

Histologic features of chronic cutaneous lupus erythematosus of the scalp using horizontal sectioning: Emphasis on follicular findings

Hye Jin Chung, MD, MMS, and Lynne J. Goldberg, MD
Boston, Massachusetts

Background: Chronic cutaneous lupus erythematosus (CCLE) often affects the scalp resulting in scarring alopecia. While histopathologic findings of CCLE have been well described, there is little written on the morphologic changes to the hair follicles in this condition.

Objective: We aim to determine the histopathologic findings of hair follicles in CCLE of the scalp.

Methods: We conducted a retrospective study of 33 transversely sectioned skin biopsy specimens of CCLE of the scalp at the Skin Pathology Laboratory at Boston University between April 2005 and March 2015.

Results: New findings include basaloid follicular epithelium lacking hair follicles at deep levels, follicular miniaturization, increased catagen/telogen hair follicles, and pigment casts. Two histopathologic patterns could be discerned, an alopecia areatalike pattern and a lichen planopilarislike pattern.

Limitations: Generalizability of a single-center experience may be limited.

Conclusion: Follicular findings in CCLE of the scalp are reported. We hypothesize that the basaloid aggregates are remnants of hair follicles that are no longer actively cycling. (J Am Acad Dermatol <http://dx.doi.org/10.1016/j.jaad.2017.02.039>.)

Key words: alopecia; alopecia areata; chronic cutaneous lupus erythematosus; cicatricial alopecia; dermatopathology; discoid lupus erythematosus; lichen planopilaris; scarring alopecia; transverse sections.

Chronic cutaneous lupus erythematosus (CCLE) manifests as a chronic, atrophic, scarring dermatosis on sun-exposed areas. Although patients with CCLE rarely have significant systemic disease, CCLE affects the scalp in 34%-60% of cases, leading to scarring alopecia.^{1,2} The characteristics of scarring alopecia in CCLE are erythematous scaly papules and plaques with follicular plugging, hypopigmentation, peripheral hyperpigmentation, and telangiectasia.³ A biopsy is often needed to distinguish these findings from other forms of scarring alopecia, including lichen planopilaris and folliculitis decalvans.

Abbreviations used:

AA:	alopecia areata
BMZ:	basement membrane zone
CCLE:	chronic cutaneous lupus erythematosus
LPP:	lichen planopilaris

While histologic findings of CCLE are well described, few reports have characterized the morphologic changes to hair follicles in this condition.^{2,4-6} In addition, most of the previous histologic studies of CCLE of the scalp used vertically sectioned specimens.^{2,5,6} We performed a

From the Section of Dermatopathology, Department of Dermatology, Boston University School of Medicine.

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Correspondence to: Lynne J. Goldberg, MD, 609 Albany St, Boston, MA 02118. E-mail: lynngold@bu.edu.

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retrospective review of 33 horizontally sectioned specimens of CCLE of the scalp from 31 patients to focus on follicular morphology, anticipating that the description of the changes in follicular epithelium of CCLE of the scalp will lead to more accurate diagnosis and insight into the mechanism of follicular destruction.

METHODS

We performed a retrospective study of CCLE of the scalp at the Skin Pathology Laboratory at Boston University from April 2005 through March 2015. Hematoxylin-eosin–stained transverse sections of punch biopsy specimens obtained from the scalp were reviewed. Originally, 46 cases were identified. Thirteen cases were excluded because of the following: unavailability of slides ($n = 4$), lack of hair follicles ($n = 3$), and histologic findings suggestive of diagnoses other than CCLE ($n = 6$). Thus, the study ultimately included 33 specimens with a diagnosis of CCLE confirmed by clinicopathological correlation. The study was approved by the institutional review board at the Boston University Medical Campus under protocol H-34004.

Two dermatopathologists (L.J.G. and H.C.) reviewed both qualitative (eg, morphology of follicles, fibrosis, inflammation) and quantitative (eg, size, number, cycle) findings at 3 follicular levels (the lower follicle, isthmus, and infundibulum), as well as the epidermis. Hair counts were done at the lower follicle (at or just above the junction of subcutaneous fat layer and the reticular dermis) to determine anagen and catagen/telogen percentages. At the isthmus, where sebaceous glands are grouped with follicles in follicular units, the number of terminal and vellus hairs was counted. For cases in which sebaceous glands were absent, the location of the isthmus was approximated at the mid-dermis. Vellus hairs were defined as being ≤ 0.03 mm in diameter. The presence of miniaturization was determined for those patients whose ethnicity was known, comparing the number of vellus hair follicles per mm^2 with the expected number of vellus follicles per mm^2 , which was calculated based on biopsy size, normal follicular density for that skin type, and a normal terminal to vellus ratio of 7:1.^{7,8}

RESULTS

Thirty-three biopsy specimens from 31 patients with CCLE of the scalp were included. The clinical features of the patients can be found in [Table I](#). Patient age ranged 19–81 years with a mean of 43 years. Women predominated over men, with a ratio of 3.4:1. Race was documented in just over half

the cases, with African American the most common ($n = 13$). The duration of disease ranged from 2 weeks to >16 years. The most common biopsy site was on the central scalp. Most clinicians recognized the findings of CCLE; the next most common clinical impression was lichen planopilaris (LPP).

The histopathologic findings are categorized by horizontal level ([Table II](#)). Common deep follicular changes included fibrous stelae, deep perivascular inflammation, and increased dermal mucin ([Fig 1](#)). Just

under half of cases demonstrated increased catagen/telogen hair follicles, perieccrine inflammation, and inflammation in fibrous stelae. Pigment casts were present in 19% of specimens. At the isthmus, aggregates of basaloid follicular epithelium were noted in 55% of specimens, and in an additional 25% at the level of the lower follicle. When followed to the skin surface, these structures did not form hair shafts, and either ended blindly at superficial levels ([Fig 2](#)) or merged with dilated follicular infundibulae ([Fig 3](#)). Sebaceous glands were lacking in nearly all the cases, and most follicles exhibited interface change, perifollicular inflammation, and a thickened basement membrane zone (BMZ) ([Fig 4](#)). Dilated eccrine ducts were present in 15% ([Fig 5](#)). Follicular miniaturization was present in 46% of specimens, all in African American patients. The most common finding at the infundibulum was follicular interface change, followed by dilated follicular infundibulae, compound follicles mostly in groups of 2 and 3, and perifollicular inflammation ([Fig 6](#)). The vast majority of cases demonstrated vacuolar alteration and a thickened BMZ at the dermo-epidermal junction (DEJ), and most exhibited follicular plugging. Epidermal atrophy was uncommon.

DISCUSSION

The histologic findings of CCLE of the scalp reported in the literature are summarized in [Table III](#).^{2,4,6} Many

CAPSULE SUMMARY

- Few reports describe the morphologic changes to hair follicles in chronic cutaneous lupus erythematosus (CCLE) of the scalp.
- Aggregates of basaloid epithelium at the level of the isthmus and lower follicle, pigment casts, compound follicles, and dilated eccrine ducts are present in patients with CCLE.
- Two histopathologic patterns of CCLE were uncovered: one resembling alopecia areata and one resembling lichen planopilaris.

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