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Treating linear porokeratosis with topical lovastatin/cholesterol cream

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Abstract

Linear porokeratosis is a rare variant of porokeratosis that is characterized by unilateral lesions along the lines of Blaschko. Like all variants of porokeratosis, linear porokeratosis is characterized by the histopathologic finding of cornoid lamellae bracketing the lesion. The underlying pathophysiology involves a two-hit post-zygotic knockdown of genes involved in mevalonate biosynthesis in embryonic keratinocytes. Although there is currently no standard or effective treatment, therapies targeted to rescue this pathway and restore keratinocyte cholesterol availability are promising. Presented here is a patient with a rare, extensive case of linear porokeratosis treated with compounded 2% lovastatin/2% cholesterol cream leading to partial resolution of the plaques.

Keywords: cornoid lamellae, linear porokeratosis

Introduction

Linear porokeratosis is a disorder of genetic mosaicism leading to hyperkeratotic lesions along the lines of Blaschko. Most commonly, linear porokeratosis lesions are unilateral and affect just one extremity [1]. Rarely, generalized linear porokeratosis occurs which affects multiple extremities and the trunk [1]. On histopathology, linear porokeratosis is characterized by the distinct finding of the cornoid lamellae [2]. Recently several advances have been made in understanding the etiology of linear porokeratosis and potential therapeutic options [3,4]. Presented here is a patient with a case of extensive linear porokeratosis extending unilaterally from the neck to the palms and soles. They were treated with compounded 2% lovastatin/2% cholesterol cream which led to partial resolution of the plaques.

Case Synopsis

A 30-year-old man presented with asymptomatic, erythematous, hyperkeratotic papules and plaques on the right side of his body from his neck to his palms and soles that appeared to follow a Blaschko-linear distribution (**Figure 1**). These lesions were present since birth and since had evolved morphologically, becoming less hyperkeratotic in distal areas, but remained unchanged in distribution. Previously, he had been diagnosed with an epidermal nevus and treated with tazarotene and focal deep curettage with no improvement. The differential diagnosis included linear porokeratosis, linear psoriasis, inflammatory linear verrucous epidermal nevus, linear lichen planus, and lichen striatus. A biopsy was obtained and histopathology revealed cornoid lamellae bracketing a verrucoid squamous proliferation with alternating areas of hypergranulosis with overlying compact orthokeratosis and hypogranulosis with overlying parakeratosis (**Figure 2**). Histopathology and clinical presentation were supportive of linear porokeratosis and treatment was initiated with compounded 2%

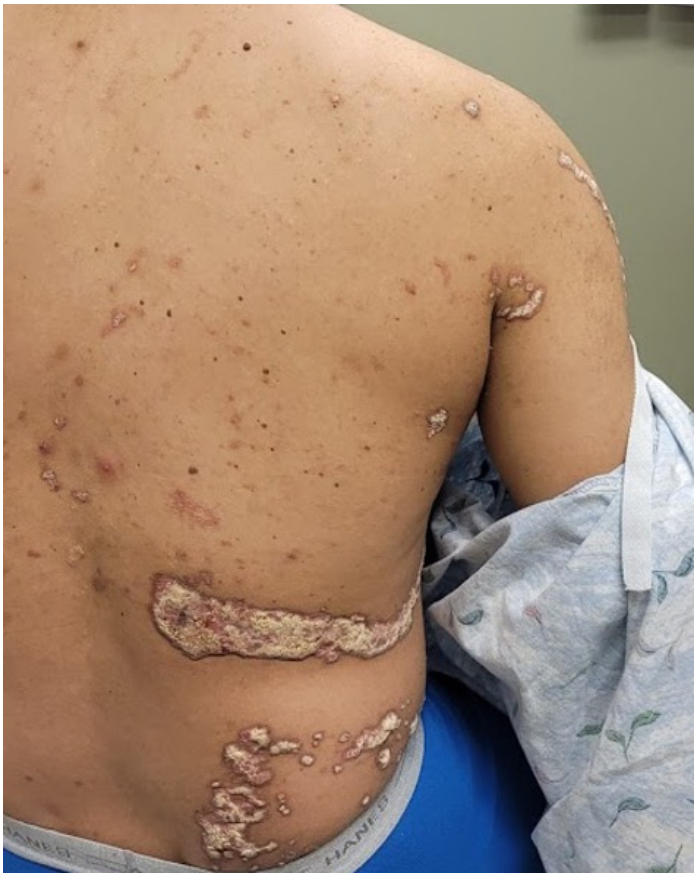

Figure 1. *Thick, verrucous, erythematous papules and plaques of the right side of the patient's body in a Blaschko-linear distribution.*

lovastatin/2% cholesterol cream. The patient reported partial improvement in his lesions while he was using the cream consistently, but he decided against continued treatment; to him, the effort of application exceeded the perceived benefit.

Case Discussion

This report documents an unusual case of extensive linear porokeratosis which presented a diagnostic challenge due to the extent of effected skin and clinical similarity to other rashes distributed Blaschko-linearly. Ultimately histopathology and a strong clinical history allowed linear porokeratosis to be distinguished from disease such as inflammatory linear verrucous epidermal nevus, linear psoriasis, linear lichen planus, and lichen striatus. It is important that clinicians make this distinction because linear porokeratosis carries an increased risk of malignancy and requires long-term monitoring [5]. In fact, an estimated 7.5% of porokeratosis patients develop a cutaneous malignancy at the site of an existing porokeratosis lesion [5]. Among porokeratosis variants, linear porokeratosis carries the highest risk for malignancy [5]. Additionally, extensive and long-lasting lesions increase the risk of cancer [5]. The risk of potential future malignancy among patients with linear porokeratosis warrants consideration of treatment and long-term follow-up.

Linear porokeratosis is a disorder of genetic mosaicism and its development in-utero leads to its classic distribution along the lines of Blaschko. Recently, there have been advances in the understanding of the pathophysiology of linear porokeratosis [1]. Whole genome sequencing has shown that a post-zygotic two-hit knock down of genes involved in mevalonate synthesis likely underlies the disease [3]. It is believed that disruption

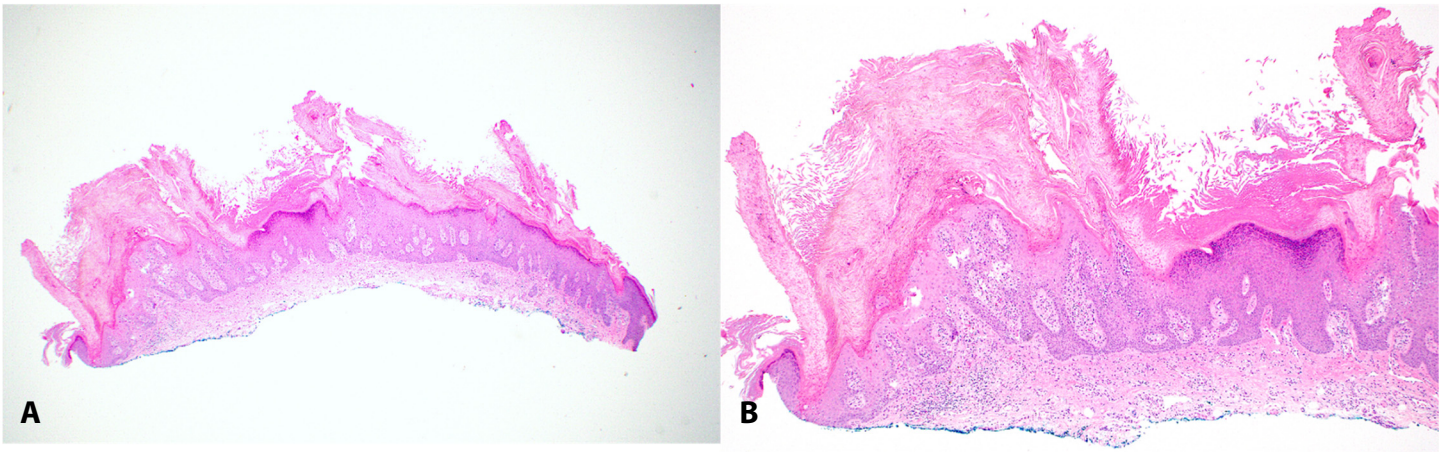

Figure 2. *H&E histopathology.* ***A)*** *Cornoid lamellae bracketing the verrucoid squamous proliferation, 2×.* ***B)*** *Higher power showing alternating areas of hypergranulosis with overlying compact orthokeratosis and hypogranulosis with overlying parakeratosis, 4×.*

of cholesterol synthesis may decrease the stability of keratinocytes and lead to the clinical picture seen in linear porokeratosis [3].

Currently, definitive and effective treatment for porokeratosis is lacking. Many non-invasive treatment modalities have been attempted with varying results; however, evidence exists mostly in the form of case reports. For example, Cohen et al. reported a case of linear porokeratosis successfully treated using diamond fraise dermabrasion in 1990, but this treatment modality has never been investigated in a larger study [6]. Other treatments have been attempted including topical 5-fluorouracil (5-FU), cryotherapy, topical vitamin D analogs, acitretin, and corticosteroids [4,7]. Surgical excision is often effective but is not feasible in generalized cases [7]. Developing a consistently effective treatment has been made especially difficult due to the previously unknown pathophysiology and the rarity of the disease. As genomic sequencing data has become available, it has been theorized that targeting the dysfunctional mevalonate biosynthesis pathway may provide an effective treatment option for porokeratosis. The use of cholesterol to bypass the faulty mevalonate synthesis pathway coupled with a statin to reduce the accumulation of toxic metabolites is gaining traction as promising potential treatment for porokeratosis and other cutaneous disorders of cholesterol metabolism [4,8]. Interestingly, one study showed near complete resolution of disseminated superficial actinic porokeratosis lesions and partial resolution of linear porokeratosis after topical lovastatin/cholesterol treatment [4]. Our patient was prescribed compounded 2% lovastatin/2% cholesterol cream to be applied topically daily to the relatively thinner plaques just on his left upper extremity and experienced partial resolution of these plaques.

Conclusion

In conclusion, reported herein is a rare case of linear porokeratosis that presented a diagnostic challenge amongst other causes of plaques distributed along the lines of Blaschko. This report highlights the importance of a correct diagnosis due to the increased risk of malignancy in linear porokeratosis and explores a recently a proposed treatment—topical lovastatin/cholesterol. Although this case supports the use of topical lovastatin/cholesterol in the treatment of linear porokeratosis, further case studies, series, and perhaps clinical trials are necessary to solidify its efficacy.

Potential conflicts of interest

The authors declare no conflicts of interest.

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