

Lichenoid allergic contact dermatitis to rubber masquerading as a fixed drug eruption

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Abstract Allergic contact dermatitis secondary to textile allergens is not uncommon given continuous exposure to these allergens. Common textile allergens include rubber additives, textile dyes and formaldehyde. Rubber materials are used in various garments such as dresses, underwear and stretchy athletic wear. Allergic contact dermatitis commonly presents with eczematous eruption but it can present in other forms such as lichenoid eruption. In this case report, we present a 53-year-old male with lichenoid allergic contact dermatitis due to textile rubber allergen previously misdiagnosed as fixed drug eruption.

Key words

Contact dermatitis; Rubber; Diphenylguanidine.

Introduction

Textile allergic contact dermatitis (ACD) secondary to rubber additives can present in different forms of skin eruptions such as eczematous, lichenoid, pustular and erythema multiforme-like eruption. Lichenoid allergic contact reactions to rubber additives have not been previously reported to our knowledge. In our case, lichenoid contact dermatitis was misdiagnosed as fixed drug eruption.

Case report

A 53-year-old male was referred to contact dermatitis clinic at Brigham and Women's Hospital for persistent pigmentation on his waistband area for 1 year, treated presumptively

elsewhere for tinea and then fixed drug eruption (FDE) (**Figure 1**).

He did not improve with antifungal treatment nor topical steroids. A skin biopsy performed by his referring dermatologist was read as FDE. The culprit was felt to be meloxicam which he took prior to onset of symptoms. He stopped taking meloxicam. Subsequently, after an 8-hour plane flight, he noted a new itchy rash of bilateral axillae which he equated with wearing a stretch-material shirt. Another biopsy from the axilla was read elsewhere as FDE despite his avoiding meloxicam. He was subsequently referred to our contact dermatitis clinic. Upon examination, he had hyperpigmented minimally scaly patches in a linear distribution at the waistband area and scattered hyperpigmented macules of varying sizes in bilateral axillae.

Patch testing was performed using a modified American Contact Dermatitis Society standard series (Chemotechnique MB Diagnostics AB, Vellinge, Sweden). Allergens were tested in Finn Chambers (SmartPractice, Phoenix, AZ.). Readings were performed at day 2 and day 4 day post placement revealing a 1+ reaction to the

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Figure 1 Linear hyperpigmented patches along waistband area.

rubber additive, diphenylguanidine (1% petrolatum). Review of his original pathology by our dermatopathologist showed a lichenoid infiltrate, pigment incontinence and eosinophils consistent with lichenoid allergic contact dermatitis (ACD). Textile modifications such as avoiding stretch-material shirts and wearing drawstring cotton boxers were recommended. Since instituting these measures, he has not developed any new rashes on waistband or axillary areas. Hyperpigmentation on affected areas did not resolve completely given pigment incontinence associated with this lichenoid reaction.

Given his clinical picture, patch test results and histology and the fact that he did not develop new rash after avoiding textile rubber materials, we diagnosed him with lichenoid ACD due to textile rubber additives.

Discussion

Textile allergic contact dermatitis is not uncommon and has been increasing lately.¹ It can be caused by variable chemicals and compounds found in clothing such as rubber additives, dyes and formaldehyde used as anti-wrinkling chemical. Textile allergens mostly cause type 4 hypersensitivity reaction in the form of allergic contact dermatitis. Patient may

present with itchy rash affecting body areas in contact with the allergen and in the case of rubber additive allergy, the most commonly involved areas are those in which the clothing fits tightest and the areas in direct contact with elastic, such as underwear area and axillary area.

Rubber accelerators are chemicals used to speed up the manufacturing process of rubber (vulcanisation). These chemicals include benzothiazoles, thiurams and carba chemicals such as diphenylguanidine.² Final rubber product can be used in clothing, rubber gloves, shoes and waistbands.

Although eczematous dermatitis is the most common presentation of ACD, lichenoid reactions can occur and may be misdiagnosed by pathologists not familiar with this histologic presentation. Histopathology of lichenoid ACD typically shows spongiosis, eosinophilia and lichenoid lymphocytic infiltrate in the dermis.³

Lichenoid allergic contact dermatitis has been reported from PPD,⁴ fragrance,⁵ tattoo inks⁶ and in the oral mucosa secondary to metal allergens.⁷ Other uncommon histologic presentations of ACD include granulomatous, purpuric, lymphomatoid, pustular and erythema-mutiforme like reaction.⁸ Lichenoid reactions to rubber additives have not been previously reported to our knowledge. Our patient did not experience further eruptions once he changed his textiles. We postulated that the pigmentation did not resolve completely given pigment incontinence along with lichenoid reaction seen in his biopsy.

Patch test is the gold standard for diagnosing ACD to rubber accelerators. Standard screening patch tests such as T.R.U.E test include some rubber accelerators but more rubber allergens can be tested via extended rubber series patch test.

Extended patch testing with rubber series is needed in many patients with suspected allergy to rubber additives. Diphenylguanidine, that was positive in this patient, is not included in the standard T.R.U.E test or the European standard patch test. A retrospective cross-sectional analysis of North American Contact Dermatitis Group (NACDG) data that included 43,417 patients who underwent patch testing to the NACDG screening series (65-70 allergens), result showed that 9507 individuals (22%) had at least 1 positive clinically relevant reaction to supplemental (non-screening) allergens with personal care products being the most common source of supplemental allergen (51%) followed by allergens from clothing/wearing apparel which represented 18%.⁹

Dejonckheere *et al.* studied patch test result of 44 healthcare workers who underwent patch testing due to suspected allergy to rubber gloves and found that 86% of the study population reacted positively to 1,3-diphenylguanidine, 84% to carba mix and 30% to thiuram mix. The most commonly identified allergen was 1,3-diphenylguanidine, far ahead of thiurams which were previously described as the most sensitizing accelerators. The study authors recommend that 1,3-diphenylguanidine be added to the European baseline series.¹⁰

Tomc C *et al.* reported a case of ACD caused by mercaptobenzothiazole in thermal undergarments. Rash was on torso, arms and legs where there is contact with the thermal undergarments. Patch test was positive for mercaptobenzothiazole and mercapto mix and the patient had a positive allergic reaction to his own garments.¹¹

Ahuja *et al.* reported a patient who presented with itchy eczematous and hyperpigmented rash that was sharply demarcated corresponding to site of contact with her underwear elastic. She underwent patch testing and showed positive

allergic reaction to rubber accelerator mercaptobenzothiazole. She improved after she stopped using that undergarment.¹²

Conclusion

Rubber ACD should be considered in setting of lichenoid reaction seen in biopsy results in patients with eruptions in close approximation to elastic/ rubber items.

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Author's contribution

AA: Identification and management of the case, manuscript writing and has given final approval of the version to be published.

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