Cancer – adjuvant skin care

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Cancer treatments are very stressful for the psyche and body. The skin is also sometimes severely affected and causes problems for those affected. You can provide valuable help here with the right skin care before and after treatment.

Cancer causes those affected to change their lifestyle completely or temporarily. This also applies to skin care – before, during and after treatment. How skin care can be adapted depends on the individual therapies and their side effects. Surgery, radiotherapy, medication and other measures have different effects. The aim must be to optimise prevention, protection and aftercare as much as possible.
Scars are a common consequence of operations performed on the skin or through the skin. Scars are an aesthetic problem. Regeneration-supporting care, peelings and the activation of microcirculation are cosmetic measures following primary wound healing. Pigmentation contrasts and post-inflammatory hyperpigmentation (PIH) after skin transplants fade with liposomal vitamin C derivatives or, conversely, can be evened out with pigment-containing foundations and powders. Sun protection is important if there is a lack of melanin in the scar area.

Damage caused by radiation

Irradiation of the skin and internal organs through the skin causes redness (erythema) – similar to sunburn. Together with the associated irritation, this is known as radiodermatitis:

- Increased cell division after radiation damage causes the skin to flake (desquamation). The uppermost barrier layers of the stratum corneum are shed. If the basal layer is severely damaged, the barrier layer peels off in a weeping process. Necrotic changes to the skin and oedema can be the result.
- Increased pigment formation may occur later.
- If the hair root cells are damaged, the hair falls out.
- The function of the sweat glands is restricted.
- The body's own collagen-degrading matrix metalloproteinases (protein-splitting enzymes) are stimulated in a dose-dependent manner, so that the skin may atrophy. Actinic skin damage may also occur.
- Sebum secretion decreases and the skin barrier is severely disrupted. Visible consequences are dry skin as a result of increased transepidermal water loss (TEWL) and reddened skin.

Of course, the skin must not be exposed to additional UV radiation (sun) during therapy. If exposure cannot be avoided, the skin should be protected with sun protection products with a high sun protection factor.
Like ultraviolet radiation from the sun, radioactive radiation produces oxygen radicals and peroxinitrite in the skin. However, the penetration depth is greater and the visible effect in the form of inflammation with burning and itching occurs later. The décolleté area is particularly sensitive.

Help for inflamed skin

The radicals are partly intercepted by amino acids of the NMF (Natural Moisturising Factor) and endogenous hyaluronic acid. The latter is found in the extracellular matrix and is broken down in the process – a process that also contributes to skin atrophy. NMF and hyaluronic acid are therefore generally suitable for conditioning, moisturising skin care before and after radiotherapy.
Physiological, lamellar base creams together with linseed oil or kiwi seed oil nanodispersions have proven to be effective for general, therapy-related skin care. In the case of actinic keratoses, boswellia nanodispersions can also be used. The phosphatidylcholine (PC) contained in the preparations has a cell-protective effect against gamma radiation.[1] PC liposomes have a regenerative effect in the case of radia-

[1] Soloviev AI, Stefanov AV, Tishkin SM, Khromov AS, Parshikov AV, Ivanova IV, Gurney AM, Saline containing phosphatidylcholine liposomes possess the ability to restore endothelial function damaged resulting from G-irradiation, Journal of Physiology and Pharmacology 2002; 53 (4): 701-712

tion damage. Phosphatidylserine (PS)[2] also suppresses cytokines that trigger inflammation. Avocado oil-PC mixtures dispersed in water can be used for skin cleansing with a simultaneous moisturising effect.

Skin cleansing and care

Body cleansing with aggressive surfactants should be avoided wherever possible. Lukewarm water is sufficient for cleansing the skin in most cases. Camomile baths have a soothing effect. For men, wet shaving with shaving soap can be a source of irritation. It is therefore recommended to switch to dry shaving. To soothe the skin, hydrogels with CM glucan – a polysaccharide obtained from yeast – are a good alternative to alcohol-based shaving lotions.
Hydrogels with alginates, hyaluronic acid, CM glucan, aloe vera, D-panthenol and amino acids (NMF) are well suited to keeping the skin moisturised. Some gels can contain vegetable oils whose omega-6 and omega-3 acids have an anti-inflammatory effect. In the form of anhydrous oleogels, the plant oils can be applied like a cream. They grease well and are well absorbed compared to paraffins.
Irritating and sensitising additives in cosmetics easily pass through the disturbed skin barrier during therapy. They should be excluded by INCI. The risk of infection can be countered with lamellar barrier creams and regeneration-promoting vitamin supplements (A, C, E, D-panthenol).
The same criteria apply to decorative products as for pure skin care: as few additives as possible and no substances that impair the skin's own regeneration. This means avoiding occlusive paraffin oils and mineral waxes.

Damage caused by medication

With systemic chemotherapy, rapidly growing skin and mucous membrane cells are affected. Barrier disorders are the consequence – and with them dryness and an increased risk of infection, which is further increased by the drug-induced weakening of the immune system. Fungal and herpes skin infections are common. Hygiene is therefore an important requirement. However, as with radiotherapy, skin cleansing should be moderate so that the skin barrier is not further damaged. Medical hydrogels are recommended for dry mucous membranes. The side effects of pharmaceutical cytostatics include

- Mitosis inhibitors such as vinca alkaloids have a toxic effect and cause hair loss.
- Alkylating cytostatics (e.g. cyclophosphamide) have a toxic effect and cause hair loss and erythema.
- Folic acid antagonists such as methotrexate can cause exanthema, erythema, often also itching and reactions at injection sites.
- Pyrimidine antagonists such as 5-fluorouracil cause photosensitisation and hyperpigmentation.

When the signalling pathways of the body's own growth factors are blocked by cancer drugs, changes inevitably occur in the skin, hair and nails:

- Vascular endothelial growth factor (VEGF) triggers the formation of new blood vessels (angiogenesis), which enables the tumour to "feed" itself better via the new blood vessels.
  Blockade of VEGF: Multikinase inhibitors inhibit the VEGF signalling pathway, among other things, and reduce tumour angiogenesis. Erythema on the face, skin rashes (exanthema), itching and swelling are observed.
- The Epidermal Growth Factor (EGF) stimulates cell division and cell growth via its receptors. EGF prevents apoptosis (programmed cell death). As a result, it also promotes the growth and metastasis of tumours; it must therefore also be blocked.
  Blockade of EGF: Signal transduction inhibitors prevent the EGF signal from being passed on to the receptor inside the tumour cell. The same reaction occurs in the skin cells. The skin becomes dry and cracked. Itching, redness, inflammation and pustules appear.

A frequently observed phenomenon is hand-foot syndrome, e.g. during treatment with capecitabine or 5-fluorouracil. Both are pyrimidine antagonists. Side effects include swelling and reddening of the palms of the hands and soles of the feet. Blisters and rhagades may also form – possibly accompanied by itching. Signs may include sensory disturbances such as numbness, tingling or burning. Fingernails and toenails are also sometimes affected. They can become loose or even fall out.
Whether and to what extent the symptoms occur depends on the type of medication used, but also on the dose and duration of treatment.

[2] Lautenschläger H, Phosphatidylserin in der Hautpflege, Chemie in unserer Zeit; 11. August 2023, https://doi.org/10.1002/ciuz.202300005

Strengthen the skin barrier

The most important care measure is to support the skin barrier with non-irritant (fragrance-free, preservative-free and largely emulsifier-free) skin care products in combination with moisture-retaining active ingredients. The extent to which itching can be successfully treated with urea and redness with essential fatty acids (linseed oil, kiwi seed oil) as well as vascular stabilising extracts (echinacea, butcher's broom) and tranexamic acid must be tested individually. Anti-inflammatory frankincense extracts (boswellia)[3] can also be helpful.

Immunotherapeutics and hormone therapeutics

Immunotherapies can be active or passive and aim to strengthen the immune response against the cancer cells, i.e. to slow their growth or cause them to die.

- In active immunotherapy, vaccines made from killed tumour cells or antigens are used to trigger the body's own immune response, which is directed against the cancer cells.
- Passive immunotherapy influences growth factors, among other things. These include the body's own cytokines (e.g. interferons), immunoglobulins or T lymphocytes. Interferons can temporarily cause non-specific skin rashes, skin dryness or hair loss. Otherwise, skin care is orientated towards the symptoms. It should not irritate the skin and should be more moisturising if necessary.

Hormone therapy, e.g. in cases of prostate, breast and uterine cancer, interferes with the estrogen or testosterone balance. Hormone-specific skin changes affect the sebaceous glands, for example. In this case, nourishing liposomal lotions based on phosphatidylcholine can help. Unusual skin reactions can be side reactions to painkillers, which are often used as an adjunct to treatment. It may then be advisable to change the painkillers.
Molecular therapies influence specific biochemical mechanisms within the tumour cells. They are very diverse and must be considered individually with regard to their effects on the skin.
Hyperthermia is rather unspectacular as far as the skin is concerned. In this case, tumour cells are damaged by a higher local temperature.

Note: Parts of the manuscript are taken from the book "Corneotherapy".[4]

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[3] Lautenschläger H, Weihrauch – Harz mit Heilkraft, medical Beauty Forum 2015 (4), 12-16

[4] Lautenschläger H, Corneotherapy – link between dermatology and cosmetics, 1st edition, Deutscher Apotheker Verlag, Stuttgart 2023, ISBN 978-3-7692-8132-3