Volume 29 Number 6|November/December 2023|
29(6):10

Linear discoid lupus erythematous simulating *en coup de sabre* morphea in a female chronic granulomatous disease carrier

Diem-Phuong Dao[1] BS, Dev Ram Sahni[2] MD MHA, Richard D Sontheimer[3] MD

Affiliations: [1]School of Medicine, Virginia Commonwealth University, Richmond, Virginia, USA, [2]Department of Dermatology, University of Utah Health, Salt Lake City, Utah, USA, [3]Department of Dermatology, Brigham and Women's Hospital, Boston, Massachusetts, USA

Corresponding Author: Dev Ram Sahni MD MHA, Department of Dermatology, University of Utah Health, 30 North 1900 East, 4A330 SOM, Salt Lake City, UT 84132, Tel: 801-581-6465, Email: sahnidr@alumni.vcu.edu

Abstract

Discoid lupus erythematosus (DLE), a subtype of chronic cutaneous lupus may be observed in a linear pattern. A 21-year-old woman with history of chronic granulomatous disease state presented to our clinic for a chronic six-year skin eruption on her left eyebrow, left cheek, and left forehead. A punch biopsy of involved left forehead skin was performed and revealed perivascular and periadnexal lymphohistiocytic infiltrate without features of morphea or panniculitis, confirming the histopathologic changes of cutaneous lupus erythematous. The patient was diagnosed with linear DLE, mimicking *en coup de sabre*, within Blaschko lines. The pathogenesis for DLE in association with chronic granulomatous disease is ambiguous; however, X-linked lyonization is crucial for both conditions and may explain cooccurrence of disease states.

Keywords: Blaschko lines, discoid lupus, granulomatous disease, linear morphea, lupus erythematosus

Introduction

Discoid lupus erythematosus (DLE), a subtype of chronic cutaneous lupus, confers significant morbidity [1-3]. Clinical presentation includes scarring alopecia, marked dyspigmentation of plaques, erythematous papules with scaling and telangiectasia, and facial lesions, especially in photo-exposed areas [2,3]. Discoid lupus erythematosus with linear configurations that follow the lines of Blaschko are atypical and rare. However, reports of DLE mimicking *en coup de sabre* morphea do exist [3]. In addition, there are associated rare immunodeficiencies linked to DLE such as the chronic granulomatous disease (CGD) state. Herein, we report a a patient with CGD carrier state and DLE mimicking *en coup de sabre* morphea and lesions following the lines of Blaschko.

Case Synopsis

A young patient presented to dermatology clinic with a chronic rash on her left face. She had been treated with intralesional triamcinolone acetonide with marked improvement. However, the patient reported that the same skin lesions started to flare two months prior to her initial visit to our clinic. These skin changes were painful, red, and sensitive to sun exposure. Applying hydrocortisone 1% cream provided no benefit. She admitted to experiencing myalgias and arthralgias. She denied other skin changes including Raynaud phenomenon. She was not taking any oral prescriptions or over-the-counter medications.

Pertinent past medical history included the patient being a CGD carrier (proven via genetic testing). In addition, she had a history of three early miscarriages. Family history included the patient's mother being a CGD carrier. In addition, her mother

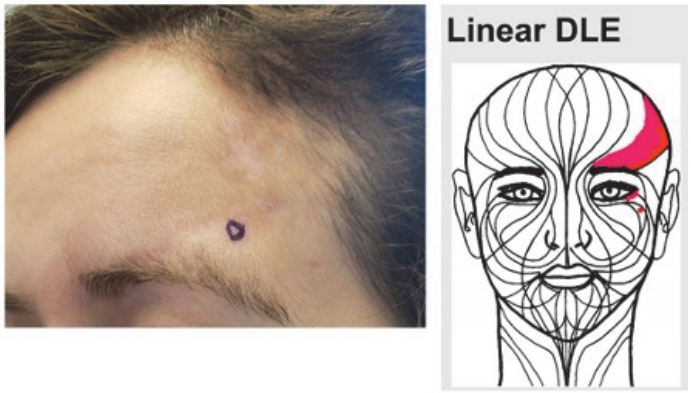

Figure 1. *Appearance of the patient's facial skin changes (the blue ink circle designates the site of the second skin biopsy). Images of the scalp involvement were not available.*

had a history of cutaneous lupus and sarcoidosis. Review of symptoms was remarkable for abdominal discomfort, syncopal-like episodes, photophobia, and headaches.

Physical examination during this initial visit revealed a linear array of atrophic erythematous plaques with patchy brown dyspigmentation extending from the mid left parietal scalp to left lateral eyebrow with alopecia. The initial clinical impression was the *en coup de sabre* presentation of morphea. However, a lesional punch biopsy performed on the left forehead revealed vacuolar interface dermatitis consistent with cutaneous lupus erythematosus.

She returned to our clinic four years later complaining of a flaring eruption in the same location with associated symptoms of pain, hair loss, and sun sensitivity. Follow-up physical examination revealed a linear band of firm, atrophic, dyspigmented skin extending from the mid left parietal scalp to the left lateral eyebrow. In addition, there was edema and erythema of the lateral third of left lower eyelid as well as a solitary patulous, keratin-plugged follicle over the left zygomatic arch having the appearance of comedonal DLE (**Figure 1**). These two latter examination findings were not present on the initial physical examination four years earlier. Another punch biopsy of involved left forehead skin was performed and revealed perivascular and periadnexal lymphohistiocytic infiltrate without features of morphea or panniculitis, further confirming the histopathologic changes of cutaneous lupus erythematous (LE), (**Figure 2**).

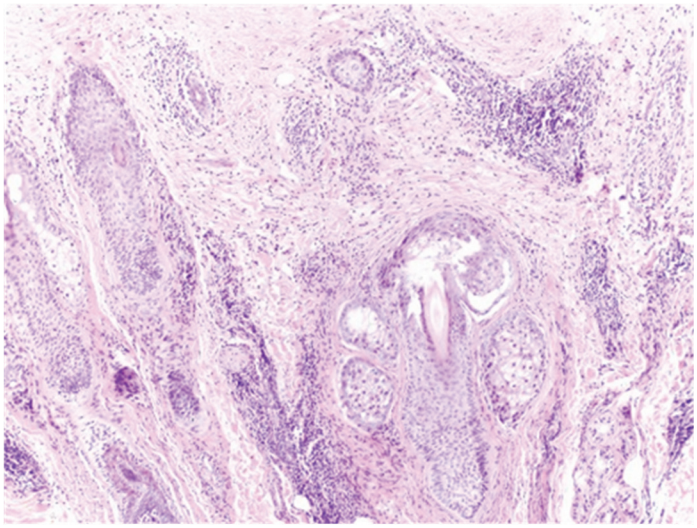

Figure 2. *Patient's skin biopsy. Perivascular and periadnexal lymphohistiocytic infiltrate. H&E, 100×.*

Laboratory testing at that time included a positive ANA titer of 1:320 (speckled pattern). However, the following autoantibody test results were reported as being negative or within normal limits: Ro/SSA, La/SSB, Sm, dsDNA, Scl-70, thyroid peroxidase, phospholipids, and rheumatoid factor. In addition, the following other blood test results were reported as being negative/within normal limits: thyroid-stimulating hormone, complete blood count, and complete metabolic panel.

The patient was diagnosed with linear DLE following Blaschko lines and treated with oral hydroxychloroquine 5mg/kg/day with marked improvement of the erythema and clinical symptoms 6 weeks later.

Case Discussion

Linear forms of cutaneous LE represent a rare variant of cutaneous LE presenting predominantly in childhood, adolescence, and young adulthood. Linear DLE and linear lupus panniculitis represented the two most common clinical subtypes in a pediatric-onset linear cutaneous LE case series [4]. Linear pediatric cutaneous LE characteristically followed Blaschko lines and was accompanied by systemic LE in only 6% of cases. Both linear DLE and linear lupus panniculitis can be accompanied by atrophy and alopecia [4]. Differential diagnosis considerations for other linear skin disorders were

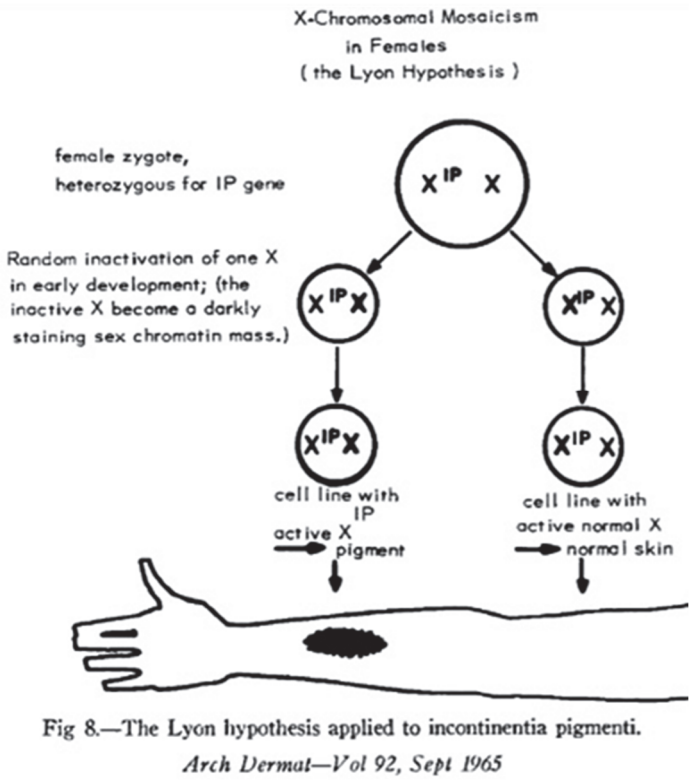

Figure 3. *Lyonization and Blaschko lines in **i**ncontinentia pigmenti and other X-linked epidermal genodermatoses. (Reprinted with publisher's permission).*

eliminated by the significantly-positive ANA, histopathology findings, and symptoms of photosensitivity and arthralgias.

It is currently believed that Blaschko lines demarcate the dorsoventral migration patterns of embryonic ectodermal development. Blaschko lines may reflect functional X-chromosome mosaicism resulting from lyonization (X-inactivation) during early embryogenesis. These lines become clinically visible in the heterozygous state for various X-linked gene defects [5]. In addition, Blaschko lines may be comprised of normal skin cells in which the normal paternal X chromosome is active. The remaining affected skin cells contain an active abnormal maternal X chromosome (**Figure 3**), [6].

Dermatologists encounter Blaschko lines most frequently in the context of understanding the clinical expression of X-linked epidermal genodermatoses. Clinical examples include inflammatory linear verrucous epidermal nevus, ichthyosis, and incontinentia pigmenti.

Chronic granulomatous disease state is a rare hereditary disease characterized by ineffective oxidative metabolism in phagocytes, predisposing patients to infections [7]. Recurrent fungal and bacterial infections, sarcoidosis, rheumatoid arthritis, and DLE are various conditions that can occur in association with CGD. The X-linked form of CGD comprises the majority of cases, affecting males more severely. Cutaneous LE is observed in individuals with X-linked CGD or female carriers of X-linked CGD [7].

Conclusion

The pathogenesis for DLE in association with CGD is ambiguous. Possible explanations include apoptotic neutrophils acting as pathogenic and immunogenic factors. These factors reinforce characteristics seen in lupus with similar characteristic seen in patients with X-linked CGD and/or CGD carriers. Skewed X-chromosome inactivation could additionally lead to a duplicate gene-initiated exaggerated immune responsiveness in females having other autoimmune diatheses [8-10].

Potential conflicts of interest

The authors declare no conflicts of interest.

References

1. Okon LG, Werth VP. Cutaneous lupus erythematosus: diagnosis and treatment. *Best Pract Res Clin Rheumatol*. 2013;27():391-404. [PMID: 24238695].
2. Hassan M, Watters KA, Netchiporouk E. Linear discoid lupus erythematosus mimicking *en coup de sabre* morphea: A case report. *SAGE Open Med Case Rep*. 2019;7:2050313X19882843. [PMID: 31666954].
3. Ribero S, Sciascia S, Borradori L, Lipsker D. The cutaneous spectrum of lupus erythematosus. *Clin Rev Allergy Immunol*. 2017;53:291-305. [PMID: 28752372].
4. Lim D, Hatami A, Kokta V, Piram M. Linear cutaneous lupus erythematosus in children-report of two cases and review of the literature: A case report. *SAGE Open Med Case Rep*. 2020;8:2050313X20979206. [PMID: 33343900].
5. Happle R. Lyonization and the lines of Blaschko. *Hum Genet*. 1985;70:200-6. [PMID: 3894210].
6. Curth HO, Warburton D. The genetics of incontinentia pigmenti. *Arch Dermatol*. 1965;92:229-35. [PMID: 11851242].

7. Xie C, Cole T, McLean C, Su JC. Association Between Discoid Lupus Erythematosus and Chronic Granulomatous Disease--Report of Two Cases and Review of the Literature. *Pediatr Dermatol*. 2016;33:e114-20. [PMID: 27001332].
8. Collison J. X-chromosome inactivation altered in SLE. *Nat Rev Rheumatol*. 2019;15:318. [PMID: 31040440].
9. Sharma R, Harris VM, Cavett J, et al. Rare X chromosome abnormalities in systemic lupus erythematosus and sjögren's syndrome. *Arthritis Rheumatol*. 2017;69:2187-2192. [PMID: 28692793].
10. Prabhat N, Chakravarty K, Pattnaik SN, et al. Systemic lupus erythematosus with autoimmune neurological manifestations in a carrier of chronic granulomatous disease - a rare presentation. *J Neuroimmunol*. 2020;343:577229. [PMID: 32247876].