Abstract
Bullous congenital ichthyosiform erythroderma is a rare genodermatosis that affects 1 in 200,000 people. Management for adults entails symptomatic relief, but infants may require intensive care if substantial blistering is present. We present a case of bullous congenital ichthyosiform erythroderma in a 48-year-old male and provide a discussion about the disease and treatment options.

Introduction
Bullous congenital ichthyosiform erythroderma (BCIE) is a rare genodermatosis that was formerly known as epidermolytic hyperkeratosis (EHK) or epidermolytic ichthyosis (EI). About 50% of cases arise from spontaneous mutation, but autosomal-dominant (AD) and rare autosomal-recessive forms also exist.1-3 BCIE clinically manifests with erythema, blistering, and erythroderma in infancy, but the severity of disease may decrease over time.1

Case Report
A 48-year-old African American male presented for evaluation of blisters and scaling over the entirety of his body since birth. The blisters were painful, pruritic, and made worse by heat and sweating. He had previously used Eucerin lotion without relief. The patient had an otherwise unremarkable 12-point review of symptoms except for mild joint pain, 15 pack-year smoking history, and moderate alcohol intake.

Dermatological examination revealed marked hyperkeratosis, thickened palms with palmoplantar keratoderma, hyperlinear creases, and soles with fissures and cracks (Figure 1). Brown, cardboard-like scale with desquamation on the neck, back, abdomen, and extremities was also present. The lesions extended to the volar aspect of the wrists, dorsa of the feet, and the Achilles tendon. Dark-brown hyperkeratosis with mild scaling, arrayed in a linear fashion, was present in his axillae, antecubital fossa (Figure 2), and popliteal fossa. Brown, cardboard-like scale with desquamation on the neck, back, abdomen, and extremities was also present. The lesions extended to the volar aspect of the wrists, dorsa of the feet, and the Achilles tendon. Dark-brown hyperkeratosis with mild scaling, arrayed in a linear fashion, was present in his axillae, antecubital fossa (Figure 2), and popliteal fossa. The hair, teeth, nails, mucosa, and other body surfaces were spared. The patient’s mother, maternal aunt, and two cousins had a similar skin condition with pronounced scaling. Differential diagnosis included BCIE, epidermolysis bullosa, lamellar ichthyosis, X-linked ichthyosis, staphylococcal scalded skin syndrome, Stevens-Johnson syndrome, and toxic epidermal necrolysis.

Two 4mm punch biopsies were taken from representative lesions on the abdomen and left knee. Histopathological findings revealed orthokeratotic hyperkeratosis, hypergranulosis, church-spire-like papillomatosis, and marked vacuolar changes in the keratinocytes of the upper spinous and granular layers (Figure 3). There were also few coarse, irregularly shaped, keratohyalin granules and intracytoplasmic vacuolization, along with involvement of the entire suprabasal layer. This was consistent with the diagnosis of BCIE.

Discussion
BCIE is a rare AD genodermatosis that was first described by Brocq in 1902.4 It is caused by mutations in keratin 1 and keratin 10 that impair intermediate filament formation in the suprabasal keratinocytes, although a case with a novel mutation in the 1A helix initiation motif of keratin 1 has been reported.4 Confirmation of disease can be established by mutation-specific testing for keratin defects using buccal swabs or blood.5 Cost constraints prohibited genetic testing and genetic counseling for our patient, but these services should be offered to affected individuals and families. Patients should also be made aware of the possibility of passing the chromosomal defect on to their children.

Clinically, BCIE presents in neonates with erythema, widespread superficial blistering, and erythroderma. If the blisters rupture, they may leave raw, denuded areas that can cause secondary infections, sepsis, dehydration, electrolyte imbalances, and hypothermia. In light of these concerns, affected newborns should be handled gently and transferred to the intensive care unit (ICU) immediately after birth. Although a
delicate scale may be present following delivery, hyperkeratosis is seldom noticeable until the third month of life. Clinical data from 28 patients with BCIE in Japan found that 96.4% had rash, 67.9% had erythroderma, and 75% of patients younger than 20 years had generalized blistering.6 As a person ages, the symptoms may wane or even disappear, but the classically described “corrugated cardboard” scale persists.6 Proliferation of scale allows for the overgrowth of bacteria, particularly Staphylococcus aureus, that causes malodor.6

In 1994, DiGiovanna and Bale separated the various clinical presentations of BCIE into two primary types based on the presence or absence of palm and sole hyperkeratosis.2 The two primary types were further subdivided into three subtypes each that described the various clinical presentations. Some subtypes have generalized involvement; others are more localized.5 EHK is still being used as a synonym for BCIE even though multiple unusual subtypes of BCIE (annular, linear, cyclic) have been described.2 4 6 13 The histopathological hallmark of BCIE is “epidermolytic hyperkeratosis” (EHK) despite the identical finding being present in several conditions including acanthoma, epidermoid cyst, infundibular cyst, epidermal nevus, hiedraderma, nevus comedonicus, seborrheic keratosis, actinic keratosis, leukoplakia, basal cell carcinoma, squamous cell carcinoma, and melanoma.16 Although no cure exists for BCIE, oral retinoids such as isotretinoin, acitretin, and etretinate are that provide symptomatic relief include high-dose lactic acid, alpha-hydroxy acid, calcipotriol, and emollients and other barrier ointments that retain moisture are recommended. Gene therapy hope to generate induced pluripotent stem cells that allow for genetic correction of the defect in keratin 1 or keratin 10.

Conclusion
In conclusion, accurate diagnosis of BCIE is important so that genetic counseling and prenatal diagnosis may be offered to affected families.19 Management includes oral retinoids for children and symptomatic care with proper use of emollients and mild antibacterial cleansers for adults.14 Infants should be treated in the ICU to prevent secondary infections, sepsis, dehydration, electrolyte imbalances, or death.15

References

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