CancerCare Manitoba
ActionCancerManitoba

Practice Guideline: Symptom Management

Part 2. Skin Assessment for Breast Cancer Patients Receiving Radiation

Part 2 of a 5 Part Series:

Evidence Based Recommendations for the Assessment and Management of Radiation-Induced Skin Toxicities in Breast Cancer

Effective Date: January 2018

CancerCare Manitoba Guideline

Symptom Management – Methodology for Radiation-Induced Skin Toxicities in Breast Cancer Series

Developed by: Clinical Practice Guideline Adaptation Working Group

Table of Contents

Preface

At CancerCare Manitoba (CCMB) the Clinical Practice Guidelines Initiative seeks to improve patient outcomes in terms of survival and quality of life through the development, dissemination, implementation, and evaluation of guidelines for the management of common clinical scenarios encountered by cancer patients throughout the province.

This practice guideline was created through the collective efforts of a dedicated group of front-line staff, guideline methodologists, and researchers from: CCMB, University of Manitoba's Faculty of Nursing, Queen's University School of Nursing in Kingston Ontario, and the Canadian Guideline Adaptation Study Group—an initiative of the Canadian Partnership Against Cancer Guidelines Advisory Group.

The content of this guideline was in large part adapted from guidelines produced by: the British Columbia Cancer Agency (2006), the Cancer Care Ontario Program in Evidence-Based Care (2005), and the Winnipeg Regional Health Authority (WRHA, 2005).

The CCMB Department of Nursing and Radiation Oncology Program will review and update this document once every 3 years, unless emerging evidence from scientific research, or practice issues requiring urgent resolution dictate a need for a more immediate change in content.

Purpose

This document is intended as a guide to facilitate a shared, evidence-based approach to the clinical assessment and management of radiation-induced skin toxicities in adults with breast cancer.

For this purpose, it may be used by qualified and licensed healthcare practitioners involved with the care of oncology patients, which may include (but is not limited to): physicians, surgeons, nurses, radiation therapists, pharmacists, dieticians and psychosocial oncology professionals at CancerCare Manitoba's tertiary sites in Winnipeg, the Western Manitoba Cancer Centre in Brandon, and CCMB Community Oncology Program sites throughout the province.

Disclaimer

This guideline document should be viewed as an evidence-based practice tool, and as such, it does not represent an exhaustive text on the subject of radiation-induced skin toxicities. Clinicians are advised to use the guideline in their practice concomitantly with information from other evidence-based sources.

Use of this guideline in any setting should not preclude use of the practitioner's independent judgment, nor should it replace consultation with the appropriate oncology specialty when indicated (e.g. radiation or medical oncology, nursing, pharmacy, radiation therapy, psychosocial oncology, spiritual care, nutritional therapy). Clinicians are expected to apply the recommendations within the boundaries of professional standards and scope of practice, and according to their personal level of training and experience.

It is the responsibility of the practitioner to develop an individualized disease or symptom management plan for each patient under his/her care, and ideally this should take place within the context of an inter-professional team. The needs and preferences of the patient and the family should always be reflected in the plan of care.

Skin Assessment for Breast Cancer Patients Receiving Radiation – Guideline Recommendations

The panel's recommendations for skin assessment in adult breast cancer patients undergoing radiation therapy are adapted from rigorously appraised content of the BC Cancer Agency guideline Care of Radiation Skin Reactions, and the Winnipeg Regional Health Authority's (WRHA) Wound Care Guidelines: Radiation, review and consideration of evidence from primary published literature and supporting foundational nursing documents, and experiential evidence contributed by local clinical experts.[1, 2]

As these selected guidelines are multi-interventional, recommendations are presented here in summary tables for ease of use by clinicians. Assessment criteria and rationales cited in the recommendations tables are linked to supporting evidence. Where the level of evidence rating (LE) is the same for two or more sources, a single rating is given. Where ratings differ, the range is provided in order of highest to lowest level. (See Appendix 2 – Levels of Evidence).

Table 1. Essential Elements of a Global Assessment for RT-Induced Skin Toxicities in Adult Breast Cancer Patients

Assessment Criteria	Rationale	Level of Evidence
Advanced age (> 65 years)	Older patients are at increased risk of impaired skin and wound healing. Increased risk of co-morbidities, age-related physical changes in the structure of the dermis and at the dermal junction, and decrease in the production of collagen and elastin can result in impaired wound healing. Age is not a contraindication to treatment.[3,4]	***III-IV***
Smoking	Smoking affects ability of skin to heal, and reduces ability of cells to re-oxygenate during treatment. Nicotine has an adverse effect on healing as it impairs collagen production.[2,3,4,5]	***III-IV***
Nutritional status	Malnutrition can impair healing due to lack of substrates for tissue repair.[2,4] [See Malnutrition Screening Tool – *Appendix 1*].	***IV***
Pre-existing skin conditions	Pre-existing skin conditions can increase risk of radiation reactions or negatively impact healing (e.g. eczema, lymphedema, scleroderma, psoriasis).[2,4]	***IV***
Alcohol use	Excessive alcohol consumption can impair healing, as often nutrition is compromised due to effects of alcohol.[2]	***IV***
Personal/family history of radio-sensitive conditions	A history of radiosensitive conditions may identify the patient as at risk for radiation skin reaction.[1, 2, 4]	***IV***
Co-morbidities	Certain co-morbidities can increase risk of skin reactions and may impair healing. These include such conditions as: collagen vascular diseases *CVD* (rheumatoid arthritis, systemic lupus, Raynaud phenomena, fibromyalgia, polymyositis, dermatomyositis, Sjörgren's syndrome, scleroderma, polymyalgia rheumatica), diabetes, renal failure, multiple sclerosis, hyper/hypothyroidism, iron-deficiency anaemia, chronic sun exposure, lymphedema, organ transplant.[1,2,3,4,6,7]	***IIa-IV***
Medications	Certain medications can cause photosensitivity and impaired healing.[2,4] Please see the Breast Wound Care Pocket Guide for a full list of phototoxic drugs.	***IV***
Areas of compromised skin integrity within treatment field	Existing scars (including surgical scars), lesions, and previous lymphocele aspiration can increase risk of developing skin reactions.[3,4]	***III-IV***
Areas of skin-to-skin contact in treatment field	Skin-to-skin contact (e.g. axillae, breast folds) in radiation treatment field increases risk of skin reaction.[2,3,4]	***III-IV***
Treatment-related risk factors	Large volume of tissue being treated, high total dose of radiation, large fractions size, accelerated fractionation treatments, longer treatment duration, use of tangential fields, use of tissue equivalent or bolus material can increase risk of radiation reactions.[2,3,4,8]	***III-IV***
Allergies	Patient allergies influence the type of dressing and other topical products used for management of skin toxicities (e.g. latex, silicone, antibiotic, and tape allergies).[3]	***III***
Skin pigmentation	Patients with darker skin pigmentation have reported increased skin reactions and greater difficulty detecting skin reactions compared to those with lighter skin pigmentation.[4,7,9]	***IIb-IV***
Patient concerns	Patient concerns can impact patient's ability to adhere to skin care and dressing instructions.[2]	***IV***
Weight/body mass index and breast size	Higher body mass index (BMI) and larger breast size increase risk of radiation skin reactions.[4,3]	***III-IV***

Table 2. Essential Elements of a Focal Assessment for RT-Induced Skin Toxicities in Adult Breast Cancer Patients

Assessment Criteria	Rationale and Level of Evidence	Level of Evidence
For All Patients Assess: • Location • Size of affected area: length, width, depth • Description and colour of the wound bed and surrounding skin • Discomfort: burning, pruritus, pulling, tenderness, other • Description of skin - <u>erythema/dry desquamation:</u> edema, dryness, pruritus, scaling, flaking, peeling, excoriation - from scratching • Drainage, blisters, or open areas - *indicators of moist desquamation* • Pain level (0-10) and pain description • <u>Late effects:</u> pigmentation changes, permanent hair loss, telangiectasia, fibrous changes, atrophy	***Panel's Rationale:*** Classic criteria for integument assessment. Use promotes best practice in wound care. *Sources:* BC Cancer Agency Guideline pages 4, 8, 10 & 11.[1] Sibbald RG, Orsted H, Coutts P, Keast D. (2006). Best practice recommendations for preparing the wound bed: Update 2006. Wound Care Canada; 4(1):15-29.[10]	***IV***
For Patients With Areas of Non–Intact* Skin Assess **e.g. moist desquamation, recall phenomenon* • Location: 1) moist areas 2) dry areas • Size of wound • Wound base: granular tissue, eschar, or necrotic tissue • Exudate: 1) type 2) amount 3) odour • Discomfort: burning, pruritus, pulling, tenderness • Clinical signs of infection: 1) fever 2) foul odour 3) purulent drainage 4) pain and swelling in and extending outside of radiation treatment field	***Panel's Rationale:*** Classic criteria for wound assessment. Use promotes best practice in wound care. *Sources:* BC Cancer Agency Guideline page 11[1]. Sibbald RG, Orsted H, Coutts P, Keast D. (2006). Best practice recommendations for preparing the wound bed: Update 2006. Wound Care Canada; 4(1):15-29.[10]	***IV***
For All Patients Use Standardized Assessment Tool Grade skin toxicities using: • Common Terminology Criteria for Adverse Events (CTCAE) v4.03 for dermatitis associated with radiation/chemoradiation[11]	***Panel's Rationale:*** Consistent language for assessment and documentation is necessary for improved communication among care team members. Use of standardized scales for grading skin toxicities promotes best practices in wound care.	***IV***

References

1. BC Cancer Agency. Care of radiation skin reactions. Available online at: www.bccancer.bc.ca. Updated on 23 October 2006. Accessed on 07 March 2013. ***Level of Evidence IV***

2. Winnipeg Regional Health Authority (WRHA). Wound care guidelines: Radiation. Updated 2005. www.wrha.mb.ca. Last accessed 2010. ***Level of Evidence IV***

3. Porock D, Kristjanson L, Nikoletti S, et al. Predicting the severity of radiation skin reactions in women with breast cancer. Oncol Nurs Forum 1998;25(6):1019-29. ***Level of Evidence III***
4. Haas ML, Moore-Higgs GJ (Eds.). Principles of skin care and the oncology patient. Pittsburgh: Oncology Nursing Society (ONS) Publishing Division, 2010. ***Level of Evidence IV***
5. Freiman A, Bird G, Metelitsa AI, et al. Cutaneous effects of smoking. J Cutan Med Surg 2004;8(6):415-23. ***Level of Evidence IV***
6. Lin A, Abu-Isa E, Griffith K, et al. Toxicity of radiotherapy in patients with collagen vascular disease. Cancer 2008;113(13):648-53. ***Level of Evidence IIa***
7. McNees P. Skin and wound assessment and care in oncology. Semin Oncol Nurs 2006;22(3):130-43. ***Level of Evidence IV***
8. Iwakawa M, Noda S, Yamada S, et al. Analysis of non-genetic risk factors for adverse skin reactions to radiotherapy among 283 breast cancer patients. Breast Cancer 2006;13(3):300-7. ***Level of Evidence III***
9. Ryan JL, Bole C, Hickok JT, et al. Post-treatment skin reactions reported by cancer patients differ by race, not by treatment or expectations. Brit J Cancer 2007;97(1):14-21. ***Level of Evidence IIb***
10. Sibbald RG, Orsted H, Coutts P, et al. Best practice recommendations for preparing the wound bed: Update 2006. Wound Care Can 2006;4(1):15-29. ***Level of Evidence IV***
11. Cancer Therapy Evaluation Program. Common terminology criteria for adverse events (CTCAE) Version 4.03 DCTD, NCI, NIH, DHHS. Available online at: http://evs.nci.nih.gov/ftp1/CTCAE/CTCAE_4.03_2010-06-14_QuickReference_5x7.pdf. Updated 2010. Last accessed 22 May 2014. ***Level of Evidence IV***

CancerCare Manitoba

Symptom Management Recommendations

Skin Assessment for Breast Cancer Patients Receiving Radiation

I. Background

A holistic approach to assessing and caring for the person with a wound is best used, in order to maximize healing or maintain wound control. A thorough wound assessment must include a global assessment of the patient's risk for radiation skin reaction and factors that may affect wound healing, as well as a focal assessment of the wound itself. Further, it is desirable that focal wound assessment be conducted within the context of global assessment. These parameters offer the care provider important decision-making information, and create a comprehensive wound history.[1]

Definitions	
Global Assessment	Global assessment refers to identification of specific patient- and treatment-related factors that have been linked to increased risk of RT-induced skin toxicities.
Focal Assessment	Focal assessment refers to evaluation of integument (i.e. skin and, in the event of an open wound, underlying tissues) within the radiation-treatment field.

Clinical Questions

What elements should a thorough skin assessment include for adult breast cancer patients undergoing radiation therapy?

In addition to the main question of interest for this topic, several other queries relevant to local clinical context were posed by the panel:

- **When should global and focal skin assessments be performed?**
- **Who is best qualified to perform the assessments?**
- **Which standardized tools for skin assessment and documentation of clinical findings should be used at this treatment centre?**
- **What information related to skin assessment should be included in patient teaching?**

References

1. Haas ML. Radiation therapy: Toxicities and management. In Henke Yarbro C, Wujcik D, Holmes Gobel B (Eds.), *Cancer Nursing: Principles and Practice* (pp.312-51). 7th Edition; Sudbury, Jones and Bartlett, 2010.
Level of Evidence IV

II. Key Evidence

Of the three clinical practice guidelines selected for adaptation, two contained recommendations regarding assessment criteria for skin toxicities in breast cancer patients receiving radiation therapy—*Care of Radiation Skin Reactions*, BC Cancer Agency, and WRHA *Wound Care Guidelines: Radiation.*[1,2] AGREE II rigor scores for these source guidelines were widely disparate, however both were found acceptable for adaptation by consensus agreement.

Discussions and Limitations of Evidence

In the panel's clinical opinion, the BC Cancer Agency guideline contains detailed information for focal skin/wound assessment and the WRHA guideline presents concise, clinically relevant information for global assessment including patient-related risk factors, all of which should be part of a comprehensive skin toxicity assessment in the patient population of interest. Overall, a level of evidence (*LE*) IV rating was assigned to recommendations in the source guidelines where links to supporting evidence were not explicit (*Appendix 2)*. Despite the lack of documented high level empirical evidence, BC Cancer Agency and WRHA skin assessment criteria were selected for inclusion in the CCMB guideline after systematic appraisal by the panel. Each intervention in the two multi-interventional guidelines was discussed, taking into consideration potential for patient benefit *vs.* harm, ease of applicability, and general acceptability.

Following thorough consideration of the source guidelines' clinical content, the panel concluded:

- Queries regarding timing/frequency of assessment, qualified practitioners, standardized tools and essential elements for patient teaching were either not addressed in the source guidelines, or interventions were not definitive *and*
- Rationales for selected assessment criteria (risk factors) in the adapted guideline should be supported with the highest level of evidence available

Elements of Skin Assessment and Risk Factors

Inconsistencies in results were noted between studies. For example, while Twardella et al. found smoking was not associated with risk of acute RT-induced skin toxicity, conversely Porock et al. identified it as a predictive factor.[3, 4] Comparison across studies was also limited due to differences in patient populations or variables assessed. Generally, numbers of participants in studies looking at specific risk factors were small, making analysis of results difficult.

Studies were included for consideration as supporting evidence where the sample population size was relatively large, and where variable(s) evaluated were judged applicable to adult breast cancer patients receiving radiotherapy.

Some evidence was found which supports global assessment criteria adapted from the WRHA source guideline; this literature is referenced in Part I. Methodology of this series. Limited evidence was also found for several skin toxicity risk factors/assessment criteria that were *not* mentioned in the source guidelines. Other risk factors added to the Global Assessment criteria in the CCMB guideline after further discussion and acceptance by panel members include:

A. Patient-Related Factors[3-11, 12]

Many radiation- and patient-related factors can influence the skin's response to radiation. Areas of compromised skin integrity within the treatment field increase the risk of a patient experiencing radiodermatitis. This includes areas with existing burns, lesions, infection, surgical incisions, areas of proposed postoperative radiation, previous radiation or chemotherapeutic treatments, previous lymphocele aspiration, and other existing skin integrity issues.[4-7] Medical comorbidities (i.e. diabetes mellitus, renal failure, collagen vascular diseases (CVD), chronic illness, and immunosuppression) can also have an impact on tissue repair and the skin's ability to heal.[4-8,12] Further, certain genetic disorders (i.e. ataxia telangiectasia, Bloom's syndrome, Fanconi anemia, retinoblastoma, Down's syndrome, basal cell nevus syndrome, progeria, etc.) are known to be hypersensitive to radiation.[4] Although literature is mixed, expert consensus suggests that variation in the severity of skin reactions experienced by each patient may be attributed to age, general health, prescribed drugs, self-medication, smoking history, alcohol intake, ethnicity, mobility, weight, height, nutritional status, hydration, combined treatment modalities, and ultraviolet (UV) exposure.[3-7,9-11,12] Important risk factors for the development of radiodermatitis in patients include areas of skin-to-skin contact, moist areas causing friction, skin folds and bony prominences, and areas of thin or smooth epidermis.[5,9,12] Specifically, obesity and large breast volume are considered prognostic factors for radiodermatitis in breast cancer patients.[3,10]

Level of Evidence IIa, IIb, III, IV

i. Advanced Age[4,5,7]

Older age is cited in the literature and foundational nursing documents as a positive risk factor for radiation-induced skin reactions.[4,5,7] Aging skin is typically prone to injury and heals more slowly, due to physiologic tissue changes and systemic co-morbidities associated with aging.[4] A 1997 study by Porock et al. *(n= 126)* noted an *inverse* relationship between age and skin toxicity over the sternum.[4] This relationship may have been due to reduced epidermal mitosis seen in old age (and thus reduced RT effect on skin cells), or due to effect of chemotherapy (which can increase radiation skin reaction) and *not* age. The authors hypothesized that the mean age of the few subjects who did receive chemotherapy was lower, thereby explaining why less sternal skin toxicity may have been observed in the older subset.[4]

Level of Evidence III, IV

ii. Collagen Vascular Disease - CVD (Co-Morbidities)[2,5,8,9,13,14]

CVD is an autoimmune disorder affecting collagen and including the following subtypes: systemic lupus erythematosus (SLE), scleroderma, dermatomyositis/polymyositis, ankylosing spondylitis, polymyalgia rheumatic/temporal arteritis, Wegener's granulomatosis, rheumatoid arthritis (RA), Raynaud's phenomenon, fibromyalgia, Sjörgren's syndrome, and other mixed connective tissue disorders (MCTD). Radiation therapy is generally well tolerated by patients with a comorbid diagnosis of CVD.[8] However, due to heterogeneity of literature, a CVD diagnosis is often considered a contraindication to radiation therapy by practicing oncologists.[8] Results from a non-randomized matched-control study revealed that incidence of any acute toxicity, severe acute toxicity, and severe late toxicity was not significantly different between CVD subjects (65.1%/10.5%/9.3%) and controls (72.5%/10.4%/3.7%).[9] However, results also suggested that oncology patients with CVD may be predisposed to significantly higher rates of any late toxicity (29.1% CVD vs. 14% control; p=0.001).[5,8] Comparisons of CVD subtype indicated that SLE showed higher crude incidence of *any* acute toxicity (88.2% vs. 76.2%), severe

acute toxicity (29.4% vs. 11.9%), and severe late toxicity (35.3% vs. 4.8%) compared to controls.[8] Several of the subtypes revealed higher incidence of late toxicity compared to controls including RA, SLE, dermatomyositis/polymyositis, polymyalgia rheumatic/temporal arteritis, and mixed connective tissue disorders.[5,8] Lin et al. (2008) concluded that although a predisposition to radiodermatitis in CVD oncology patients has been previously suggested, treatment is generally well tolerated with relatively low incidence of severe acute or late toxicity.[8] Attention must be paid to other influential factors that can impact the risk of toxicity, including CVD subtype, site of irradiation, radiation dose, the use of concurrent chemotherapy, tobacco smoking, and other comorbid diseases or skin conditions.[2,5,8,9,13,14]

Level of Evidence IIa, IV

iii. Skin Pigmentation[5,7,12,13]

Ultraviolet (UV) and ionizing radiation can cause irreparable damage to the skin.[13] Melanin is a component of skin which offers some protection against these effects through the absorption of light over a broad spectrum.[13] Dark skin pigmentation is a result of more melanin and related melanocytes present in the skin and therefore has been thought to be protective. However, expert opinion and research are mixed as to whether individual skin pigmentation is a predictive factor in the development of radiodermatitis. A 5-week comparison study of weekly symptom inventories was completed by the MD Anderson Cancer Center to determine whether skin pigmentation had any effect on the development or experience of radiodermatitis.[13] This study complemented a national symptom inventory at 31 private community practice sites. Results showed that self-reported skin reactions were not influenced by pre-treatment expectations, nor were there any significant differences in pre-treatment expectations between darker and lighter pigmentations. As well, no significant differences were found in reported moderate or severe skin reactions according to treatment type (chemotherapy, radiotherapy, chemoradiation), and no correlation was found between the reporting and severity of post-treatment skin reactions in lighter ($r=0.014$; $p=0.781$) or darker ($r=0.02$; $p=0.936$) pigmentations. However, independent *t*-test analyses indicated a significant difference ($p=0.006$) between average skin problem scores reported by darker (mean = 5.8) and lighter (mean =2.98) pigmentations. Eighty percent of those with darker pigmentation reported moderate skin reactions and 20% reported severe skin reactions, as compared to those with lighter pigmentation; 39% and 8%, respectively. The authors caution that statistical bias is possibly due to the underrepresentation of those with darker pigmentation in the study (national n=33/656 (5%); local n=10/308 (3%)). They concluded that skin pigmentation may influence the frequency of skin reactions leading to more reports of severe post-treatment skin complications in patients with darker pigmentation and that it did not appear to be protective. Supporting their conclusions they suggest that this may be due to poor visible detection of mild or moderate damage in darkly pigmented skin and more noticeable radiation-induced pigmentation effects in lightly pigmented skin.[13] Foundational nursing documents cite this study.[5,7,12] The panel's decision to include skin pigmentation as an assessment element in the adapted guideline is intended to encourage vigilance in skin assessment during all phases of treatment, and to remind clinicians to be responsive to patient concerns.

Level of Evidence III, IV

B. Treatment-Related Risk Factors[4-7,9,10,12]

Severity of radiodermatitis is influenced by several treatment-related factors. Susceptibility to radiation toxicity is influenced by the volume of tissue treated, accelerated fractionation treatments, fractionation schedule, large fraction size, total daily dose, use of bolus doses, location of treatment field (breast, axilla, areas of skin folds),

duration of treatment, type of energy, use of tangential fields, and the use of a radiosensitizer or previous radiation exposure.[4-7,9,10,12] Foundational nursing documents suggest that the location of the radiation field is the most important factor to consider in breast cancer patients.[12] Evidence shows that there is an increased risk of developing acute skin reactions for women undergoing breast irradiation because of the curved, tangential radiation fields and the resultant increased dose to the skin's surface and folds.[12] The inclusion of drug therapy (concurrent chemotherapy, immunotherapy, or targeted therapies) to the treatment plan can impair healing of radiodermatitis.[5] Chemotherapy agents such as anthracyclines, taxanes, alkylating agents, fluorouracil, methotrexate, DOXOrubicin, and gemcitabine have increased risks associated with the development of radiation recall dermatitis – an acute inflammatory response in a previously irradiated field after the administration of a systemic drug.[4,5,9] Hormonal drugs (e.g. tamoxifen), immunotherapy drugs (e.g. interferon), and antimicrobials (e.g. tuberculosis treatment cefazolin) have also been shown to cause this effect.[4,5,9] Chemotherapeutic agents may impair radiodermatitis healing due to effects of immunosuppression, direct cytotoxic effects on normal tissue, or comprised nutritional uptake due to gastrointestinal side-effects.[4]

Level of Evidence III, IV

Assessment Timing/Frequency and Qualified Practitioners

The BC Cancer Agency guideline did not address timing or frequency of skin toxicity assessment, nor practitioner qualifications for performance of same.[1] The WRHA guideline recommends "thorough skin assessments at baseline and at regular intervals throughout treatment" as part of a nursing physical exam.[2] The panel accepted the WRHA recommendation on principle, with intent to modify the statement so as to provide more explicit guidance. Accordingly, consensus recommendations were formulated, based on selected readings from foundational documents[5,12,13,15,16] and discussion by the panel's experts.

Level of Evidence IV (*See Clinical Considerations)*

Standardized Tools for Skin Assessment and Documentation

A. Assessment

The Common Terminology Criteria for Adverse Events (CTCAE)[17] is frequently used at CCMB for description and measurement of adverse events, particularly as part of clinical trials. Further, clinicians of various disciplines are familiar with the tool (nurses, pharmacists, physicians). By consensus decision the Guideline working group recommended use of CTCAE as a standardized tool for grading skin toxicities. The recommendation was accepted by the Panel members.

The Malnutrition Screening Tool (MST)[18] is a concise standardized scoring system used for identifying potential risk for malnutrition. As sound nutrition is a key element in maintaining skin health and promoting recovery from radiation induced skin toxicities, Panel members recommended use of the MST to identify patients who might benefit from early referral for thorough nutrition assessment and counselling.

The Panel recognized that the organization did not have a standardized tool for the purposes of comprehensive skin and wound assessment and therefore tasked the working group with developing one. Creating this customized tool was undertaken as part of the implementation phase of the guideline concurrently with the development of other implementation tools.

B. Nursing Documentation

During the adaptation phase of the guideline development (Decision and Selection module) nursing documentation was raised as a discussion item at several meetings and workshops. It was decided that any new tool must:

- Be electronic with capacity for integrated standardized assessment tools
- Provide consistent and accurate descriptors
- Enhance workflow efficiency (i.e. prevent charting duplication)
- Be specific to the guideline's recommendations yet generic enough to be adapted for assessment and treatment of other cancer related skin wounds
- Allow for overall health assessment of patients in order to determine risk factors for developing radiation dermatitis and predictors of complications, *and*
- Enable focused recording of skin assessment and wound care

Information Services was engaged to create documentation tools in response to these expressed needs. The following were developed:

1. Global Wound Care Assessment Tool which includes the MST (Malnutrition Screening Tool)
2. Focal Skin Assessment and Care Plan which incorporates the CTCAE version 4.0 grading system for radiation dermatitis

These electronic health record templates were designed in 'tick box' format but also allow for free text recording. An added benefit of using standardized templates in this 'questionnaire' format is that periodic system reports may be generated for quality audit purposes. Quality audits will assist in assessing nursing use of the tools and hence, indirectly, measurement of adherence to the guideline recommendations.

References

1. BC Cancer Agency. Care of radiation skin reactions. Available online at: www.bccancer.bc.ca. Updated on 23 October 2006. Accessed on 07 March 2013. ***Level of Evidence IV***
2. Winnipeg Regional Health Authority (WRHA). Wound care guidelines: Radiation. Updated 2005. www.wrha.mb.ca Last accessed 2010. ***Level of Evidence IV***
3. Twardella D, Popanda O, Helmbold I, et al. Personal characteristics, therapy modalities and individual DNA repair capacity as predictive factors of acute skin toxicity in an unselected cohort of breast cancer patients receiving radiotherapy. Radiother Oncol 2003;69:145-53. ***Level of Evidence IIb***
4. Porock D, Kristjanson L, Nikoletti S, et al. Predicting the severity of radiation skin reactions in women with breast cancer. Oncol Nurs Forum 1998;25(6):1019-29. ***Level of Evidence III***
5. Haas ML, Moore-Higgs GJ (Eds.). Principles of skin care and the oncology patient. Pittsburgh: Oncology Nursing Society (ONS) Publishing Division, 2010. ***Level of Evidence IV***
6. Feight D, Baney T, Bruce S, et al. Putting evidence into practice: Evidence-based interventions for radiation dermatitis. Clin J Oncol Nurs 2011;15(5):481-92. ***Level of Evidence IV***

7. Iwakawa M, Noda S, Yamada S, et al. Analysis of non-genetic risk factors for adverse skin reactions to radiotherapy among 283 breast cancer patients. Breast Cancer 2006;13(3):300-7. ***Level of Evidence III***
8. Lin A, Abu-Isa E, Griffith K, et al. Toxicity of radiotherapy in patients with collagen vascular disease. Cancer 2008;113(13):648-53. ***Level of Evidence IIa***
9. Iwamoto RR, Haas ML, Gosselin TK (Eds.). Manual for radiation oncology nursing practice and education. Pittsburgh: Oncology Nursing Society (ONS) Publishing Division, 2012. ***Level of Evidence IV***
10. Butcher K & Williamson K. Management of erythema and skin preservation: Advice for patients receiving radical radiotherapy to the breast: A systematic literature review. J Radiother Pract 2012;11(01):44-54. ***Level of Evidence Ia***
11. Yamazaki H, Yoshida K, Nishimura T, Kobayashi K, Tsubokura T, Kodani N, Aibe N, Nishimura T. Association between skin phototype and radiation dermatitis in patients with breast cancer treated with breast-conserving therapy: Suntan reaction could be a good predictor for radiation pigmentation. J Radiat Res 2011;52:496-501. ***Level of Evidence III***
12. Haas ML. Radiation therapy: Toxicities and management. In Henke Yarbro C, Wujcik D, Holmes Gobel B (Eds.), Cancer Nursing: Principles and Practice (pp.312-51). 7th Edition; Sudbury, Jones and Bartlett, 2010. ***Level of Evidence IV***
13. McNees P. Skin and wound assessment and care in oncology. Semin Oncol Nurs 2006;22(3):130-43. ***Level of Evidence IV***
14. Freiman A, Bird G, Metelitsa AI, et al. Cutaneous effects of smoking. J Cutan Med Surg 2004;8(6):415-23. ***Level of Evidence IV***
15. McQuestion M. Evidence-based skin care management in radiation therapy: A clinical update. Semin Oncol Nurs 2011;27(2):e1-e17. ***Level of Evidence IV***
16. Nystedt KE, Hill JE, Mitchell AM, et al. The Standardization of Radiation Skin Care in British Columbia: A Collaborative Approach. Oncol Nurs Forum 2005;32(6):1199-1205. ***Level of Evidence IV***
17. Cancer Therapy Evaluation Program. Common terminology criteria for adverse events (CTCAE) Version 4.03 DCTD, NCI, NIH, DHHS. Available online at: http://evs.nci.nih.gov/ftp1/CTCAE/CTCAE_4.03_2010-06-14_QuickReference_5x7.pdf. Updated 2010. Last accessed 22 May 2014. ***Level of Evidence IV***
18. Isenring E, Cross G, Daniels L, et al. Validity of the malnutrition screening tool as an effective predictor of nutritional risk in oncology outpatients receiving chemotherapy. Support Care Cancer 2006;14(11):1152-6. ***Level of Evidence III***

III. Clinical Considerations

The following guidance is offered to clinicians to further promote best practices for assessment of radiation-induced skin toxicities and wounds at CCMB. These recommendations are based on consensus of expert opinion after consideration of available literature, consultation with appropriate oncology subspecialists, and panel discussion. All statements are rated as ***Level of Evidence IV.***

Timing/Frequency of Assessment and Documentation

Perform global assessment at baseline (first encounter with patient) and update thereafter as needed, e.g. with changes in the patient's condition and at care transition points such as transfer between providers. Document assessment findings using the CCMB Global Wound Care Assessment (*Appendix 1*).

Perform focal assessment at first sign of Grade 1 skin toxicity (CTCAE v. 4.0), and repeat with each dressing change. Assessment findings should be documented using the CCMB Focal Skin Assessment Tool and Care Plan (*Appendix 3).*

Qualified Practitioners

Comprehensive (global and focal) skin assessment may be performed by a qualified practitioner (e.g. nurse, radiation therapist) according to the individual's level of training and within scope of practice boundaries.

Assessment Tools

Use standardized tools to assess radiation-induced skin toxicities. The CTCAE[3] version 4.0 grading system for radiation dermatitis is recommended for use by nursing staff (*Appendix 3)*.

Consider serial color photo documentation of non-healing chronic wounds. To be of benefit, photos must be taken with the same camera, by the same person, in the same environmental conditions (place, lighting, position). To satisfy Manitoba's Personal Health Information Act (PHIA), written consent from the patient is required prior to each photo.[1] Further information can be found be referring to CancerCare Manitoba's Policy No. 01.103 entitled Audio, Video and Photographic Recordings.

The Malnutrition Screening Tool (MST)[2] is available for nutritional screening of cancer patients at CCMB. Patients with a score of 2 or more may be at risk for malnutrition and should be considered for referral to a dietician for further nutritional assessment and intervention. Nutritional consultation may be offered to patients through the CCMB Department of Patient and Family Support Services. Seek patient input as to preferred site for referral. The MST can be found as part of the Global Wound Care Assessment in *Appendix 1*.

Patient Education

Education is a shared responsibility, and is initiated by all oncology care team members on first encounter with the patient. Patient teaching is continually reinforced throughout the treatment course by radiation therapists and by nurses in follow-up. Patients should be taught to recognize signs and symptoms of radiation-induced skin reactions, and when to report these to a healthcare professional. Teaching must be tailored to suit the individual

patient's condition, knowledge, and comfort level with self-management. Include self-assessment for skin reactions with health promotion education, and provide standardized materials to the patient at the patient's first visit with the oncology care team. *Please see the Patient Education Sheets for the tool in its entirety. (See Appendices 5 to 8)*

Research Implications

Validity and reliability testing of assessment tools selected for use at this treatment centre should be conducted, but such testing lies beyond the scope of this guideline.

References

1. Winnipeg Regional Health Authority (WRHA). Wound care guidelines: Radiation. Updated 2005. www.wrha.mb.ca Last accessed 2010. ***Level of Evidence IV***
2. Isenring E, Cross G, Daniels L, et al. Validity of the malnutrition screening tool as an effective predictor of nutritional risk in oncology outpatients receiving chemotherapy. Support Care Cancer 2006;14(11):1152-6. ***Level of Evidence III***
3. Cancer Therapy Evaluation Program. Common terminology criteria for adverse events (CTCAE) Version 4.03 DCTD, NCI, NIH, DHHS. Available online at: http://evs.nci.nih.gov/ftp1/CTCAE/CTCAE_4.03_2010-06-14_QuickReference_5x7.pdf. Updated 2010. Last accessed 22 May 2014. ***Level of Evidence IV***

Guideline Contacts and Contributors

Contact

Pam Johnston, RN, MN, NP, CONC
Radiation Oncology, Pain & Symptom Management

Panel Members

Pam Johnston, RN, MN, NP, CONC *Radiation Oncology, Pain & Symptom Management*	**Bob Moroz, RT** *Radiation Therapist*
Cathy Coates, RN *CCMB Staff Nurse*	**Michele Morton, RN** *CCMB Staff Nurse*
Linda Davidson, RN *CCMB Staff Nurse*	**Rebecca Pritchard, RN** *CCMB Staff Nurse*
Gina Winski, RT *Clinical Resource Educator*	**Deb Scott, RN** *CCMB Staff Nurse*
Michelle Lobchuk, RN, PhD *Expert Methodologist*	**Tamara Szajewski, RN** *CCMB Staff Nurse*
Erin Mattson, RN *CCMB Staff Nurse*	**Danica Wasney, BSc (Pharm), ACPR, BCOP** *Clinical Pharmacist*

Clinical Practice Guidelines Initiative

Pamela Johnston, RN, BA *Senior Coordinator*	**Jaymie Walker, MSc** *Guidelines Analyst (2015-2016)*
Daile Unruh-Peters, MA *Implementation Facilitator*	**Morgan Murray, MSc** *Guidelines Analyst (2014-2015)*
Susan Friedenberger *Research Assistant*	**Carrie O'Conaill, MPH** *Research Assistant (2013-2014)*
	Sonia E Tsutsumi, BA *Administrative Assistant (2009 – 2011)*

Other Contributors

Kristi Hofer, BSc (Pharm) *CCMB Pharmacy*	**Catherine Russell, BPT** *WRHA Breast Health Centre*
Dr. Sarvesh Logsetty, MD, FRCS(C), FACS *Burn Unit, Health Sciences Centre*	**Beth Szuck, BA, HEc, CACE** *WRHA*
Angela Martens, RD *CCMB Patient and Family Support Services*	**Dr. Marni Wiseman, MD, FRCPC** *CCMB Department of Medical Oncology/Hematology*
Ruth Holmberg *CCMB Medical Librarian*	**Steve Jones, Language Specialist** *St. Boniface Hospital Research*
Kathleen Klassen, RN, MN, GNC(C), IIWCC *WRHA*	

Reviewers

Dr. Rashmi Koul, *Radiation Oncologist, CancerCare Manitoba*

Dr. William Hunter, *Radiation Oncologist, Western Manitoba Cancer Centre*

Jordana Jones, *RT Nurse, Western Manitoba Cancer Centre*

Tamara Wells, *Clinical Nurse Specialist Palliative Care, Winnipeg Regional Health Authority*

Kathleen Klassen, *Acting Director of Centralized Operations, WRHA Home Care Program, Winnipeg Regional Health Authority*

Approved By

Rashmi Koul, MBBS, DNB, MD, FRCPC, CCPE
Head, Department of Radiation Oncology, Medical Director, Radiation Oncology Program, CCMB

Pam Johnston, RN, MN, NP, CONC
Nurse Practitioner, Radiation Oncology, and Pain and Symptom Management, CCMB

Acknowledgements (2008 – 2010)

Special thanks to Queens University Can-Implement Research Study Team:

Margaret B. Harrison RN, PhD
Community Health and Epidemiology
Director, Queen's Joanna Briggs Collaboration
Senior Scientist Practice and Research in Nursing (PRN) Group Queen's University

Joan Van den Hoek BNSc
Practice and Research in Nursing (PRN) Group
Queen's University Kingston

Elizabeth J. Dogherty PhD
Queen's University, School of Nursing

Meg Carley BA
Data Manager, Queen's University, School of Nursing
Data Manager, Canadian Partnership Against Cancer

The authors gratefully acknowledge the support of CancerCare Manitoba, the CancerCare Manitoba Foundation, the Provincial Oncology Clinical Practice Guidelines Initiative, contributors and external reviewers.

IV. Appendices

Appendix 1 - Global Wound Care Assessment

Date: _____

Risk Factors for Impaired Healing:

- ☐ Advanced age > 65
- ☐ Smoking
- ☐ Alcohol use (amount/day) _____
- ☐ Malnutrition

Malnutrition Screening Tool (MST)

Have you lost weight recently without trying?

No	0
Unsure	2

If yes, how much weight (kilograms) have you lost?

1 – 5	1
6 – 10	2
11 – 15	3
>15	4
Unsure	2

Have you been eating poorly because of a decreased appetite?

No	0
Yes	1
Total	

Those patients with a score of 2 or more are at risk of malnutrition and should be referred to the dietician for further assessment and intervention.

- ☐ Heavy Disease Burden
- ☐ Limb Ischemia
- ☐ End of Life
- ☐ Patient Non-Adherence
- ☐ Diabetes
- ☐ Hyper/hypothyroidism
- ☐ Multiple Sclerosis
- ☐ Iron-deficiency Anaemia
- ☐ Collagen Vascular Diseases (CVD) (Rheumatoidarthritis, systemic lupus, Raynaud phenomena, fibromyalgia, polymyositis, dermatomyositis, Sjörgren's syndrome, scleroderma and polymyalgia rheumatica)
- ☐ Organ Transplants
- ☐ Receiving Chemotherapy
- ☐ Allergies (i.e. latex, silicone, tape, antibiotics, etc): _____
- ☐ Other: _____

Pre-existing Skin Conditions that Increase Risk of Radiation Skin Reaction:

- ☐ Eczema
- ☐ Scleroderma
- ☐ Psoriasis
- ☐ Edema-presence of lymphedema can impair healing
- ☐ Personal and family history of radio-sensitive conditions
- ☐ Other: _____

Medications Which Can Cause Photosensitivity:

- ☐ Antidepressants
- ☐ Antimicrobials
- ☐ Steroids
- ☐ Imuran
- ☐ Antipsychotics
- ☐ St. John's wort
- ☐ Immunosuppressive agents
- ☐ Other: _____

Factors Contributing to Radiation Reaction:

- ☐ Large volume of tissue being treated
- ☐ High total dose of radiation
- ☐ Large fractions size
- ☐ Accelerated fractionation treatments
- ☐ Longer treatment duration
- ☐ Use of tangential fields
- ☐ Use of tissue equivalent or bolus material
- ☐ Breast size
- ☐ Areas of compromised skin integrity within treatment field (e.g. lymphocele aspiration)
- ☐ Areas of skin-to-skin contact within treatment area
- ☐ Patient concerns

Appendix 2 – Levels of Evidence

Levels of Evidence	
Ia	Evidence obtained from meta-analysis of randomised controlled trials
Ib	Evidence obtained from at least one randomised controlled trial
IIa	Evidence obtained from at least one well-designed controlled study without randomisation
IIb	Evidence obtained from at least one other type of well-designed, quasi- experimental study
III	Evidence obtained from well-designed, non-experimental descriptive studies, such as comparative studies, correlation studies and case studies
IV	Evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities

British Committee for Standards in Haematology 2007 http://www.bcshguidelines.com

References

1. Shekelle PG, Woolf SH, Eccles M, et al. Clinical guidelines: Developing guidelines. *Brit Med J* 1999;318(7183):593

Appendix 3 - Focal Skin Assessment and Care Plan

Date: _____

Type of Wound:

- ☐ Radiation (select type):
  - ☐ Erythema
  - ☐ Pruritus/Dermatitis
  - ☐ Dry Desquamation
  - ☐ Moist Desquamation
  - ☐ Radiation Recall

Location of Wound:

- ☐ Breast

Size of Wound (cm, mm):

- ☐ Length _____
- ☐ Width _____
- ☐ Depth _____

Description of Skin (if no skin breakdown):

- ☐ Erythema
- ☐ Edema
- ☐ Dryness
- ☐ Scaling
- ☐ Flaking
- ☐ Peeling
- ☐ Excoriation – from scratching
- ☐ Rash

CTCAE Version 4.0: Grading System for Radiation Dermatitis

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Faint erythema or dry desquamation	Moderate to brisk erythema; patchy moist desquamation, mostly confined to skin folds and creases; moderate edema	Moist desquamation in areas other than skin folds and creases; bleeding induced by minor trauma or abrasion	Life threatening consequences; skin necrosis or ulceration of full thickness dermis; spontaneous bleeding from involved site	Death

CTCAE Grade:

- ☐ Grade 0
- ☐ Grade 1
- ☐ Grade 2
- ☐ Grade 3
- ☐ Grade 4
- ☐ Grade 5

Description and Colour of Wound Bed: Describe in Percentage (i.e. 50%)

- ☐ Red _____%
- ☐ Pink _____%
- ☐ Slough/Yellow _____%
- ☐ Eschar/Necrosis _____%

Surrounding Skin/Peri Wound Skin:

- ☐ Intact
- ☐ Maceration
- ☐ Hardness
- ☐ Induration
- ☐ Scaly/dry
- ☐ Denudation
- ☐ Erythema
- ☐ Other: _____

Undermining/Tunneling:

Indicate amount in cm and location via 12hr clock (i.e., 2cm at 5 o'clock)

_____

Drainage Amount:

- ☐ Large (over 10 cm squared on inner dressing)
- ☐ Moderate (4-10 cm squared on inner dressing)
- ☐ Small (1-4 cm squared on inner dressing)
- ☐ Scant (less than 1 cm squared on inner dressing)

Type of Drainage:

- ☐ Serous
- ☐ Sanguineous
- ☐ Serosanguineous
- ☐ Purulent
- ☐ Other: _____

Odour:

- ☐ Present
- ☐ Absent

Cause of Odour:

- ☐ Sloughing necrotic tissue
- ☐ Infection
- ☐ Other: _____

Length of Packing Gauze Required: _____cm

Pain Level:

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6

- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10

Pain Description:

- ☐ Intermittent
- ☐ Continuous
- ☐ Burning
- ☐ Itching
- ☐ Pulling
- ☐ Tenderness
- ☐ Pressure
- ☐ Tingling
- ☐ Shooting/Electrical
- ☐ Ache
- ☐ Other: _____

Culture/Swab Sent?

- ☐ Yes
- ☐ No

Wound Assessments to be done by:

- ☐ Radiation Floor Nurse
- ☐ Home Care Nurse
- ☐ Clinic Nurse
- ☐ Advanced Practice Nurse
- ☐ Hospital/Ward
- ☐ Other: _____

Frequency of Dressing Changes/Assessment:

- ☐ Daily
- ☐ Twice Daily
- ☐ Every Second Day
- ☐ Weekly
- ☐ Other: _____

Dressings to be done by:

- ☐ Radiation Floor Nurse
- ☐ Home Care
- ☐ Clinic Nurse
- ☐ Patient
- ☐ Radiation Therapist
- ☐ Other: _____

Wound Healing:

- ☐ Improved
- ☐ No change
- ☐ Wound deteriorated

Dressing Instructions:

_____
_____
_____
_____
_____

Goal of Therapy:

- ☐ Complete resolution/healing
- ☐ Infection control
- ☐ Palliative care
- ☐ Wound management while receiving radiation

Discharge Plans:

- ☐ Home Care
- ☐ Patient/family to do own dressing _____
- ☐ Clinic Nurse to monitor
- ☐ Hospital
- ☐ Other: _____

Radiation Patient Education:

- ☐ Basic skin care
- ☐ Signs and symptoms of infection
- ☐ Principles of moist wound healing
- ☐ Offered Erythema, Pruritus and Dry Desquamation Patient Education Sheets
- ☐ Offered Moist Desquamation Patient Education Sheet
- ☐ Offered Late Reactions Patient Education Sheet

Patient Understanding of Education Provided:

- ☐ Patient understood education
- ☐ Reinforcement of education required

Appendix 4 – Medications Linked to Photosensitivity

This list does not mean drugs should be discontinued, only that patients may be more likely to have a skin reaction with radiation.

Medications Linked to Photosensitivity

Phototoxic Drug	Examples
Antihistamines	
	cetirizine, cyproheptadine, diphenhydrAMINE, loratadine, promethazine
Anti-infectives	
Fluoroquinolones	ciprofloxacin, levoFLOXacin, moxifloxacin, norfloxacin, ofloxacin
Tetracyclines	doxycycline, minocycline, tetracycline
Others	azithromycin, cefTAZidime, ceFAZolin, dapsone, isoniazid, metroNIDAZOLE, pyrazinamide, sulfamethoxazole/trimethoprim, sulfaSALAzine, sulfiSOXAZOLE
Antifungals	
	voriconazole, itraconazole, griseofulvin
Antiretroviral	
	ritonavir, saquinavir
Antimalarials	
	quiNINE, chloroquine, hydroxychloroquine, pyrimethamine
Antivirals	
	amantadine, acyclovir
Antineoplastics	
	capecitabine, dacarbazine, epiRUBicin, fluorouracil, interferon alpha, pentostatin, procarbazine, tretinoin, vinBLAStine
Cardiovascular	
Diuretics	furosemide, hydroCHLOROthiazide, spironolactone, indapamide, chlorthalidone, metOLazone, triamterene
Antihypertensives	captopril, dilTIAZem, enalapril, NIFEdipine, sotalol
Statins	atorvastatin, fluvastatin, simvastatin, lovastatin, pravastatin
Others	amiodarone, fenofibrate, quiNIDine
Anticonvulsants	
	carBAMazepine, gabapentin, lamoTRIgine, OXcarbazepine, topiramate, valproic acid
Antipsychotics	
Phenothiazines	chlorproMAZINE, fluPHENAZine, perphenazine, prochlorperazine, thioridazine
Other	cloZAPine, haloperidol, loxapine, OLANZapine, QUEtiapine, risperiDONE, thiothixene, ziprasidone

Medications Linked to Photosensitivity – cont'd	
Phototoxic Drug	**Examples**
Antidepressants	
Tricyclics	amitriptyline, clomiPRAMINE, desipramine, doxepin, imipramine, maprotiline, nortriptyline, trimipramine
Selective Serotonin Reuptake Inhibitors	citalopram, FLUoxetine, fluvoxaMINE, PARoxetine, sertraline, St. John's wort
Others	buPROPion, mirtazapine, nefazodone, traZODone, venlafaxine
Sedatives/Hypnotics	
	ALPRAZolam, chlordiazePOXIDE
Analgesics	
NSAIDS	celecoxib, diclofenac, ibuprofen, ketoprofen, meloxicam, naproxen, piroxicam, sulindac
Other	cyclobenzaprine, dantrolene, SUMAtriptan
Antidiabetics	
Sulfonylureas	chlorproPAMIDE, glyBURIDE, glimepiride, gliclazide
Epidermal Growth Factor Inhibitors	
	cetuximab, erolitinib, gefitinib, lapatinib, PANitumumab, vanDETanib
Retinoids	
	acitretin, ISOtretinoin
Sunscreens	
	cinnamates, benzyphenomes, para-aminobenzoic acid, salicylates
Miscellaneous	
	benzocaine, chlorhexidine, coal tar, gold salts, methoxsalen, minoxidil, oral contraceptives, selegiline, tacrolimus, thalidomide
Photodynamic therapy pro-photosensitizers	
	5-aminolevulinic acid, methyl-5-aminolevulinic acid, porfimer sodium, verteporfin

References

1. Shields KM. Drug-induced photosensitivity. *Pharmacist's letter* 2004;20(200509). ***Level of Evidence IV***
2. Zhang AY, Elston DM et al. Drug-induced photosensitivity. *Medscape.* http://emedicine.medscape.com/article/1049648-overview. Last Accessed June 30, 2016. ***Level of Evidence IV***

Appendix 5 – Basic Skin Care

Radiation Therapy Breast or Chestwall — Basic Skin Care

CancerCare Manitoba
ActionCancerManitoba

There are things you can do every day to take care of your skin during radiation.

You should start the following recommendations on the first day of your treatment and continue them until you are finished radiation and completely healed.

Promote Skin Hygiene — *keep radiated skin clean*

- Short, gentle, low pressure showers or baths with lukewarm Water.
- Mild soap may be used gently, if desired.
- Do not scrub the skin in the treatment area.
- Pat skin dry. Do not rub.
- Do not use a wash cloth in treatment areas.
- Deodorants and antiperspirants can be used on intact skin. Patients may continue to use deodorants and antiperspirants (includes aluminum based) if they wish. There is no evidence that skin reactions will be any worse. **Stop use if a skin reaction develops**.
- Do not freshly apply deodorant/antiperspirant on the day of your treatment until after treatment.

Promote Comfort

- Wear loose fitting non-binding clothing (e.g. soft breathable fabric like cotton; sports bra with wide band).

Prevent Infections

- Good hand washing.
- Do not use talcum, baby powder or cornstarch in treatment areas.

Protect from the Skin from Injury

- Do not use tape or bandages in treatment field.
- Do not scratch (e.g. keep your nails short).
- Do not wear jewelry over treatment area.
- Avoid using ice packs, heating pads and hot water bottles on the treatment area. You may not be able to feel extreme temperature changes in the radiated areas and you may cause an injury.
- Do not swim in lakes or pools if you have a radiation skin reaction. If the treatment area is intact, swimming in pools or lakes is permissible. After swimming immediately remove swimsuit and rinse the skin.
- Do not use hot tubs and saunas.
- Do not shave in treatment area (if necessary use an electric shaver instead).
- Do not use products containing alcohol, alpha hydroxyl acids, perfumes or other drying agents in treatment areas.
- Do not use petroleum based products.
- Do not freshly apply moisturizers within a two hour period before treatment.
- Do not use tanning lamps/salons.
- Avoid vigorous rubbing in the treatment area.

Reminder!

Do not freshly apply moisturizer within a ***two hour period*** before treatment.

Do not freshly apply deodorant/antiperspirant ***on the day of your treatment until after treatment.***

Evidence Based Recommendations for the Assessment and Management of Radiation-Induced Skin Toxicities in Breast Cancer **Guideline** — Basic Breast or Chestwall Radiation Skin Care Version 1.0

Protect from Environment

- Treatment area should not be exposed to the sun.
- Cover treatment area with clothing and wear a wide brimmed hat to protect from the sun and wind.
- Use a sunscreen (SPF 30 or higher) if the treatment area cannot be kept out of the sun and as long as the skin is not open. Wash off the sun screen after being in the sun.
- Do not freshly apply sunscreen within a two hour period before treatment.

Keep Your Skin Healthy

- Drink enough fluids. Females should drink approximately 2.2 litres (9 cups) and males 3 litres (13 cups) total fluids per day.
- Limit how many drinks with caffeine you have each day. This includes coffee, tea and colas. It is recommended not to have more than 237-300 mL or 400 mg of caffeine per day. Having more caffeine can lead to dehydration.

Moisturizers should be non-scented, lanolin free, and alcohol free.
Use at least 2—3 times per day.

STOP using moisturizers if your skin becomes open **AND** call a member of your Radiation Oncology team!

- Follow Canada's Food Guide for good nutrition. Make sure you are eating enough protein. This can help your skin to heal.
- If you are having trouble eating and/or are experiencing weight loss, talk to your Radiation Oncology Team; they may refer you to see a dietician. You can take a multivitamin/mineral supplement to help you meet your nutritional needs.
- For diabetics, it is important to keep your blood sugar levels within your recommended range. If the blood sugar is too high, there may be delayed healing of the radiated skin or an increased risk for infection.
- Use a non-scented, lanolin free, alcohol free moisturizer (e.g. glaxal base cream) on your skin at least 2-3 times per day throughout treatment. **If your skin becomes open, stop using the moisturizer and call your Radiation Oncology Team.** Remember, do not freshly apply moisturizers within a two hour period before treatment.
- Aloe Vera gel can be used to cool the skin. It does not moisturize skin.

Additional Notes:

Advice is available at any time!

JUST ASK a member of your Radiation Oncology Team!

Appendix 6 – Erythema and Dry Desquamation

Radiation Therapy Breast or Chestwall — Skin Changes/Reactions: Erythema and Dry Desquamation

CancerCare Manitoba
ActionCancerManitoba

Erythema — the radiated skin becomes pink to red in colour. There may also be mild swelling, burning, itching and pain. Usually occurs 2—3 weeks after starting treatment.

Dry Desquamation — dryness of the radiated skin, itching, scaling, flaking and peeling. These skin changes cause a break in the skin. Open skin can increase the risk of infection.

Important

If you notice that you have Erythema or Dry Desquamation talk to a member of your Radiation Oncology Team.

Continue to follow the guidelines laid out on the Radiation Therapy Breast or Chestwall — Basic Skin Care sheet that you were given. In addition:

Promote Skin Hygiene — *keep radiated skin clean*

- Continue to bath or shower if possible using recommended soaps, as tolerated.
- If you take baths, do not soak the open skin under the water. This water is dirty and can cause an infection.
- Deodorants and antiperspirants can be used on intact skin. Patients may continue to use deodorants and/or antiperspirants if they wish. There is no evidence that skin reactions will be any worse. **Stop use if a skin reaction develops.**
- Do not freshly apply deodorant/antiperspirant on the day of your treatment until after treatment.

Reminder!

Only use deodorants and antiperspirants on intact skin.

STOP use if you develop a skin reaction.

Do not freshly apply deodorant/ antiperspirant ***on the day of your treatment* until after treatment**.

Itchy Skin

- Talk to your Radiation Oncology Team about hydrocortisone cream and/or an oral antihistamine to relieve itchiness.

Promote Comfort

- Medications are available to treat pain. Talk to your Radiation Oncology Team.

Reminder!

Do not freshly apply moisturizer within a ***two hour period*** before treatment.

Prevent Infections

- Every day check for signs of infection (fever, odour, discharge, swelling or pain). Contact your Radiation Oncology Team if you have any signs of infection.

Protect the Skin from Injury

- Open skin is vulnerable to infection. Do not swim in pools or lakes. Chlorine can irritate and dry the skin. Lakes can contribute to skin infections.
- Do not freshly apply moisturizers within a two hour period before treatment.

Protect from Environment

- Continue to follow basic skin care guidelines.

Keep Your Skin Healthy

- Continue to follow basic skin care guidelines.

Evidence Based Recommendations for the Assessment and Management of Radiation-Induced Skin Toxicities in Breast Cancer **Guideline** — Erythema, Itch and Dry Desquamation Version 1..0

Appendix 7 – Moist Desquamation

Radiation Therapy Breast or Chestwall — Skin Changes: Moist Desquamation

CancerCare Manitoba
ActionCancerManitoba

Moist Desquamation is when the skin peels, blisters and has clear yellow drainage. Open skin can be painful because the nerves in the skin are not protected. This can be worse in areas where the skin touches other skin. For example: in the armpit and side of chest being rubbed by the arm with movement.

If you notice that you have moist desquamation talk to a member of your Radiation Oncology Team. The area usually needs to have a dressing put on to keep it clean and prevent infection.

Continue to follow the guidelines laid out on the Radiation Therapy Breast or Chestwall — Basic Skin Care and Radiation Therapy Breast of Chestwall — Skin Changes: Erythema, Itch and Dry Desquamation sheets that you were given. In addition:

Promote Skin Hygiene — *keep radiated skin clean*

- Do not use soap on open skin.
- Do not use deodorants and antiperspirants on open skin.

Promote Comfort

- Medications are available to treat pain. Talk to your oncology doctor or nurse.
- Talk to your radiation nurse who will help you with dressings if needed.

Prevent Infections

- Every day check for signs of infection (fever, odour, discharge, swelling or pain). Contact your Radiation Oncology Team if you have any signs of infection.

Protect the Skin from Injury

- Continue to follow basic skin care guidelines.
- Open skin is vulnerable to infection. Do not swim in pools or lakes. Chlorine can irritate and dry the skin. Lakes can contribute to skin infections.

Protect from Environment

- Continue to follow basic skin care guidelines.

Keep Your Skin Healthy

- Continue to follow basic skin care guidelines.
- Do not use moisturizer on open skin.

You should check daily for infections.

Signs of infection are:
Fever
Odor
Discharge
Swelling or pain

Evidence Based Recommendations for the Assessment and Management of Radiation-Induced Skin Toxicities in Breast Cancer **Guideline** — Moist Desquamation Version 1.0

Appendix 8 – Late Skin Effects

Caring For Yourself After Radiation

CancerCare Manitoba
ActionCancerManitoba

It is important to continue to follow the instructions given to you on the Radiation Therapy Breast or Chestwall — Basic Skin Care Information sheet; and any other additional sheets you may have been given (Radiation Therapy Breast or Chestwall — Skin Changes: Erythema, Itch, Dry Desquamation and/or Radiation Therapy Breast or Chestwall — Skin Changes: Moist Desquamation) until your side effects have gone away — usually within 6—8 weeks.

Skin Care

- Skin reactions (redness, itchiness, peeling and/or blistering) in the treated area may continue to increase for up to 7—10 days following the completion of your treatment. The reactions should then slowly start to improve. It may take up to 6—8 weeks before your skin is fully healed.
- Some patients have been given permanent tattoos, while others may have had marks drawn on their skin. Do not scrub off any skin marks—marks will disappear on their own.
- If your skin is peeling or blistering it is important that you follow the specific washing/cleaning instructions given to you by the nurse or therapist.
- Wait until the tenderness/redness and itchiness has gone away before resuming use of cosmetics or perfumes, and/or shaving in the treated area.
- Over time you may notice changes in the treated skin; it may appear slightly darker or tanned, or you might notice more freckles.
- The treated skin may always be more sensitive to the sun and cold. Keep treated areas well protected by covering up when outside. Use a sun block product with a SPF of at least 30; put it on 30 minutes before going out. Re-apply at least every two hours or after swimming or sweating. It is recommended to use sunscreen on sunny days in the winter. Remember to check sunscreen bottles for best before date—old sunscreen will not protect you.
- Do not use tanning beds.

Reminder!

You may experience fatigue for some time after the completion of treatment. Consider adjusting your life style for a few months (i.e. only return to work part-time).

Fatigue

- Tiredness and fatigue will continue while your body heals. Your energy levels will return with time, usually within 8—12 weeks after your last day of treatment. If fatigue persists see your physician. Follow *Canada's Food Guide* for recommendations of the amount and type of foods required to meet your nutritional and physical needs.

Follow Up Care

After your treatment is completed, a follow-up appointment will be scheduled. At this appointment you will be provided with a personalized follow-up care plan which will outline a follow-up schedule including necessary tests and appointments, what symptoms to watch for, and a summary of the treatments you received to treat your breast cancer. A copy of this follow-up plan will be provided to your family physician or nurse practitioner.

Additional information about available cancer and post treatment programs can be found by calling the **Breast & Gyne Cancer Centre of Hope** at 204-788-8014 or 1-888-660-4866 (toll free) or in a booklet entitled *Moving Forward after Cancer Treatment* is available online at movingforwardaftercancer.ca.

Important

If you do not receive a treatment summary/follow-up care plan from your Radiation Oncology Team please contact your clinic nurse @

_____

Evidence Based Recommendations for the Assessment and Management of Radiation-Induced Skin Toxicities in Breast Cancer **Guideline** — Caring for Yourself and Late Skin Reactions Version 1.0

Late Effects

You may experience late effects from your radiation treatment. Late effects are side effects from radiation that may show up several months to years after the treatment has ended. Not everyone will have late effects, but it is important to know what to look for.

Within the treated area, the way your skin looks, feels and moves can change. It may be more severe for some people than others. These effects may be permanent or improve gradually over time. Late radiation skin changes may include:

- **Scaling** is when the skin peels and flakes. This dryness is caused by damage to the sweat/oil glands.
- **Atrophy** is when the radiated skin becomes thin **and** fragile. Skin may recover over time but it will never get back to the way it was before radiation.
- **Telangiectasia** is purplish-red spots on the skin surface that look like little spiders. This is caused by damage to tiny blood vessels in the skin. This can occur up to 8 years following radiation therapy.
- **Fibrosis** is when the skin feels hard, thick and uneven. This can cause tightness that limits movement of the area. Soft tissue under the skin can become hard and painful. Fibrosis can occur 4-6 months after treatment.
- An **ulcer** is an open sore that does not heal easily. An injury to the radiated area can cause the skin to become red, hot and painful. The skin may break open and cause an ulcer.
- **Hyperpigmentation** is a darkening of the skin. This often resolves in 3 months to a year after completion of radiation but may not go away. People with darker skin have more melanin and may experience more hyperpigmentation.
- **Hypopigmentation** is a lightening of the skin. This can be a permanent change that occurs following the resolution of hyperpigmentation.
- **Lymphedema** is a collection of fluids that causes swelling in the arms.

Please contact the **Breast and Gyne Cancer Centre of Hope** at 204-788-8014 or 1-888-660-4866 and ask to speak to the Breast Cancer Patient and Family Educator **as soon as possible** if you notice:

- Telangiectasia
- Severe fibrosis causing pain or which limits the ability to move the area and nearby limbs
- Tissue breakdown or ulceration
- Severe scaling
- Lymphedema

Additional Notes:

_____

_____

_____

_____

_____

_____

_____

CancerCare Manitoba
675 McDermot Avenue
Winnipeg, Manitoba, Canada
R3E 0V9
www.cancercare.mb.ca

CCMB Clinical Practice Guideline: Symptom Management
Management of Long-Term Effects of Radiation-Induced Skin Toxicities in Breast Cancer – A 5 Part Series
January 2018