as resection of the infected abscess and fistula-containing cutis in the affected region, and radical wide excision included all hair-bearing skin (with or without signs of HS) of the affected region with a clear margin of at least 1 cm. The affected areas were classified into axillary, inguinal, genital, perianal, and upper thigh. To assess the clinical course after discharge, all patients and their general practitioners were interviewed by questionnaire, and patients underwent physical examination documenting the signs, location, therapy, and clinical course of persistent or recurrent HS and late sequelae after surgery. Recurrence was defined as persistent or newly developed signs of HS appearing in the same area which made a reoperation necessary.

### Results

Surgery for HS was performed in 31 patients (8 women and 23 men). The mean age at onset of disease was 31.5 years (range 12–54 years). No patient was lost to follow-up. The mean follow-up period after initial surgery was 72 months (range 3–238 months).

**Table 1** Localization of HS in male and female patients (partially more than one area affected)

Region	Males (n=23)	Female (n=8)
Axillary	2	4
Inguinal	12	3
Upper thigh	7	3
Gluteal	3	1
Penis/labia	1	1
Perianal	4	2

### Clinical presentation

While 12 patients had HS in only one area, axillary ( $n=6$ ) or perianal ( $n=6$ ), 19 were affected in several regions. The skin lesions were localized mainly in the inguinal region ( $n=15$ ) and the upper medial thigh ( $n=10$ ). The gluteal ( $n=4$ ) and genital ( $n=2$ ) regions ( $n=2$ ) were rarely involved. The location of HS differed between men and women. Axillary HS was found in 4 of 8 women and in 2 of 23 men, whereas 12 (53%) of the males and only 3 (37%) of the females had inguinal involvement (Table 1).

### Surgery

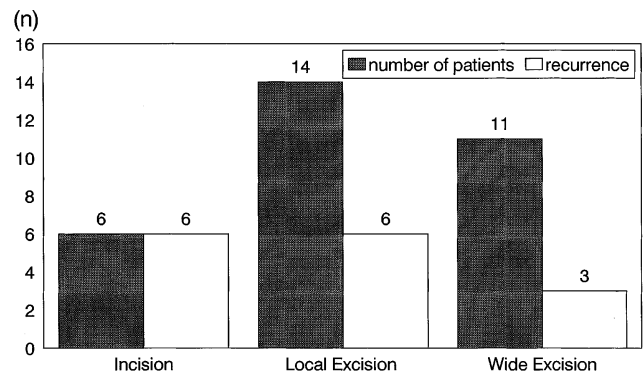
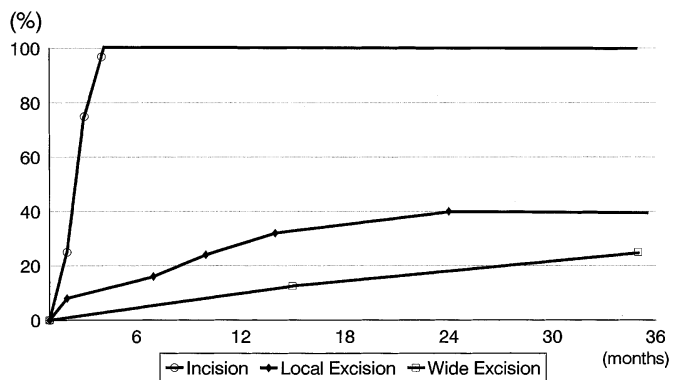
Primary surgery included 6 abscess drainages, 14 limited, and 11 radical wide excisions. Primary wound closure was carried out in two patients after limited resection (both patients developed recurrence). The postoperative complication rate was low (6.5%), with one hemorrhage after radical wide excision requiring reoperation and one deep venous thrombosis.

### Clinical course and recurrence

Of the 31 (45%) patients 14 underwent reoperation for recurrent HS. In 6 patients (19.3%) HS progressed at previously unaffected sites which was not defined as a recurrence.

There was a significant effect of the extent of surgery on the recurrence rates and the disease-free interval after surgery. HS recurred in all 6 patients who had undergone drainage procedures only. After limited excision and radical wide excision the recurrence rates were 42.8% ( $n=6$ ) and 27% ( $n=3$ ;  $P<0.05$ , Fisher's exact test; Fig. 1). The disease-free interval differed between procedures as follows: HS recurred after a median interval of 3 months after abscess drainage (range 1–4 months), 11 months (range 2–24 months) after limited, and 20 months (range 15–35 months) after radical wide excision ( $P<0.05$ , Fisher's exact test; Fig. 2).

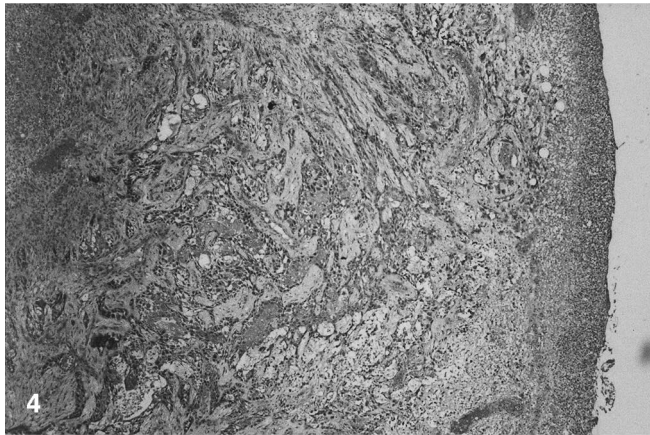
The location of HS also had an effect on the recurrence rate. There was only one case of recurrence (16.6%) in axillary and perianal HS. All other recurrences were in cases of inguinal or genital HS ( $P<0.05$ ). We found no differ-

**Fig. 1** Number of recurring HS cases in relation to the initial surgical procedure**Fig. 2** Cumulative rate of recurring or persisting HS in relation to the time and type of initial surgical procedure

ence in recurrence rates due to gender, age of patient, or duration of disease.

Of the 14 patients with recurrent or persistent disease 6 had more than one recurrence at the same site (range 2–8) and therefore required repeated surgery. Severe perianal and genital HS necessitated penis amputation in one patient, and a protective colostoma in another.

A rare complication developed in a 61-year-old patient with a 45-year history of HS and 17 previous operations at different sites (gluteal, inguinal, upper thigh, perianal). He was referred to our unit with an indurated swelling and an extensive abscess in the gluteal region, 15×10 cm in diameter. The infected area was radically resected (Fig. 3). Histological examination of the specimen revealed fragments of a poorly differentiated squamous cell carcinoma (Fig. 4). Abdominal and pelvic computed tomography showed solid hypodense tissue in the gluteal region, between the intergluteal fold and the rectum (Fig. 5). The inguinal lymph nodes were enlarged, but no organ metastases were found. The patient was treated by secondary wide radical excision followed by radiotherapy (total dose 54 Gy). He died 4 months after diagnosis due to rapid tumor progression.



**Fig. 3** Case of severe HS in a patient with incidentally detected extensive squamous cell carcinoma. Wound area after excision of the infected areas

**Fig. 4** Histological examination (hematoxylin and eosin) of the poorly differentiated squamous cell carcinoma

**Fig. 5** Computed tomography of HS and squamous cell carcinoma with solid hypodense tissue in the gluteal region and the intergluteal fold

## Discussion

HS was first described as a clinical entity by Velpeau in 1839. In 1864 the French surgeon Vemeuil was the first to associate HS with the sweat glands. Especially those areas rich in apocrine glands, such as axillary, inguinal, genital, perianal, and perineal regions, are affected by the disease. The disease develops mainly in men between the third and fourth decades of life [1]. HS in the perianal region is ten times more common in men, while axillary disease is more prevalent in women [2–4]. Although its etiology is unknown, HS seems to be associated with obesity, proneness to acne, excessive sweating, endocrine disorders such as Cushing's syndrome and diabetes, poor personal hygiene, and smoking [5–8]. The pathogenesis of HS begins with a keratinous plugging of the apocrine duct, followed by duct and gland dilation and severe inflammation. Gland rupture spreads the infection to surrounding tissues. The cycle is repeated in the adjacent apocrine glands, leading to localized abscesses, chronic draining sinuses, and finally scarring and fibrosis [6, 9, 10].

There is no standard treatment of HS, and most studies lack a long-term follow-up after their initial surgical procedure. However, the postoperative care and observation of patients with HS remains an important factor since recurrence of the disease can occur even years (35 months in our own patients) after initial surgery [11]. Conservative management ranges from antiseptic cleaning or topical steroid creams to systemic antibiotic therapy. Combined antiandrogen and estrogen therapy in women has also been reported to control HS [10, 12–17]. Although acute, intermittent lesions of early HS often respond to conservative therapy, it is unlikely that such treatment alters the clinical course of the disease. Patients occasionally derive symptomatic benefit from long-term antibiotics, but relapse is almost inevitable when treatment is withdrawn [11, 13–14, 18, 19]. Therefore surgery is the only effective therapy for severe HS, especially in view of possible complications after long-standing disease.

Incision and drainage of individual lesions and abscesses may temporarily improve symptoms but do not cure the underlying sinuses and infected apocrine glands. In the presented series acute infection recurred within 3 months in all patients who had undergone this minimal procedure. Recurrence is due principally to limited resection and inadequate eradication of sweat glands. In general, HS recurs earlier the less infected and abscess-containing skin is resected. Another cause of recurrence is an unusually wide distribution of apocrine glands. Obesity, local pressure, and skin maceration are important promoting factors. In about 20–25% of patients HS progresses to a previously unaffected area, as seen in our study [14, 20].

Disease location also affects the recurrence rate. Unlike axillary HS, which frequently has a mild course, inguinal HS is often associated with a high recurrence rate and a debilitating outcome. This was confirmed in our series, in which only one patients with axillary HS developed recur-

rence. All other recurrences were seen in patients with inguinal or genital HS.

Furthermore, the method of wound management may affect the course of the disease. In a series by Watson [21], reoperation was necessary in 54% of cases with primary wound closure, in 19% after flap repair, and in 13% after grafting. This confirms our experience that attempts at primary skin closure inadvertently compromise the excision margin and increase the risk of recurrence [22].

Most authors agree that radical wide excision of the affected skin reduces recurrence to a minimum [10, 14, 18, 23–27]. Overall recurrence rates range between 0% and 74% in the literature; follow-up after surgery varies in these studies between 0 and 47 months [5, 14, 15, 28–31]. In a series of 82 patients with wide excision and a mean follow-up of 47 months, Harrison et al. [14] found a 26% recurrence rate for all cases, which is comparable to the 27% recurrence rate in our series after radical wide excision. In our data we found no advantage of a limited regional excision of the affected skin. After this procedure almost every second patient developed a recurrence.

There are numerous reports of severe complications in chronic HS including anemia, intestinal keratitis, osteomyelitis, fistulous communications to pelvic organs, and even death [32, 33]. It remains unclear whether radical excision can prevent some of these. Squamous cell carcinoma is a dreaded but very rare complication with only 26 reported cases since its initial description by Anderson and Dockerty in 1958 [34]. Our own patient with squamous cell carcinoma had a 45-year history of HS, with multiple surgical procedures. He presented with advanced cancer infiltration which made curative resection impossible. Radiotherapy had no effect on tumor growth in our patient, who died 4 months after diagnosis. Jackman [35] found an incidence of 3.2% in 125 cases of perianal HS. Squamous cell carcinoma tends to be found in patients with perianal and gluteal disease, but is less frequent in axillary cases. In a review of all published cases by Perez-Diaz in 1995 [36], the average age at diagnosis was 47 years, with male predominance. The mean duration from the onset of HS to squamous cell carcinoma was 20 years. Only 4 patients had a history of less than 10 years. Treatment varies from wide local excision to abdominoperineal resection, sometimes combined with radio- or chemotherapy. According to follow-up data, 30% of the patients are alive and recurrence free after 1 year, and 41% develop recurrent cancer [33, 34, 36–41].

## Conclusion

HS is a rare inflammatory disease affecting the apocrine glands in the skin of the inguinal, gluteal, genital, perianal, and, rarely, axillary regions. Although the character of HS is benign, the recurrence rate with subsequent complications is high. Factors influencing this rate are location, type of wound closure, and especially the extent of surgery. Incipient and small lesions may respond to conservative ther-

apy, but it is unlikely that conservative treatment alters the clinical course of the disease. Drainage procedures and limited resections lead to an unacceptable rate of recurrence, with an unnecessary risk of possible life-threatening complications such as squamous cell carcinoma.

Low recurrence rates and prevention of complications can be achieved only by a radical wide resection of all apocrine gland bearing cutis in the affected area. In addition, patients with HS need to be followed-up and treated over a long period after surgery to exclude late developing recurrences and to detect a malignant degeneration in an early stage by histopathological examination of suspicious areas.

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