

Pielęgnacja i ochrona skóry w trakcie i po radioterapii

Care and protection of the skin during and after radiotherapy

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STRESZCZENIE

Znaczny procent pacjentów z chorobą nowotworową wymaga radioterapii. W trakcie leczenia promieniowaniem jonizującym często dochodzi do popromiennego zapalenia skóry o różnym nasileniu, które jest powodem wielu dolegliwości, takich jak świąd skóry, ból, pieczenie, doprowadza również do czasowego odroczenia leczenia. Właściwa opieka i pielęgnacja skóry przynosi złagodzenie objawów popromiennych oraz umożliwia kontynuację zaplanowanej terapii. Praca ma na celu przedstawienie doniesień o poszukiwaniu nowych substancji roślinnych mogących mieć zastosowanie w pielęgnacji skóry z odczynem popromiennym.

Słowa kluczowe: radioterapia, popromienne zapalenie skóry, pielęgnacja skóry, odczyn popromienny

ABSTRACT

A significant percentage of patients with cancer require radiotherapy. During treatment with ionizing radiation, radiation dermatitis of varying severity often occurs, which causes many ailments such as itching, pain, burning and also leads to a temporary postponement of treatment. Proper care and skin care brings relief from symptoms of radiation recall and allows for the continuation of planned therapy. The work aims to present reports on the search for new plant substances that may be involved in the care of the skin with radiation dermatitis.

Key words: radiotherapy, post-radiation skin damage, skin care, radiation dermatitis

In the treatment of malignant tumors surgery, chemotherapy and radiotherapy are used. Despite tremendous progress in radiotherapy techniques, radiation dermatitis, which is the result of ionizing radiation on the skin, is still an important problem for patients, oncologists and medical staff who care for patients during radiotherapy. Ionizing radiation causes the imbalance between the process of keratinized layer cell loss, and the maturation and differentiation of stem cells, the basal layer of the epidermis [1]. With the increase in dose, normal tissue restoration possibilities are limited. Damage to endothelial cells, reduction of the number of Langerhans cells and the release of various pro-inflammatory cytokines occurs [2].

Radiotherapy can be divided into:

- Radical - with the task of healing the sick with independent radiotherapy or in combination with other methods. The treatment is applicable in therapy of non-Hodgkin lymphoma, Hodgkin lymphoma (Hodgkin's disease), seminoma testes, retinoblastoma, neuroblastoma, head and neck cancers, gynecological cancers, prostate cancers, soft tissue sarcomas.
- Palliative - is mainly aimed at improving the quality of life for patients with advanced cancer. Has an analgesic action, reduces bleeding

(cancer of the bladder, rectum, lung, breast), reduces the symptoms of spinal cord compression, reduces the egzophytic ulcer in breast, groin, skin cancer, decompression of superior vena cava syndrome, ameliorates the symptoms of metastases to the central nervous system (CNS) and bones.

Huge advances in technology, the use of modern equipment for radiotherapy and the use of modern techniques in radiotherapy such as IMRT (intense dose modulation) and VMAT (volumetric arc therapy) significantly reduced the amount and degree of effects of this therapy. Ionizing radiation is the frequent cause of radiation dermatitis, especially in the area of the groin, breast, head and neck cancer.

An important clinical problem of radiotherapy is the toxic damage to the skin. It depends on: the technique of radiation therapy, the type of energy and total dose of radiation, the duration of irradiation, the dose rate, the number and size of fractional doses, the sensitivity of irradiated cells, the concentration of oxygen in the irradiated tissues and the degree of their hydration [3], as well as the individual characteristics of the patient, such as age, skin type, chronic diseases (diabetes, renal failure), malnutrition, alcohol consumption, smoking, genetic predisposition [4, 5].

Among direct results of ionizing radiation of the skin, include a variety of dermal lesions, which due to the time of disclosure in

Table 1. The severity of adverse reaction in the course of radiation dermatitis according to the National Cancer Institute - Common Terminology Criteria for Adverse Events (version 3)

Adverse reaction	Rash, dermatitis after irradiation
1 degree	Light erythema or dry exfoliation
2 degree	Moderate to severe erythema; patchy moist exfoliation, usually limited to the folds and creases of the skin, moderate swelling
3 degree	Moist exfoliation in the area other than the folds and creases of the skin, bleeding caused by minor trauma or abrasion
4 degree	Skin necrosis or ulceration through the entire thickness of the skin; spontaneous bleeding from the affected area
5 degree	Death

relation to the irradiation time are divided into early and late radiation reactions. The first symptoms of radiation can appear after a few days of exposure, causing redness of the skin and mucous membranes in the treatment area, in the course of further treatment may occur such problems as exfoliation of the epidermis or epithelium, pain, burning and skin tightness, huge discomfort

which leads to deterioration of quality of life.

Greater treatment toxicity also occurs in places where the two skin surfaces are in contact (groin, armpits and chest) and where the skin is thin (groin, face, armpit). In these places the severity of reaction is the result of mechanical friction of the surfaces and excessive sweating.

After 2-3 weeks of radiotherapy erythema and dry epidermis exfoliation, then wet exfoliation (blisters filled with the serum – fluid) appear, sometimes effusion appears. To evaluate the severity of the radiation reaction the scale according to the National Cancer Institute - Common Terminology Criteria for Adverse Events is most widely used.

Reactions of the skin are one of the most common complications during and after treatment with ionizing radiation. Taking care of the skin can significantly reduce the irritation. Appropriate clothing is important – it should be loose and airy, preferably made of natural fibers (linen, 100% cotton). If possible, you should ensure the skin in the area of exposure to have constant access to fresh air. Do not apply medicinal plasters or bandages - warming or analgesic.

You should treat your skin very gently: do not scratch, do not expose to extreme temperatures - hot baths and sunbathing are contraindicated. Apply as little cosmetics as possible on the irradiated area.

Washing irradiated skin with lukewarm water and mild soap is currently recommended for all patients in the process of radiotherapy. According to the guidelines of Supportive Care Guidelines Group from Canada, skin should be washed with water

only or water and a mild soap with a neutral pH, non-perfumed, not containing lanolin [6]. Scented soaps, creams, deodorants, etc. may cause an increase radiation reaction of the skin. If you need to shave, use electric razor that does not require usage of foam and causes less irritation.

To facilitate skin renewal and speed up repair processes, it is extremely important to carefully care for it, preferably using cosmetics designed specifically for skin subjected to radiotherapy. **RadioProtect** cream moisturizes, oils, protects and soothes treatment toxicity, moreover, it is has soothing and calming effect. It contains: panthenol, olive oil, natural bioflavonoids, resveratrol, squalene, and glycerol. Recent years have been dedicated to searching for substances that assist in the fight against actinic skin reaction. Among the plants that could potentially contain such substances are: Mary thistle (lat. *Silybum marianum*) and Japanese knotweed (lat. *Polygonum cuspidatum*).

Mary thistle is a plant from the Asteraceae family. It comes from the Mediterranean area: Southern Europe, Egypt, Israel, Turkey. In Poland, it is obtained from crops that also appears naturally.

Silybin is one of two key active ingredients in the **RADIOPROTECT** cream. It belongs to the group of flavonoids found in the seeds of Mary Thistle (*Silybum marianum*).

Silybin exerts antihapatotoxic properties, blocks the effects of



RadioProtect krem

Specjalistyczny krem kojąco – łagodzący do stosowania na skórę podrażnioną po naświetlaniu promieniami UV i jonizującymi, opalaniu, solarium, zabiegach laserem. Zalecany również do pielęgnacji skóry dla osób przyjmujących chemioterapię.

Skład kremu oparty na naturalnych składnikach. Resveratrol i silybina neutralizują działanie wolnych rodników i mogą wspomagać funkcje ochronne skóry. Krem działa kojąco, łagodząco, zmniejsza uczucie gorąca i pieczenia. Skutecznie pielęgnuje, natłuszcza i nawilża skórę, która odzyskuje swój naturalny komfort, pozostaje gładka i elastyczna.

Krem przebadany dermatologicznie, nie stwierdzono działania drażniącego i alergizującego. Europejski certyfikat CPNP1518963

Skład: Aqua, Olea Europea Oil, Myrystyl Myristate, Maleated Soybean Oil, Cetearyl Oliviate, Sorbitan Oliviate, Glycerin, Panthenol, Polygonum cuspidatum extract, Silybum marianum fruit extract, Squalene, Carbomer, Sodium Hydroxymethylglycinate, Parfum Mentha.

Producent: AUREA PHARMA s.c.
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death cap mushroom mycotoxins associated with hepatic injury: α -amanitine, falloidine, as well as carbon tetrachloride, ether, acetaminophen, amidopyrine, antipyrine, ethanol and chloroform. Seals cellular membranes of the liver, hindering the penetration of these substances. It prevents cirrhosis and fibrosis of the liver, kidneys and the heart. Also, exhibits anti-inflammatory and antioxidant properties and protects against free radicals. Silybin is a component of the highest biological activity. Previously used preparations, even when using high doses, have good tolerability and the absence of significant side effects [2].

Silybin protects the skin from cancer in two ways - it prevents DNA damage and destroys the already damaged cells. It kills cancer cells arising from excessive exposure to UVA and protects against the harmful effects of UVB radiation – according to researchers from the University of Colorado. This information is given by the Photochemistry and Photobiology periodic. *Silybum marianum* extract (with a content of 80% silybin in RADIOPROTECT cream) contains bioflavonoids which have a sealing and reinforcing effect on the walls of capillaries, by inhibiting the activity of hyaluronidase, so that they act against bleeding, ecchymosis, varicose veins and atherosclerosis. They are antibacterial and antiviral; exhibit bacteriostatic sensitivity in relation to the gram-positive and gram-negative bacteria. Inhibit platelet aggregation. Occurring partly in the cell membrane and beyond, flavonoids can "sweep" free radicals influencing cells from the outside and the inside. Flavonoids dissolving in the lipid fraction of cell membrane can be protected against oxidation and can enhance the activity of vitamin E slowing down LDL oxidation. They participate in maintaining the integrity of vessel walls and their mechanical resistance. Among so many capabilities to influence biological processes in living cells, antioxidant properties of flavonoids seem to be the most important.

The second plant, which aroused great interest of scientists is *Polygonum cuspidatum* otherwise known as Japanese knotweed (*Reynoutria japonica*). Its herbal material is the rhizome - *Rhizoma Reynoutria japonicae* (syn. *Rhizoma Polygoni cuspidati*). It contains active ingredients: resveratrol, flavonoids, anthraquinone

and naphthaquinone compounds, phenolic acids, phenols, acids, phytosterols, chryzophanol, tannins and coumarin derivatives. Japanese knotweed containing resveratrol has been used for a long time by the doctors in traditional Eastern medicine to treat inflammatory skin disorders, and inhibiting inflammation.

Resveratrol (trans-3,5,4'-trihydroxystilbene) is a phytoalexin, or antibiotic agent (fitocide) located in the immune system of the plant. Phytoncides (2-Methoxy-6-acetyl-7-methyl-juglone) in *Reynoutria japonicae* have a greater antibacterial and antifungal effect than many of clinically synthesized antibiotics. It is destructive for the pathogen affecting a plant. In the human body, it also exhibits a high biological activity. It is an antioxidant and prevents the formation of free radicals and peroxides. It is anti-cancerous. It exhibits anti-inflammatory properties. Prevents degenerative changes of epithelial and connective tissue of blood vessels. It is one of the active ingredients in the RADIOPROTECT cream. It inhibits a division of cancer cells and metastasis of tumors. Acts anti-mutagenic, "sweeping" free radicals and peroxides and has an additional anticancer effect (prophylactics).

The extract of Japanese knotweed destroys: *Propionibacterium acnes*, *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Candida albicans*, *Cryptococcus*, *Leptospira*, *Moraxella*. It inhibits the emission of sebum, stimulates and prolongs the life of cells, accelerates tissue regeneration, wound healing. Has strong astringent, anti-inflammatory, antipyretic, anti-edema, anti-exudative, antibacterial, antifungal, antiviral, antiprotozoal, antiacaro, accelerates the healing of wounds on mucous membranes and skin, alleviates pain, accelerates treatment of ulcers, and strongly inhibits autoimmune reactions.

For several years the only patented, Polish cream - RADIOPROTECT is recommended and used successfully by radiotherapists in patients during radiotherapy. The cream soothes and calms skin irritation caused by ionizing radiation. It reduces the sensation of heat and burning, it soothes redness. It effectively nourishes, hydrates and moisturizes the skin which becomes elastic, supple and smooth. Supports skin's barrier functions.

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RadioProtect Cream

Specialist soothing cream for skin irritated after UV exposure and ionizing, sunburned and after solarium. Also recommended for skin care for patients receiving chemotherapy.

Resveratrol contained in the cream and natural bioflavonoids, neutralizes free radicals and can support skin's barrier function.

The cream is soothing, calming, reduces the sensation of heat and burning. It effectively nurtures and nourishes the skin that regains its natural comfort, remains smooth and elastic.

The cream was dermatologically tested, there was no irritation or allergy. European certificate CPNP1518963.

Ingredients: Aqua, Olea Europea Oil, Myristyl Myristate, Maleated Soybean Oil, Glycerin, Cetearyl Olivat, Sorbitan Olivat, Panthenol, Polygonum cuspidatum extract, Silybum marianum fruit extract, Squalene, Carbomer, Sodium Hydroxymethylglycinate, Parfum Menthol.

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