




Research Article

Demographic and Histopathological Evaluation in 71 Patients Diagnosed with Dissecting Cellulitis of the Scalp

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Background. Dissecting cellulitis of the scalp (DCS) is a recurrent condition in the hair follicle, resulting in permanent alopecia. **Objective.** We aimed to report the demographic and histopathologic characteristics in patients with dissecting cellulitis. **Materials and Methods.** We designed a cross-sectional study of patients with DCS who attended the Razi Dermatology Hospital from 2015 to 2019. **Results.** Seventy-one patients with a female to male ratio of 1 : 10 were recruited. The mean age of the patients was 21.6 years old (range: 13–69). Of them, 77.5% were younger than 32 years. The mean disease duration was 14 months (range: 3–84). Longer disease duration caused more severe disease (p value < 0.001). However, age and disease severity were not associated (p value > 0.05). Comorbidity with head and neck acne was found in 29 patients: the age of 28 patients was less than 32 years, which showed acne was associated with younger patients (p value < 0.001). Concerning the histopathological findings, the most frequent one was lymphoplasmic cell infiltration in 90% of the specimens, followed by neutrophilic infiltration in 79%, irregular fibrosis in 66%, granulation tissue in 56%, folliculitis in 49%, deep dermal involvement in 49%, and granuloma in 38% of the cases. **Conclusion.** DCS was more frequent in men, and it was a disease of youth (second and third decades of life). Head and neck acne has concomitance with the disease, especially in young patients.

1. Introduction

Cicatricial alopecia is a chronic and recurrent disease in the hair unit, causing irreversible hair loss [1, 2]. There are two types of cicatricial alopecia, primary and secondary [1, 3, 4]. Dissecting cellulitis of the scalp (DCS) accounts for 1–2% of primary cicatricial alopecias (PCA) [5]. In the early studies, DCS predominantly occurs in 20–40 years old men of African-American ancestry. However, according to recent studies, DCS also occurs in other races, males, females, and pediatric patients [6–8]. The clinical presentation is painful nodules and abscesses, and in the late stage, sinuses with interconnecting draining pathways may occur [5, 6, 9, 10]. The severity of the disease depends on the number of nodules, abscesses, sinus tracts, scars, and the involvement of

an isolated scalp area or the entire calvaria [7, 11]. In the early stages, the patient may experience hair regrowth spontaneously or only with treatment [10]. However, misdiagnosis and improper management may lead to permanent hair loss due to the destruction of the hair follicles and either atrophic or hypertrophic scarring [1, 2, 5, 8, 10]. Aesthetically, it would lead to major wounds and psychological side effects in patients [5].

DCS usually happens in young males with a past medical history of acne [12]. DCS can occur on its own or within “the follicular occlusion tetrad” of dissecting cellulitis, hidradenitis suppurativa, pilonidal cyst, and acne conglobata [5, 8, 12, 13]. The cause of DCS is still not known. Some studies suggested a similar pathogenic mechanism with acne, a fault in follicular keratinization that obstructs the

hair follicle orifice. Then, sebum and keratin accumulate in pilosebaceous units and expand, causing secondary bacterial infection, and consequently, folliculitis or perifolliculitis occurs [13], making this disease a deep, chronic, and relapsing folliculitis [10]. In the early stages, the disease can be undiagnosed, and early diagnosis is necessary to prevent scarring [7]. Positive clinical diagnosis of DCS occurs only in few cases with a typical appearance of the disease. Therefore, histopathological assessments are helpful for a definite diagnosis of DCS [5]. There are few studies about the DCS characteristics, most of which are case reports. Our study aimed to describe the disease's epidemiology, clinical, and histopathologic features.

2. Materials and Methods

In this cross-sectional study, patients referred to the dermatopathology unit of the Razi University Hospital were recruited from 2015 to 2019. The recruited patients had a confirmed diagnosis according to the pathological findings of DCS. Biopsy samples of all 71 patients were fixed in formalin, paraffin-embedded, and sectioned routinely; then, specimens were stained with hematoxylin and eosin. Epidemiological (age and gender) and clinical (duration and severity of disease and existence of head and neck acne) variables were recorded.

There is no specific severity scale for DCS, so in this article, two dermatologists assessed the clinical severity of the disease based on the number of nodules and abscesses, interconnecting sinus tract presence, and the extent of scalp areas (frontal, parietal, vertex, temporal, or occipital) involvement by fibrous tissue. Stage 1 is one nodule or abscess in one area, stage 2 is more than one nodule or abscess with sinus tracts in one and more areas, and stage 3 is more than one nodule or abscess with sinus tracts and fibrosis in one and more scalp areas. Stage 1 was considered mild, and stages 2 and 3 as severe diseases.

Histopathological reports have investigated the presence of folliculitis, granulation tissue, irregular scar, lymphoplasmacytic and neutrophil infiltration, granuloma, and deep involvement of the dermis.

3. Results

The demographic data and clinical features are summarized in Table 1. Seventy-one patients (65 males and six females) with DCS were included. There was a significant male predominance (male:female: 65:6) (p value < 0.05). The mean age of the patients was 26.1 years old (range: 13–69). Fifty-five (77.5%) patients were 0–32 years old, and only 16 (22.5%) patients were older than 32. From the onset of clinical symptoms to the diagnosis of DCS was recorded as the duration of the disease. The mean of this clinical feature was 14 months (range: 3–84). The duration and the severity of DCS were directly associated with each other (p value < 0.001) (Figure 1). All patients with more than three years of disease had severe diseases. The disease severity and age were not associated (p value > 0.05).

Comorbidity with head and neck acne was found in 29 patients: 22 patients were younger than 22 years, six patients

TABLE 1: Demographic and clinical data of 71 patients diagnosed with dissecting cellulitis of the scalp.

Variables	N (%)	
	Gender	Male
	Female	6 (8.5)
Age, years	0–18	19 (26.75)
	18–22	17 (24)
	22–32	19 (26.75)
	>32	16 (22.5)
Disease duration, years	<1	29 (41)
	1–2	19 (26.5)
	2–3	11 (15.5)
	3–4	5 (7)
	>4	7 (10)
Comorbidity with head and neck acne	0–18	13 (68.4)
	18–22	9 (52.9)
	22–32	6 (31.6)
	>32	1 (6.3)

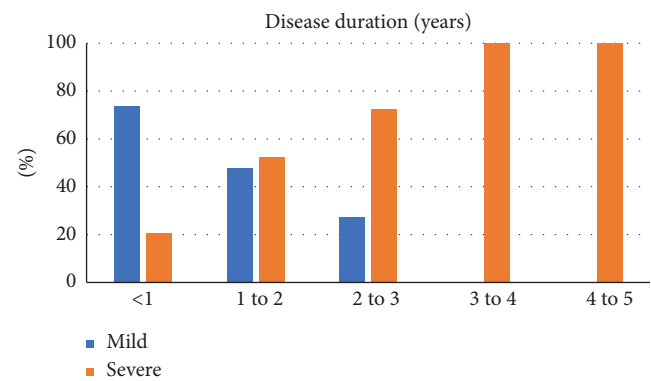


FIGURE 1: The correlation between severity and duration of dissecting cellulitis of the scalp in 71 patients.

were 22–32 years, and one was older than 32 years old. Acne occurred more in younger patients (p value < 0.001). Figure 2 demonstrates a man with DCS.

4. Histopathological Findings

Table 2 demonstrates the results of patients' biopsies. The most common histopathologic findings were lymphoplasmacytic infiltration in 64 (90%) patients and neutrophilic infiltration in 56 (79%) patients. Other findings were irregular fibrosis in 47 (66%) patients, granulation tissue in 40 (56%) patients, folliculitis and deep dermal involvement in 35 (49%) patients, and granuloma in 27 (38%) patients. Some histopathological findings in DCS are illustrated in Figures 3(a)–3(d).

5. Discussion

This study assessed patients' demographic, clinical, and pathological characteristics with a confirmed diagnosis of DCS.

Early literature reported a more prevalence of DCS in African-Americans patients with dark skin [12, 13]. Nevertheless, the recent case series mentioned more widespread



FIGURE 2: A 27-year-old male with scarring DCS that caused numerous areas of alopecia.

TABLE 2: Histological findings of patients with dissecting cellulitis of the scalp in 71 patients.

Histological findings		N (%)
Inflammatory cell types in the dermal and subcuticular layer	Lymphoplasmacytic	64 (90)
	Neutrophilic	56 (79)
Irregular fibrosis in the dermis		47 (66)
Granulation tissue		40 (56)
Folliculitis		35 (49)
Deep dermal involvement		35 (49)
Granuloma		27 (38)

cases of DCS and reported this disease in other races, for example, 66 patients with DCS from Taiwan [7] and three white male patients from Switzerland [14].

DCS has a high prevalence in young males and the onset of this disease in young persons [7, 12–15]. In our cases, we also found a male predominance (91.5%) of the disease. The male-to-female ratio in the literature was more than what we recorded (63:3 vs. 65:6) [7].

Our patients' mean age (26.1) was in agreement with recent studies [7, 13], and the mean age of women (32.1 years) was greater than the males (25.6 years). This finding was consistent with a similar study stating that DCS usually occurs in men aged 18–40; four female patients were older, aged 43, 40, 23, and 50 years old [12]. Nevertheless, another study reported a significantly higher mean age of men than women (25.4 years vs. 14.7) [7]. Of our patients, 77.5% were 1–32 years, implying that the frequency of this disease increased up to 30 years old and then decreased. Therefore, the highest frequency of DCS was in the second and third decades of life. In previous studies, the highest frequency of DCS was in the third and fourth decades of life [12, 15].

The mean duration of the disease was 14 months (range: 3–84). In the literature [13], and the mean duration of the disease is reported to be 34.3 months (range: 4–120), justifying the longer duration of the disease vs. our study. The disease duration was more than three years in 17% of our patients; all had severe disease, suggesting a more severe

DCS in a longer disease duration [7]. Our results supported this hypothesis as well.

The pathogenesis of DCS remains poorly defined, but more frequent comorbidity of head and neck acne and hidradenitis suppurativa with DCS implies common pathways in their induction. Lee et al. [7] and Badaoui et al. [13] reported that 23% and 20% of their patients had acne conglobata. In our study, comorbidity with head and neck acne was found in 40.84% of our patients, of which 75.86% were younger than 22 years. Accordingly, head and neck acne, especially in younger patients, was most commonly associated with DCS. This association between head and neck acne and DCS can be a helpful clinical sign in the diagnosis of DCS, so in a patient with a doubtful diagnosis in the early stage, comorbidity of head and neck acne can help the physician to diagnose DCS.

The presence of inflammatory cells in the reticular layer and the subcutaneous junction was a characteristic histopathological feature of DCS. In the final stages, perifollicular and intrafollicular mixed, neutrophilic and lymphoplasmacytic inflammation were observed [8, 16]. In our study, lymphoplasmacytic (90%) and neutrophilic (79%) infiltrations were the most common histopathologic findings, which were in line with a recent study [15]. Other studies reported that lymphocytes were the significant cell types in a prolonged wound and neutrophil cells focally gathered around the hair follicle with interrupted epithelium in the acute phase [5, 7, 17].

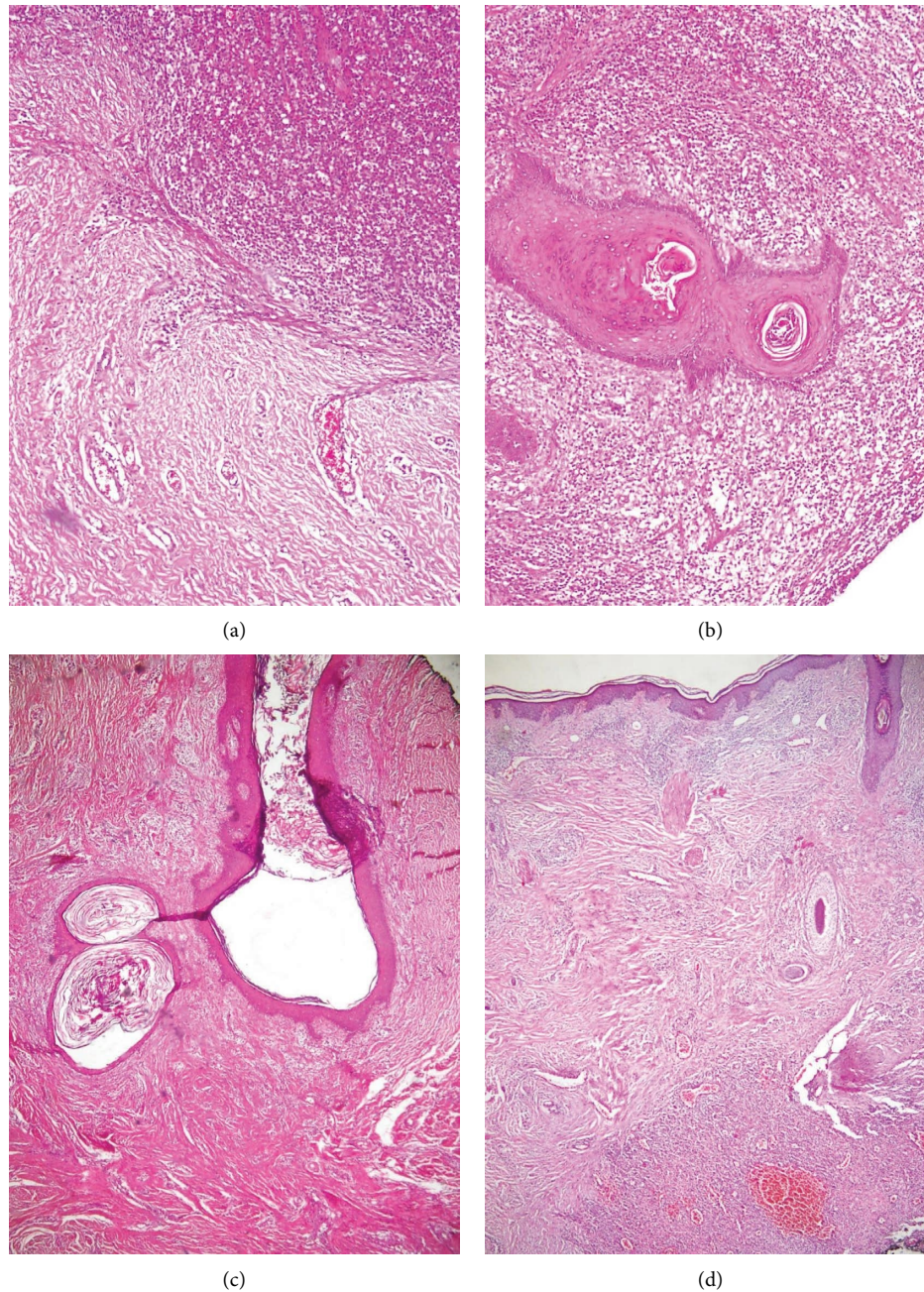


FIGURE 3: Dissecting cellulitis of the scalp: (a) inflamed granulation tissue and scarring (magnification $\times 10$), (b) deep folliculitis and perifolliculitis with granulation tissue (magnification $\times 10$), (c) sinus tract formation and dermal scarring (magnification $\times 10$), and (d) deep granulation tissue (magnification $\times 4$).

In the continuation of the destruction of the hair follicle, the granulomatous structure appears [5, 7, 8, 17], we found this feature in 38% of biopsies, and it was 33.3% in another research [7].

Granulation tissue, fibrosis, keloid, hypertrophic scar of the dermis, and superficial fat may be present in the final stage [5, 7, 16]. Granulation tissue was present in 56% of our patients and 90.5% of another study's patients [7]. Fibrosis was present in 66% of our specimens, while it was reported to be 90.5% in the literature [7]. This study had some limitations. First, folliculitis is the fundamental part of DCS

diagnosis, and it was expected to be seen in all samples, but due to the sampling process being taken horizontally and vertically from different points of the skin tissue, folliculitis was found in 49% of our samples; however, in the absence of folliculitis, the presence of folliculitis-related dermal change including perifollicular infiltrating cells, deep dermal involvement, granulation tissue, granuloma, and fibrosis led us to the diagnosis of this disease. Second, in many cases, a definitive diagnosis is dependent on the clinical course of the disease, and a longer follow-up would be required for the final diagnosis.

6. Conclusions

DCS usually affects young males with a history of acne. Head and neck acne was present in almost half of the patients, and it was more common in younger patients. Underdiagnoses of DCS may occur, especially at the early stage. Physicians' awareness of demographic and histopathologic features of DCS can help in early diagnosis, effective treatment, and prevention of scarring alopecia.

Data Availability

The data used to support the findings of the study are available from the corresponding authors upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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