

COMMON ENVIRONMENTAL CONTACT ALLERGENS IN SINGAPORE

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ABSTRACT

Contact allergens produce three types of reactions. The commonest reaction is allergic contact dermatitis (ACD). The commonest contactants in Singapore causing ACD are, in decreasing order of importance, nickel, fragrances, neomycin, lanolin, colophony, flavine, rubber chemicals, paraphenylenediamine, clioquinol and chromates.

Another type of allergic contact reaction is immunologic contact urticaria (ICU). ICU is an IgE mediated mechanism. Contact allergens causing ICU in Singapore are proteinaceous foodstuffs and rubber latex products.

Photoallergic contact dermatitis is occasionally seen in Singapore. The commonest agent is Musk Ambrette, a perfume fixative found in male colognes.

Keywords : Contact dermatitis, Singapore, Allergens, Contact urticants, Photocontact allergens

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INTRODUCTION

Substances are capable of eliciting an allergic response on simple contact with the skin alone. They do not have to be ingested or inhaled. Fortunately, out of the myriad of substances in the environment, only a small number repeatedly cause contact allergy. This paper discusses the common environmental contact allergens in Singapore.

Contact allergens produce 3 kinds of allergic reactions viz :

- (1) Allergic contact dermatitis
- (2) Immunologic contact urticaria
- (3) Photoallergic contact dermatitis

(1) ALLERGIC CONTACT DERMATITIS (ACD)

Allergic contact dermatitis is by far the commonest type of allergic reaction elicited by cutaneous contact. An individual who was previously exposed and sensitized to a particular substance, on subsequent skin exposure will most commonly manifest clinically as an allergic contact dermatitis. This is a type IV hypersensitivity reaction. This type of contact allergy can be tested by a procedure called a patch test.

Table I lists the 10 commonest environmental allergens in Singapore. The figures represent the percentage of positive patch test reactions compiled from 1,073 patch tests done in the National Skin Centre in 1989.

Table I
Common environmental contact allergens causing ACD in Singapore compared with other countries(12).

Allergen	Singapore	Europe	North America	Japan
Nickel	20.8	6.7	11.0	4.0
Fragrances	12.3	NA	NA	NA
Neomycin	7.1	3.7	6.0	5.8
Lanolin	6.5	2.6	3.0	1.2
Colophony	6.5	3.3	NA	2.9
Flavine	4.9	NA	NA	NA
Rubber Chemicals	4.6	NA	NA	NA
Paraphenylenediamine	4.0	4.9	8.0	4.1
Clioquinol	3.3	1.7	NA	1.3
Chromates	2.1	6.6	8.0	6.8

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NICKEL

Nickel is by far the commonest contact allergen in Singapore. This is the case throughout the world.

Nickel is ubiquitous in the environment. An additional factor is the close contact nickel has with the skin. Many of the apparel we wear contain metal eg. nickel spectacle frames, wrist watch straps, belt buckles, zips, buttons. Nickel allergy is particularly prevalent in women. Many women get sensitized during the process of ear piercing for earrings. The equipment used for the process is usually nickel plated, and plasma is an efficient solution in leaching nickel from earrings(1).

Nickel is also present in the industrial environment. Nickel exposure is high in the electroplating process. Some work tools are nickel plated. In the electronic factories of Singapore, many production operators wear earthing straps to eliminate static electricity. This contains nickel.

FRAGRANCES

Of all patch tests done in 1989 in the National Skin Centre 12.3% gave positive reactions to fragrance mix and/or to balsam of Peru. The latter is a good indicator of perfume allergy.

Fragrances are not only present in perfumes and scents. Many cosmetics and skin care products have fragrances added to increase their attractiveness. Indeed the chief cause of cosmetic allergy is allergy to the fragrances added (2). Many cosmetic companies are aware of this and some have come up with fragrance free products which they market as hypo-allergenic.

Fragrances are sometimes added to topical medicaments to mask the medicinal odour. Physicians must be aware of this.

LANOLIN

Of all patch tests done in 1989 in the National Skin Centre 6.5% gave positive reactions to wool alcohol and/or Amerchol L101, both indicators of lanolin allergy.

Lanolin is an extract from wool, with excellent emollient properties. It is often used in cosmetic and skin care products, and sometimes in topical medicaments. Patients allergic to lanolin would not be able to tolerate these products.

The cosmetics and pharmaceutical industries are not compelled in Singapore to list all the ingredients of their products in the package. This makes it difficult for patients who try to purchase lanolin free products. A law making complete labelling mandatory will do a lot of good in this aspect (3).

MEDICAMENTS

The medicaments commonly causing ACD in Singapore are neomycin, flavine and clioquinol(4).

Neomycin is an important sensitizer, giving a 7.1% reaction rate. It is used as a topical antibiotic, sometimes alone, sometimes in combination with bacitracin. It is often used in combination with a topical steroid for the treatment of infected eczemas and infected insect bite reactions.

Flavine is also an important sensitizer in Singapore. It has a wide usage here, present in almost every first aid box as an antiseptic for cuts and burns. We feel that this practice should stop. This is because not only is flavine a strong sensitizer, the allergic contact dermatitis it provokes is often severe. The reaction is sometimes vasculitic and erythema-multiforme like, and not infrequently spreads to other areas of the skin(5). In a study comparing the sensitizing potentials of topical antimicrobials used in Singapore, flavine has the highest sensitizing index and also the highest severity index(6).

Clioquinol is a topical medicament often added to topical steroids for its anti-candidal and anti-bacterial properties. It is an important sensitizer.

COLOPHONY

Colophony is a plant extract. Its chief use is in the making of sticky plaster. Patients who are intolerant of ordinary sticky plaster react because of allergy to colophony.

In the industrial environment, colophony is present in the soldering flux used for welding. Rosin flux contains colophony, and can cause allergic contact dermatitis on the hands and occasionally on the face from welding fumes(7).

RUBBER CHEMICALS

Rubber produces two types of contact allergy. The commoner reaction is allergic contact dermatitis. This reaction is caused by the chemicals added to the rubber during the process of manufacturing, and not to the rubber latex itself. The chemicals are added for vulcanizing, accelerating and antioxidant purposes. Rubber chemicals produce a 4.6% reaction rate in Singapore. Rubber products causing problems are rubber gloves, boots and safety shoes and rubber elastic in garments. Occasionally, the source of rubber causing ACD is obscure. A case of hand dermatitis was found to be due to ACD to rubber chemicals from his motor cycle handle(8). Sometimes, people sensitized to rubber chemicals can develop ACD from the rubber gloves worn by their surgeons during surgery(9).

PARAPHENYLENEDIAMINE

Paraphenylenediamine (PPD) is the most cosmetically satisfactory dyeing agent for greying hair. It is the commonest hair dye used in Singapore. Unfortunately, this product is quite sensitizing and gives a 4% reaction rate in our series. Safer substitutes are metallic dyes and henna. Unfortunately, they produce inferior cosmetic results.

CHROMATES

Chromates was the most important contact allergen causing industrial dermatitis a few years back. The problem is less serious now because of the slowing down of the construction industry. The chief source of chromates is cement where chromate is present as a contaminant. Next comes leather which nowadays is usually chrome-tanned.

(2) IMMUNOLOGIC CONTACT URTICARIA (ICU)

Some substances on contact with skin, produce a Type I hypersensitivity reaction. This is a wheal and flare reaction, occurring within 20 to 30 minutes of contact, mediated by IgE. This reaction has been termed immunologic contact urticaria, to differentiate it from non-immunologic contact urticaria, the latter caused not by an allergy, but by a direct action on the receptors of blood vessels. ICU can be tested in vivo by a skin prick test and in vitro by RAST test.

Only two types of substances commonly cause ICU in Singapore viz. proteinaceous foodstuffs and rubber latex.

Chefs and food-caterers are the people commonly affected by ICU from proteinaceous foodstuffs. Foodstuffs shown to cause this in Singapore include prawns, lobster, salmon and beef.

As stated earlier, rubber produces two types of contact allergy. In contrast to rubber chemicals causing ACD, it is the rubber latex itself that produce ICU. The allergen is probably one or more of the proteins present in rubber latex. This is an IgE mediated reaction and causes itch, urticaria and sometimes anaphylaxis in people using latex gloves.

(3) PHOTOALLERGIC CONTACT DERMATITIS

Some substances need the presence of light to elicit an

allergic response. The contact dermatitis elicited is therefore present in the light exposed areas of the skin. This reaction is called photoallergic contact dermatitis. It can be investigated by a photo patch test. The chief cause of photoallergic contact dermatitis is Musk Ambrette. This is a perfume fixative present in some male colognes and toiletries. Many of the men's colognes in Singapore contain Musk Ambrette(10). Sometimes the exposure is not deliberate, as in one case of periodic photoallergic contact dermatitis from the cologne used by a patient's barber(11).

The photo contact allergens tetrachlorosalicylanide and tribromosalicylanilide present in germicidal soaps that caused an epidemic of photoallergic contact dermatitis in Europe some years ago is not seen in Singapore. The occasional report of photoallergic contact dermatitis from sunscreens is as yet not a problem here, in part due to the infrequent use of sunscreen by Singaporeans.

CONCLUSION

This paper discusses the common contact allergens in Singapore currently. It must be borne in mind that this may change with time, with some allergens disappearing from the scene, and new allergens appearing because of new products being introduced. The prevalence must be continuously monitored to detect changing trends.

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