



Original Research

Men, main victims of hidradenitis suppurativa (A prospective cohort study)

Hemmat Maghsoudi*, Hojjat Almasi, Mahmood Reza Miri Bonjar

Department of Surgery, Faculty of Medicine, University of Medical Sciences of Tabriz, Iran



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ABSTRACT

Background: Hidradenitis suppurativa (HS) is a chronic inflammatory disease presenting as painful subcutaneous nodules, characterized by multiple abscess, inter-networking sinus tracts. We present the option of surgical treatment involving wide surgical excision and methods of reconstruction as well as the rate of recurrence.

Method: This study reviewed 44 sites in 21 patients with moderate to extensive HS treated surgically in our hospital from 2000 to 2016, with a follow up of at least 24 months.

Results: A total number of 44 operative procedures were performed during the study period with 13.6% (6 sites) involving axilla, 38.6% (17 sites) involving the gluteal area, 29.5% (13 sites) involving the perineal and perianal area and 11.4% (5 sites) involving the inguinal region, 4.5% (2 sites) involving the scrotal area, and 1.3% (one case) retrorectal abscess.

Conclusion: Conservative treatment methods have little or no effects especially on gluteal, perineal/perianal and axillary hidradenitis suppurativa. The morbidity associated with the established disease is significant, and the only successful treatment is wide surgical excision.

1. Introduction

Hidradenitis suppurativa is a chronic inflammatory disease presenting as painful subcutaneous nodules [1]. It is characterized by multiple abscesses inter-networking sinus tracts, foul-smelling exudate from draining sinuses, inflammation in the dermis, both atrophic and hypertrophic scars, ulceration, and infection.

The current pathophysiologic mechanism is that there is follicular occlusion, and not an apocrine disorder as previously believed. Conservative approaches alone are not effective as a long-term treatment. They are, however, a good adjunct to the surgical treatment [1,2]. Insufficient debridement is the major factor for high recurrence rate [1–3]. Healing of wounds by secondary intention results in poor aesthetic outcome and of dressing is tedious for patients.

Currently available medical treatments are insufficient and their efficacy is transient. As a result, advanced-stage severe HS requires invasive surgical removal of all the involved tissue [1–4]. In this report, we present our experience with moderate and extensive perianal, perineal, axillary, inguinal, gluteal, scrotal hidradenitis suppurativa, and retrorectal cases, including our treatment, methods, and outcomes.

2. Patients and methods

This study reviewed 44 sites in 21 patients with moderate to extensive HS treated surgically in our hospital (Tabriz, IRAN) from 2000

to 2016, with the follow up of at least 24 months. By using a standardized data-collection form, the following information was obtained: age, sex, BMI, smoking, addiction, affected sites, size of HS, cleaning habitus, family history of HS, and number of previous operations. The diagnosis has been made clinically without the need for imaging or laboratory tests. We did not use rectal tube for prevention of the surgical field from contamination with stool in the patients with perianal or gluteal lesions. Colostomy was not used in any patients for this purpose.

Total surgical excisions were performed under spinal or general anesthesia on all patients. All patients were operated on in the lithotomy, jackknife, supine or prone positions according to site of HS. The operative technique was complete excision of the entire diseased skin and subcutaneous fatty tissue and down to the muscular fascia on aggressive cases. Patients with limited disease involving the axilla or inguinal region were selected for excision and primary closure if the skin and soft tissue could be mobilized adequately. Preoperative and postoperative antibiotherapy is administered for all patients according to wound tissue culture test results.

Hurley's clinical staging was used for the classification of patients (Table 1) [4]. Excision and primary closure was used only for moderate (Hurley stage II) axillary and inguinal disease, whereas wide local excision and split-thickness skin grafting or fasciocutaneous flap was the mainstay of treatment in patients with diffuse (Hurley stage III). We excluded Hurley stage I from this study. These findings were entered on

* Corresponding author. The Sina Hospital, Azadi Street, P.O. Box 1548, Tabriz 5163639888, East Azarbaijan, Iran.
E-mail address: maghsoudih@yahoo.com (H. Maghsoudi).

Table 1
Hurley staging system.

Stage	Stage characteristics
I	Solitary or multiple isolated abscess formation without scarring or sinus tracts
II	Recurrent abscess, single or multiple widely separated lesions with sinus tract formation
III	Diffuse or broad involvement across a regional area with multiple interconnected sinus tracts and abscesses

a computer by means of an SPSS 19 (Chicago, Illinois) data base file designed by the authors and analyzed using SPSS 19 program for chi-square test, Fisher's Exact test, or Student *t*-test for unequal variance where appropriate. The level of significance by comparing two or multiple variables in χ^2 test or Student *t*-test was set at $P \leq .05$. The work has been reported in line with the STROCCS criteria [5].

3. Results

This study reviewed 44 sites in 21 patients with moderate to extensive HS treated surgically in our hospital from 2000 to 2016, with the follow up of at least 24 months (Table 2). Nineteen (90.5%) were men and two (9.5%) women. The mean age at the presentation for operative management was 47.4 years (SD: 16.14), (range: 19–71 years) and the average duration of symptomatic disease was 8.7 years (range 2–30 years). None of these patients were detected to have any comorbid or associated conditions. According to answers about cleaning habits, personal hygiene was poor in 91% of the patients. 13 of

19 (68.4%) male patients were smokers and 6 of 19 (31.6%) were addict. All of included patients had previously been prescribed a treatment by non-surgical or inadequate surgical treatment modalities such as short term antibiotic treatments, local wound care and abscess drainage for long periods (up to 30 years). Ten patients previously were treated by limited local excision and primary closure. 33.3% (7 cases) had positive family history of HS. There were two squamous cell carcinoma superimposed on HS in permanent pathology.

Affected sites were axillary 13.6% (6 sites), inguinal 11.4% (5 sites), gluteal 38.6% (17 sites), perineal and perianal 29.5% (13 sites), retrorectal abscess with perianal and perineal involvement 1.3% (one case) and 4.5% (2 sites) involving the scrotal area. No significant relationship between HS and BMI, age, addiction, job, and site of the lesions. There is significant correlation between HS and sex and smoking ($P < .05$). 90.5% (19 patients) showed no complication after surgery. The average time of hospital stay period was 5 days. Physiotherapy and postoperative rehabilitation were also done. After follow up (mean follow up time is 24 months), all of the patients showed no recurrence. Figures (pictures of before and after operations) of cases (cases of 15, 13, 3, 6, and 12) were shown in Figs. 1–5.

4. Discussion

Hidradenitis suppurativa remains a challenging disease for both the patients and the physician. Because of the varying clinical manifestation and sites involved by the disease, patients with HS present to, or are referred to many different specialties including plastic surgery, surgery, dermatology, Gynecology, medicine, immunology and infection control. Unfortunately, HS is commonly mismanaged owing to a

Table 2
Distribution of 21 patients according to job, sex, age, BMI, smoking, addiction, site of involvement, defect size, and number of previous surgical operation.

Patient.no	Job	Sex	Age (years)	BMI	Smoking	Addiction	Site of involvement	Defect size (cm, cm ²)	Number of Previous surgical operation
1	Free employment	male	54	24.3	+	+	Bilateral gluteal	40 × 37 = 1480	3
2	Farmer	male	53	21	+	–	Left inguinal	21 × 19 = 777	2
3	Free employment	male	62	27.8	+	–	Bilateral gluteal	53 × 47 = 2491	0
4	Farmer	male	71	26.2	–	–	perineal	23 × 31 = 713	1
5	Free employment	male	59	23.6	–	–	Perineal + gluteal	51 × 48 = 2448	1
6	Free employment	male	38	25.7	+	+	Bilateral gluteal	49 × 62 = 3038	3
7	Free employment	male	67	28	+	–	Perineal + gluteal	30 × 37 = 1110	2
8	worker	male	51	21	+	–	Bilateral inguinal	20 × 23 = 460 22 × 27 = 594	3
9	worker	male	69	25.4	+	–	Bilateral axillary	15 × 10 = 150 13 × 12 = 156	1
10	worker	male	32	26.3	–	–	Inguinal + perineal	10 × 7 = 70 8 × 7 = 56	1
11	worker	male	41	29	+	+	Bi-axillary	8 × 7 = 56 7 × 6 = 42	0
12	worker	male	21	23	+	+	Perianal, perineal, and scrotal in continues	13 × 15 = 195	0
13	Free employment	male	56	27	+	+	Perineal and scrotal	20 × 17 = 340	1
14	Free employment	male	45	24.1	–	–	Bigluteal in continues with right inguinal	37 × 28 = 1036	2
15	worker	male	33	22	–	–	bigluteal	13 × 19 = 247	1
16	worker	male	56	23.7	+	–	Perineal and perianal	11 × 9 = 99	0
17	housekeeper	female	57	26.8	–	–	Right gluteal	12 × 7 = 84	0
18	farmer	male	58	22.6	–	–	Bigluteal and intergluteals and perineal, axillary	51 × 45 = 2295 10 × 7 = 70	3
19	student	male	19	22	+	–	axillary	12 × 8 = 96	1
20	scholar	female	21	23	–	–	Perineal, bigluteal, and retrorectal abscess	37 × 45 = 1665	4
21	worker	male	32	20.3	+	+	Perineal, perianal and retrorectal abscess	21 × 19 = 399	2



Fig. 1. Before and after operation pictures of patient no.15.



Fig. 2. Before and after operation pictures of patient no.13.

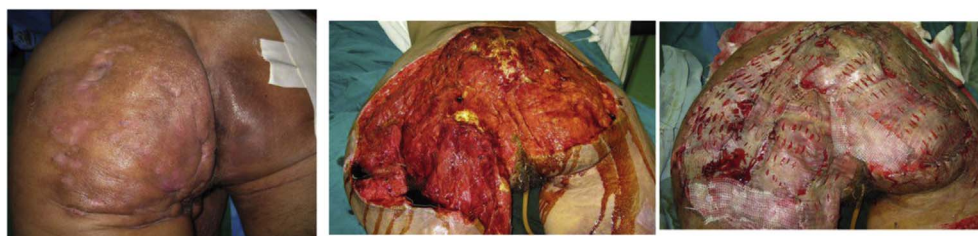


Fig. 3. Before and after operation pictures of patient no.3.

failure of early diagnosis and once, established, chronicity and progression ensue. No specific test for diagnosis exists. In spite of some author's opinions, the role of endocrine factors in the etiology of HS has been controversial. Hyperandrogenism does not have a proven role in the disease. Poor hygiene, smoking, alcohol consumption, and bacterial involvement are thought to exacerbate rather than initiate the disease process [6–8]. Treatment varies depending on disease severity and extent. The majority of patients with early-stage disease (abscesses without significant scarring) respond to topical or systemic antibiotics. Antiandrogens have an equivocal role in therapy. Application of various anti-inflammatory agents has been successful in limited cases with questionable long-term efficacy. With the goal of ablating hair follicles; radiation therapy, radiofrequency ablation, and carbon dioxide (CO₂) laser ablation have been employed, again with less satisfactory long-term results [7,8].

Our observation of this group of patients is that lack of personal hygiene, utilization of inadequate treatment modalities and smoking result in severe and widely disseminated lesions that affect the quality of life and general health status of the patients. Also, all seem to agree that surgical excision is the best or only curative therapy at present. The newer chemical or antibiotic agents and physical therapeutic efforts accomplish little and temporary improvement and they probably do not alter favorably the ultimate progress of disease. Such measures seem to postpone curative measures and add to the patient's financial expenditure [9,10].

In those cases, in which it is necessary to remove large portions of skin and subcutaneous tissue, a subsequent skin graft will assist materially in reducing the healing time and also will improve the result [9,10]. Lesions are in the perianal, perineal, gluteal, groins, between breasts in women, axillaries, and the combination of these areas but in



Fig. 4. Before and after operation pictures of patient no.6.



Fig. 5. Before and after operation pictures of patient no.12.



our study, there was not involvement of between breasts in women.

We know that the apocrine glands are compound tubular glands which usually open into a hair follicle and they act by rupture of the cell membrane and the cellular protoplasm which is forming a thick secretion of unknown composition. They are not activated until puberty and tend to become infected in persons having an oily skin and so-called acne diathesis. The current pathophysiologic mechanism is follicular occlusion, and not apocrine disorder as previously believed. The exact etiology of HS still remains unclear, genetic factors may play a role as a positive family history has been elicited in 26% of patients with HS [11,12]. In our study, 33.3% had family history of HS.

There is no consensus about the relationship between HS and sex, race, and site of the lesions. Axillary seems to be more frequent in women. The gluteal, inguinal, perineal, and perianal zones are more frequently involved in men. HS appear more commonly in young adult and are observed after puberty [13]. Children are never affected unless they have precocious puberty. In our study men were main victim of HS, and only two female patients affected. Perhaps, this difference is due to the higher prevalence of HS in men in our region.

HS in the perianal, perineal, and gluteal zones may be confused with fistula-in-ano, and pilonidal sinus, but, patchy, irregular, brawny infiltration of the involved tissues with multiple draining sinuses should easily guide us to the correct diagnosis [8,13]. In our series, two of patients were treated as pilonidal sinus previously.

In patients with longstanding history of hidradenitis and chronic nonhealing wounds, it is important to rule out malignancy. There have been several reports of squamous cell carcinoma (S.C.C) arising in chronic HS [14,15]. A retrospective review of Swedish database of hospital discharge diagnoses from 1965 to 1997 revealed a 50% increased risk of developing any cancer in patients with HS. Over the general population, significant increases were specifically found in nonmelanoma skin cancers, buccal cancer, and primary liver cancer [14,15]. Most patients with cancers had untreated HS for longer than 20 years. One should at least keep a high index of suspicion for this entity in patients with long standing disease and extensive scarring in the affected areas. In our series, two patients had S.C.C transformation which treated by complete excision with 1 cm margin and covered by split thickness graft.

Operative excision of the involved follicles and inflammatory process is the only curative treatment [3,16], as the same as our study. Various surgical methods for the treatment of HS have been described previously. Wide local excision with skin grafting, skin flap transfer, and primary closure has been common. However, with the popularization of surgical methods using fasciocutaneous or musculocutaneous flaps, these flaps have been applied positively for the treatment of HS [11,16]. There is no doubt that early recognition of the condition can greatly reduce its morbidity and proper surgery can lessen the sequelae. An intelligent understanding of the disease by the patient will also do

much to promote a cordial patient-doctor relationship if another gland flares up.

Although skin graft may result in contractures and extensive scarring, but this can be acceptable especially in the gluteal regions. In these areas, skin graft contraction does not cause functional problems and scars are covered easily. Patients generally do not complain about aesthetic results. Local or regional flaps can only be used if a wide and adequate excision with sure margins is performed. We used only flaps or grafts or combination of them according to extent of HS. Primary closure was used in moderate Hurley stage II HS defects in axillary, inguinal and perianal regions after wide excision of the diseased areas and elevation and development of the skin flaps [14,16]. All patients were very satisfied with the functional and aesthetic results. In our study, no recurrence was observed during study.

It is likely that recurrence is a frequent consequence of HS. HS results in considerable morbidity, and excessive hospital stays. Although HS is uncommon, many surgeons will experience this disease at least once during their professional careers. The present study did not aim to address the optimum management of HS; however, it did highlight the significant morbidity that can arise with the use of inadequate treatments. Alternatives should be given consideration to the following and results compared in prospective trials: wide local excision, and covered by flaps, grafts, primary closure or combinations of these. In addition, genetic and personal factors should be studied. The limitation of our study is a few numbers of patients. Other studies are needed with more number of patients for proper treatment recommendation for HS.

Ethical approval

No ethical approve.

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Author contribution

(1) The conception and design of the study, or acquisition of data, or analysis and interpretation of data: **Hemmat Maghsoudi**.

(2) Drafting the article or revising it critically for important intellectual content: **Hemmat Maghsoudi, Hojjat Almasi, Mahmood Reza Miri Bonjar**.

(3) Final approval of the version to be submitted: **Hemmat Maghsoudi, Mahmood Reza Miri Bonjar, Hojjat Almasi**.

Conflicts of interest

No conflict of interest.

Trial registry number

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Guarantor

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References

- [1] A. Alikhan, P.J. Lynch, D.B. Eisen, Hidradenitis suppurativa: a comprehensive review, *J. Am. Acad. Dermatol.* 60 (2009) 62–63 539–61; quiz.
- [2] E. Balik, T. Eren, T. Bulut, Y. Büyükcuncu, D. Bugra, S. Yamaner, Surgical approach to extensive hidradenitis suppurativa in the perineal/perianal and gluteal regions, *World J. Surg.* 33 (2009) 481–487.
- [3] S. Yazdanyar, G.B. Jemec, Hidradenitis suppurativa: a review of cause and treatment, *Curr. Opin. Infect. Dis.* 24 (2) (2011) 118–123.
- [4] R.J. Kagan, K.P. Yakuboff, P. Warner, G.D. Warden, Surgical treatment of hidradenitis suppurativa: a 10-year experience, *Surgery* 138 (2005) 734–741.
- [5] R.A. Agha, M.R. Borrelli, M. Vella-Baldacchino, R. Thvayogan, D.P. Orgill for the STROCSS Group, The STROCSS statement: strengthening the reporting of cohort studies in surgery, *Int. J. Surg.* 46 (2017) 198–202.
- [6] Adnan Menderes, Ozgur Sunay, Haluk Vayvada, Mustafa Yilmaz, Surgical management of hidradenitis suppurativa, *Int. J. Med. Sci.* 7 (4) (2010) 240–247.
- [7] S. Ather, D.S.Y. Chan, D.J. Leaper, K.G. Harding, Surgical treatment of hidradenitis suppurativa: case series and review of the literature, *Int. Wound J.* 3 (2006) 159–169.
- [8] J. Iwasaki, D.E. Marra, E.F. Fincher, R.L. Moy, Treatment of hidradenitis suppurativa with a nonablative radiofrequency device, *Dermatol. Surg.* 34 (2008) 114–117.
- [9] J. Rivard, D. Ozog, Henry Ford Hospital dermatology experience with Levulan Kerastick and blue light photodynamic therapy, *J. Drugs Dermatol.* JDD 5 (2006) 556–561.
- [10] W.P. Morgan, K.G. Harding, L.E. Hughes, A comparison of skin grafting and healing by granulation, following axillary excision for hidradenitis suppurativa, *Ann R Coll Surg Engl* 65 (1983) 235–236.
- [11] A. Tanaka, M. Hatoko, H. Tada, M. Kuwahara, K. Mashiba, S. Yurugi, Experience with surgical treatment of hidradenitis suppurativa, *Ann. Plast. Surg.* 47 (2001) 636–642.
- [12] R.J. Kagan, K.P. Yakuboff, P. Warner, G.D. Warden, Surgical treatment of hidradenitis suppurativa: a 10-year experience, *Surgery* 138 (2005) 734–741.
- [13] D.E.M. Slade, B.W. Powell, P.S. Mortimer, Hidradenitis suppurativa: pathogenesis and management, *The British Association of Plastic Surgeons* 56 (2003) 451–461.
- [14] K.M. Mitchell, D.E. Beck, Hidradenitis suppurativa, *Surg. Clin.* 82 (6) (2002) 1187–1197.
- [15] L.B. Rosenzweig, A.S. Brett, J.F. Lefavre, J.J. Vandersteenhoven, Hidradenitis suppurativa complicated by squamous cell carcinoma and paraneoplastic neuropathy, *Am. J. Med. Sci.* 329 (3) (2005) 150–152.
- [16] S.F. Bocchini, A. Habr-Gama, D.R. Kiss, A.R. Imperiale, S.E. Araujo, Gluteal and perianal hidradenitis suppurativa: surgical treatment by wide excision, *Dis. Colon Rectum* 46 (7) (2003) 944–949.