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SEVERE PHOTO-OXIDATIVE INJURY FROM OVER-THE-COUNTER SKIN MOISTURIZER: A CHILD ABUSE MIMIC

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Abstract—Background: The cutaneous manifestations of pathological conditions have been described to mirror findings commonly associated with child abuse. Although it is important for clinicians to report suspected abuse, vigilance is required to detect conditions that mimic abuse. Phytophotodermatitis, a phototoxic reaction to furocoumarin-containing plants, is a well-described mimicker of nonaccidental trauma. However, non-furocoumarin-containing chemicals may cause similar presentations through a process called auto-oxidation. Typically, these chemical reactions occur as a result of aero-oxidation or, less commonly, photo-oxidation. **Case Report:** We report the first pediatric case of photo-oxidative contact dermatitis from an over-the-counter skin moisturizer. A 12-month-old Hispanic boy presented to the Emergency Department with an apparent scald burn over his anterior chest and left shoulder. Given the lack of apparent cause, a nonaccidental injury was suspected. He was admitted to the pediatric service under the consult of Dermatology and the child maltreatment team. Further history and clinical progression strongly suggested a photo-oxidation reaction from chemical components in a widely available over-the-counter skin moisturizer. **Why Should an Emergency Physician Be Aware of This?:** This case highlights an infrequently reported cause of pediatric contact dermatitis: a photo-oxidative reaction to chemical components in skin moisturizer. It is important for the clinician to be able to differentiate injuries secondary to nonaccidental trauma from conditions that mirror their presentation. The clinical features of this case mimicked child maltreatment and underscore the importance of an

interdisciplinary team approach in the care of these children. Published by Elsevier Inc.

Keywords—photo-oxidation; skin moisturizer; aero-oxidation; contact dermatitis; child abuse mimic

INTRODUCTION

The reporting of suspected child abuse or neglect has increased nearly twofold over the past 30 years (1). In 2011 alone, the National Child Abuse and Neglect Data System reported that over three million children received an investigation or alternative response. Despite significant utilization of resources, abuse or neglect was not found in over 75% of reported cases (2). The differentiation of injuries secondary to child maltreatment from conditions mimicking their presentation requires a clinician's utmost diligence. The cutaneous manifestations of several pathological conditions have been described to mirror findings commonly associated with child abuse (3,4). One of the most well-described dermatologic child abuse mimics is the reaction of sensitized skin to sunlight, referred to as a phototoxic reaction (4,5). The most common example is phytophotodermatitis, a reaction that occurs with ultraviolet light exposure after contact with furocoumarin-containing plants, such as limes, figs, celery, parsley, and wild parsnips (5,6).

However, it is important for clinicians to know that non-furocoumarin-containing chemicals may cause similar clinical presentations through a process called auto-oxidation. Typically, these chemical reactions occur as a result of aero-oxidation (i.e., exposure to air) or, less commonly, photo-oxidation (i.e., exposure to sunlight or ultraviolet radiation). It is well recognized that aero-oxidation of certain substances can exacerbate allergic contact dermatitis (7). Nonfurocoumarin photo-oxidation injuries, however, are not well reported in the emergency or acute care medical literature. Herein, we present a child with a photo-oxidation injury to the trunk from an over-the-counter moisturizer mimicking a scald-like injury from nonaccidental trauma.

CASE REPORT

A 12-month-old Hispanic boy presented to the Emergency Department (ED) one day after the onset of an apparent scald burn over his anterior chest and left shoulder. The mechanism of injury was uncertain. The family members present had no obvious explanation for the injury. They reported that the child had been in the care of the family and a trusted babysitter over the last several days. The mother stated she had noticed a red rash on the sun-exposed areas of his trunk the day prior to presentation after she had picked the child up from the babysitter's house. Upon questioning by the mother, the babysitter had explained that the child had dry skin on his neck, chest, back, and shoulders, so she had treated those areas with an over-the-counter skin moisturizer cream she had purchased approximately 2 months prior. No sunscreen was applied to the child that day, and he played outside under the direct supervision of the babysitter for approximately 1.5 h. When they came inside, the babysitter noted "sunburn" limited to the areas not well protected by the child's loose-fitting shirt. Notably, the rash spared the relatively sun-protected areas of his anterior neck that had been covered by the skin moisturizer.

Assuaged by the babysitter's explanation, the mother returned the child to the sitter's house again that morning and asked her to keep a vigilant eye on the developing rash. This time, prior to allowing the child to play shirtless outside, the babysitter applied sunscreen over the child's face, torso, and extremities and the same skin moisturizer over the previously applied areas of dry skin. Early that afternoon, on the day of presentation to the ED, the babysitter called the mother to report that blisters were now developing over the child's posterior neck, chest, and shoulders. This prompted the mother to immediately retrieve the child from the babysitter's house, and she presented directly to the ED for evaluation.

At the ED, the mother reported that the child had been outdoors multiple times in the past without developing a

sun-related dermatitis. He did not take any over-the-counter products, prescription medications, or herbal supplements, and his only known allergy was to penicillin. The mother reviewed the medical team's list of known furocoumarin-containing plants, and she denied having any in the home or backyard. On physical examination, the child's vital signs were as follows: heart rate 102 beats/min; respiration rate 28 breaths/min; oxygen saturation 100%; temperature 36.7°C (98.1°F) (temporal artery); and blood pressure 124/78 mm Hg. Skin examination revealed a blistering pinkish-red rash that appeared to be clinically consistent with a scald burn (Figures 1 and 2). Approximately 5% of the body surface area was involved, and the child's lesions were confined to the anterior chest, shoulder, and upper back. The remainder of his physical examination was unremarkable.

A child abuse protocol was initiated due to the unclear mechanism of injury. A chest x-ray study and skeletal survey were obtained, and both were normal, with no evidence of previous trauma. Social Work was consulted and interviewed the patient and his family. Child Protective Services was alerted as well as local law enforcement, given the atypical nature of the apparent burn and inconsistent story. A blister on the chest was unroofed and the fluid was sent for Gram stain and culture. During the course of observation in the ED, roughly 32 h since the babysitter had noted the initial sunburn, the blistering rash began to evolve; large bullae were now noted on the superior portion of the chest and superior back. The lesions did not appear to be pruritic, but were mildly tender to palpation. Given this progression, the child was admitted to a monitored medical bed awaiting Pediatric Dermatology and child abuse specialist consultation.

Overnight, the child continued to develop new erythema and tender vesicles/bullae focally located on the bilateral superior shoulders, posterior neck, and superior



Figure 1. Anterior trunk on presentation; skin examination revealed a blistering pinkish-red rash that appeared to be clinically consistent with a scald burn.

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