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Contact dermatitis due to urea-formaldehyde resin in shin-pads

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Case Report

A 10-year-old boy presented with a 2-year history of eczema on both shins, which cleared with 0.05% clobetasol butyrate cream, but recurred each time that this was discontinued. He played football at least 3× a week and regularly used protective shin-pads during training. Wearing below-knee stockings under the shin-pads had not improved his skin. As a baby, he had had flexural eczema, but no asthma or hay fever. His mother had hay fever.

He was patch tested to a standard series and a textile series (Chemotechnique), together with a sample of his shin-pads. At D 2 and 4, there were the following positive reactions: formaldehyde ++/++, the formaldehyde-releasing preservatives quaternium 15 ++/++ and imidazolidinyl urea ++/++, and carba mix +; the fabric finishes dimethylol dihydroxyethylene urea 4.5% aq., dimethylol propylene urea 5% aq., and tetramethylol acetylenediurea +/+ each; ethylene urea melamine-formaldehyde resin 5% aq., and urea-formaldehyde resin 10% pet. ++/++ each; and the epoxy hardener hexamethylenetetramine ++/++. He did not react to the sample of his shin-pads.

A diagnosis of a combination of mechanical irritant and allergic contact dermatitis was made. After 1× daily 0.1% mometasone furoate ointment for 1 month and staying off football, the eczema completely resolved. The manufacturers of the shin-pads supplied product information and alternative shin-pads. The original shin-pads contained urea-formaldehyde resin, which was used to set and fix non-woven yarn. The new shin-pads were composed of a different backing material, which was also less abrasive. Our patient continued to play football several times a week without developing further dermatitis.

Discussion

Allergic contact dermatitis affects 20% of us at some time during childhood and is no more common in atopics (1). In a multicentre patch test study of 415 children, 0–2.3% reacted to formaldehyde 1% aq.: atopic children had fewer positive patch test reactions in this study than non-atopic (2). Patch testing and subsequent avoidance of a relevant allergen improves the prognosis (3).

Urea-formaldehyde resin has a relatively high formaldehyde release, and is nowadays less commonly used in textiles (4). Allergic reactions to such finishes are now unusual, except under aggravating conditions such as heat and friction (5). A significant number of patients are patch-test positive to textile formaldehyde resins without also being positive to formaldehyde (6, 7).

There has been 1 previous report of allergic contact dermatitis due to formaldehyde resins in sports gear: a professional basketball player allergic to phenol-formaldehyde resin in a knee-guard (8).

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Eczematous erythroderma induced by cyanamide

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The term cyanamide is applied to both free cyanamide (carbimide) and its calcium salt (calcium carbimide). It is extensively used as a fertilizer, herbicide and chemical intermediate (1). In the medical field, cyanamide was introduced into Canada, Europe and Japan in 1956 as a treatment for chronic alcoholism. It acts by interfering with the hepatic metabolism of ethanol by inhibiting aldehyde dehydrogenase. When this transformation does not take place, there is an increase in acetaldehyde in the blood, resulting in unpleasant sensations (2). The rare adverse skin reactions due to cyanamide include allergic contact dermatitis (3–7), lichen planus (8, 9) and lichenoid eruption (9).

Case Report

A 61-year-old man presented to our Department in April 1997 with no family or personal history of atopy, with a past medical history of laryngeal cancer, chronic bronchitis and alcoholic hepatopathy, and receiving treatment with Colme® (calcium cyanamide) since January 1997, and paracetamol and Benerva® (thiamine) for 1 month. He gave a 1-month history of pruritic, erythematous scaly lesions that had started on the upper eyelids and spread in a few days to the face, trunk and

extremities, including the palms and soles. He did not report fever. Physical examination revealed universal redness and scaling of the skin (erythroderma), favouring the antecubital and popliteal fossae, and also the palms and soles. The oral mucous membranes were not involved, neither was there hair loss. He had no lymphadenopathy or hepatosplenomegaly. Laboratory studies showed the following abnormal values: MCV 100 fl (83–97 fl), ALT 63 U/L (1–40 U/L) and GGT 59 U/L (1–50 U/L). Biopsy of a cutaneous lesion showed hyperkeratosis with parakeratosis, irregular acanthosis with spongiosis and some epidermal microvesicle formations, and perivascular infiltrates of round cells in the papillary dermis. The lesions resolved in a week once Colme® was discontinued, and treatment with oral and topic corticosteroids and emollients were started, and did not relapse.

The patient was patch tested with the GEIDC standard series, Benerva® 10% aq. and pet., paracetamol 0.1% pet. and Colme® 10% and 50% aq., with positive reactions to nickel sulfate at D4 and Colme® 10% and 50% aq. at D2 and D4 (Table 1). Subsequently, we patch tested him with the components of Colme®: cyanamide 0.1%, 0.5%, 1% and 5% aq., sorbic acid 2% and 5% pet., and acetic acid 3% aq., with positive reactions only to cyanamide at D2 and D4 (Table 1). 20 controls were tested with cyanamide 5% aq., all of them being negative.

Discussion

Our patient presented with erythroderma, favouring the antecubital and popliteal fossae, with histopathological findings of spongiotic dermatitis, which resolved in a week once Colme® was discontinued. Patch tests with Colme® 10% and 50% aq., and with cyanamide 0.1%, 0.5%, 1% and 5% aq. were positive at D2 and D4. To our knowledge, this is the 1st report of eczematous erythroderma induced by cyanamide (Colme®). With reference to systemic reactions induced by cyanamide, there are only 2 reports that describe 8 patients with lichen planus and lichenoid dermatitis (8, 9). Histopathologic findings were similar in all of them, reflecting a lichenoid dermatitis.

Table 1. Patch test results

Allergens	Concentration and vehicle	D2	D4
GEIDC standard series			
nickel sulfate	2.5% pet.	–	+
Colme®	10% aq.	+	++
Colme®	50% aq.	++	++
cyanamide	0.1% aq.	+	+
cyanamide	0.5% aq.	+	++
cyanamide	1% aq.	++	++
cyanamide	5% aq.	++	++
sorbic acid	2% pet.	–	–
sorbic acid	5% pet.	–	–
acetic acid	3% aq.	–	–