**Skin Diseases due to Physical Factors**

**Isomorphic (Koebner) response.**

Defined as the development of lesions of pre-existing skin disease in previously normal skin that has been subjected to trauma. Physical traumas, include friction, pressure, incision and laceration, skin grafting, bites, vaccination, skin tests, burns, freezing, and ultraviolet (UV) and ionizing radiations.

Diseases showing the Koebner response include: warts, molluscum contagiosum (both probably by dissemination), psoriasis, lichen planus, vitiligo, pemphigus foliaceus, lupus erythematosus.

**Heat injuries**

**Miliaria.**

Miliaria is the retention of sweat as a result of occlusion of eccrine sweat ducts, produces an eruption that is common in hot and humid climates. The occlusion prevents normal secretion from the sweat glands, and eventually the backed up pressure causes rupture of the sweat gland or duct at different levels. The escape of sweat into the adjacent tissue produces miliaria. Depending on the level of the injury to the sweat gland or duct, several different forms are recognized:

Miliaria crystallina

Small clear very superficial vesicles with no inflammation. The lesions are asymptomatic and their duration is short lived because they tend to rupture at the slightest trauma. The lesions are self-limited and no treatment is required. The obstruction of duct is within stratum corneum.

Miliaria rubra

Discrete pruritic erythematous papulovesicles with burning or tingling sensations. The site of injury and sweat escape is in prickle cell layer, where spongiosis is produced.

Miliaria profunda

Asymptomatic skin-colored deep-seated papules. The occlusion of the duct is in the upper dermis. It usually follows a severe bout of miliaria rubra.

Treatment of miliaria

Cool environment, calamine lotion.

**Erythema Ab Igne.**

Erythema Ab Igne is a persistent erythema or the reticulated residual pigmentation resulting from it. It is usually produced by long exposure to excessive heat (infrared radiation) without the production of a burn. The disease is common on the legs of women as a result of habitually warming them in front of heaters. After the cause is removed, the affection tends to disappear gradually, but sometimes the pigmentation is permanent.

Treatment: The use of cream containing fluocinolone acetonide 0.01%, hydroquinone 4% and tretinoin 0.05% may reduce the unsightly pigmentation.

**Actinic (solar) injuries**

**Sunburn.**

Sunburn is acute sun damage to skin, caused primarily by ultraviolet B light radiation. Clinically painful sharply demarcated erythema limited to areas of sun exposure; if severe, blister formation; later, peeling of skin occur.

Treated by NSAIDs. If sunburn is severe then fluid replacement is important. Otherwise simply lubricate the skin and wait natural healing.

**Freckle and Lentigo.**

Freckles are small (<0.5 cm) brown macules that occur in profusion on the sun-exposed skin of the face, neck, shoulders, and backs of the hands. They become prominent during summer and subside during winter. Histologically, increased melanin and normal number of melanocytes. Therapy is by sunscreens and light avoidance.

Lentigo (lentigine) is a benign hyperpigmented macule appearing at any age and on any part of the body including the mucosa. The intensity of the color is not dependent on sun exposure. Histologically, increased number of melanocytes. Therapy is none needed, if bothersome, cryotherapy or laser ablation.

**Photoaging.**

Photoaging is due to chronic light exposure. The degree of photoaging is proportional to total ultraviolet light exposure. The diseases include:

* Solar elastosis: reflecting an increase in abnormal elastic fibers. Occasionally focal intense elastosis presents as a yellow nodule or plaque. The manifestations of elastoses are: Cutis rhomboidalis nuchae in which multiple deep furrows are seen on the nape. Favre-Racouchot disease in which cysts and comedones especially in periorbital location. Lemon skin in which pale yellow color and thickened skin.
* Idiopathic guttate hypomelanosis: reflecting focal areas of hypopigmentation, most common on arms and less often legs.
* Solar lentigines: irregular hyperpigmented macules, most common on face and backs of hands.
* Poikiloderma: combination of hyperpigmentation and hypopigmentation, telangiectases and atrophy.

**Carcinogenesis.**

Skin cancers are the most common human malignancies. In addition to chronic effects of light on the skin, many other factors are involves, such as exposure to other forms of ionizing radiation, heat, trauma and chemical carcinogens, certain scars (such as those associated with tuberculosis and osteomyelitis), immunosuppression and pre-existing dermatoses such as mucosal lichen planus and lichen sclerosus. Tumors are basal cell carcinoma, squamous cell carcinoma, and malignant melanoma.

**Light–sensitive dermatoses.**

There are many dermatoses that can worsen with light exposure, including: lupus erythematosus, dermatomyositis, rosacea, recurrent herpes simplex virus infections, lichen planus, allergic contact dermatitis (for example, allergy to chromium salts in cement workers), and atopic dermatitis.

**Cold injuries**

**Chilblains (pernio).**

Chilblains is a localized erythema and swelling caused by exposure to cold. Blistering and ulceration occur in severe cases. This occurs chiefly on the hands, feet, ears, and face. Onset is enhanced by dampness. Burning and itching are symptoms. Histologically, it is lymphocytic vasculitis.

Therapy is by protection against cold and dampness. Nifedipine 20 mg three times a day.

**Frostbite.**

Frostbite is freezing and local deprivation of blood supply to the soft tissues. The ears, nose, cheeks, fingers, and toes are most often affected. The frozen part painlessly becomes pale and waxy. Various degrees of tissue destruction occur. These are erythema and edema, vesicles and bullae, gangrene, and injury to muscles, tendons, periosteum, and nerves. The degree of injury is directly related to the temperature and duration of freezing.

Therapy is by rapid rewarming in a water bath between 37° and 43° C is the treatment of choice. Analgesics should be given because of the considerable pain experienced with rapid thawing. When the skin flushes and is pliable thawing is complete. Supportive measures such as bed rest, high-protein/high-calorie diet, wound care, and avoidance of trauma are imperative.

**Mechanical injuries**

**Callus (Callosity).**

Callus is a nonpenetrating circumscribed hyperkeratosis produced by pressure. It occurs on parts of the body subject to intermittent pressure, particularly the palms and soles, and especially the bony prominences of the joints (example, prayer callous on the knees). Most problems are encountered with calluses on the soles. Ill-fitting shoes, orthopedic problems of the foot caused by aging or a deformity of the foot exerting abnormal pressure, and high activity level are some of the etiologic factors to be considered in painful callosities of the feet.

The callus differs from corn in that it has no penetrating central core and it is a more diffuse thickening.

It tends to disappear spontaneously when the pressure is removed. Padding to relieve the pressure, paring of the thickened callus, and the use of keratolytics such as 40% salicylic acid plasters are the therapies.

**Corn (Clavus).**

Corn is circumscribed horny conical thickening with base on the surface and the apex pointing inward and pressing on subjacent structures. Corns arise at sites of friction or pressure. There are two varieties: the hard corns, which occur on the dorsa of the toes or on the soles, and the soft corns, which occur between the toes and are softened by the macerating action of sweat.

In a hard corn, the surface is shiny and polished and, when the upper layers are shaved off, a core is noted in the densest part of the lesion. It is this core that causes a dull/boring or sharp/lancinating pain by pressing on the underlying sensory nerves.

The soft interdigital corn usually occurs in the fourth interdigital space of the foot. These are soft, soggy, macerated so that they appear white. Treatment by simple excision may be effective.

Plantar corns must be differentiated from plantar warts, this done by paring off the surface keratin until either the elongated dermal papillae of the wart with its blood vessels appear, or the clear horny core of the corn is seen.

The relief of pressure or friction by corrective footwear or padding is important. Salicylic acid plaster 40% is applied, after 48 hours the plaster is removed, the white macerated skin is rubbed off, and a new plaster is reapplied. This is continued until the corn is gone.

Salicylic acid-lactic acid collodion is painted on the pared site of the corn and allowed to dry each day until cure. This treatment is especially effective for interdigital soft corns.

**References:**

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