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Authors
McNally, Michelle A
Ibraheim, Marina K
Tschen, Jaime
et al.

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Acrokeratoelastoidosis: is there an association between asthma and sporadic cases in children?

Michelle A McNally[1] BSN, Marina K Ibraheim[1] BS, Jaime Tschen[2] MD, Misha V Koshelev[3] MD PhD

Affiliations: [1]McGovern Medical School, The University of Texas Health Science Center at Houston, Houston, Texas, [2]St. Joseph Dermatopathology, Houston, Texas, [3]Department of Dermatology, The University of Texas Health Science Center at Houston, Houston, Texas

Corresponding Author: Misha V Koshelev MD PhD, 6655 Travis Street Suite 980, Houston, TX 77030, Tel: 713-500-8334, Email: Misha.V.Koshelev@uth.tmc.edu

Abstract

Acrokeratoelastoidosis (AKE) is a rare, benign papular keratoderma that presents as keratotic papules on the lateral margins of the palms and soles. It is most commonly inherited in an autosomal dominant fashion, although sporadic cases are also described. We present a sporadic case of AKE in an 11-year-old girl with a past medical history significant for asthma. On literature review, we found three other cases presenting in children with a past medical history of asthma. We suggest a possible association between asthma and sporadic cases of AKE in children. Current understanding of the pathophysiology of AKE and its associated risk factors is limited and no effective treatment exists. Awareness of a possible association with asthma and atopy, careful history recording in young patients presenting with sporadic cases of AKE, and further research may help to delineate the likelihood of an association between AKE and asthma or atopy. Developing a better understanding of the associated factors that may contribute to the disease process may help guide more effective, targeted treatments in the future.

Keywords: acrokeratoelastoidosis, connective tissue disease, palmoplantar keratoderma, marginal papular keratodermas, asthma, atopy

Introduction

Acrokeratoelastoidosis (AKE) is a rare cutaneous condition belonging to a family of disorders known as marginal papular keratodermas. Clinically, it presents as firm, skin-colored, translucent or yellowish, oval-to-round, firm papules involving the lateral aspects of the hands and feet. Lesions are typically asymptomatic, but they may be a cause of cosmetic concern. Currently, no effective treatment options exist [1]. We present a patient with AKE and describe a possible association between asthma and sporadic forms of AKE.

Case Synopsis

An 11-year-old girl presented with a several year history of multiple asymptomatic, untreated papules on the hands and feet. The patient's past medical history was significant for asthma; current medications included montelukast and cetirizine. Family history was non-contributory and there was no history of similar lesions in other family members.

On physical examination, multiple 2-3mm smooth, shiny, round, translucent to flesh colored, confluent papules coalescing into plaques were symmetrically distributed on the palmar surface of the thenar eminence of the hands (**Figure 1A**). Diffuse hyperkeratosis was present over the thenar aspect of the palms. Multiple 5-8mm translucent, round, hyperkeratotic papules were present on the dorsal aspects of the toes (**Figure 1B**). Dermatoscopy revealed linear areas of whitish-yellowish discoloration of hyperkeratotic skin (**Figure 1C**). A 6mm punch biopsy of the left palm revealed dense orthokeratotic surface keratin with an otherwise normal epidermis (**Figure 2**). Verhoeff-Van Gieson

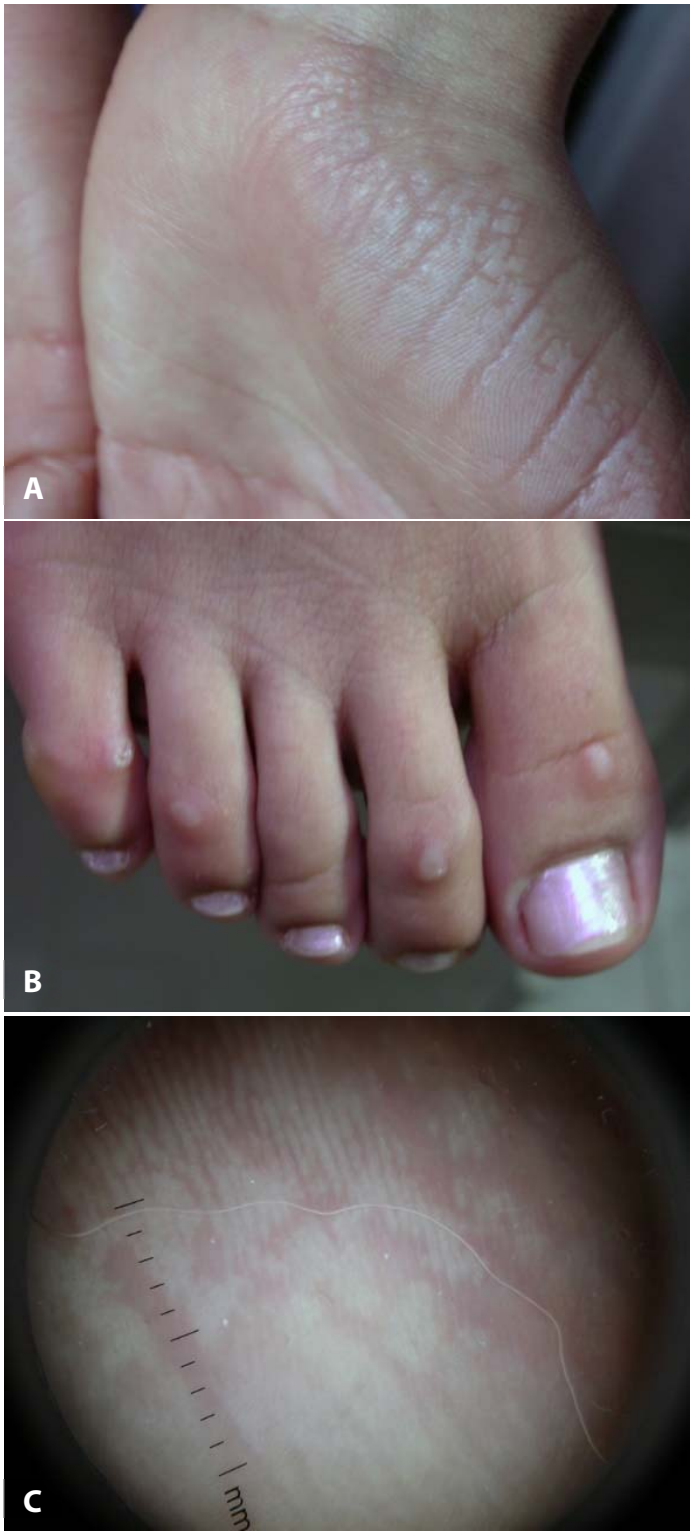

Figure 1. ***A)*** *2-to-3 mm round, confluent, translucent, flesh colored papules coalescing into plaques, symmetrically distributed on the palmar surface of the thenar eminence of the left hand.* ***B)*** *Several 5-to-8 mm translucent, hyperkeratotic papules located on the dorsal aspects of the 1st, 2nd, and 4th toes of the right foot. A papule with central umbilication is present on the 5th toe.* ***C)*** *Dermatoscopic view showing a whitish to yellowish linear discoloration of hyperkeratotic skin.*

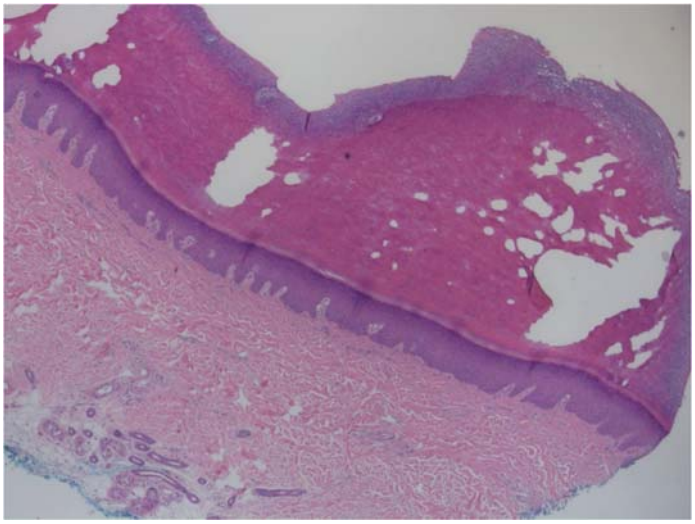

Figure 2. *H&E histopathology low power view depicting prominent hyperkeratosis, 40×.*

(VVG) staining showed prominent loss of elastic fibers with extensive fragmentation consistent with a diagnosis of AKE (**Figure 3**). Based on clinical and histopathologic findings, a diagnosis of AKE was made. The patient was prescribed topical 0.05% clobetasol lotion along with 5% salicylic acid with no improvement after three months of treatment.

Case Discussion

Acrokeratoelastoidosis is inherited in an autosomal dominant manner, although a sporadic form has also been described [1]. We performed a literature review of available English case reports indexed on PubMed. Of the 39 articles retrieved the majority reported cases were in adults. We found 8 cases in patients age 18 or younger and five cases in adults that mentioned a history since childhood or adolescence (**Table 1**). Of these 13 cases, five cases were familial, five were sporadic, and three did not discuss the presence or absence of AKE in other family members. Interestingly, there was a history of asthma in two of the sporadic cases reported in children or adolescents [1,3], a finding shared with our patient. In both cases, there was a history of eczema in the patients' fathers. A third case of AKE was reported in a child with asthma and allergic rhinitis [4]. A family history of AKE, asthma, or atopy was not discussed. These cases, along with the history of asthma in our patient, lead us to hypothesize that asthma, or atopy, may be associated with sporadic cases of AKE.

Table 1: *Cases of acrokeratoelastoidosis reported since childhood or adolescence.*

Author	Reported age	Onset	Etiology	Co-morbidities
McNally [current case]	11	Several years prior	Sporadic	Asthma
Klekowski [3]	8	Since birth	Sporadic	Asthma; father: eczema
AlKahtani [6]	5	Since birth	Sporadic	Hyperhidrosis
Hu [1]	13	Age 4	Sporadic	Asthma
Lopes [11]	45	Since adolescence	Sporadic	None mentioned
Korc [12]	36	Age 6	Sporadic	None mentioned
Korc [12]	39	Age 8	Familial	None mentioned
Barrick [13]	11	Unknown	Familial	None mentioned
Matthews* [14]	36	Age 2	Familial	Eczema
Costa[15]	38	Since childhood	Familial	None mentioned
Erbil [16]	21	Age 7	Not discussed	None mentioned
Uribe [4]	7	Age 7	Not discussed	Asthma, allergic rhinitis
Nelson-Adesokan [17]	14	Age 2	Not discussed	None mentioned

*Acrokeratoelastoidosis was also reported in the patient's two sons since ages 9 and 11.

Of note, asthma is a common disease of childhood. We acknowledge the possibility that our case and the previously reported cases may have been affected by a common childhood disease, as well as AKE. Therefore, it is plausible that no direct correlation between the two diseases exists. Additionally, AKE is rare, thus further research is needed to confirm or disprove this possible association.

At present, the etiology of AKE remains unclear. Genetic studies of familial cases provide some evidence for the genetic linkage of AKE to chromosome two [5]. In sporadic cases, friction, repeated trauma, and chronic sun exposure have all been proposed to play a role in the disease process [6].

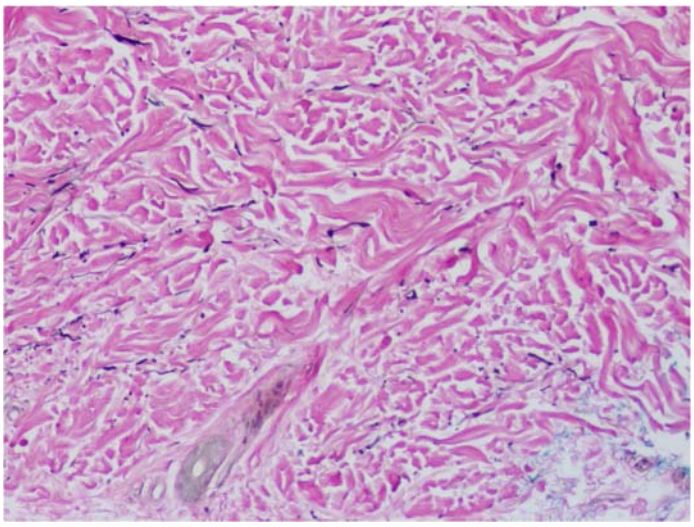

Figure 3: *Verhoeff-Van Gieson stain showing decreased and fragmented elastic fibers, 100×.*

The pathogenesis of AKE is hypothesized to be related to modifications in collagen and elastic fibers [7], defective fibroblast secretion of elastic fibers [8], overproduction of filaggrin, or focal abnormalities of keratinization [9]. Filaggrin mutations have also been implicated in susceptibility to eczema and concomitant asthma, allergic rhinitis, and allergic sensitization [10]. Studies are needed to further explore the role of filaggrin and its possible relationship to AKE, asthma, and atopy.

Conclusion

Current understanding of the pathophysiology of AKE and its associated risk factors is limited. Awareness of a possible association with asthma and atopy, along with careful history recording in young patients presenting with sporadic cases of AKE, may help to delineate the likelihood of an association between AKE and asthma or atopy. Developing a better understanding of the associated factors that may contribute to the disease process may help guide more effective, targeted treatments in the future.

Potential conflicts of interest

The authors declare no conflicts of interests.

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