

Phototoxic and photoallergic reactions after cosmetics

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Summary:

Photoallergic and phototoxic eczemas belong to exogenous photodermatoses. UV radiation and external factors which sensitized skin to sunlight are needed to form such eczemas, and the feature of all photodermatoses is the provocation or increasing of symptoms on exposure to sunlight. This results in skin lesions which are located on exposed parts of the body, especially on the face, neck, forearms. Some medicines or injections like analgesics, cardiovasculars, antimalaris, antidiabetics, neurologics and antibiotics, either taken orally or intravenously, may cause photosensitizing effects. In addition, external use medicines or cosmetics (perfumes) may lead to photoallergic and phototoxic reactions. The treatment of exogenous photodermatoses is based on the identification of the causing factors, using the patch phototest.

Key words: photoallergy, phototoxicity, photoallergic, phototoxic contact dermatitis, diagnostics

Introduction:

Photoallergic and phototoxic eczemas are qualified to induce exogenous photodermatoses. The factors which sensitize skin to UV radiation (cosmetics, medicines, sap) and UV radiation itself (mainly UVA, partly UVB), are necessary pre-conditions in creating such eczemas [1]. Hence, as a result of these two factors, photoallergic or phototoxic dermatitis appears [2].

Photo-allergic reactions occur as a result of skin exposure to both allergic substances (the so-called photohaptens) and UV radiation. UV radiation is involved in the initiation of a photochemical reaction resulting in the conversion of prohapten to hapten, then, after the conjugation with proteins, a new antigen appears. Re-exposure to UV radiation subsequently induces an immune response to the new antigen, and the photoallergic blacklash of contact dermatitis occurs (type IV). [3, 4].

Photo-allergic reactions occur as a result of skin exposure to sensitizing substances - the so-called photohaptens and UV radiation (mainly UVA and partially UVB) [5, 6]. UV radiation takes part in the initiation of a photochemical reaction resulting in the conversion of prohapten to hapten, which, in a reaction with particular proteins, generates a new antigen. The organism is therefore sensitised with the antigen and after re-exposure to UV radiation, the immune reaction (type IV) occurs which induces contact eczemas upon the skin [2, 4]. These skin lesions appear 24-48 hours after exposure to the radiation, mainly on the exposed parts of the body. Such changes are clinically eczematous: erythematous, erythematous-desquamative and alveolate. The patient feels severe itching. It is characteristic that the changes appear only on some people, moreover, their presence does not depend on the dose of sensitising substance and UV radiation (Braun-Falco 2010,

Jabłońska and others 2010, Śpiewak 2009).

Substances that can cause photoallergic reactions:

- Halogen derivatives salicylanilidides
- Drugs: sulfonamides
- Bactericidal drugs: tetracycline, Doxycycline, ciprofloxacin, azithromycin
- Antifungal drugs ketoconazole, terbinafine, itraconazole, griseofulvin
- Anthelmintics
- Analgesics (painkillers) (NSAID) ibuprofen, ketoprofen, naproxen
- Antidiabetic drugs: metformin
- Diuretics, thiazides
- Medicines for heart disease, hormonal
- Sedatives, antidepressants, anti-emetics, antidepressants,
- Oral contraceptives, retinoids
- Components of UV filters protectives: PABA, benzophenones
- Fragrances, musk ambrette, 6 Methylcoumarin
- Present in garlic diallyl sulfide
- Sweeteners such as cyclamate
- Chemical dyes quinone, methylene blue, oezene, Rose Bengal
- St. John's wort plants containing psoralenes
- Cosmetics
- Essential oils

Phototoxic reactions appear as a result of free radicals released through chemical substances by way of contact with the skin. This cause damages in cellular structures and the development of an acute inflammatory reaction (which is a sunburn). Phototoxic reactions may occur in the majority of people who are exposed

to the phototoxic substances and UV radiation together, and the reaction depends on the dose [3, 4, 7].

It should be noted that immunological processes do not participate in this phototoxic reaction. Moreover, phototoxic reaction is strictly limited to the location where these two factors operate. After removing the phototoxic factor, the reaction stops [1, 4]. However, skin lesions begin their appearance following the first contact with the photosensitising factor, but these can be evident immediately or after a few hours of exposure to radiation. The clinical changes due to this cause are similar to the effect of a sunburn, where erythema, swelling or a localised burning sensation occurs. After the inflammatory reaction clears up, various types of skin-discolouration may linger, for example, after administration of psoralen, or the pigmentation changes evident after administration of tetracycline and furosemide [2].

Perfume dermatitis:

This is a specific phototoxic reaction induced by contact with particular plants and with UV radiation. This reaction is mostly caused by plants which contain furocoumarines, psoralens (6,8 methoxypsoralen), angelicin, bergasol, xanthotal. The inflammatory reaction is a typical phototoxic reaction: an erythema appears, involving blisters, itching and a burning sensation. After the inflammation ends, a characteristic linear and irregular discolouration occurs which can still be seen after several months [4, 7].

Berloque dermatitis:

A typical phototoxic reaction, berloquedermitis appears after the skin is exposed to UV radiation following a reaction to certain perfumes or colognes or soaps. The main culprit bringing about this effect is bergamot oil. Changes like erythema or edema occur on the skin in places where contact has been made. After the inflammation clears up, pigmentation spots appear. These are difficult to remove. **Phototoxic and photo-allergic reactions vary** [1, 2, 4, 7]

Photoallergic reactions:

- Appear rarely.
- occur not after the first exposure to UV radiation, but after subsequent exposures.
- Wide spectrum UVA radiation induces these photo-allergic reactions.
- The dose of radiation is not important.
- This form of clinical dermatitis characteristically shows clinical lesions, such changes may appear on all body parts exposed to UV radiation.
- The patient suffers an itching sensation.

Phototoxic reactions:

- Appear frequently
- May appear just after the first exposition to UV radiation
- UVA radiation in a narrow range is a radiation

which induces phototoxic reactions

- The dose of radiation and causing factor is significant
- Clinical dermatitis remind sun burn
- Skin lesions appear exactly on the place of UV exposition
- The patient feels burning sensation

Differentiation of these two reactions is of a great clinical importance. The consequence of an immunological reactions may be the fixation of hypersensitivity to light despite the end of contact with the sensitizing substance [4, 7].

Phototoxic and photo-allergic reactions diagnostics:

- To determine the so-called 'causation factor' (the substance which induced the phototoxic and photo-allergic reactions).
- Modified patch tests in which the test area is exposed to UV radiation [4].

Photo-allergic and phototoxic reactions treatment:

- Causing factor detection and avoidance.
- Topical aborritant medical preparations, boric acid and altacet compresses, anti-inflammatory preparations, healing regenerating skin ointments or creams
- Antihistaminic drugs which seal the minor blood vessels, vitamin C, calcium preparations.
- Pigmentation treatments.

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