doi:10.36849/JDD.M6229

ORIGINAL ARTICLE

US Cutaneous Oncodermatology Management (USCOM): A Practical Algorithm

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ABSTRACT

Background: An increasing number of patients survive or are living with cancer. Anticancer treatments frequently have cutaneous adverse events (cAEs) that may severely impact patients' quality of life and interrupt anticancer treatment. The US Cutaneous Oncodermatology Management (USCOM) project aims to improve cancer patients' and survivors' quality of life by offering tools for preventing and managing cAEs.

Methods: An algorithm was designed to reduce the incidence of cAEs, treat cAEs, and maintain healthy skin using general measures and over-the-counter agents to support all healthcare providers treating oncology patients, including physicians, nurses, pharmacists, and advanced providers. The panel used a modified Delphi approach, developed, discussed, and reached a consensus on statements and an evidence-based algorithm.

Results: The USCOM algorithm includes education on cAEs for patients and clinicians supporting prevention, treatment, and maintenance using skincare measures before, during, and after cancer treatment. A skincare regimen including hygiene, moisturization, and sun protection products should be safe and effective in helping to minimize cAEs and improving skin conditions such as erythema, xerosis, pruritus, and photosensitivity. The number and quality of studies evaluating skincare formulations and regimens for cAEs are increasing, but the evidence on the benefits of specific formulations is still scarce.

Conclusions: The algorithm focuses on general measures and skincare to prevent or reduce the severity of cAEs. Increased awareness of cAEs by the multidisciplinary team treating and guiding the cancer patient throughout their care may improve patient outcomes.

J Drugs Dermatol. 2021;20:9(Suppl):s3-19.

BACKGROUND

According to the National Program of Cancer Registries and the North American Association of Central Cancer Registries in the United States (US) in 2019, the estimated number of new cancer cases was 1,762,450.[1] In 2019, the five most commonly diagnosed cancer types in the US for men were prostate cancer, lung and bronchus cancer, colorectum cancer, and urinary bladder cancer. For women, excluding basal and squamous cell skin cancers, common types were breast cancer, colorectal cancer, lung cancer, uterine cancer, and melanoma.[1-4] Increasingly, patients are diagnosed early, and the quality of cancer treatment has improved. Therefore, now more than ever, Americans are living with or surviving cancer.[1-4] As a result, increasing numbers of patients are living with cutaneous toxicities or sequelae of cancer or cancer treatments.[5]

When targeting cancer, various options are available depending on the type, the stage of the disease, and patient-related factors. Treatments may include surgery, radiation, transplantation, chemotherapy, targeted therapy, immunotherapy, hormonal therapy, or combinations of these.[5] Cutaneous adverse events (cAEs) from anticancer treatments occur frequently and are reported as one of the most impactful side effects of cancer treatment.[6,7] These cAEs are often visible and, as a consequence, alter the patients' self-image, leaving their disease exposed.[6,7] Additionally, cAEs related to cancer

treatment do not get medical attention needed to prevent their occurrence or provide early and effective treatment.[8,9] As a result, cutaneous toxicities may be disabling or disfiguring, cause pruritus or pain, alter tactile exchange, impede interpersonal relationships, severely affect the quality of life,[6,7] and may lead to reduction or discontinuation of anticancer treatment, affecting clinical outcomes.[8-12]

A preemptive skincare regimen has been shown to improve patients' quality of life and skin conditions.[7,8] In a study of 95 patients receiving panitumumab-containing therapy, 48 received pre-emptive skincare and 47 received reactive. The incidence of severe skin toxicities in the pre-emptive skincare group had reduced by 50% compared to the reactive skincare group.[7] Moreover, dermatology consultation has led to a reduced interruption of oncology treatment.[9]

A multidisciplinary oncology treatment team should educate on prevention, treatment, and maintenance using OTC skincare as part of their cancer patients' comprehensive care before cancer treatment starts.[12] An algorithm was designed to reduce the incidence of cAEs, treat cAEs, and maintain healthy skin using general measures and OTC agents to support all healthcare providers treating oncology patients, including physicians, nurses, pharmacists, and advanced providers. The clinical algorithm would be feasible to implement by non-dermatologists. It aims to support clinicians working with oncology patients throughout the entire continuum of care to achieve optimal outcomes, improving patients' quality of life.

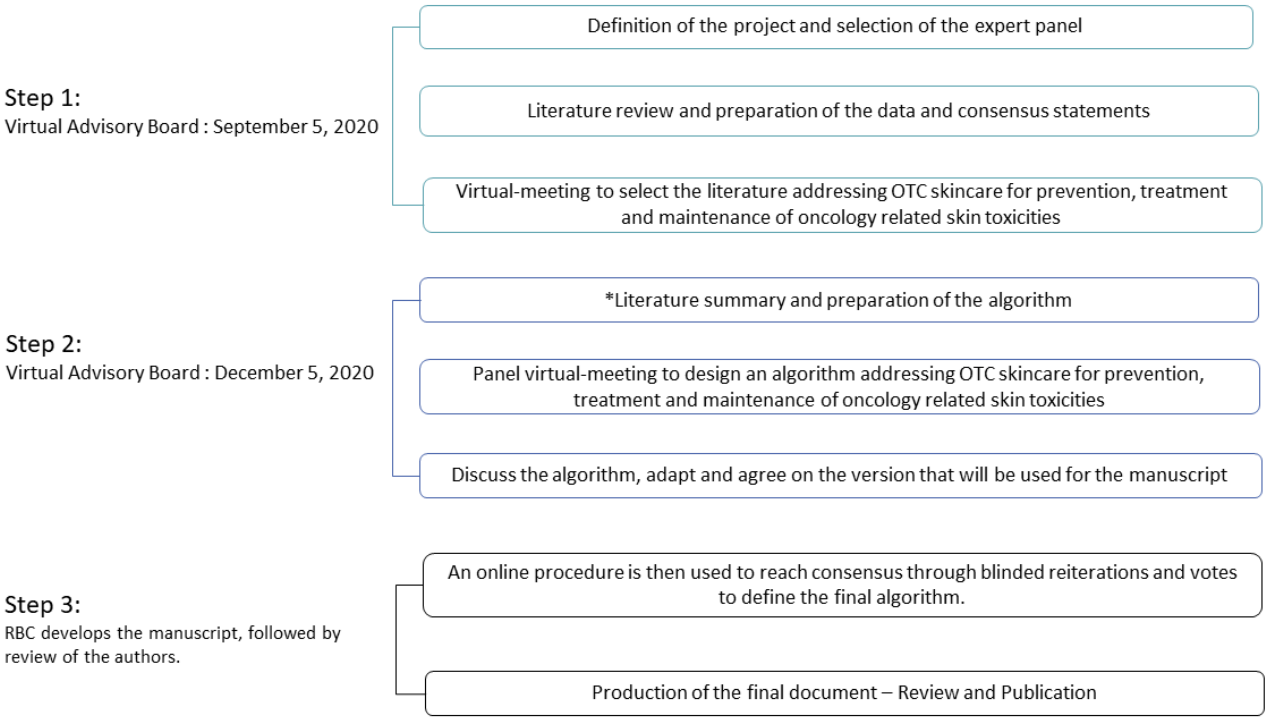
SCOPE

The US Cutaneous Oncodermatology Management (USCOM) project initiated by La-Roche Posay aims to improve cancer patients' and survivors' quality of life by offering tools for preventing and managing cAEs. The USCOM panel of clinicians who treat cAEs developed, discussed, and reached a consensus on statements and an evidence-based algorithm. The algorithm focuses on prevention measures and skincare for cAEs using a skincare regimen, including hygiene, moisturization, sun protection, and camouflage products. The algorithm aims to improve patient outcomes and seeks to determine the best approach for oncology skin care programs for all stakeholders in the US health care setting. These include medical oncologists, radiation oncologists, family practice/internal medicine physicians, dermatologists, oncology nurses, advanced practice providers (APPs), nurse practitioners (NPs), physician assistants (PAs), and pharmacists.

METHODS

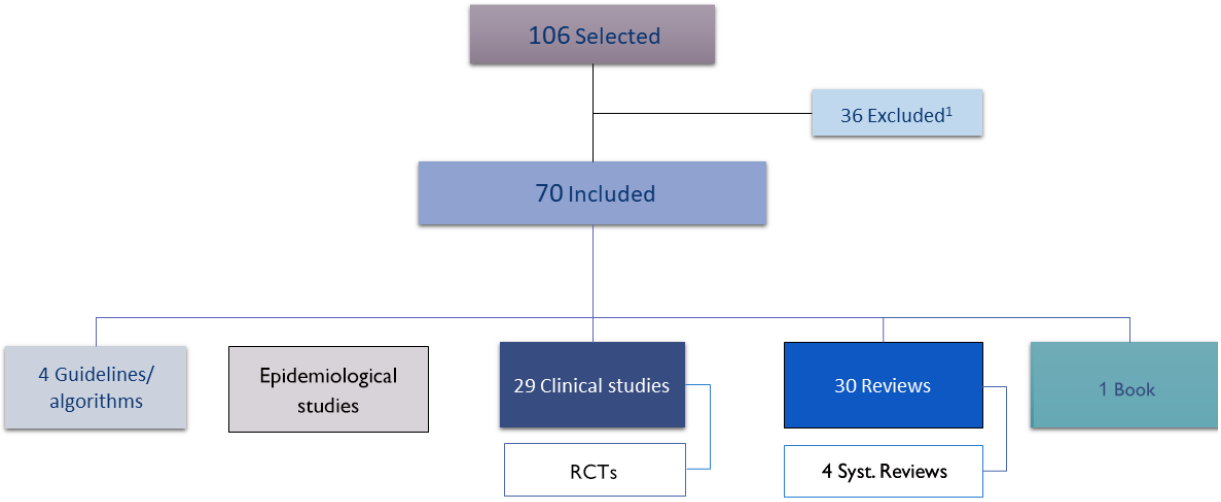
For the statements and the USCOM algorithm's development, the panel used a modified Delphi approach following the AGREE II instrument.[13,14] The modified Delphi method is a communication technique for interactive decision-making for medical projects.[14] The method was adapted from face-to-face meetings to a virtual meeting to discuss the outcome of

FIGURE 1. The process.



*The selected literature has to be clinically relevant to the algorithm on OTC skincare

FIGURE 2. Literature search results.



1. Excluded were: Duplications; In case of an update on a review article, the latest version was used; Poor quality.
2. RCT= randomized controlled trial, Systematic (Syst.)

literature searches and reach a consensus on the statements and algorithm based on the selected literature. The virtual discussion was followed by virtual follow-up, replacing the use of a questionnaire.[14] The process entailed preparing the project, selecting the panel, and conducting systematic literature searches followed by three steps (Figure 1).

Step 1: Virtual panel meeting on September 5, 2020 to review the results of the systematic literature review addressing OTC skincare for prevention, treatment, and maintenance of cAEs and to discuss and adopt statements using evidence coupled with the panels' experience and opinion.

Step 2: Virtual panel meeting on December 5, 2020 to develop, review, and reach consensus on the algorithm.

Step 3: Online process to fine-tune the statements and the algorithm and to prepare and review the publication.

Literature Review

The literature review included guidelines, consensus papers, and publications on the management of cAEs, and clinical and other research studies published in the English language from January 2010 to August 2020. Excluded were articles with no original data (unless a review article was deemed relevant), not dealing with skincare for prevention and treatment of oncology-related cAEs, and publication language other than English.

A dermatologist and a physician-scientist conducted the searches on August 25 and 26, 2020 on PubMed and Google Scholar as a secondary source of the English-language literature using the terms:

Skincare regimens prevent and treat cutaneous toxicities associated with radiation treatment, chemotherapy, targeted therapy, immunotherapy, hormonal treatment, prevention, management, maintenance of cutaneous toxicities, and health-related quality of life. Adjunctive skincare, OTC skincare, staff and patient education, communication strategies, adherence, concordance, efficacy, safety, tolerability, and skin irritation.

The results of the searches were evaluated independently by two reviewers who resolved discrepancies by discussion. The searches yielded one hundred and six publications. After excluding duplicates (n = 36) and articles deemed not relevant for the statements and algorithm (other subjects, low quality, a small number, case studies), 70 papers remained. Thirty were review articles including four systematic reviews, four guidelines/algorithms, five epidemiology studies, one book, one definitions article, and twenty-nine clinical studies (Figure 2).

The literature search results were evaluated independently by two reviewers who graded the clinical publications for study type and quality (randomized controlled trial [RCT] of high quality = A, B, or C) and assigned a level of evidence (level 1 to level 4) using the pre-established criteria (Table 1).[15]

Twenty clinical publications addressed cAEs impacting the quality of life, dermatologic consultation, or skincare, providing important information to support the statements and the USCOM practical algorithm on prevention, treatment, and maintenance using OTC skincare. Most were graded C-3 (n = 13); there were four C-2, and three articles graded B-2 (Table 2).

Consensus Statements

The reviewers drafted statements based on the selected

FIGURE 3. Algorithm for cancer-treatment related cAEs. For grading and risk, see details given in Table 4.

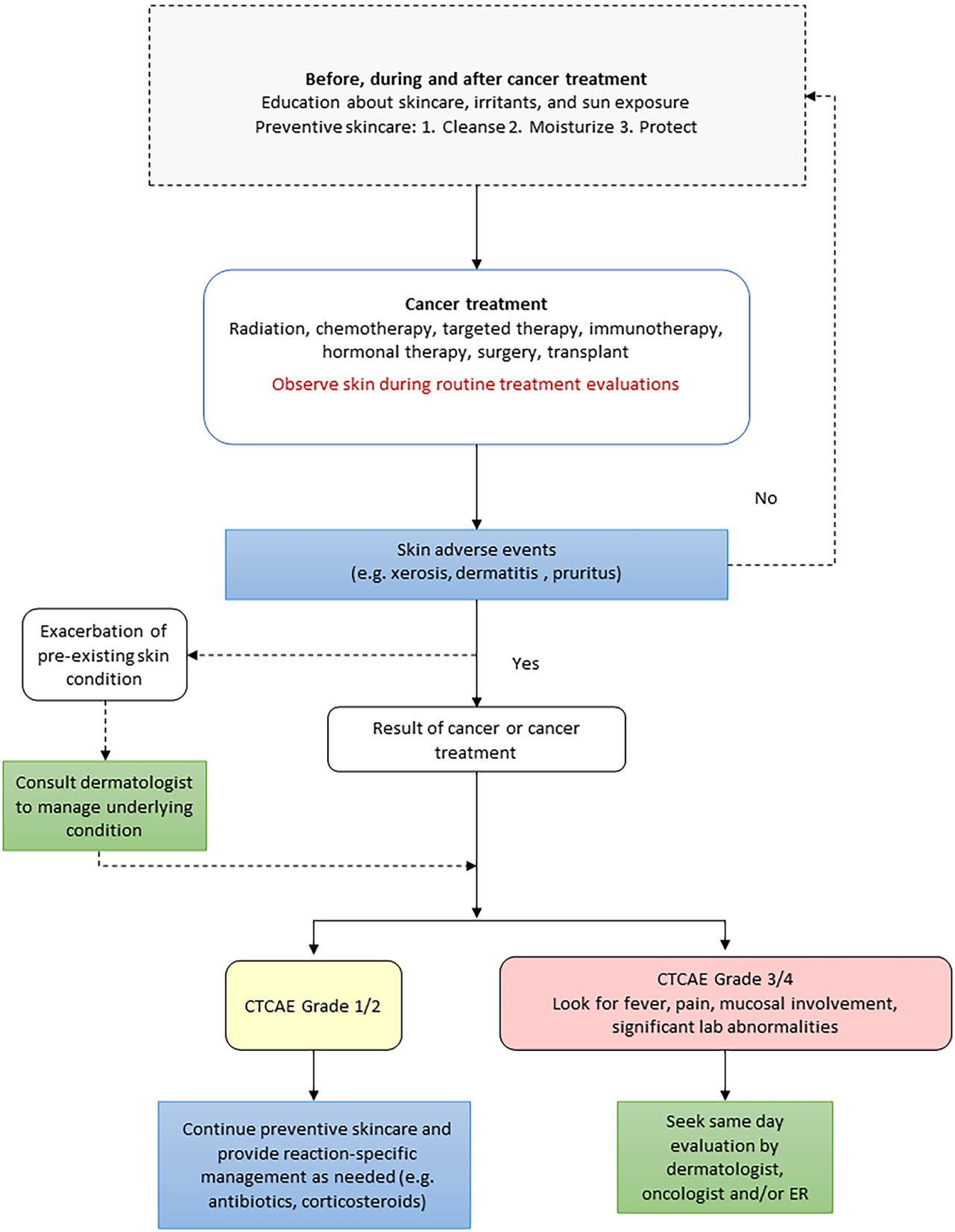


TABLE 1.

Grading and Rating of the Evidence[13]

Grade	Details	Rating	Details
A	RCT, high-quality double-blind trial (eg, sample-size calculation, flow chart of patient inclusion, intention-to-treat analysis, sufficient sample size)	1	Further research is unlikely to change confidence in the estimate of effect (ie, at least two grade A trials are available, and their results are mostly consistent with results of additional grade B or grade C studies)
B	RCT of lesser quality (eg, only single-blind; limited sample size, but with at least 15 patients per study arm)	2	Further research is likely to have a significant effect on confidence in the estimate of effect and may change the estimate (ie, at least three grade B trials are available, and their results are mostly consistent with any additional grade C trials)
C	Comparative trial with severe methodologic limitations (eg, not blinded, very small sample size, no randomization)	3	Further research is very likely to have an important effect on confidence in the estimate of effect and is likely to change the estimate (ie, conflicting evidence or limited number of trials, mostly grade B or grade C)
		4	Any estimate of effect is very uncertain (ie, little or no systematic experimental evidence; trials extremely limited in number and/or quality)

Randomized controlled trial (RCT)

TABLE 2.

Clinical Study Type and Level of Evidence

Clinical Study Type	Level of Evidence	Reference
Cross-sectional study on the impact of skin problems on QoL in patients with cancer treatment	C-3	Lee et al, 2018[6]
Open-label randomized trial on evaluating the impact of a pre-emptive skin treatment regimen on skin toxicities and QoL in patients with metastatic colorectal cancer	B-2	Lacouture ME et al, 2010[7]
Cross-sectional survey on the influence of oncodermatology interventions on patient QoL	C-3	Aizman L et al, 2020[8]
Retrospective cohort on dermatology consultation reducing interruption of oncologic management among hospitalized patients with cAEs	C-3	Chen ST et al, 2020[9]
Retrospective study on outpatient dermatology consultations impact on oncology patients with acute cAEs	C-3	Barrios DM et al, 2020[10]
Retrospective cohort study on cancer treatment interruption and diagnostic concordance between referring clinicians and dermatologists	C-3	Barrios DM et al, 2017[11]
Clinical evaluation of a comprehensive skin toxicity program for patients treated with EGFRi	C-3	Yu Z et al, 2020[17]
Qualitative analysis of acute skin toxicity among breast cancer radiotherapy patients	C-3	Schnur JB et al, 2011[19]
A clinicoepidemiological study of cAEs of chemotherapy in cancer patients	C-2	Biswal SG et al, 2018[23]
A phase II study on pre-emptive skin toxicity treatment for EGFRi evaluating efficacy of skin moisturizers and lymecycline.	C-3	Grande R et al, 2013[26]
Clinical study on targeted therapy-induced facial skin cAEs and the impact on QoL in cancer patients	C-2	Yagasaki K et al, 2018[39]
Assessment of QoL and treatment outcomes of patients with persistent postchemo-therapy alopecia	C-2	Freites-Martinez A et al, 2019[40]
Cohort on early use of steroids affects immune cells and impairs immunotherapy efficacy	C-3	Della Corte CM et al, 2019[42]
Clinical evaluation of supportive and barrier protective skin care products in the daily prevention and treatment of cutaneous toxicity during radiotherapy for breast cancer	C-2	Berger A et al, 2018[46]
Randomized cross-over study on the advantage of a proactive, barrier-protective, supportive skin care in patients with breast cancer on chemotherapy	B-2	Wohlrab J et al, 2011[47]
Evaluation of supportive and barrier-protective skin care products in the daily prevention and treatment of cutaneous toxicity during systemic chemotherapy	C-3	Lüftner D et al, 2018[48]
Outcomes study on embedding dermatologic care within oncology practices	C-3	Sauder MB et al, 2021[50]
Clinical study assessing the validity of clinician advice that patients avoid the use of topical agents before daily radiotherapy treatments	C-2	Baumann BC et al, 2018[54]
Quantitative study on unanticipated toxicities from anticancer therapies: survivors' perspectives	C-3	Cole C et al, 2015[58]
Retrospective survey on the benefits of a multidisciplinary toxicity team for cancer immunotherapy-related cAEs	C-3	Zurfley F et al, 2017[61]

Quality of life (QoL), Cutaneous adverse events (cAEs), EGFR inhibitors (EGFRi)

literature before the meeting. During the virtual meeting, the panel selected and fine-tuned six consensus statements from the draft list of twenty and further added three statements and revised them online after the meeting. Through blinded reiterations and votes, the USCOM panel defined the final statements. The panels' consensus, established as an 80% agreement, was obtained.

Development of the Algorithm

A concept algorithm based on the literature selected before the virtual conference was discussed and adopted using clinical evidence coupled with the panel's expert opinion and experience. An online procedure was then used to reach consensus through blinded reiterations and votes to define the final algorithm.

A clinical algorithm's function is to standardize and support medical decision-making, such as regulating the selection and use of treatment regimens.[13] The best algorithms have inputs and outputs, precisely defined specific steps, and uniquely defined results that depend on the preceding steps used to solve a problem.[16] For the development of the USCOM algorithm, the mnemonic RECUR (Reliable, Efficient, Clear instructions, Understandable, Remember easily) was used.[16]

The current algorithm focuses on preventing and managing cAEs that can benefit from skincare measures and has the following sections: Measures before, during, and after cancer treatment. Assessment includes evaluating the type and severity of the cAEs and describes the action to be taken (Figure 3).

Cancer-Treatment-Related cAEs

Statement 1: *Dermatologic toxicities associated with cancer treatment are common.*

Over the past decade, 5-year cancer survival rates have improved, especially for prostate and breast cancer.[1] Earlier cancer diagnosis, more effective treatments, and enhanced prevention measures, such as anti-smoking measures, have contributed to more cancer patients surviving and living with cancer.[1] Many of these patients suffer from disabling cAEs, which are frequently inadequately managed without the appropriate use of personal hygiene products and skincare.[12,18]

The current review and algorithm focus on a skincare regimen that prevents or reduces the severity of cAEs, treatment, and maintenance. For that reason, it gives only a summary of the cancer treatments and cAEs.

Depending on the type of cancer and cancer treatment, various cAEs may occur.[5] Radiation therapy causes non-specific DNA damage that is limited to the area that received radiation. The damage is dependent on the target volume, dose, and radiation schedule and may affect one to four patients.[20] Acute radiation dermatitis (ARD) may occur during radiation treatment, and subacute radiation dermatitis can persist months after treatment.[19-22]

Mild ARD presents with dry desquamation, mild erythema, and pruritus. Moderate ARD presents with moderate erythema, patchy moist desquamation in skin folds and creases, bleeding induced by minor trauma, and pruritus. Severe conditions show moist desquamation, spontaneous bleeding, severe pain, and even ulceration.[19-22]

Chronic radiation dermatitis ranges from persistent mild to severe pigmentary alteration, atrophy, necrosis, and telangiectasia.[21]

Chemotherapy aims to disrupt the cell cycle's specific phases in actively dividing cancer cells, causing significant effects while on treatment.[23] The cAEs can be non-specific or agent-specific, and sequelae of therapy/metabolites can occur on uninvolved organs.[23] Chemotherapy can be associated with reversible or permanent alopecia, hand and foot syndrome (HFS), nail changes (onycholysis, pigmentary alteration, brittle nails), and phototoxicity.[23] HFS presents with erythema and tenderness, with or without blisters with a surrounded rim of erythema. Painful and thickened lesions can occur and are more pronounced in areas with increased pressure and friction.

Targeted therapies inhibit specific molecules involving tumor pathogenesis.[24-27] Targeted therapy-related cAEs include papulopustular reactions, reversible alopecia hyperkeratosis (keratosis-pilaris like changes, keratoderma), nail changes (onycholysis, pigmentary alteration, brittle nails), paronychia (± pyogenic granulomas), phototoxicity, trichomegaly, and hirsutism.[18,24-28]

Immunotherapy aims to activate the host immune mechanisms by blocking immune-suppressing pathways. cAEs may occur at any time during and after treatment. These cAEs include pruritus, xerosis, lichenoid reactions, psoriasiform reactions, eczematoid eruptions, vitiligo, bullous diseases, etc.[27-36]

Hormonal therapy, for instance, treating breast and prostate cancer, may cause flushing, xerosis, vulvovaginal dryness, atrophy, alopecia, or pigmentary alterations.[37,38]
The panel developed an overview of the treatments and related cAEs, including a glossary to help identify frequently occurring cAEs relevant to the current algorithm.

Impact of Cutaneous Toxicities on the Patients' Quality of Life

Statement 2: *Acute and chronic skin reactions can significantly*

impact the quality of life and disrupt cancer treatment.

Many studies are available on cAEs; however, more robust studies are needed on prevention, treatment, and maintenance using skincare.[5-12,17-20,22,25,29,39] cAEs negatively affect functional and emotional domains relating to QoL in cancer patients. Moreover, multiple negative experiences due to cAEs may increase psychological distress and avoidance of personal relationships, leading to social isolation.[6-8,39]

Patients reported that cAEs significantly limit their daily activities and are an essential contributor to a reduced QoL.[6-8,39] Women noted alopecia as the most traumatic adverse event of various systemic cancer treatments.[18,23,24,40]

Although clinicians acknowledged the importance of achieving a sufficient balance between cancer-treatment efficacy and cAEs to maintain an optimal QoL in cancer survivors, the research available on the prevention and treatment using an effective skincare regimen for these cAEs is limited.[6-12, 39]

Cutaneous AEs Impact Cancer Treatment

Statement 3: *Disabling skin reactions is a significant problem for many patients and their treating physicians.*

Cytotoxic and targeted cancer treatments that impede cancer cells' proliferation also affect rapidly proliferating organ systems. The most commonly documented cAEs include papulopustular rash, xerosis, pruritus, nail changes, chemotherapy-induced alopecia, and hand-foot syndrome/skin reaction.[8] The probability of cancer patients to develop cAEs with cytotoxic and targeted cancer treatments significantly impact wellness and treatment adherence.[5-12,18,28-40] Persistent cAEs may be disabling, and over 50% of cancer patients treated with selected agents may experience an interruption in therapy secondary to these toxicities.[10,11] It is important to have a dermatologist on the multidisciplinary oncology team to enable accurate diagnosis and treatment of the cAEs, allowing the continuation of cancer treatment that historically would have been discontinued.[8,39,41]

When reviewing inpatient records from 2011–2018, Chen et al (2019) selected 33 cases with confirmed cAEs due to immunotherapy with similar severity grading.[9] Systemic steroids used to manage these cAEs decreased the cancer-treatment effect of immunotherapy https://pubmed.ncbi.nlm.nih.gov/31856311/.[42] Involving a dermatologist in the treatment of cAEs, the retrospective study showed that patients were less likely to receive systemic steroids (18% vs 55%) and less likely to have cancer treatment disrupted or discontinued (0 vs 36%).[9] Another study by Barrios et al (2017) demonstrated that 50% of patients who received cytostatic and targeted therapy experienced an interruption in treatment due to cAEs.[11]

Skincare Benefits for cAEs

Statement 4: *When acute cutaneous reactions develop, effective skincare should be reinforced to reduce further complications and assist in managing toxicities.*

Currently, cutaneous toxicity programs are being established, aiming to promote dermatologic health in cancer patients.[39] A multidisciplinary team, including dermatologists, can improve oncology patients' care.[8-10,12] Attention for prevention and early and correct diagnosis ruling out life-threatening cAEs can improve adherence to cancer treatment and, therefore, outcomes.[8-10,12]

A multidisciplinary panel of clinicians treating oncology patients recommended that, ideally, dermatologic services should be readily available for patients undergoing cancer treatments.[12] The service should include urgent access to a dermatologist to identify and assist in managing life-threatening cAEs.[12] Moreover, when acute cAEs develop, an effective skincare regimen should be put in place immediately to prevent further deterioration of the condition and improve patient comfort and quality of life.[12,39,44,45] Although studies have demonstrated that dermatological care resulted in improved patient-reported QoL and cancer treatment outcomes, the influence of skincare on cancer treatment adherence is yet to be elucidated.[8]

Statement 5: *Supportive care and appropriate skincare continue to be mainstays of prevention and treatment for acute and chronic dermatologic toxicities.*

The number and quality of studies evaluating skincare formulations and regimens for various cancer-treatment-related cAEs increase, but the evidence on the benefits of specific formulations is still scarce. Currently, most available studies include patients with ARD. Rosenthal et al (2019) reviewed the efficacy of topical agents for ARD and found formulations containing aloe vera, chamomile, ascorbic acid, pantothenic acid, dexpanthenol, and trolamine to lack benefits.[22] They further showed that formulations containing hyaluronic acid, epidermal growth factor, granulocyte-macrophage colony-stimulating factor, and topical corticosteroids have potential benefits.[22] The review did not consider those topical agents that have ingredients known as soothing to be beneficial, such as niacinamide, panthenol, squalene, glycerin, shea butter, and allantoin.[47]

Lüftner et al (2018) conducted a multicenter prospective observational open-label study to evaluate the use of a 12-product kit for fifty patients receiving chemotherapy who received skincare kits before starting their cancer treatment with instructions to use the skincare throughout the treatment phase.[48] The study indicated skincare benefits, helping to

BOX 1.

Information and Patient Education
• Establish proactive contact with the patient from the start of the treatment. • Allow patients to verbalize their symptoms. • Encourage frequent communication, develop a rapport and trust, and ensure open communication between the patient and the team. • Have a detailed discussion with the patient, treating physician and nurse, or other team members explaining the treatment protocol, cAEs, hospital visits, diagnostic tests, management of cAEs, prophylactic, and preventative measures. • Provide detailed patient education on the skin changes that may occur before starting the cancer treatment. • Give patients contact information and explain who to contact, when, and why. • Explain to the patients that they should always report their skin changes, regardless of severity. • Reinforce that prevention and early treatment of cAEs lead to better cancer-treatment outcomes and quality of life. • Explain the condition and rationale for applying cleansers, moisturizers, and sunscreen to prevent, treat, and maintain cAEs. Demonstrate the application process. • Provide instruction sheets or digital information and websites for later home reference and education.

minimize cAEs and improving the skin condition such as edema, erythema, dryness, desquamation, pigmentation disorders, and cracks.[48]

Education on Prevention Measures

Statement 6: *Early education and skincare use may have benefits for quality of life and prevention of severe skin sequelae for cancer patients and survivors.*

The USCOM panel agrees that early education of patients on their cancer treatment-related cAEs and prevention measures using skincare is an important step in building a therapeutic relationship with the patient enabling their active participation in the cancer treatment plan.[8,12,20] Before starting the cancer treatment, a detailed discussion between the patient, treating physician and nurse, or other multidisciplinary oncology team members should address the treatment protocol, potential side effects, hospital visits, diagnostic tests, and management of cAEs, and preventative measures (Box 1: Information and education).[12] The discussion should be supported by written or digital material to allow the patient to clarify and process the information (Box 2: Resources).[12] This session's outcome should be: 1) The patient expresses an understanding of the treatment and potential cAEs and how to access the relevant information. 2) The patient understands how and when to contact an oncology team member. 3) The patient has been educated on prevention measures and skincare suitable for their individual needs.

BOX 2.

Resources

Title	Type	Function	Reference
Glossary	Review	A brief overview of cAEs	Sauder M et al. *Skin Ther Letter* 2021;S(3):1-10.[50]
AAD Dermatology World. https://oncodermlabs.com/pages/health-guides	Information leaflet	A quick reference to the various cancer treatments, cAEs, and approaches.	Ruth C. *The Dermatology World*, December 2019
MSKCC Dermatologic Health	Website	Introduction to cAEs	https://www.mskcc.org/cancer-care/diagnosis-treatment/symptom-management/dermatologic-health-during-after-treatment
ASCO Cancer net	Website	Cancer physicians and oncology professionals provide information for cancer patients, their families and caregivers	https://www.cancer.net/coping-with-cancer/physical-emotional-and-social-effects-cancer/managing-physical-side-effects/skin-reactions-targeted-therapy-and-immunotherapy
Information about cancer and its treatment	--	--	https://www.cancer.gov/about-cancer/treatment/side-effects/skin-nail-changes

American Academy of Dermatology Association (AAD); American Society of Clinical Oncology (ASCO)

TABLE 3.

Cutaneous Adverse Events and the Use of Skincare			
	Grade 1 Mild: <10% surface without erythema or pruritus	Grade 2 Moderate: 10% to 30% with erythema, pruritus	Grade 3 Severe: >30% with erythema, pruritus, fissures and resik for secondary infection
Hygiene	Gentle cleanser daily use	Gentle cleanser daily use	Further research is likely to have a significant effect on confidence in the estimate of effect and may change the estimate (ie, at least three grade B trials are available, and their results are mostly consistent with any additional grade C trials)
Skin Care	Moisturizing cream or skin repairing balm once or twice/day	Moisturizing cream or skin repairing balm once or twice/day	Moisturizing cream or skin repairing balm once or twice/day
Hand and Foot Reactions	Wear thick, comfortable socks and shoes, or try gel insoles. Protect your hands and feet against injury. Do not put too much weight on your hands and feet, especially during the first 2 months of treatment. Use creams containing urea or salicylic acid. For areas at risk for infection use an antiseptic.		
Fissure Care	Gently remove excess callus. Skin repairing balm or a urea-based cream once or twice/day Advanced dressing (HCD, foam dressing, non-adherent contact layer, etc). For areas at risk for infection use an antiseptic. Ethyl-cyanoacrylate adhesives or adhesive tapes to close fissures and support the underlying tissue.		
Photo-Protection	Use protective clothing. Apply photo-protection anti UVA / anti UVB: minimum SPF 30 one application every 2 hours in case of sun exposure		

Grade 1: Mild, Grade 2: Moderate, minimal, local or noninvasive intervention indicated, Grade 3: Severe, medically significant but not immediately life-threatening, Grade 4: Life-threatening consequences urgent intervention indicated, Grade 5: Death related to AE. Note that not all cAEs have 5 grades.[49]
An Adverse Event (AE) is any unfavorable and unintended sign (including an abnormal laboratory finding), symptom, or disease temporally associated with the use of medical treatment or procedure that may or may not be considered related to the medical treatment or procedure. Activities of Daily Living (ADL) *Instrumental ADL refer to preparing meals, shopping for groceries or clothes, using the telephone, managing money, etc. **Self-care ADL refers to bathing, dressing, and undressing, feeding self, using the toilet, taking medications, and not bedridden.[49]

Sauder et al (2020) emphasized the need for evolving, ongoing, and frequent communication with the patient throughout their cancer care while checking if they have processed and understood the information.[12] Providing patients understand the significance of prevention measures using skincare and early reporting of new and worsening cAEs, it may be easier to resolve the condition and prevent disruption or discontinuation of cancer treatment.[8,9-12]

The USCOM Algorithm

The USCOM algorithm uses the Common Terminology Criteria for Adverse Events (CTCAE) grading system v5 with five grades (1 = mild to 5 = lethal) (Table 3).[49] For cAEs, the five grades do not apply to all cAEs. The USCOM algorithm defined grade 3 (Severe, medically significant but not immediately life-threatening) and Grade 4 (Life-threatening consequences urgent intervention indicated) conditions to be followed up immediately. Further symptoms to investigate and follow up immediately are fever, pain, mucosal involvement, and significant laboratory abnormalities.

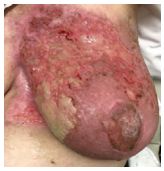
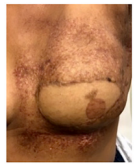
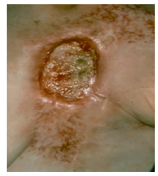
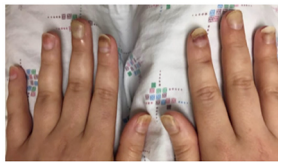
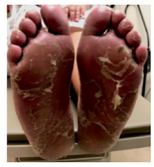
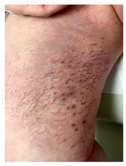
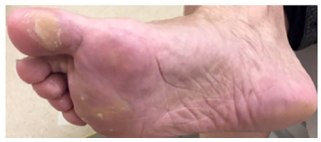
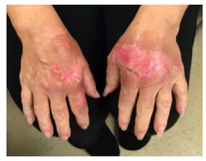
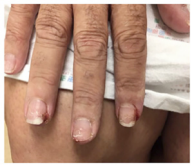
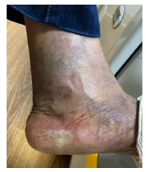
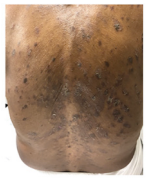
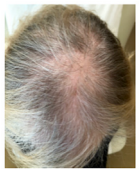
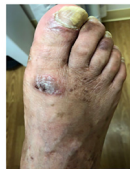
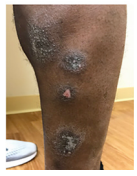
The algorithm focuses on the cAEs that can benefit from skincare use. Altered skin barrier functions related to cancer or cancer treatment that may benefit from skincare include xerosis, keratosis pilaris, fissures, pruritus, radiation dermatitis, hand and foot syndrome (HFS), and nail toxicities.[12] Papulopustular eruptions and rashes such as eczema, lichenoid reactions, and others resulting from innate immunity alterations may also benefit from skincare.[12]

Statement 7: *Education and proper skincare may help optimize skin health and quality of life in patients undergoing active cancer treatment and cancer survivors.*

Patients should be educated on preventive measures, recognizing cAEs, and contacting the oncology team.[12,50] Oncology patients may underreport their cAEs or not want to bother the oncology team for something they do not recognize as potentially serious or at risk of interrupting their cancer treatment.[12,50] Frequently, patients assume the cAE is due to an allergy, weather conditions, diet, or stress.[12] A glossary containing photographs and a checklist for identifying the cAE risk may support non-dermatologists to undertake effective action (Figure 4). Further, a checklist for identifying cAEs that are serious or even life-threatening may support early recognition and reporting. (Box 3: Checklist – assess the risk of the cutaneous AE).[12,49,50]

The USCOM panel recommends initiating general preventive measures for cAEs such as avoiding skin irritants, scented products, temperature extremes, and sun exposure. Further, they recommended patients use sun-protective clothing (eg, brim hats and sunglasses).[12,50] Recommendations include that patients always liberally and daily use a skincare regimen that

FIGURE 4. Cancer treatment-related cutaneous adverse events and glossary. *Photographs by kind permission of Dr. J. Leventhal and Dr. B. Mclellan*

Treatment	Cutaneous Adverse Events
Radiotherapy	RD may present as dry or moist desquamation, erythema, pruritus, bleeding atrophy, necrosis, and ulceration Fig 4-1:  Grade 4 RD with moist desquamation  RD of the right breast with erythema and dry desquamation  RD, ulceration, atrophy, pain, necrosis, and hyperpigmentation
Cytotoxic Chemotherapy with Various Types of Drugs	cAEs may present as alopecia (reversible and permanent), HFS/PPE, nail changes (onycholysis, pigmentary alteration, brittle nails), Phototoxicity, PATEO, Paronychia (± pyogenic granulomas), and urticaria  Onycholysis with sublingual hemorrhage from taxane/AC chemo in breast cancer patient  HFS capecitabine with aural erythema/ hyperkeratosis
Targeted Therapies	cAEs may present as papulopustular (acneiform) eruption, alopecia (reversible), pruritus, nail changes, paronychia (± pyogenic granulomas), phototoxicity, trichomegaly, hirsutism, keratoacanthoma, keratosis-pilaris like reaction, morbilliform eruption, and dermal hypersensitivity  Eczema craquele from cetuximab/ afatinib  HFS reaction from sorafenib  Phototoxic reaction from vemurafenib in patient with melanoma  Paronychia with pseudopyogenic granuloma from cetuximab/afatinib for head and neck cancer  HFS from TKI in a patient with CML
Immunotherapy	cAEs may present as non-specific maculopapular rash, pruritus, eczema/spongiosis, lichenoid reactions, psoriasis, pityriasis lichenoides-like reaction, exfoliative pyoderma gangrenosum, Grover's disease, vitiligo, bullous pemphigoid, dermatitis herpetiformis, prurigo nodularis, vasculitis, dermatomyositis, Sjögren's syndrome, Sarcoidosis, Sweet's Syndrome, acneiform rash/papulopustular rosacea, eruptive keratoacanthomas, actinic keratoses and squamous cell carcinoma, erythema nodosum-like panniculitis, radiosensitization, photosensitivity, urticaria, alopecia, alopecia areata, hair repigmentation, sclerodermoid reaction, nail changes, xerostomia  Lichenoid dermatitis from pembrolizumab for lung cancer
Hormonal Therapy	cAEs may present as alopecia (reversible); flushing; vulvovaginal dryness/atrophy  Anastrazole associated alopecia (endocrine TX)  Nummular eczema in a patient with prostate cancer receiving hormonal TX  Xerosis and nummular eczema in a patient with prostate cancer receiving hormonal TX

Adapted from Sauder et al (2020)[12] **Traditional chemotherapy** with various types of drugs depending on the type and stage of cancer and specific patient-related factors: Antimetabolites, Taxanes, Vinca alkaloids, Alkylating agents, Platinum-based agents, Topoisomerase inhibitors, Antibiotics, Anthracyclines. **Targeted therapy** with various types of drugs depending on the type and stage of cancer and specific patient-related factors: EGFR inhibitors/HER1 inhibitors, HER2 inhibitors, EGFR/HER2 inhibitors, Bruton's tyrosine kinase inhibitor (TKI), Multikinase inhibitors, MEK inhibitors, B-Raf inhibitors, mTOR inhibitors, VEGFR inhibitors, Hedgehog inhibitors. **Immunotherapy** with various types of drugs depending on the type and stage of cancer and specific patient-related factors: CTLA-4 inhibitors, PD-1 inhibitors, PD-L1 inhibitors. **Hormonal therapy** with various types of drugs depending on the type and stage of cancer and specific patient-related factors: Aromatase inhibitors, SERMs. Radiation dermatitis (RD), Hand-Foot Syndrome (HFS)/palmoplantar erythrodysesthesia (PPE), Periarticular Thenar Erythema and Onycholysis (PATEO), Chronic Myeloid Leukemia (CML) Epidermal growth factor receptor (EGFR), Human epidermal growth factor receptor (HER), Mitogen-activated protein kinase (MEK), B-Raf proto-oncogene, serine/threonine kinase (BRAF), Mammalian target of rapamycin (mTOR), Vascular endothelial growth factor receptor (VEGFR), Cytotoxic T-lymphocyte-associated protein 4 (CTLA-4), programmed cell death 1 (PD-1), Programmed death–ligand 1 (PD-L1), Selective estrogen receptor modulators (SERMs).

BOX 3.

Instructions For Skincare With Cleansers and Moisturizers

- Skincare formulations should be safe, effective, free of additives, fragrances, perfumes, or sensitizing agents.[12]
- Apply moisturizers to the face, hands, feet, neck, and back daily, liberally and frequently. [12]
- Choose a moisturizer vehicle based on skin condition, level of xerosis, and patient preference. [12]
- Cleansers and moisturizers should have a near-physiological skin pH (4.0–6.0).[50]
- Avoid the use of soap and cleansers with an alkaline pH (>7), which may excessively remove skin lipids, elevating skin surface pH, and compromise the skin barrier function further.[50]
- Moisturizer effectiveness depends on the formulation, the vehicle, frequency, and compliance of applications.
- Skincare product choices depend on the skin condition, availability, costs, and individual preferences.[12]

includes skin hygiene, moisturization, sun protection, and, if applicable, camouflage products (Table 4).[46-48,50]

Statement 8: *Skin cleansing, skin hydration, and photoprotection should be considered in cancer patients and survivors to prevent and manage cutaneous side effects before, during, and after cancer therapy.*

Skincare, including gentle cleansers, moisturizers that help restore skin barrier integrity and function, photoprotection using sun avoidance measures, and sunscreen, is to be used throughout the patient's cancer care. The skin care products used for patients undergoing cancer therapy should be safe, effective, free of additives, fragrances, perfumes, and sensitizing agents, and should have a near physiologic (skin surface) pH.[12,46-48,50]The skincare regimen should be tailored to the individual patient, cosmetically pleasant, and easy to use (Box 4: Skincare instructions).[12,46,50]

Various papers on prevention and treatment of cAEs using skincare for the specific cancer-treatments have demonstrated benefits.[8,12,18,20,22,25,26,29,43,45-48,50]

A study including 253 women with breast cancer undergoing radiation treatment evaluated the tolerability and benefit of a skincare regimen for preventing radiation dermatitis.[46] The study assessed the advantage of using thermal water containing OTC skincare regimen that included a cleanser, emollient, wound healing cream, and sunscreen in preventing radiation dermatitis. During the 6-week radiation treatment period, those who used skincare every day had fewer cAEs than those who applied less skincare. The evaluated skincare regimen is in line with recommendations to use skincare products to reduce cAEs and their impact on those receiving radiation treatment.[43-50]

Unsuitable skincare products are those with allergens and irritants such as common preservatives causing allergy, fragrances, and perfumes.[50] Soaps, surfactants, and detergents, especially those with an alkaline pH (>7), remove skin lipids, elevate skin surface pH, and lower the skin microbiome's diversity is explicitly damaging for cancer patients and those at risk for cancer treatment-related cAEs.[50,52,53]

Moisturizers form a barrier that retains water by preventing transepidermal water loss (TEWL).[46] However, some clinicians recommend avoiding the use of occlusive moisturizers and topical medications as they may cause maceration or trigger infection.[18,50]

Use AHA's with caution as they can change the pH and be irritants.[12,50]

Moisturizers containing lipids help restore the skin barrier function or maintain its integrity.[53] Skincare such as those containing panthenol provides good skin penetration when administered in an adequate vehicle, such as water-in-oil emulsions. The skincare helps improve stratum corneum hydration, reducing transepidermal water loss and maintaining skin softness and elasticity.[46]
Contrary to the advice many cancer patients receive when undergoing radiation treatment, skincare does not interfere with or increase the radiation dose to the skin and can be used in moderation before radiation treatments.[54] Even if applied shortly before radiation treatment, thin or moderately applied skincare will have minimal influence on skin radiation dose.[54] Frequently, patients are concerned about toxic effects on the skin.[54] Allowing patients to apply skincare throughout their radiation treatment period will simplify patient instructions and reduce patient confusion and anxiety.[54] Providing patients with clear instructions on how to apply skincare on a daily basis throughout radiation routinely is likely to improve patient quality of life and adherence to the prevention and management of cAEs using skincare.[12,50,54,55]

The use of antiperspirants for patients undergoing radiation treatment for breast cancer seems to be equally safe. A study showed no difference in surface radiation dose nor an increased toxic effect when using antiperspirants during radiation therapy.[56]

Challenges to implementing a skincare regimen include

TABLE 4.

Common Terminology Criteria for Cutaneous Adverse Events (CTCAE-v5)					
CTCAE Term	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**
Alopecia	Hair loss of <50% of normal for that individual that is not obvious from a distance but only on close inspection	Hair loss of >50% normal for that individual that is readily apparent to others	-	-	-
Bullous Dermatitis	Asymptomatic; blisters covering <10% BSA	Blisters covering 10–30% BSA; painful blisters; limiting instrumental AD	Blisters covering >30% BSA; limiting self care ADL	Blisters covering >30% BSA; associated with fluid or electrolyte abnormalities; ICU care or burn unit indicated	-
Dry Skin	Covering 30% BSA and associated with pruritus	Covering 10–30% BSA and associated with erythema or pruritus; limiting instrumental ADL	Covering >30% BSA and associated with pruritus; limiting self-care ADL	-	-
Eczema	Asymptomatic or mild symptoms; additional medical intervention over baseline not indicated	Moderate; topical or oral intervention indicated; additional medical intervention over baseline indicated	Severe or medically significant but not immediately lifethreatening; IV intervention indicated	-	-
Erythema Multiforme	Target lesions covering <10% BSA and not associated with skin tenderness	Target lesions covering 10–30% BSA and associated with skin tenderness	Target lesions covering >30% BSA and associated with oral or genital erosions	Target lesions covering >30% BSA; associated with fluid or electrolyte abnormalities; ICU care or burn unit indicated	Death
Erythroderma	-	Erythema covering >90% BSA without associated symptoms; limiting instrumental ADL	Erythema covering >90% BSA with associated symptoms (eg, pruritus or tenderness); limiting self-care ADL	Erythema covering >90% BSA with associated fluid or electrolyte abnormalities; ICU care or burn unit indicated	Death
Hyperhidrosis	Limited to one site (palms, soles, or axillae); self-care interventions	Involving >1 site; patient seeks medical intervention; associated with psychosocial impact	Associated with electrolyte/hemodynamic imbalance	-	-
Hyperkeratosis	Present	-	Limiting self-care ADLs	-	-
Nail Changes	Present	-	-	-	-
Nail Discoloration	Asymptomatic; clinical or diagnostic observations only	-	-	-	-
Nail Loss	Asymptomatic separation of the nail bed from the nail plate or nail loss	Symptomatic separation of the nail bed from the nail plate or nail loss; limiting instrumental ADL	-	-	-
Pain of Skin	Mild pain	Moderate pain; limiting instrumental ADL	Severe pain; limiting self-care ADL	-	-
Palmar-Plantar Erythrodysesthesia Syndrome	Minimal skin changes or dermatitis (eg, erythema, edema, or hyper-keratosis) without pain	Skin changes (eg, peeling, blisters, bleeding, fissures, edema, or hyper-keratosis) with pain; limiting instrumental ADL	Severe skin changes (eg, peeling, blisters, bleeding, fissures, edema, or hyper-keratosis) with pain; limiting self-care ADL	-	-

TABLE 4. (CONTINUED)

Common Terminology Criteria for Cutaneous Adverse Events (CTCAE-v5)					
CTCAE Term	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Photosensitivity	Painless erythema and erythema covering <10% BSA	Tender erythema covering 10–30% BSA	Erythema covering >30% BSA and erythema with blistering; photosensitivity; oral corticosteroid therapy indicated; pain control indicated (eg, narcotics or NSAIDs)	Life-threatening consequences; urgent intervention indicated	Death
Pruritus	Mild or localized; topical intervention indicated	Widespread and intermittent; skin changes from scratching (eg, edema, papulation, excoriations, lichenification, oozing/crusts); oral intervention indicated; limiting instrumental ADL	Widespread and constant; limiting self care ADL or sleep; systemic corticosteroid or immunosuppressive therapy indicated	-	-
Purpura	Combined area of lesions covering <10% BSA	Combined area of lesions covering 10–30% BSA; bleeding with trauma	Combined area of lesions covering >30% BSA; spontaneous bleeding	-	-
Rash Acneiform	Papules and/or pustules covering <10% BSA which may or may not be associated with symptoms of pruritus or tenderness	Papules and/or pustules covering 10–30% BSA, which may or may not be associated with symptoms of pruritus or tenderness; associated with psychosocial impact; limiting instrumental ADL; papules and/or pustules covering >30% BSA with or without mild symptoms	Papules and/or pustules covering >30% BSA with moderate or severe symptoms; limiting self-care ADL; associated with local super-infection with oral antibiotics indicated	Life-threatening consequences; papules and/or pustules covering any % BSA, which may or may not be associated with symptoms of pruritus or tenderness and are associated with extensive superinfection with IV antibiotics indicated	Death
Rash Maculo-Papular	Macules/papules covering <10% BSA with or without symptoms (eg, pruritus, burning, tightness)	Macules/papules covering 10–30% BSA with or without symptoms (eg, pruritus, burning, tightness); limiting instrumental ADL; rash covering > 30% BSA with or without mild symptoms	Macules/papules covering >30% BSA with moderate or severe symptoms; limiting self-care ADL	-	-
Skin Ulceration	Combined area of ulcers <1cm; nonblanchable erythema of intact skin with associated warmth or edema	Combined area of ulcers 1–2 cm; partial thickness skin loss involving skin or subcutaneous fat	Combined area of ulcers >2 cm; full-thickness skin loss involving damage to or necrosis of subcutaneous tissue that may extend down to fascia	Any size ulcer with extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structures with or without full thickness skin loss	Death
Telangiectasia	Telangiectasias covering	Telangiectasias covering >=10% BSA; associated with psychosocial impact	-	-	-
Urticaria	Urticarial lesions covering <10% BSA topical intervention indicated	Urticarial lesions covering 10–30% BSA; oral intervention indicated	Urticarial lesions covering >30% BSA; IV intervention indicated	-	-

A gentle cleanser respects the pH of the skin (pH 4.0–7.0). Examples: Lipikar Syndet, Cleansing oil, Surgras bar, Surgras gel (all La Roche-Posay [LRP]), CeraVe liquid cleanser, bar, Hydrating cream-to-Foam Cleanser (all CeraVe). Moisturizing creams that support skin lipids and skin barrier function maintenance and repair. Examples Toleriane Ultra or Rich for the face, Lipikar Balm AP, Body Milk or ISO-Urea Body Milk (all LRP), CeraVe Moisturizing cream (CeraVe), Cetaphil Moisturizing Cream, Aveeno Skin Relief Moisturizer Repair (Johson & Johnson). Sun-screen, examples: Anthelios XL SPF50+ (LRP), Helioplex SPF50+ (Neutrogena). Skin repairing balm, examples: Cicaplast Baume B5 (LRP), Aquaphor Skin Repairing Balm (Eucerin). Cleanse the area with water and use an antiseptic for areas at risk for infection. Examples: Chlorhexidine, Povidone-iodine or Hypochlorous acid spray (Levicyn [IntraDerm Pharmaceuticals]). Avoid the use of topical antibiotics to avoid antibiotic resistance (51). Hydrocolloid dressing (HCD), for example, Comfeel (Coloplast), Tegaderm HCD (3M). Foam dressing, for instance: Allevyn (Smith & Nephew), Tielle (3M + KCl), Mepilex foam (3M). Non-adherent contact layers include silicone coated dressings, examples: Mepitel (Mölnlycke), Adaptic (3M+KCl). Dressing changes depend on the level of exudate and are typically twice/week. Medical therapeutic topical and systemic treatments are outside the scope of the algorithm.

BOX 5.

Sunprotection and Sunscreen

- Avoid unprotected sun exposure, and use a sunscreen with a sun protection factor (SPF) of at least 15.
- If the sunscreen causes a burning sensation, you can try sunscreens that contain zinc oxide or titanium dioxide. Remember to use enough sunscreen.
- Apply more than half a teaspoon of sunscreen to each arm, your face, and your neck.
- Apply just over 1 teaspoon to your chest and abdomen, your back, and each leg.
- Re-apply sunscreen every 2 hours when outdoors, or more often if sweating or swimming.
- Use a broad-brimmed hat if going outside.
- And avoid being in direct sunlight between 10 AM and 4 PM.

complex regimens and applications viewed as a "chore," especially when initiated prophylactically, "wait and see" attitude, socioeconomic factors, and cost.[12,50]

Patients receiving cancer treatment [ie, chemotherapy or targeted therapy] have a higher risk of developing photosensitivity.[23,47] In a phototoxic reaction, medications such as chemotherapy drugs absorb UV radiation. This absorption of UV light causes a change in the drug's chemical composition, which emits skin-damaging energy.[23,47] Moreover, exposure to UV radiation is associated with skin cancer development.[57] UV radiation has wavelengths shorter than visible light and is subdivided into UVA1, UVA2, UVB, and UVC.[57] The shorter the wavelength, the greater the potential for UV radiation to cause biological damage.[57]

Sunscreens are part of a complete program for sun protection that includes protective clothing and sun avoidance.[57-59] Sunscreens can be classified as UVB filters, UVA1, UVA2 filters, or physical blockers.[57-59] Chemical filters, such as oxybenzone, avobenzone, octocrylene, and ecamsule, are aromatic compounds that absorb high-intensity ultraviolet radiation.[57] UVA filters have a range of 320–400 nm, while UVB blockers are active in 290–320 nm.[58] Octocrylene is a widely used UVB filter and has a thick, oily texture and a peak absorption at 303 nm (range, 290–360 nm).[57] Sunscreens such as oxybenzone have UVA activity in the 320–340 nm range. Avobenzone, oxybenzone, and ecamsule (Anthelios SX) are effective in most of the UVA range.[57-59] Most currently available sunscreen formulations aim for coverage of both UVA and UVB spectra.

Physical blockers, including zinc oxide, are effective in both the UVA and UVB ranges as they reflect or refract UV radiation.[57-59] Many dermatologists recommend daily sunscreen of SPF 30 or higher, especially for sun-exposed areas, 15 minutes before sun exposure and every 2 hours after that. Special populations that are at higher risk for sun-induced toxicities and neoplasms should avoid sun exposure by using para-aminobenzoic acid (PABA) free UVA and UVB protection as well as sun-protective clothing.[60] (Box 5: Sun protection and sunscreen)

Fissures, Blisters, and Wounds

Apply a wound dressing for patients with fissures, bullae, erosions, and ulcers. Depending on the wound bed condition and exudate levels, various dressings may be used, such as a foam dressing or a non-adherent wound contact layer, including silicone-coated dressings. The frequency of dressing changes depends on exudate level. Cleanse the peri-wound skin with water and a gentle cleanser and remove debris from the wound bed. For wounds at risk for infection, use an antiseptic. Avoid the use of prophylactic topical antibiotics to comply with antimicrobial stewardship preventing antibiotic resistance.[51]

Statement 9: *Effective management of dermatologic toxicities associated with cancer treatment is a multidisciplinary effort involving dermatologists, oncologists, and APPs.*

A collaborative, interprofessional approach is the most efficient method of connecting cancer patients with dermatological care from the start of their cancer care.[8-12,45,50] cAEs often occur secondary to chemotherapeutic agents, yet up to 84% of cancer survivors with cAEs are not referred to a dermatologist.[60]

There is a high discordance on the decision to pause anticancer therapy between dermatologists and referring clinicians, with medical oncologists more likely to discontinue cancer therapy due to cAEs.[9-11] Consequently, timely intervention by a dermatologist trained in supportive dermatology for oncology patients is critical to preventing avoidable treatment interruptions.[7] Urgent access to a dermatologist is paramount to identifying and assisting in managing dangerous or life-threatening cAEs.[12,50,61] Equally important is a dermatologist's ability to improve quality of life related to cAEs and to preserve cancer treatment through managing cAEs.[12,50]

The USCOM panel recommends that education, optimal communication, access to support information, and early reporting of cAEs will enable efficient use of dermatology services.[62] Telemedicine or virtual consultation can facilitate patients' and healthcare professionals' access to dermatological expertise. Telemedicine can also include online patient portals, patient apps, remote monitoring, patient education, and CME for healthcare providers.[63] These virtual tools further offer a suitable solution for rural areas where

access to specialized multidisciplinary oncology teams may not be available.

LIMITATIONS

A small panel of physicians developed the algorithm, representing a few centers, and did not include patients in the development. While alternatives for prevention and management of cAEs could exist, the statements are suggestions for best practice developed from a panel of expert clinicians supported by peer-reviewed literature. Although limited evidence was available to guide the development of the algorithm, the project will hopefully encourage more skincare studies to prevent and treat cAEs.

CONCLUSIONS

A multidisciplinary team treating and guiding the cancer patient may improve cancer treatment tolerance. The USCOM algorithm on general skincare measures, including cleansers and moisturizers to prevent or reduce the severity of cAEs, may increase awareness and help improve cancer patient outcomes.

DISCLOSURE AND ACKNOWLEDGMENTS

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by unrestricted educational grant from La Roche-Posay US. Dr. Lacouture has a consultant role with Johnson and Johnson, Novocure, QED, Bicara, Janssen, Novartis, F. Hoffmann-La Roche AG, EMD Serono, Astrazeneca, Innovaderm, Deciphera, DFB, Azitra, Kintara, RBC/La Roche Posay, Trifecta, Varsona, Genentech, Loxo, Seattle Genetics, Lutris, OnQuality, Azitra, Roche, Oncoderm, NCODA, Apricity. Dr. Lacouture also receives research funding from Lutris, Paxman, Novocure, J&J, US Biotest, OQL, Novartis and AZ and is funded in part through the NIH/NCI Cancer Center Support Grant P30 CA008748.

All authors contributed to the development of this work and its review and agreed with its content.

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