

THE NEED FOR TOPICAL TREATMENT OF PHOTOAGED SKIN

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Synopsis

Photoaged skin, a misnomen for photodamaged skin, is seen more often in the offices of the dermatologists. The reasons are clear: people expose themselves to the sun but accept the erythema threshold dose as the only borderline for their almost addictive desire to tan by sun exposure. The repair mechanisms of the epidermal cells are overcharged, mutations occur the sun of which lead to the unpleasant picture of dermatoheliosis. This skin disease is disturbing for the patient due to its senile appearance, and disturbing for the doctor who regognizes the precancerous state. Until recently, not much could be done. But, those last four years brought evidence for the valuable action of tretinoin: may changes of dermatohelioses may be reversed by continuing applications of this retinoid.

Riassunto

La cute fotoinvecchiata o fotodanneggiata viene rilevata sempre più spesso presso gli ambulatori dei dermatologi. Le ragioni sono chiare: la gente si espone al sole accettando l'eritema come una conseguenza necessaria per ottenere la desiderata abbronzatura. I normali meccanismi di riparazione delle cellule epidermiche non sono più sufficienti, il sole provoca così mutazioni a livello del DNA, principale causa delle sgradevoli forme di dermatoheliosi. Queste manifestazioni cutanee non piacciono a maggior ragione al dermatologo che le riconosce come stati precancerosi. Fino a pochi anni fa non venivano proposti rimedi. Da qualche anno viene proposto come rimedio l'uso dell'acido retinoico, che può rendere reversibili alcuni di questi fenomeni.

Introduction

A well-tanned skin is still regarded as a sign of youth and health. So, people continuously expose themselves to the sun. The doses of UV-B rarely exceed the erythema threshold as sunburn is unpleasant and painful, and sun-worshippers have learned to avoid it. But regularly, the dose for irreparable DNA damage is surpassed. Therefore, dermatologists see more and more patients with prematurely aged skin (photoaged skin, heliodermatitis, dermatoheliosis, chronic actinic skin damage).

Skin ageing

In the skin, there are two different forms of ageing: intrinsic (genetic) and extrinsic. Extrinsic ageing is caused by physical influences, mainly by UV-B irradiation.

UV-B irradiations provokes acute and chronic effects. Among the acute effects, sunburn, phototoxic and photoallergic reactions, and photodermatoses have to be mentioned. The chronic effects consist of DNA-damage. Photones of the UV-B range may react with DNA in the cell nuclei of epidermal cells causing dimerization, hydration, chain break or protein-cross linkage. The repair system of the cell takes care of such damage: within 24 h., newly synthesized parts replace the damaged sequences in the DNA strands. However, the capacity for repair is neither unlimited nor adaptive. It is assumed that the threshold dose for irreparable damage lies at about two thirds of the erythema (sunburn) threshold dose. And, as already mentioned, people used to stay out in the sun until the last minute below their sunburn dose. In consequence, an increasing amount of damaged DNA is transferred to the generations of daughter cell and mutations arise, which are clinically seen as photodamaged skin, actinic keratoses and, lastly, non-melanoma skin cancer

(1, 5, 6, 7, 8, 9).

Carcinogenesis in the epidermis occurs in three stages (11):

- initiation, i.e. mutation-like genetic changes by irreparable damage to the DNA caused by UV-B,
- promotion of tumour formation by exposing initiated cells to an environment that induces a selective outgrowth of the initiated cell clones, e.g. UV-B radiation,
- conversion of pre-malignant to malignant cells, again by UV-B irradiation (or spontaneously).

Significance of photodamaged skin

Photodamaged skin is of medical and cosmetic concern. The medical aspect is the presence of pre-malignant skin lesions, either visible or sub-clinical, and the dry, itchy skin which needs continuous care and protection. The cosmetic aspect is prematurely aged skin. However, the symptom of looking old, the decrease in self-esteem cannot be neglected and should not be regarded as a purely cosmetic problem. One can look at photodamaged skin from two viewpoints, but either warrants a medical treatment is.

Measures in photodamaged skin

Genetically aged skin and photodamaged skin needs regular skin care, i.e. a substitution for the lacking hydrolipid emulsion. Furthermore, as alkaline neutralization is weak, slightly acid cleaning bars or lotions with excellent tolerance are recommended (8). Lastly, the skin must be protected against any further irradiation with UV-B to avoid further promotion and conversion (cf. carcinogenesis above).

In the last years, a new treatment has been tried and found to be most successful in photodamaged skin: the topical application of tretinoin (2, 3, 4, 10). In numerous investigations, the beneficial effects of tretinoin (= all-transretinoic acid, = Vitamin-A-acid) have been confirmed. The most prominent features were:

- Skin surface: formation of a shiny, glossy, even, homogeneously pigmented, pink surface. Comedones, hyperkeratoses and actinic keratoses disappear.

- Horny layer: regular arrangement of the layers, broader intercellular spaces, reduced number of layers.

- Rete Malpighi: atypical and dysplastic cells disappear, regular layers are formed, the number of Langerhans cells increases, cells show signs of metabolic activity. Melanosomes are distributed in a homogeneous, fine manner.

- Dermis: formation of new, fine collagen fibres just below the basal membrane, angiogenesis, improved vascularization.

On the basis of its numerous pharmacological actions, tretinoin has to be considered as a useful drug for topical treatment of photodamaged ("prematurely aged") skin.

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