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Canadian Skin Management in Oncology (CaSMO) Algorithm for Patients With Oncology Treatment-Related Skin Toxicities

CaSMO Canadian skin management in oncology group

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ABSTRACT

Introduction: Cancer treatment has significantly improved overall survival and progression-free survival of patients; however, adverse cutaneous reactions are common. If not treated effectively, cutaneous sequelae may lead to severe morbidities that seriously affect the patients' quality of life (QoL) and decrease cancer-treatment outcomes.

Objectives: The Canadian skin management in oncology (CaSMO) algorithm focuses on general skincare measures for cancer-treatment-related skin toxicity prevention and management to improve patient outcomes.

Methods: The CaSMO algorithm working group used an online procedure to reach a consensus on the algorithm, which was built using evidence from the literature combined with the panel's opinion and experience.

Results: The algorithm has the following steps: Education on cancer treatment-related skin toxicities for clinicians and patients, prevention/reduction measures, evaluation of severity, skincare management, including general management. Prevention measures include daily and frequent skincare use, including cleansers and moisturizers to support skin hydration.

Conclusions: The CaSMO algorithm focuses on general skincare measures that may help prevent or reduce the severity of cancer-treatment-related skin toxicities, improving treatment tolerability leading to improved patient outcomes.

Key words: cancer treatment-related cutaneous toxicities; skincare

Introduction

Due to increased cancer incidence and improved 5-year survival rates in Canada, a growing number of people are living with cancer and the sequelae of cancer treatment, including cutaneous sequelae.[1-2] Depending on the cancer type, stage, and patient-related factors, cancer treatment may include surgery, radiation therapy, chemotherapy, targeted therapy, hormonal treatment or stem cell transplantation, and more recently, targeted therapy and immunotherapy.[3-8] Although technology and agents used for cancer treatment have significantly improved overall survival and progression-free survival, adverse cutaneous reactions are common.[3-10] Clinicians and healthcare providers are focused on the tumor's clinical response and potentially life-threatening side

effects.[8] After life-threatening reactions are ruled out; skin toxicity-related adverse events may lead to morbidities that significantly affect the patients' quality of life (QoL).[8-14] Additionally, cutaneous side effects may hamper optimal cancer treatment due to treatment reduction, interruption, or discontinuation.[15] Over 50% of cancer patients experience a treatment interruption due to dermatologic adverse events that can ultimately lead to treatment discontinuation.[8-15]

A review of one-hundred thirteen dermatology consultations over a two months period in 2015 of patients with cancer treatment-related skin toxicities showed a high discordance between referring clinicians and dermatologists.[15] Of the 79 patients receiving hematologic cancer-treatment, 41 (52%) patients had their treatment interrupted. Of the ten cases where discontinuation of therapy was recommended, the dermatologists agreed on one case. The study illustrates the importance of dermatological consultations for these patients.[15]

A retrospective study of outpatients with cancer treatment-related skin toxicities seen by a dermatologist reported a high frequency of positive cancer treatment outcomes with a low recurrence of skin toxicity, overall indicating fewer cancer-treatment interruptions.[16]

Few studies have evaluated the impact on QoL of cancer treatment-related skin toxicity. A study by Lee et al. evaluated 375 patients who received cancer treatment for breast cancer (136 [36.27%]) or colorectal cancer (114 [30.40%]). It showed that clinicians' observations on the impact of cutaneous toxicities on QoL might differ from what patients report, and the patients' age did not affect skin toxicity-related QoL. However, the type of cancer treatment and the duration of the therapy reduced patients' QoL.[8] In line with findings from other researchers, the study demonstrated that the symptoms such as itching, dry skin, easy bruising, pigmentation, papulopustular rash on the face, periungual inflammation, nail changes, and palmoplantar lesions particularly lead to a reduction in QoL.[8-14]

A survey evaluating patients' quality of life resulting from cutaneous toxicities demonstrated a reduction in QoL but concluded that dermatologic care resulted in improved patient satisfaction outcomes. However, patients were unsure if dermatologic interventions aided in improved cancer-treatment adherence.[17]

Before starting cancer treatment, patients should be counseled on the potential skin adverse events and ideally review preventative measures that include a basic skincare regime.[18-25] Oncologists, family physicians, oncology nurses, pharmacists, and dermatologists have the opportunity to join forces to care for oncology patients with skin reactions and to share evidence-based knowledge.[25] Among physicians, there may still be a bias against using skincare in the context of oncology treatment. Hesitation to use skincare may stem from earlier experiences with potentially harmful products (e.g., fragranced, elevated pH, etc.).[23] Currently, there are gentle cleansers, moisturizers, and sunscreens available that this group believes are ideally suited for oncology patients.[23,24]

Scope

The CaSMO project aims to improve patient outcomes by preventing and managing cancer treatment-related skin toxicities. A review article by the CaSMO working group[26] discussed a holistic approach to cancer patients' treatment, including patient education, therapeutic relationship, and frequent, open communication between the patient and the oncology team. The working group further recommended measures for preventing and treating skin toxicities using a skincare regime involving hygiene, moisturization, and sun protection.[26]

The current CaSMO algorithm is designed as a first in a series and focuses on general skincare measures for cancer-treatment-related skin toxicity prevention and management. The clinical algorithm is easy to apply also by non-dermatologists. It targets all healthcare providers dealing with oncology patients, including specialist physicians, primary and palliative care physicians, nurses, pharmacists, and radiation technologists.

This algorithm will be followed by other algorithms developed for specific cancer treatments and related skin toxicities, e.g., radiation, traditional chemotherapies, targeted therapies, and immunotherapy.

Methods

The CaSMO algorithm working group, a panel of clinicians treating oncology patients, was to convene for a one-day meeting; however, due to the COVID-19, a web conferencing meeting took place on March 29, 2020. The algorithm was developed following the AGREE II instrument[27] using a modified Delphi approach. A concept algorithm based on the literature selected before the web conference was discussed and adopted using clinical evidence coupled with the expert opinion and experience of the CaSMO working group members. An online procedure was then used to reach consensus through blinded reiterations and votes to define the final algorithm. The CaSMO working group's consensus on the algorithm was established as an eighty percent agreement was obtained.

Literature Review

A literature review included guidelines, consensus papers, and publications on the management of oncology treatment-related skin toxicities, clinical and other research studies published in the English language from January 2010 to January 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 treatment-related skin toxicity, publication language other than English. A dermatologist and a physician/scientist conducted the searches on January 30 and 31, 2020, on PubMed and Google Scholar as a secondary source of the English-language literature, using the terms:

Skincare regimes for prevention and treatment of cutaneous toxicities associated with radiation treatment, chemotherapy, targeted therapy, immunotherapy, hormonal treatment, prevention, management, maintenance of cutaneous toxicities, health-related quality of life, and skincare

The results of the searches were evaluated independently by two reviewers; discrepancies were resolved by discussion. The searches yielded two-hundred and thirty-six publications. After the exclusion of duplicates (n = 94) and articles (N = 109) that were deemed not to be relevant for the algorithm (other subjects, low quality, a small number, case studies), thirty-three papers remained. Twenty-three were review articles, including one

guideline, two algorithms, and two systemic literature reviews, of which one was a meta-analysis. Additionally, we selected eight clinical studies and two books (Figure 1).

Cancer Treatment-Related Skin Toxicities

Each type of cancer treatment is associated with specific skin reactions. A recently published review article by the CaSMO working group gives a more detailed description of cancer treatment-related cutaneous toxicities.[26] Specific reactions are beyond the scope of this article and may be featured in future articles from the CaSMO group.

The CaSMO Algorithm

Features of a Medical Algorithm

For the development of the CaSMO algorithm, the unpublished mnemonic RECUR (Reliable, Efficient, Clear instructions, Understandable, Remember easily) was used.

A clinical algorithm's function is to standardize and support medical decision-making, such as regulating the selection and use of treatment regimens, thereby improving adherence to evidence-based guidelines.[27] The best algorithms have inputs and outputs, precisely defined specific steps, and uniquely defined results that depend on the preceding steps.[27]

The current algorithm focused on preventing or reducing and managing skin side effects of cancer treatment using skin care measures. The algorithm has the following steps: education on cancer treatment-related skin toxicities for both clinicians and patients, prevention/reduction measures, evaluation of severity, initial dermocosmetic management, and eventual reaction specific management (Figure 3A and 3B).

Education on Cancer Treatment-Related Skin Toxicities

Education on cancer treatment-related skin toxicities is essential for both clinicians and patients.[8,26] The panel agreed that before initiating cancer treatment, the first step is building a therapeutic relationship with the patient enabling active participation of the patient in their cancer treatment plan. The plan should be viewed holistically, with attention to health determinants such as education, mental health, income, social status, access to resources, and geographic location.[3,5,26]

A detailed discussion between the patient, treating physician and nurse, or other team members, if applicable, includes explaining the treatment protocol, potential side effects, hospital visits, diagnostic tests, management of AEs, and prophylactic and preventative measures.[3,5,26]

Strategies suggested by the panel include:

1. Educating patients on the skin changes that may occur by giving both verbal information and print or online references (Table 1).[3,5,26]
2. Informing the patient on who to contact when they experience an AE.[26]
3. Establishing proactive contact with the patient, especially in the early stages of treatment.[26]
4. Addressing AEs early[3,5,26]

Patients often underreport their skin changes or confuse them with reactions related to other factors, i.e., allergies, weather, diet, stress, or they do not want to be a bother.[5] (Box 1: Information)

The panel stressed that fluid, ongoing, and frequent communication is essential while checking if the patient's information is processed and understood. The clinician should emphasize the importance of early and detailed reporting by the patient of new and worsening AEs during the treatment period and the follow-up, explaining that it is much easier to manage or resolve AEs when detected early.[5,23,24,26] Moreover, low-grade AEs may not initially seem severe to patients who frequently fear discontinuing their cancer treatments.[23-25]

Prevention Measures Using Skincare

The focus of the initial steps of the algorithm is on skincare measures. The over-the-counter (OTC) skincare regime should start before the cancer treatment begins to prevent skin toxicities.[3,5,26] It is essential to inform the patient about the importance of good skin hygiene and barrier maintenance.[3]

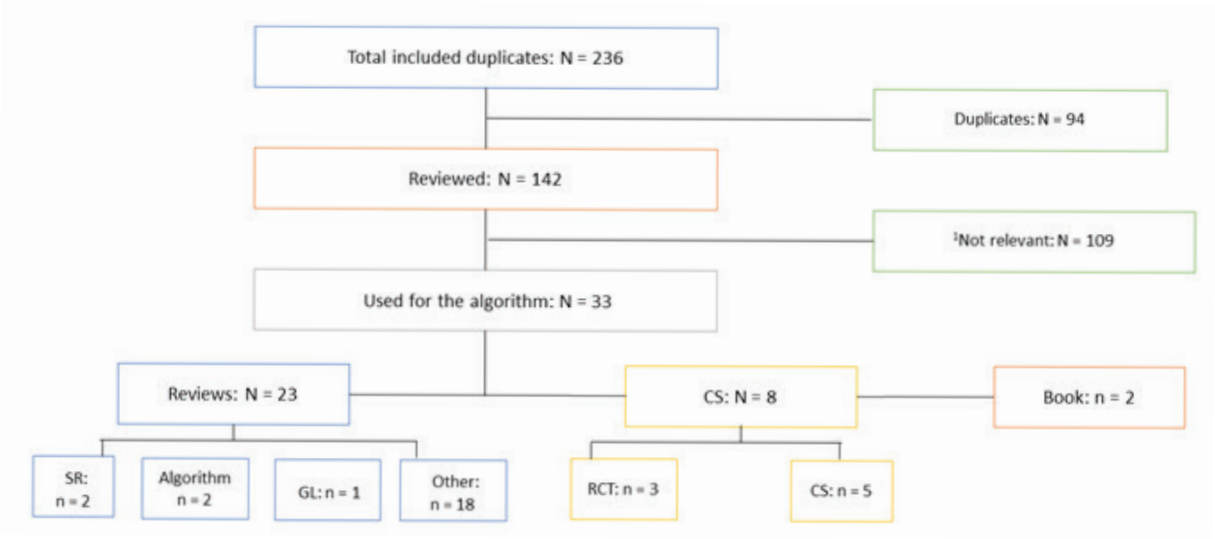
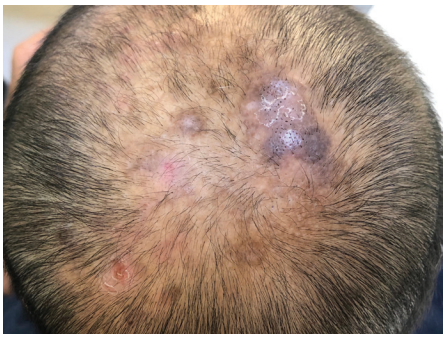


Figure 1: Systematic literature searches results

Not relevant: Other subject, poor quality, small number, case studies
Clinical studies (CS); Randomized controlled trials (RCT); Retrospective studies (RS); Cross-sectional studies (CS); Systematic reviews (SR); Guidelines (GL); Meta-analysis (MA)



2A: Scarring alopecia

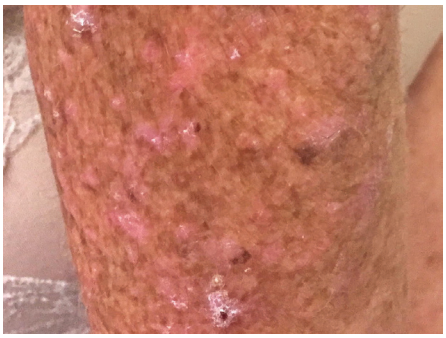
2B: HFS: Palmar erythema and edema

2C: HFS: Focal hyperkeratotic plaques with an erythematous base

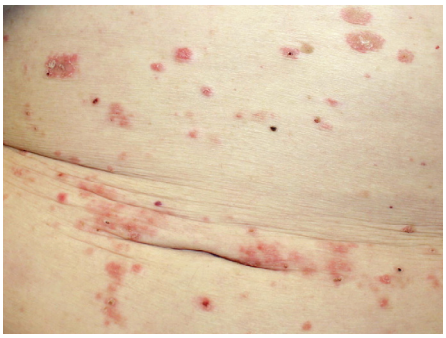
2D: Toenail toxicity

2E: Nail toxicities - periungual erythema with painful pyogenic granuloma-like lesion

2F: Rash: Papulopustular (acneiform) eruption on the mid face

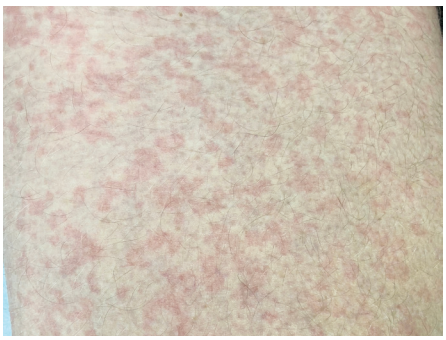


2G: Rash - Lichenoid dermatitis on the arm discrete violaceous papules and plaques with overlying white scale



2H: Rash - Tense bullae and urticarial plaques on the abdomen characteristic of bullous pemphigoid

2I: Psoriasiform on hand palm



2J: Maculopapular rash on the back

2K: Pruritus - Scratch marks

Figure 2: Glossary on skin toxicities relevant for all the clinicians of the treatment team

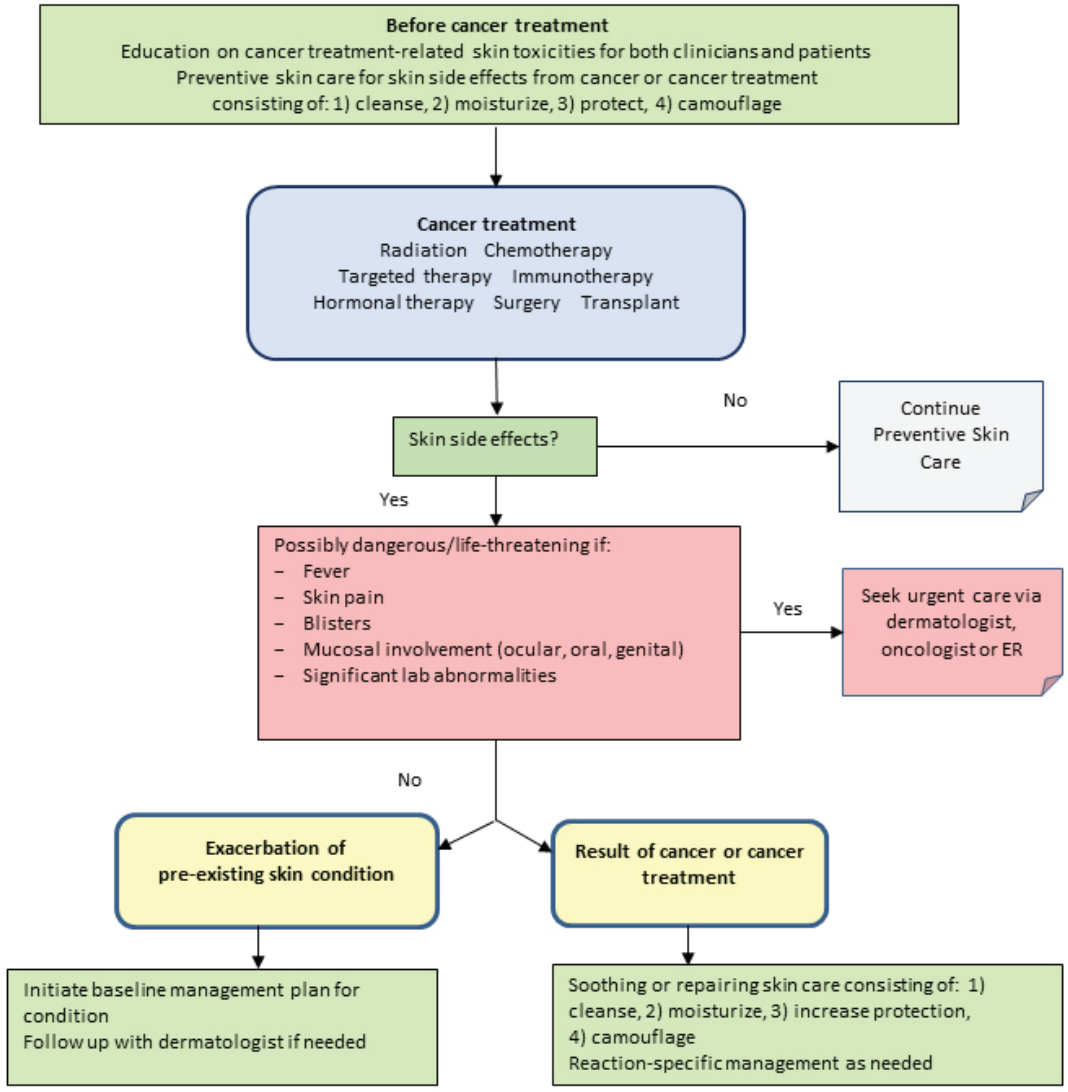


Figure 3A: Canadian Skin Management in Oncology (CaSMO) Algorithm

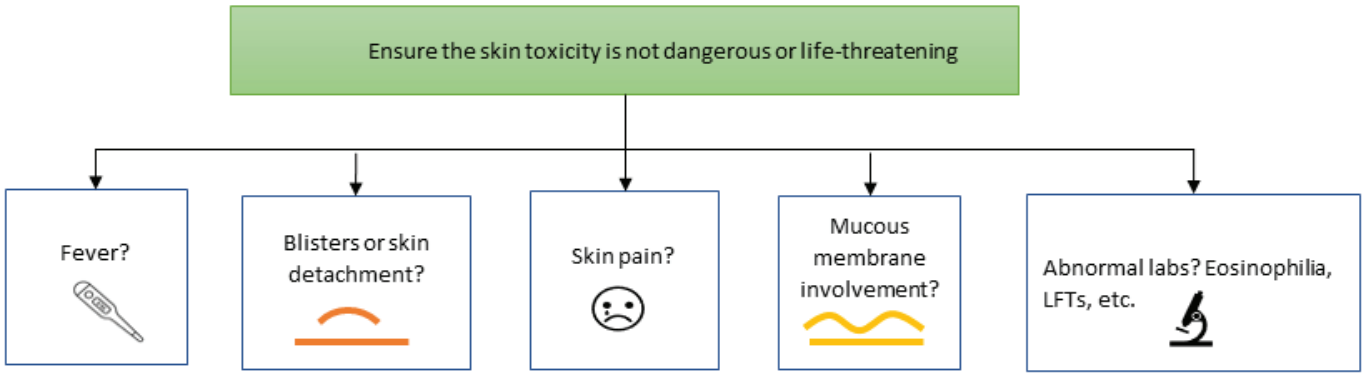


Figure 3B: Canadian Skin Management in Oncology (CaSMO) Algorithm

Liver function tests (LFTs) Albumin, Total protein, ALP (alkaline phosphatase), ALT (alanine transaminase), AST (aspartate aminotransferase), and gamma-glutamyl transpeptidase (GGT), Lactate dehydrogenase (LD), Prothrombin time (PT).[26,32]

Title	Type	Function	Reference
Glossary	Review	A brief overview of cutaneous AEs	Sauder M, et al. Skin Ther Letter 2020;(10):1-12.[26]
AAD Dermatology World	Information leaflet	Gives a quick reference to the various cancer treatments, cutaneous AEs, and approaches.	Ruth C. The Dermatology World//December 2019 Support system. www.aad.org/dw/
Product Elimination Diet	Websites	The product elimination diet is a basic three-step process that can be used when having skin problems.	https://producteliminationdiet.com
CDA Skincare	Websites	CDA websites that provide medical education and public education on several aspects of skincare.	https://dermatology.ca https://dermatology.ca/recognized-products/skincare/

Table 1: Resource selection.
American Academy of Dermatology Association (AAD); Canadian Dermatology Association (CDA)

- Establish a proactive contact with the patient from the start of the treatment.
- 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, AEs, hospital visits, diagnostic tests, management of AEs, prophylactic, and preventative measures.
- Provide detailed patient education on the skin changes that may occur before starting the cancer treatment.
- Explain to the patients that they should always report their skin changes, regardless of severity.
- Reinforce that prevention and early treatment of AEs lead to better cancer-treatment outcomes and quality of life.

Box 1: Information and patient education

At the same time, provide education on general measures such as avoiding skin irritants, scented products, temperature extremes, sun avoidance, and the use of sun-protective clothing (e.g., brim hats and sunglasses).[26] The daily skincare regime should contain products addressing hygiene with gentle cleansers, skin moisturization, and sun protection. [22-26]

The skincare formulations for patients undergoing cancer-therapy should be safe, effective, free of allergens and irritants such as common preservatives causing allergy, fragrances, and perfumes.[26] Skincare formulations should also have a near physiologic skin surface pH.[24-26,28] A physiological skin surface pH is acidic (4.0–6.0), while a high skin surface pH may lead to skin irritation, dryness, and elevated inflammation.[26,28] Soaps, surfactants, and detergents, especially those with an alkaline pH, may excessively remove natural moisturizing factors and skin lipids, elevating skin surface pH, which is explicitly damaging for cancer patients and those at risk for cancer treatment-related skin toxicities.[26,28] A skin cleanser with a near physiologic skin surface pH (4.0–6.0) is less aggressive than alkaline soaps and has demonstrated benefits when used for inflammatory skin conditions.[28]

Daily and frequent use of a non-occlusive moisturizer to support skin hydration is generally accepted practice, although there is a lack of evidence to support their use.[23] Moisturizers form a barrier that retains water by preventing transepidermal water loss (TEWL). Additionally, moisturizers may have hydrophilic humectants, such as glycerol, propylene glycol, butylene glycol, alpha hydroxyl acids (AHAs), including lactic, glycolic, and tartaric acids. Use AHA's with caution as they can change the pH and be irritants.[23] An example of a hydrophilic matrix substance is hyaluronic acid, a mucopolysaccharide found in the dermis that functions as both a humectant and a penetration enhancer.[23] (Box 2: Skincare using cleansers and moisturizers) A review of topical agents for treating radiation therapy-related skin toxicities concluded that emollients containing aloe vera, chamomile, ascorbic acid, pantothenic acid, dexpanthenol, and trolamine lacked therapeutic effect[29] and may cause irritation or allergy. (Box 3: Criteria for moisturizers)

A study on the efficacy and tolerability of thermal water containing skincare regime (La Roche-Posay) consisted of two types of cleansers, a moisturizer, a healing baume, and an SPF50+ sunscreen.[26] The skincare was used for preventing skin toxicity in two-hundred-fifty-three women with mostly stage I (International Union Against Cancer (UICC) /American Joint Committee on Cancer (AJCC)) breast cancer undergoing radiotherapy. The heavy users who daily used the total skincare regime showed significantly ($p \leq 0.0001$) less severe skin toxicities than those with lower skincare regime use who used parts of the regimen from time to time.[26]

Sunscreens are part of a complete program for sun protection that includes protective clothing and sun avoidance.[30] Sunscreens can be classified as UVB filters, UVA filters, or physical blockers.[30] A broad-spectrum sunscreen protects against both UVA and UVB light. UVA filters are active in the range of 320–400 nm, while UVB blockers are active in the range of 290–320 nm.[30] Sunscreens such as oxybenzone and octocrylene have UVA activity in the 320–340 nm range. Avobenzone, benzophenones, and dicamphor

- Use gentle cleansers such as those with a near-physiological skin pH (4.0 – 6.0).[28,26]
- 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.[28,26]
- Apply moisturizers to the face, hands, feet, neck, and back daily. [26]
- Choose a moisturizer vehicle based on skin condition, level of xerosis, and patient preference.,[26]
- Apply moisturizers liberally and frequently.[26]

Box 2: Skincare using cleansers and moisturizers

- Skincare formulations should be safe, effective, free of additives, fragrances, perfumes or sensitizing agents.[26]
- Skincare formulations should have a physiologic skin surface pH.[23-25,28]
- Moisturizer effectiveness depends on the formulation, the vehicle, frequency, and compliance of applications. [23,26]
- Skincare product choices depend on the skin condition, availability, costs, and individual preferences.[23,26]

Box 3: Criteria for moisturizers

sulfonic acid are effective in most of the UVA range.[30] Most currently available sunscreen formulations aim for coverage of both UVA and UVB spectra. Physical blockers, including titanium dioxide and zinc oxide, are effective in both the UVA and UVB ranges.[31] Most 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 are advised to avoid sun exposure by using para-aminobenzoic acid (PABA) free UVA and UVB protection as well as sun-protective clothing.[31] (Box 4: Sunscreen)

Assess for Life-Threatening or Dangerous Reactions

If, despite a preventative approach to skincare, cutaneous toxicities occur, clinicians must first assess if the reaction is dangerous or life-threatening. The patient's demographic data, medical history, cancer characteristics, performance status, previous cancer therapies, past dermatological history, and concomitant skin conditions should be reviewed.[6] Physical examination focusing on the morphology and the distribution of the presented cutaneous toxicity is important to distinguish between the various presentations (Table 2).[6,20,32-34]

To ensure the skin toxicity is not dangerous or life-threatening, the clinician should check five significant symptoms:[26]

1. Does the patient have a fever?
2. Are blisters or skin detachment present?
3. Is the skin painful?
4. Is there mucous membrane involvement (oral, ocular, or genital)?
5. Does the patient have abnormal laboratory blood values?

Laboratory tests should include a complete blood count, electrolytes, renal and liver function, and inflammatory markers, among others.[32] Peripheral blood eosinophilia (≥500 eosinophils/microL) may be caused by numerous conditions, including allergic, infectious, inflammatory, and neoplastic disorders, and evaluation should seek to identify the cause and possible organ involvement.[32]

Severe cutaneous toxicities include Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN), overlap SJS-TEN, acute generalized exanthematous pustulosis (AGEP), and drug reaction with eosinophilia and systemic symptoms (DRESS).[6,7]

The most significant cutaneous eruption is SJS, TEN, or SJS-TEN overlap characterized by extensive epidermal loss (<10% SJS, >30% TEN, 10-30% SJS-TEN overlap) with mucous membrane erosions and often presents as an impaired general condition.[35-36] Management requires immediate discontinuation of the offending agent, hospitalization ideally to a burn unit, early involvement of ophthalmology, gynecology, and urology to prevent permanent scarring.[35-36] The medical treatment of SJS, TEN, or SJS-TEN overlap varies by institution and typically involves high dose intravenous steroids as well as steroid-sparing agents.[6,35-36] The evidence for optimal treatment of this life-threatening condition is an evolving field and beyond the scope of this paper.

Patients with acute generalized exanthematous pustulosis (AGEP) present with fever and hundreds of non-follicular, sterile pustules on a background of edema and erythema. AGEP has a predilection for face and intertriginous areas that then progresses to become widespread. AGEP can be associated with neutrophilia, hypocalcemia, and transient renal dysfunction. [6,7,35-36]

Patients with DRESS typically present fever, facial edema, lymphadenopathy, and morbilliform eruption with follicular accentuation, which may progress to erythematous rash and exfoliative dermatitis.[6,7,36] Hematologic abnormalities, including eosinophilia and atypical lymphocytosis, are a hallmark of

- Sunscreens are one part of a complete program for sun protection that includes protective clothing, shade, and sun avoidance.[26]
- Sunscreens and sunblocks may prevent photodamage and can be classified as UVB filters, UVA filters, or physical blockers.[26,30,31]
- Sun protection factor (SPF) refers to UVB radiation, and broad-spectrum refers to the sunscreen's UVA radiation protection capacity.
- Apply daily sunscreen of SPF 30 or higher, especially for sun-exposed areas, 15 minutes before sun exposure and every 2 hours after that.[26,31]
- Special populations that are at higher risk for sun-induced toxicities and neoplasms are advised to avoid sun exposure by using UVA and UVB protection as well as sun-protective clothing.[20]
- The recommended amount of sunscreen needed for one application to an adult is 2 mg/cm2 or about 35 g to cover an adult in a swimsuit.[26]

Box 4: Sun protection

Skin Toxicity	Prevention and Treatment
Alopecia	Scalp cooling.[26]
Hand-Foot Syndrome	Avoid extreme temperatures, irritants, and friction.[26]
Oral mucositis	Oral hygiene using soft toothbrushes and baking soda rinses.[26] Pain control via saline or baking soda rinses, topical anesthetics, ice chips, or sucralfate.[26]
Nail toxicities	Avoid irritation and friction. Cooling with frozen gloves or socks. Use antiseptic washes (white vinegar solution or peroxide).[26]
Papulopustular eruptions	Sun avoidance measures and sunscreen applied to exposed areas of the body and every 2 hours when outside.[20,26]

Table 2: Measures additional to skincare for select skin toxicities

the condition. Visceral organ involvement typically manifests as hepatitis but may include thyroiditis, nephritis, interstitial pneumonitis, or myocarditis.[6,7,36] Visceral organ involvement, especially thyroiditis and myocarditis, may develop up to a year after the initial reaction.[36]It is crucial to determine the cancer-treatment that caused the reaction and determine the correct diagnosis to prevent further risks and long-term sequelae.[6,7] Definitions and grading of cutaneous AEs may pose challenges and require consultation with a dermatologist to identify the AEs correctly.[20,34] For practical reasons, as the current algorithm focuses on skincare, skin toxicities were not graded. Future algorithms by the CasMo group discussing the various types of cancer treatment-related skin toxicities in detail will address grading.

Treatment Measures With a Focus on Skincare

Most skin rashes are mild-to-moderate, but some that are not dangerous or life-threatening can still be severe, leading to cancer treatment dose reduction, dose delay, or discontinuation.[6,20,32-34] Initial assessment of the cutaneous toxicity should establish if it exacerbates a pre-existing dermatologic condition or a new reaction.[32] For exacerbation of a pre-existing skin condition, patients should initiate pre-existing plans for acute exacerbations of their condition.[32] For example, a patient with atopic dermatitis may need to increase the frequency or strength of topical steroids or steroid-sparing agents during an acute exacerbation.[37-40] If they do not have pre-existing plans for acute exacerbation, follow-up with their healthcare provider most responsible for the management of their pre-existing condition is recommended.[32] Condition-specific medical treatment is outside the scope of this paper.

In patients with new eruptions, this is most likely a result of the cancer treatment.[32,37-40] However, other causes should be excluded, such as concurrent over the counter products, medications, or infections.[32,37-40]

Reinforcing general skincare measures discussed prior to treatment and then adapting the measures according to the clinical presentation and individual patient's needs can aid in managing the eruption.[26] Depending on the condition, additional measures to skincare may be beneficial (Table 2).[3,5,26]

Improving the diagnostic and symptomatic management of cancer treatment-related skin toxicities may limit dosage reductions or treatment discontinuations.[25] Moreover, when identified early, the impact on patients' quality of life of the cutaneous AEs may be less severe.[23,32] It is therefore essential to describe the skin symptoms accurately and identify appropriate dermatological treatments to guarantee both the physical and psychological well-being of patients and optimum cancer treatment conditions.[23,30]

The panel suggests that including dermatologists in the team and building cutaneous toxicities team(s) may be beneficial for providing urgent access to care, managing dangerous or life-threatening cutaneous symptoms, and improving quality of life.[25,26] Consultation with a dermatologist may also reduce the risk of disruption of oncologic treatment.[25,26]

Chen et al. (2019) showed that patients were less likely to receive systemic steroids if a dermatologist was involved in treating cutaneous toxicities.[25,26]

Implementation of the Algorithm

A multidisciplinary shared care model will be used when implementing the algorithm. The model will include medical oncologists, family practice/internal medicine, dermatologists, oncology nurses, advanced practice providers (APPs), nurse practitioner (NP), physician assistant (PA), and pharmacists. Additionally, oncology patient organizations need to be informed and included in the process.

Limitations

A few physicians developed the algorithm, representing a few centers, and did not include patients in the development. Although limited evidence was available to guide the development, the project will hopefully spur more skincare studies to prevent and manage cutaneous toxicities.

Conclusion

The CaSMO algorithm focuses on general skincare measures to prevent or reduce the severity of cancer-treatment-related cutaneous toxicities. Increased awareness of cutaneous adverse events by the multidisciplinary team treating and guiding the cancer patient through their journey may improve treatment

tolerance. Moreover, daily and frequent skincare use, including cleansers and moisturizers to support skin hydration, may help prevent cutaneous toxicities or reduce their severity, leading to improved patient outcomes.

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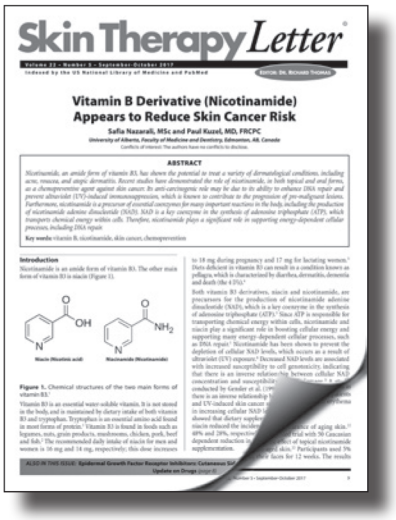

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