

Easter Egg Hunt Dermatitis: Systemic Allergic Contact Dermatitis Associated with Chocolate Ingestion

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Abstract: Pediatric systemic allergic contact dermatitis to nickel has previously been reported in association with cocoa. We present four clinical cases of hypersensitivity temporally associated with chocolate consumption at Easter. Clinicians should be aware of the potential for foods high in nickel to provoke patients with known nickel sensitivity and systemic dermatitis.

Allergic contact dermatitis (ACD) and atopic dermatitis (AD) are common dermatoses worldwide. Although ACD was once considered a predominantly adult disease, a growing body of evidence now demonstrates that ACD is common in children as well. The North American Contact Dermatitis Group (NACDG) found that, of children with a positive patch test reaction, 34.0% also had a diagnosis of AD, compared with 11.2% of adults ($p < .001$) (1). This suggests a significant co-occurrence of ACD and AD in children. Nickel especially is a common contact allergen in children, with the prevalence of nickel allergy estimated at 26.2% (2). Early ear piercing with nickel-releasing jewelry has long been considered a major exposure source for sensitization (3), although

this does not fully explain nickel sensitization in very young children who are not pierced and do not wear costume-type jewelry.

Dermatitis may be observed after systemic (enteral or intravascular) exposure in patients with known ACD, a phenomenon called systemic contact dermatitis (SCD) (4). SCD may be present at sites of prior ACD or become widespread. Although the prototypical sensitizers in systemic ACD are drugs (e.g., antibiotics), foods, and dental products, SCD after nickel ingestion is also frequently reported (5).

Routine patch testing of children with a diagnosis of chronic recalcitrant or generalized atopic skin disease is a standard of care for our clinic. Once patch testing is performed, topical avoidance of identified

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allergens is the mainstay of treatment. If patients continue to flare after patch testing, dietary moderation of frequently consumed items containing significant amounts of potential triggers may be suggested. At the follow-up visit, at 8 to 12 weeks, the avoidance protocol is reviewed for adherence and clinical response is evaluated. When there is evidence of improvement but still significant disease, dietary restriction of known allergens may be warranted if not already incorporated. In recalcitrant cases, topical and systemic immunomodulatory agents such as calcineurin inhibitors, methotrexate, and azathioprine may be used.

CASE REPORTS

We present four individuals with AD, two boys and two girls, ages 4 to 7 years, with contact sensitization to nickel confirmed using in-office patch test evaluations. The four patients met the Hanifin and Rajka diagnostic criteria for AD (6) before initial referral to our contact dermatitis clinic. In all four cases, a history-directed nickel restriction diet had been recommended as an adjunct to topical avoidance as the initial intervention. The specific implemented nickel restriction diet included foods that have been identified to have significant nickel content in literature (7) out of the items the families identified as repeatedly consumed by their child within a given week, i.e., “everyday” foods. These items included peanuts, peanut butter, chocolate, oats, and processed American cheese. These initial interventions proved efficacious in helping our patients achieve 60% to 80% clearance of their dermatitis when used alongside the standard-of-care therapeutics, which alone had previously failed (e.g., wet wraps, emollients, topical steroids, topical immunomodulators). All four patients were being considered for systemic immunosuppressive medications (e.g., cyclosporine, azathioprine) at the time the avoidance regimen was implemented.

All patients had demonstrated significant clinical improvement for a period ranging from 2 to 5 months when they presented with acute generalized flares of their dermatitis (>60% body surface area). In reviewing their histories, it was discovered that they had all presented approximately 48 to 96 hours after Easter Sunday. All patients were questioned about their recent activities to discern the etiology of their flares. The patients and their families were asked about adherence to the prescribed allergen avoidance regimens, including the moderation of previously identified potential food sources of nickel. All parents

initially indicated that their children had adhered strictly to the diet and denied any compromises to the dietary or topical avoidance regimens.

Upon further questioning, all four children admitted to having binged on chocolate during their Easter egg hunts, without their parents’ knowledge. All Easter egg hunts occurred in locations that the patients frequented, so there were no exposures to new grass lawns, for example, that could have confounded our findings. After a second counseling session and continued parental oversight, all four children had resolution of their generalized dermatitis on follow-up, with parent-reported intervals for improvement of 2 to 8 weeks. One year later, one family followed up to report that their child (patient 3) had flared again after specific consumption of a “large chocolate bar” (approximately 40–50 g).

These children had not received atopy patch testing with milk or grass, and all had continued in their normal daily activities (e.g., outdoor play) before and after the flares, with no apparent effect of these activities.

DISCUSSION

Our four patients demonstrated SCD reactions reportedly after significant consumption of chocolate, confirming the previous cocoa-triggered SCD in nickel-sensitized individuals (8,9). Chocolate-induced dermatitis has also been reported in individuals sensitized to *Myroxylon pereirae* (10). However, none of our patients were found to be sensitized to *M. pereirae*, so it was determined that this was not a confounding factor (Table 1). The evidence of chocolate exposure in our patients is circumstantial, because there was no parental eyewitness report of the chocolate being consumed, but by providing a supportive environment, we were able to elicit a history that strongly suggested this association in a timeframe that coincided with a heavily chocolate-focused holiday: Easter.

TABLE 1. Demographic Characteristics and Patch Test Results

Patient	Sex	Age	Concurrent atopic dermatitis	Positive patch test results
1	Male	4	Yes	Nickel, lanolin
2	Male	6	Yes	Nickel, carbamates, thiuram, neomycin
3	Female	5	Yes	Nickel, cocamidopropyl betaine
4	Female	7	Yes	Nickel, cobalt, thimerosal

TABLE 2. *Top Nine Foods Containing ≥ 0.65 mg/kg of Nickel According to Food and Drug Administration Total Diet Study (7,12)*

Food product	Nickel, mg/kg, mean (range)	Amount of nickel in average U.S. serving size, μ g
Sunflower seeds (shelled), roasted, salted	2.87 (1.85–3.83)	>100
Oat ring cereal	2.27 (1.35–3.75)	>100
Candy bar, milk chocolate, plain	1.00 (0.85–1.32)	11–20
Chocolate syrup	0.96 (0.71–1.20)	51–60
Granola with raisins	0.96 (0.68–1.69)	51–60
Lima beans, immature, frozen, boiled	0.74 (0.07–1.21)	>100
Chocolate chip cookies	0.65 (0.47–0.86)	11–20
Brownie	0.65 (0.34–0.92)	51–60
Pinto beans, dry, boiled	0.65 (0.37–0.85)	>100

Although effective, a nickel-free diet may be difficult to implement (7,11). Milankar and Zirwas (7) developed a simple point-based avoidance guide that patients and physicians can use as an aid in the treatment of SCD to nickel. Their guide is a detailed overview of the main U.S.-consumed foods and includes more than 80 food types to consider and calculate as part of the selection process. We present nine high nickel-containing foods from the guide, cross-referenced with the average U.S. serving sizes (Table 2).

CONCLUSION

From this experience, we recommend considering restriction of chocolate consumption in patients with confirmed contact sensitization to nickel and recalcitrant widespread dermatitis (11). Patient preferences can direct dietary modification and the nickel point-based dietary avoidance regimen can help to guide it (avoiding higher-point foods is most effective) (7,13).

REFERENCES

1. Zug KA, McGinley-Smith D, Warshaw EM et al. Contact allergy in children referred for patch testing: North American Contact Dermatitis Group data, 2001–2004. *Arch Dermatol* 2008;144:1329–1336.
2. Pham AK, Zug KA, Warshaw EM et al. Epicutaneous patch testing in children by the NACDG, 2005–2011. Abstract presented at the American Contact Dermatitis Society Annual Meeting, Denver CO, March 2014.
3. Brandão MH, Gontijo B. Contact sensitivity to metals (chromium, cobalt and nickel) in childhood. *An Bras Dermatol* 2012;87:269–276.
4. Veien NK. Systemic contact dermatitis. *Int J Dermatol* 2011;50:1445–1456.
5. Yoshihisa Y, Shimizu T. Metal allergy and systemic contact dermatitis: an overview. *Dermatol Res Pract* 2012;2012:749561.
6. Breninkmeijer EE, Schram ME, Leeflang MM et al. Diagnostic criteria for atopic dermatitis: a systematic review. *Br J Dermatol* 2008;158:754–765.
7. Mislankar M, Zirwas MJ. Low-nickel diet scoring system for systemic nickel allergy. *Dermatitis* 2013;24:190–195.
8. Krecisz B, Chomiczewska D, Kiec-Swierczynska M et al. Systemic contact dermatitis to nickel present in cocoa in 14-year-old boy. *Pediatr Dermatol* 2011;28:335–336.
9. Matiz C, Jacob SE. Systemic contact dermatitis in children: how an avoidance diet can make a difference. *Pediatr Dermatol* 2011;28:368–374.
10. Veien NK, Hattel T, Laurberg G. Can oral challenge with balsam of Peru predict possible benefit from a low-balsam diet? *Am J Contact Dermat* 1996;7:84–87.
11. Christensen JM, Kristiansen J, Nielsen NH et al. Nickel concentrations in serum and urine of patients with nickel eczema. *Toxicol Lett* 1999;108:185–189.
12. Wilhelm M, Wittsiepe J, Seiwert M et al. Levels and predictors of urinary nickel concentrations of children in Germany: results from the German Environmental Survey on children (GerES IV). *Int J Hyg Environ Health* 2013;216:163–169.
13. Total Diet Study Statistics on Element Results based on 2006–2008 US Food and Drug Administration Market Baskets [online]. Available at <http://www.fda.gov/Food/FoodSafety/FoodContaminantsAdulteration/TotalDietStudy/ucm184232.htm>. Accessed April 2, 2014.