Allergic Contact Dermatitis Caused by P-Tert-Butylphenol-Formaldehyde Resin in Orthopedic Braces

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Abstract

P-tert-butylphenol-formaldehyde resin is a widely used adhesive chemical. It is used in a broad range of products and it is important to be aware of its omnipresence when encountering children with suspected allergic contact dermatitis. We present a girl who developed contact allergy to p-tert-butylphenol-formaldehyde resin used in orthopedic braces.

CASE PRESENTATION

A 6-year old girl presented with dermatitis on the lower legs. The patient had congenital talipes equinovarus (club foot) and since birth, she was treated with surgery and orthopedic braces. She developed dermatitis corresponding exactly to the sites of contact on the legs, thus giving a high suspicion of contact dermatitis. At one point, the braces had to be adjusted. Duct tape was used to fasten the braces to the child’s leg and she immediately developed dermatitis in the area of skin contact with the duct tape. The dermatitis cleared when use of the orthopedic braces was discontinued.

The girl was patch tested with our standard pediatric series of allergens as well as a small piece of an orthopedic brace. The patch test readings were carried out on D3 and D7 and showed a positive (+1) reaction to p-tert-butylphenol-formaldehyde resin. We were not able to obtain precise information on the ingredients of the braces, as the data sheets were incomplete. Since p-tert-butylphenol-formaldehyde resin is a widely used adhesive chemical, it is highly probable that both the braces and the duct tape contained this adhesive chemical.

A few months later the girl further developed dermatitis on the chest and abdomen after using a T-shirt with a fabric interfacing material containing glue, supporting our suspicion on allergic contact dermatitis caused by the adhesive chemical and confirming that p-tert-butylphenol-formaldehyde resin is ubiquitous.

DISCUSSION

Contact allergy to adhesive chemicals is a common problem [1]. In Denmark, adhesive chemicals are reported to be the fourth most common allergen group among children and adolescents 1-17 years old [2]. P-tert-butylphenol-formaldehyde resin is a widely used adhesive owing to its rapid onset of action, durability, flexibility and heat resistance [1]. It is used in shoe construction and in leather goods, in laminating surfaces as well as in the rubber industry for bonding rubber to rubber and rubber to metal [3]. The allergen has been well known as a sensitizer since the initial report by Malten in 1958 [4]. It is in fact omnipresent and can be found in widely different products. Sensitization sources include leather prosthesis, watch straps, shoes [5,6], hearing aids [7], electrocardiography-monitoring electrodes [8], adhesive labels [9], some brands of plastic fingernail adhesive [10], neoprene [11], and wet suits [12]. In children cases of allergic contact dermatitis caused by p-tert-butylphenol-formaldehyde resin in shoes [13], a temporary tattoo [14], a bra [15], athletic tape [16], neoprene orthopedic braces [17], and a limp prosthesis [18] have been reported.

Our case emphasizes the ubiquity of the allergen, but it also highlights the seriousness of acquiring a contact allergy to p-tert-butylphenol-formaldehyde resin. Children who acquire this allergy will throughout life have to be very aware and make great efforts to avoid it in order to prevent recurrent episodes of dermatitis. Since the allergen can be found in so many different products, children with suspected contact dermatitis or recalcitrant dermatitis should be patch tested with a standardized series of allergens, including p-tert-butylphenol-formaldehyde resin.

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