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Short Communication

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Dermocosmetic Treatment in Radiation Therapy in Oncology Patients

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Abstract

Summary

Briefly we summarize the main adverse effects of radiation therapy in oncology patients. The ratio for radiation dermatitis and Epidermal Growth Factor Inhibitors (EGFRIs) side effects, if EGFRIs treatment is received in the same period as radiation than the case the radiation is received alone is discussed. Preventive topical techniques and palliative treatment with dermocosmetics are presented.

Keywords: Radiation therapy, Dermocosmetics.

Introduction

Based to our previous experience on cancer therapy, we tried through PubMed and Scopus databases to present briefly the skin adverse effects of radiation therapy in order to summarize the methods of their dermocosmetic and pharmaceutical management [1-3]. Radiation therapy intends to kill cancer cells by inducing damage to their DNA either directly or indirectly by creating free radicals in the cells that can in turn damage its entirety. Radiation therapy is sometimes given with curative intent and may be used singularly or with a combination of surgery, chemical and drug therapy or both. It may also be used with palliative intent. The appearance of radiation dermatitis due to direct injuries of epidermal basal cells and their connective tissue alteration is common but not unavoidable. Moreover, up to 95 % of cancer patients who undergo radiation therapy will suffer from some forms of radiodermatitis [4].

Radiodermatitis ranges from erythema and dry or wet desquamation to skin necrosis or bleeding ulceration [5]. The dose of radiation and its distribution have to be modified in case of severe symptoms. Radiation dermatitis is classified to four grades according to National Cancer Institute – Common Terminology Criteria for Adverse Events v4 .0. : Grade 1: There is a faint erythema or dry skin desquamation. Grade 2: Means there is moderate risk erythema with patchy and moist desquamation, including moderate edema. Grade 3: There is moist desquamation apart from skin folds and crease, there is also bleeding that may be induced by minor traumas or physical abrasions. Grade 4: Skin necrosis or ulceration of full thickness of dermis. Sudden bleeding from involved site may also be seen.

Preventive topical techniques include topical avoidance of creams, moisturizers and emulsions just before radiation treatment since they can cause bolus effect which will then artificially increase the dose of radiation to the epidermis [6]. Grade specific management approaches are: Gentle washing with mild soap, drying gels with antiseptics, hydrophilic dressings after radiotherapy, zinc oxide if it is possible to remove it totally before the next session. Maybe hyaluronic acid cream or anti-inflammatory emulsion could be useful although some researchers are opposite to the application of such medications [5]. Generally, there is a discrepancy in bibliography regarding the use of hyaluronic acid. No benefit was observed for the treatment of radiation dermatitis ≥ grade 2 regarding adjuvant breast cancer radiotherapy [7], whereas, Elmashad, et al. found favorable impact of hyaluronic acid on radio-dermatitis [8].

Prophylactic use 1% hydrocortisone was profitable in breast cancer radiation. Recently it has been reported that the use of 1 % hydrocortisone cream delayed the onset of dermatitis by radiation in a random double-blind research in breast cancer patients who were undergoing radiotherapy [9]. Although the reason in treating radiodermatitis with topical anti-oxidants is strong, the clinical studies have not been so promising. Even in large scale randomized controlled trials, results have been hindered by the inconsistent use of placebos and topical vehicles of transmission [10]. The results of a trial performed by Cui, et al. shows that an olive oil based preparation could be a safe and effective in radiodermatitis prophylactic treatment. Lanolin creams, cornstarch or baby powders (talc) should be avoided [11].

In case of infection topical antibiotics, except doxycycline, are suggested. Strong attention is needed for signs of sepsis and/or fever.

The ratio for radiation dermatitis and Epidermal Growth Factor Inhibitors (EGFRIs) side effects is higher, if EGFRIs treatment is received in the same period as radiation than the case the radiation is received alone.

Epidermal Growth Factor Receptor Inhibitors (EGFRIs) have been used in the treatment of tumors in many organs i.e. lung, colon, breast and bladder with significant levels of EGFR/ErbB2 [12].

EGFRIs are correlated with a lower case of systemic adverse effects, in comparison to cytotoxic chemotherapeutic agents that can cause vomiting and nausea, neuropathy and even more dangerous myelosuppression. However skin adverse effects are observed because the epidermal growth factor is usually expressed in the sebaceous glands of the epidermis and hair follicles where it is important for the healthy skin functions i.e. control of differentiation and protection against UV damage, inhibition of the worsening of wound healing. The inhibition of EGFR probably is the cause of occlusion of follicles and its rupture because of the differentiation in the premature epithelial part and the expression of the gene's stimulation of the inflammation. Additionally, the changes in the barrier permeability may affect the alteration of the microflora and the promotion of bacterial growth, further burdening cutaneous injury and the creation of skin rash [13].

These agents show synergistic cytotoxicity as well as therapeutic response. Radiation increases the level of EGFRs in the normal skin; hence the presence of EGFRIs rash accelerates [14]. These skin adverse effects may also lead to the interruption of treatment. Late actions of EGFRIs and ionized radiation differ from those of the early phases. With prolong irradiation there is absence of EGFRIs skin toxicity in the pre-irradiated area. Radiation depletes the basal-layer stem cells through apoptosis and there are not EGFRs available on the skin anymore. Furthermore, late chronic radiation causes by TGF-β mediated fibrosis deprivation of hair follicles and sebaceous glands [15].

Preventive and curative care strategies in the case of radiotherapy could be adapted in the aim to delay erythema, limit complications related to radiodermatitis and improve patients' comfort. In conclusion, the combination of dermatopharmacology and cosmetic science can be very useful for the management of skin adverse effects and their psychosocial impact on oncology patients. A strong relationship between health care professionals as oncologists, radiotherapists, dermatologists, cosmetologists, aestheticians and nurses is necessary in order to inform the patients about the appropriate guidelines. A multidisciplinary approach is necessary in order to provide a tailored supportive clinical care.

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