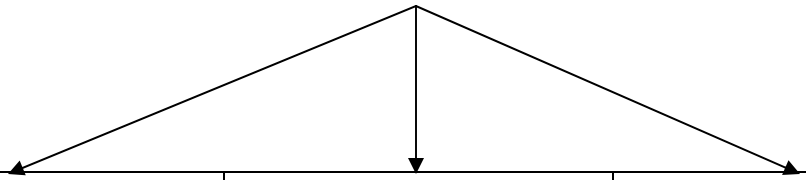
MALIGNANT WOUNDS
ASSESSMENT AND MANAGEMENT
ALGORITHM

ASSESSMENT /DIAGNOSIS

- Complete History
- Physical Status
- Psychosocial and Quality of Life Concerns
- Nutritional Assessment
- Investigations/Diagnostic Tests
- Wound Assessment



TREAT THE CAUSE	TREAT PATIENT/FAMILY CONCERNS	TREAT THE WOUND
• Surgery • Chemotherapy • Radiotherapy • Hormonal Blocking Agents	• Pain Management • Impact on the Patient • Address Psychological Issues and Coping Strategies Refer to Recommendations on Care of the Wound bed	• Prevent/Treat Infection • Control Bleeding • Manage Exudates • Control Odor • Preserve Peri-wound Skin Integrity • Aesthetic Dressing Stabilization Refer to Recommendations on Care of the Wound bed

MALIGNANT WOUNDS

INTRODUCTION

A malignant wound is also known as tumor necrosis, a fungating wound, ulcerating cancerous wound, or malignant cutaneous wound. A malignant wound can be an emotional and physical challenge for patients, families and even for the experienced clinician. Fungating and ulcerating wounds can be unsightly, malodorous and painful. These wounds can be a constant reminder of disease progression. Social isolation can result at a time when the patient needs more time with family and friends

Malignant wounds are caused by infiltration of the epidermis by primary or metastatic tumor, cutaneous infiltration occurs via the lymphatics or bloodstream or as a result of direct invasion from a primary lesion (Ferrell & Coyle, 2001). Once the fungating or ulcerating wound develops, perfusion of tissues is altered and the mass expands, the center of the tumor becomes hypoxic and leads to tumor necrosis. Additionally tumor cells secrete growth factors that support the growth of the tumor. Often large amounts of necrotic material are present in these wounds and account for the odor. The tumor may extend down into deeper structures with development of sinus or fistula formation, common in abdominal and peritoneal wounds. A malignant wound usually presents as a discrete non-tender nodule, skin toned, pink, violet-blue or black-brown in color.

The incidence of malignant wounds is unknown, but it is estimated that 5-10% of patients with metastases will develop them, and they primarily occur in the last 6 months of life. (Haisfeld Wolfe & Rund, 1997) Malignant wounds can occur with many types of cancers, commonly associated with skin, breast, lung, head and neck, melanoma, colorectal, sarcomas, cervix and ovarian cancers. (Appendix1 &2) The approach to care is holistic and primarily palliative with the aim to control symptoms at the wound site and reduce the impact of the wound on the patient's daily life. Unless the pathology is controlled these wounds are not expected to heal.

ASSESSMENT AND DIAGNOSIS

Complete history

- Underlying etiology-cancer type
- Past and current treatment of cancer and wounds
- Impact of disease (process and burden) and treatments

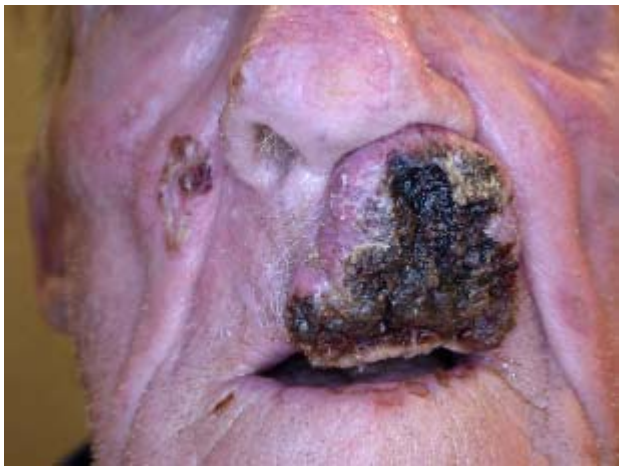
- Co morbidities: diabetes, immunosuppression**,** peripheral vascular disease (extremity wounds)**,** coagulation therapy, and clotting problems
- Allergies/sensitivities to dressing products &/or tape.

Assessment of physical status

- Physical capabilities
- Functional limitations and compromise from location of wound
  - E.g. blindness, deafness, difficulty walking, eating or dressing
- Medications- NSAIDS, steroids, chemotherapy etc.

Wound Assessment

- Refer to WRHA Wound Care Recommendations pg 11-15.
- Potential for Serious Complications:
  - Lesion is near major blood vessels; potential for hemorrhage
  - Lesion is near major blood vessels: potential for vessel compression/obstruction
  - Lesion is near airway: potential for obstruction



Assessment of Psychosocial and Quality of Life Concerns

- Cosmetic effects of dressing
- Body image alterations

- Attitudes and feelings regarding wound, cancer and treatment: e.g. depression, anxiety, denial, anger, shock, embarrassment, fear, guilt, lack of respect or self esteem
- Coping strategies/style
- Beliefs and values/ meaning of the event
- Cultural issues/marginalization
- Alterations in life related to wound and dressings- family, career, social activities
- Impact on family and partner e.g. relationship problems, sexual intimacy, impact on role within the family, functional ability,
- Financial issues
- Spiritual issues
- Communication difficulties
- Informational needs
- Support and support networks
- Identification of the person who will do wound care
- Determine expectations and needs
- Determine short/long term goals (Naylor, 2000., Kelly, 2002)

- Patient self-assessment tools maybe helpful. The Edmonton Symptom Assessment Scale (ESAS- *Appendix: 3*) will provide information on severity of pain, depression, sense of well-being and anxiety. (Chang, 2000)
- Palliative Care Performance scale*:* Appendix 4**.**

Nutritional Assessment

- Poor nutritional status (a common finding in patients with cancer) impairs the ability to maintain skin integrity and to heal wounds. Adequate nutrition is essential for healing and plays a pivotal role in the success or failure of the treatment plan.

- Nutritional screening is necessary to identify patients at nutritional risk and should take into account the following nutritional risk factors that adversely effect wound healing:

  - Recent significant weight loss. Measure height and weight at regular scheduled intervals. Contact dietitian if an adult patient has lost 4.5 kg (10 lbs) or more.
  - Impaired oral intake due to decreased appetite, swallowing difficulties, nausea and vomiting, taste changes, poor appetite and mucositis.
  - Impaired absorption caused by infection, malabsorption, medication and pancreatitis.

- Increased metabolic demand caused by cancer, trauma or infection.(Cartwright, 2002)
- Decreased Serum albumin.
- Decreased Pre-albumin (better predictor of recent changes in nutritional status).
- Decreased Serum transferrin.
- Decreased total lymphocyte (WBC) count.
- Decreased hemoglobin (<100 may be associated with poor wound healing).

o Patients identified with malnutrition or those who could develop malnutrition require further nutritional assessment by the dietitian.

Possible Investigations/Diagnostic Tests

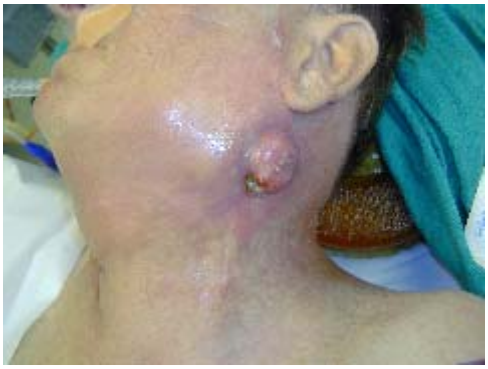
- o Complete Blood Count- Hemoglobin, WBC including neutrophils, S-transferrin, PT, PTT, INR
- o Albumin, total protein
- o Glucose
- o C&S and Fungus tests- if signs and symptoms of infection – Refer to WRHA Wound Care Recommendations for instructions on obtaining a wound culture pg 21
- o Viral Swabs if herpes suspected
- o Suspected osteomyelitis
  - Bone scan
  - Erythrocyte Sedimentation Rate /C-Reactive Protein
  - X-rays
- o CT scan- assessment of disease progression
- o Assess cardiac and respiratory function- P02 level, ankle-brachial index (ABI) pressure, capillary refill, vital signs and peripheral pulses if an extremity involved.

TREATMENT

Malignant wounds are often difficult to manage related to their location, odor, excessive exudates, and propensity for bleeding. Every malignant wound is unique in its appearance and presenting symptoms. The most common symptoms associated with malignant wounds are malodor, excessive exudates, infection, bleeding, maceration and excoriation of peri wound skin, pruritis, pain, poor aesthetics and cosmetic effects of dressings.

Interdisciplinary team management is required to manage these wounds. The team may include the patient, family, caregiver, oncology professionals (medical, surgical and radiation), palliative care professionals, family physician, home care nurse, dietitian, and

pain and symptom clinics, psychosocial oncology, enterstomal therapy nurses, lymphedema therapist, clinical nurse specialist or symptom/palliative care nurse clinician as appropriate. Consideration of cost of dressings should be kept in mind with use of less expensive when possible but consider more costly when needed.



Treat the Cause

- The use of anti-cancer treatments may be helpful in the management of malignant wounds. The decision to use treatment must balance with the potential benefit to the patient with regard to symptom control and side effects, which might adversely affect quality of life.

- Primary treatments for fungating cancers are often a combination of:
  Surgery:
  - Surgery can be used occasionally to reduce tumor mass, to debride wound, to extend symptom free period and improve cosmetic appearance.
  - Malignant wound would need to be amenable to complete excision and defect repair.
  - Surgery may not be possible due to the extent of the disease, health status, healing ability, hemorrhage and/or involvement of surrounding structures and organs.

  Chemotherapy:
  - Chemotherapy can relieve tumor symptoms and decrease mass
  - Effectiveness depends on tumor's responsiveness to chemotherapy.

  Radiotherapy:
  - Will destroy malignant tumor cells thereby reducing the size of the wound and alleviating symptoms such as exudates, bleeding and pain.
  - With radiation treatment wound may initially deteriorate as malignant cells die and skin reactions occur.

  Hormonal blocking agents:

- Used for hormone sensitive tumors

Response is slow, and may take 4-6 weeks before decrease in progression and size of wound is noted.

Treat the Patient/Family Concerns

- Patients living with malignant wounds often must cope with the issues of pain, physical disfigurement, diminished function and mobility, intolerable wound odor and advancing cancer.
- Malignant wounds can impact the patient's body image, self-esteem, psychological well-being and quality of life. Common psychological reactions include fear, anxiety, depression, denial, anger, guilt, and loss of control, embarrassment, social isolation and lowered self-esteem. Non -healing aspects of malignant wounds can result in feelings of hopelessness. It is important to assess for these factors when doing a wound assessment.

Impact on the Patient/Family

Management:

- Address physical, psychological and social concerns
- Provide emotional support- psychosocial oncology services, support groups

Appropriate spiritual care according to the patient's beliefs

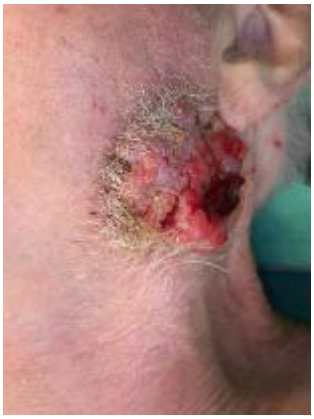
- Pay attention to outward appearance of individual
- Provide patient and family education regarding:
    - Signs and symptoms of infection
    - Pain management details
    - Dressing changes- dressings required, dressing procedure, frequency of dressing changes, extra equipment and cleansing solution required
    - Reportable wound conditions:
        - Increase in amount/malodorous exudate
        - Pruritis/cellulitis
        - Severe emotional distress
        - Increase or change in pain
        - Bleeding
        - Fever
        - Major change in the wound

    - Optimize patient and family autonomy
        - Enhance mobility /activity
        - Maximize nutrition
        - Home care services as required
        - Involve patient and family in care decisions
        - Open and honest communication of goals and decisions

    - Access to support services that will improve the patient's quality of life such as psychosocial oncology counseling services, dietitian services, pain and symptom clinics, art therapy or yoga programs, children's programs etc…
    - Assess and consider financial situation
    - Ability to obtain needed wound care supplies
- Need for education of patient/family about palliative management of severe bleeding
- Need for education of patient/family about palliative management of severe swelling and pain, possible tissue necrosis
- Need for education of patient/family about palliative management of airway obstruction

Address Psychological Issues and Coping Strategies:

- Recognizing that non-verbal caregiver reactions to the wound will be observed and interpreted by the patient.
- Encourage discussion by patient and family of their concerns and feelings.
- Be open to cultural or alternative patient and family approaches.
- Consider benefit of diversional therapies such as music, massage, relaxation or meditation.
- Consider referral to psychosocial oncology services, counseling services or social work department



Pain Management

- Refer to WRHA Wound Care Recommendations: pgs 22-23.
- Using non-adherent dressings and maintaining a moist wound environment can help decrease pain and protects exposed nerve endings.
- Occlusive dressings may help to decrease nerve pain.
- The management of pain requires identification of the nociceptors involved so that appropriate analgesia may be prescribed. These pains can be the result of

tumor pressing on or invading adjacent nerves, blood vessels and tissues. Malignant wound pain may be caused by stimulation of nerve endings (nociceptive pain) and/or pain caused by nerve dysfunction (neuropathic pain).

- Analgesia includes both non-opioids and opioids for pain management of nociceptive pain.
- Neuropathic pain may require medications other than opioids such as anticonvulsants (e.g. gabapentin), antidepressants (e.g. amitryptyline) or nerve blocks.
- Topical opiates or NMDA receptor antagonists, anesthetic creams, gels, or sprays may be helpful with pain control and minimize use of systemic medications.
- Non-steroidal anti-inflammatory drugs may be used for painful skin surface pain.
- Assess pain severity routinely– e.g. Edmonton Symptom Assessment Scale (*Appendix***:** 3), a 0-10 scale, or FACES scale *(Appendix: 5)*
- Very short acting medications such as – fentanyl, sufentanil, and nitric oxide (may be useful for pain that occurs with dressing changes as quickly metabolized. Refer to Incident Pain Protocol: http://www.palliative.info/
- Consider use of relaxation, distraction, therapeutic touch etc. Cancer patients can be referred to Mind Body Approaches group at CCMB. Contact for more information 787-4119**.**

Nutrition Management

Energy Requirements:

- Patients with malignant wounds have a high metabolic demand for healing. A stress-response factor needs to be applied. General guidelines: 25–35 kcals/kg body wt/day. Patients require regular meals and snacks throughout the day to ensure energy needs are met. (Nestle Clinical Nutrition, 1998)

Protein Requirements:

- Protein is essential for healing. Heavily exudating wounds increase protein losses. General guidelines: 1.5-2.5 grams of protein/kg body wt/day. Good sources of protein include: meat, fish, poultry, eggs, milk, cheese, yogurt, peanut butter, nuts/seeds and legumes. (Nestle Clinical Nutrition, 1998)

Micronutrient requirements:

- Prevention of a deficiency is usually accomplished by providing an increased intake. Variety and balance in the diet will provide micronutrients needed for healing.
- Zinc, Vitamin A, Vitamin E and Vitamin C play a significant role in wound healing. Oral supplementation should be considered in the form of a multivitamin/mineral supplement based on recommended nutrient intakes.

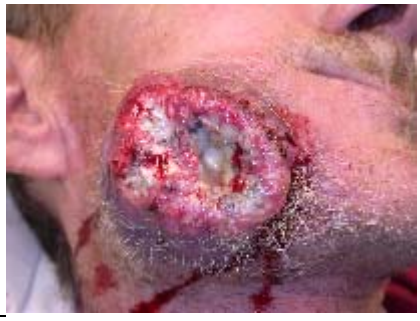
Fluid Requirements:

- Assessment and correction of dehydration is important to optimize healing. Fluid may be lost through exudating wounds. Maintain good hydration (1500-2000 mls/day of hydrating fluids).

Patients and their caregivers should be instructed on the importance of nutrition in relation to wound healing and nutrition support (dietitian referral) should be offered as needed.

Treat the Wound

- Refer to WRHA Wound Care Recommendations pgs10-32.
- Current wound care practice and treatment are based on the theory of moist wound healing. In malignant wounds management of exudates involves finding a balance between dryness and excessive exudates
- The use of traditional dressing products such as gauze and paraffin tulle is not recommended in the care of malignant wounds. These products often adhere to the wound and become incorporated in tissues within the wound and cause significant wound trauma on removal, exacerbating pain and bleeding.
- Estimate optimal wear time according to volume of exudates, nature of exudates, manufacturer instructions, clinical setting, and activity level of the patient.
- Apply a dressing that will facilitate as few dressing changes as possible so as to reduce the disruption to the patient's life to a minimum is desired.
- Select absorbent, moisture–retentive products and a secondary venting material that is flush to the wound and body contours in order to prevent exudates leakage and peri-wound maceration.



Treat Infection

- Refer to WRHA Wound Care Recommendations pg 19-22.
- Inflammatory lesions must be differentiated from an infectious process. Assess for clinical signs of infection (fever, redness, heat, edema, elevated WBC, purulent discharge, odor). Infection maybe difficult to detect if patient is immunosuppressed.
- Cancer and its treatments can increase the risk of infection development or mask the signs of infection. Drugs such as steroids are frequently prescribed and may mask the signs of infection. Signs and symptoms of infection can also be masked if patient is immunocompromised.
- Cleansing of a wound is followed by adequate debridement of necrotic tissue at the wound site if the patient's prognosis is good (Palliative Performance Scale 30% or greater) and the wound is not friable

- Yeast infections are common in cancer patients Consider yeast infection if area moist and shows erythema, papular rash, burning, itching and/or scaling.
- Seek dermatology or infectious diseases consultation if symptoms unresolved after initial treatment. However if patient's Palliative Performance score is less than 30% it may be more appropriate to provide comfort care only.
- For debridement implications please refer to WRHA Wound Care Recommendations pgs19-22.

Pharmacological Treatment

- Systemic antibiotics can induce intolerable side effects such as nausea and diarrhea.
- Topical and oral metronidazole is useful for treatment of odor and infection (aerobic anaerobic organism) Topical metronidazole may be useful for aerobic and anaerobic organisms and to overcome the side effects induced by systemic antibiotics.
    - Topical metronidazole 0.75% or 0.8% applied 1-2x/day (e.g. Metrotop Gel, Metrogel) directly to wound or dressing. (BC Cancer Agency, 2003, Bower et al., 1992., Clark, 2002., Finlay et al., 1995)
    - Cover metronidazole with non-adherent dressing to prevent absorbent cover dressing from sticking.
- In wounds with deep cavities or with vaginal tumors could try gauze soaked in IV metronidazole solution may be useful. Use 100cc IV metronidazole bag- draw up 10cc in a syringe from bag and soak gauze or apply directly to wound.
- Compounding pharmacy's are able to produce a Metronidazole powder that can be sprayed onto wounds.

- For improved penetration in extensive lesions consider use of systemic metronidazole. This could however increase the risk of sensitization. Patients may have difficulty with side effects (tachycardia, facial flushing, headache, nausea and emesis, alcohol intolerance).
- Consider use of silver sulfadiazine to control pseudomonas infection, if wound is dry.
- Avoid antiseptics such as hydrogen peroxide, povidine iodine, and sodium hydrochlorite, as they may cause tissue damage and pain.
- Consider use of slow release iodine products i.e. Iodosorb. Discontinue use as soon as infection under control. Not to be used in patients with thyroid disease or iodine sensitivity.
- Consider use of specialized antimicrobial dressing to control infection at site.

Control of Bleeding

- Wound bleeding is common in malignant wounds related to tumor necrosis. Prevention is the best therapy for controlling bleeding. Decreased platelet function and increased pressure on tissues from tumor infiltration may cause the wound to bleed easily. Bleeding may also be the result of an adherent dressing. Spontaneous bleeding may occur if tumor erodes into a blood vessel. (e.g. fungating breast wounds).Rule out potential causes such as infection, adherent dressings, and anticoagulant therapy.

Prevent Trauma:

- Refer to WRHA Wound Care Recommendations pg 27-32.
- Use caution with dressing application and removal. Moisten dressing to facilitate removal if dressing adherent or bleeding is induced. .
- Avoid frequent, unnecessary dressing changes.

Control Spontaneous bleeding

- Use hemostatic agents for slow capillary bleeding
  - Alginates – natural haemostats
  - Silver nitrate
  - Topical thrombin
  - Gel foam
  - Oxidized cellulose
  - Collagen materials

- Review overall management: medications that are vasodilators or alter viscosity, dietary factors. (e.g. Vitamin K).
- Assess feasibility of radiation to area- for moderate to heavy bleeding. Referral to radiation oncologist for assessment.
- Chemotherapy for chemo responsive malignancies if feasible.
- Surgery for appropriate lesions e.g. cauterization, ligation.
- Radiological techniques such as intravascular embolization for persistent heavy bleeding.
- Fibrinolytic inhibitors
  - Transexamic acid can be used topically or orally contact your pharmacist. (Dean et al. 1997)
  - 1% Alum may be useful for small bleeds (Young, 1997)
- Items and medications to have on hand in case of a severe bleed:
  - Dark (red, brown, black or green) towels
  - Benzodiazepines- (Midazolam) subcutaneously will help to sedate patient and decrease distress.
  - Provide pain medication if experiencing pain.

- Apply gentle pressure for 5-15 minutes with care not to cause more tissue damage. Some patients may not be able to tolerate this due to pain.

- Sulfracrate paste may be helpful for slowing capillary oozing.(Naylor, 2002, Pudner, 1998. , Mc Murray, 2002)

- Topical adrenaline can be applied to heavily bleeding areas to induce local vasoconstriction and halt bleeding. Must be used only under medical supervision as excess use of adrenaline can cause ischemic necrosis. (Grocott, 2000) Gauze soaked in adrenaline 1:1000 applied with pressure for 10 minutes to control hemorrhage. (Bird, 2000., Mc Murray, 2003., Grocott, 1999)

- Surgical haemostatic sponges can be used as a practical emergency measure for controlling fast capillary bleeding at home and in hospital or can be left on wound and covered with a dressing. (Naylor 2002.,Grocott, 1999)

- Monitor hemoglobin to ensure anemia has not developed with persistent moderate to heavy bleeding. (Dowsett, 2002)

Management of Exudate

Disorganized hyperpermeable tumor vasculature can cause an increased amount of exudates to be produced by the wound. Exudate production is increased if the tumor cells secrete vascular permeability factor which causes the microvasculature to be hyperpermeable to fibrinogen and plasma colloid Increases in exudates production can be also be the result of the inflammatory response and the breakdown of bacterial proteases (an enzyme which digests proteins). (Collier, 2000)

- Refer to WRHA Wound Care Manual Care of the Wound bed pg. 27-32. “Exuding fungating wounds are managed optimally through the maintenance of humidity, and therefore moisture, at the wound dressing interface, together with absorptive capacity and controlled venting to remove excess exudate that is excess to the requirements for interface moisture levels.” (Grocott, 2000)
- The appearance and composition of exudates will vary according to its origins and the condition of the wound.
- Debride bacteria laden necrotic tissue using the autolytic process. Refer to WRHA Wound Care Recommendations pg 17-19. However debridement is not always appropriate for patients who have extensive exuding wounds or multiple dry necrotic lesions. Largely because of exudate management problems.
- The use of hydrating dressing products such as hydrogels can increase exudates. Use them use only when wound becomes dry.

- Use absorbent filler products such as alginates, hydrofibers, foam dressings, hypertonic saline gauze (use only for moderate to heavy exudates), or polysaccharide bead dressings.
- Some patients may experience a drawing/pulling sensation**.** Fill undermining or open areas loosely as dressings expand. Do not use gauze as can leave debris behind even after irrigation.
- Refer to Aesthetic Dressing Stabilization pg.14-17 and Prevent Maceration and Irritation pg 13-14 in the sections of this guideline. Leakage of exudates can also result in embarrassment for the patient.
- If drainage cannot be reasonably contained by highly absorbent dressings consider other options; layering or pouching.
- Consult with enterstomal therapist or symptom/palliative care nurse clinician/ clinical nurse specialist for suitable options and specific application techniques.
- Support the patient to allay anxiety and promote acceptance of a pouch especially if the initial perception is negative. Time may be required for acceptance.
- Review other treatment options with physician when drainage is unrelenting.
- Anti-inflammatory medications may help to decrease the inflammatory process. Chemotherapy and radiotherapy may help to reduce tumor bulk and decrease drainage.
- If lymphedema present, refer to a Lymphedema Massage Therapist at WRHA Breast Health Centre or private practitioners.
- Large volume of fluids can be lost with excessive exudates production. Monitor blood work for fluid depletion.

Type of Wound/Goals of Care	**Dressing Choice**
Low Exudate • maintain moist environment • prevent dressing adherence and bleeding	• Nonadherent contact layers • Amorphous hydrogels • Sheet hydrogels • Hydrocolloids: contraindicated with fragile surrounding skin, may increase odor • Semi-permeable films: contraindicated with fragile surrounding skin
High Exudate • absorb and contain exudates • prevent dressing adherence in areas of lesion with decreased exudates	• alginates • foams • starch copolymers • gauze • soft cotton pads • menstrual pads (excessive exudates)

Malodorous Wounds • wound cleansing • reduce or eliminate odor	• charcoal dressings • topical metronidazole • iodosorb gel

Control of Odor

- Odour control is by far the most challenging aspect of malignant tumors. Malignant fungating wounds can produce noxious odors, which even in moderate cases can cause distress, embarrassment and withdrawal from social contact. Odor can be the result of organic breakdown of enzymes, bacteria or fungal infection. First line of defense is always to deodorize the wound / exudates and then the room.

Minimize bacterial concentration in the wound

- Refer to Care of the Wound Bed. Management of malodor involves containment of odor and treatment of its cause.
- Anticipate and manage temporary increase of odor and drainage induced by autolysis.
- Use caution if considering sharp debridement. Risks of incising tumor and inducing bleeding could outweigh benefits. *Only a physician (or suitable trained designate) should do sharp debridement, due to increased risk of bleeding.*
- Mechanical debridement using a wet to dry dressing not recommended as the process can result in bleeding.

Manage odor with appropriate treatment

- Select primary and secondary dressings capable of absorbing both discharge and odor.
- Cover dressings should be sealed to contain odor
- Increase frequency of dressing changes if needed. Try:
  - Filler primary dressings such as alginates, hydrofibers and cavity foams
  - Primary and secondary occlusive cover dressings such as hydrocolloids, foams and composite dressings.
  - Transparent films over cover dressings may enhance effectiveness.
- Consider use of dressings containing charcoal for odour control additional benefits. Select one that maintains its effect when wet. Some charcoal dressings also contain silver 0.15% which has antimicrobial activity.
- Consider antimicrobial dressings for infected wounds with odour.
- Consider potential benefits of biologically natural remedies such as -honey, sugar, live yogurt, when suggested treatments ineffective.

- M9 (deodorant drops) an ostomy deodorizer on dressing/pouches could be useful.

Modify the environment

- At the time of dressing change:
  - Provide adequate room ventilation.
  - Air exchangers or extra fans may be helpful.
  - Consider use of an odor eliminating room spray or pleasing scents such as perfumes, vanilla, lavender, or oil of clove prior to procedure. Sprays and scents can be nauseating and leave the patient with an unpleasant association with the specific fragrance.
  - Mentholatum applied near the nostrils of patient or care provider may increase tolerance.
  - Remove soiled dressings and linens from patient area or home as soon as possible.

- For enhanced effect in the patient area consider:
  - Solid room antagonizing absorber.
  - Eucalyptus leaves, incense or scented candle, or cedar chips may be helpful in the room.
  - Tray with kitty litter, baking soda, and charcoal or lava rock- replaced when no longer effective.
- In the home care setting deodorize linens and soiled equipment by washing with a bleach or vinegar solution. Presoak in cool water to facilitate the removal of body proteins.

Preservation of Peri-Wound Skin Integrity

Manage Pruritis

- Often experienced as a creeping itching sensation attributed to the activity of the tumor, particularly in inflammatory breast and cutaneous infiltration. Usually not responsive to antihistamines. (Grocott, 2001)
- Thought to be the result of tumor stretching the skin, which irritates nerve endings.
- Excoriation of the skin by exudates can also result in pruritis in malignant wounds.
- Promote skin hydration:
  - Increase fluid intake.
  - Moisturize skin with hydrophilic lotions and creams e.g. Lubriderm, Cetaphil, Glaxal Base**.** Apply to skin when damp.
- Refer WRHA Wound Care Manual to Preventative Skin Care Section of Pressure Ulcer recommendations pg 37-40. Use of a hydrogel sheet covered with semi permeable film to prevent drying out may provide relief.

- Consider additives to bath such as specialized non- perfumed oils or oatmeal.
- Humidify the environment.
- Avoid vasodilatation which accentuates pruritis:
    - Avoid scratching and rubbing area
    - Use cool compresses, tepid baths or showers
    - Consider potential benefits of antihistamines, topical corticosteroids or preparations that contain calamine
- Refer to Radiation Skin Treatment guidelines for radiation induced pruritis management
- Educate the patient on infection prevention.
- Avoid damage from nails or scratching.
- Encourage safe alternatives to scratching when urge is irresistible or persists:
    - Use light massage or gentle patting with flat of hand.
    - Wear cotton gloves when sleeping to prevent accidental scratching.
    - Choose loose clothing to avoid friction.
    - Non adherent soft silicone dressings are less painful on removal.

Prevent maceration and irritation

- The causes of maceration include exudates, excessive sweating, the presence of urine or feces and high local moisture due to prolonged occlusion combined with high exudates and transepidermal water loss.
- Protect skin with suitable barrier of liquid, paste or solid form: WRHA Wound Care Recommendations pg 44.
- Thin hydrocolloid strips can be applied around the wound to prevent trauma from adhesives and exudates- can be left in place indefinitely.
- Choose absorbent dressings that minimize exudate contact with skin.
- Select products capable of extended wear to reduce risk of skin stripping resulting from frequent dressing removal.
- For extremely fragile skin select non-adhesive products.
- If wound status changes and drainage increases adjust frequency and type of dressing to accommodate to needs.
- Refer to Aesthetic Dressing Stabilization and Exudate Control.
- Consider pouching to control copious amounts of drainage. Referral to enterstomal therapist maybe helpful. Use of damming or low suction may need to be considered also.
- Consider yeast infection if area moist and shows erythema, papular rash, burning, itching and/or scaling. Consult physician.
- Use of topical corticosteroids is controversial. Topical corticosteroids have an anti-inflammatory and vasoconstrictive action and the benefit is chiefly to peri-wound skin
- Minimize use of tapes:
    - Use narrow strips.

- Use tie tapes, avoiding excess tension.
- Picture-frame around dressing at edges to reduce linear tension.
- Hydrocolloid strips can be applied and left in place around wound to secure tapes to.

Monitor and protect satellite lesions

- Regularly inspect peri-wound areas for signs of new lesions.
- Avoid trauma from direct contact with adhesive products, aggressive cleansing or excess moisture.
- If tape has to be in contact with a nodule use an easy to remove product such as Mepilex/hydrocolloid with border. Protect skin with a skin barrier prior to application of tape.

Aesthetic Dressing Stabilization-Adapted from Barton and Parslow (1998)

Prevent tape stripping or irritation

- For large areas consider alternatives to tape.
- Wrap difficult areas with flexible supportive device:
  - Tensor bandage
  - Self –adherent bandage
  - Elasticized mesh- Tubifast
  - Clothing
  - Customized commercial dressings

Improve aesthetics

- To enhance aesthetics, dressings should provide symmetry of appearance by minimizing bulk.
- Camouflage the wound area:
  - Select skin toned products if available
  - Choose low profile flexible products that mould to uneven areas
- Utilize clothing to secure dressings:
  - Scarf or cap
  - Turtle neck
  - Knit vest
  - Sport bra
  - Supportive underwear
  - Leotards
  - Hosiery with or without legs
- Facilitate difficult clothing application:
  - Pre-stretch apparel before application
  - Cut seams and apply Velcro fasteners or ties
  - Use ready made clothing designed for those with limited mobility

- Consider benefits of specialized cosmetic techniques to conceal highly visible intact areas.

Problematic Areas

Skin Folds and Creases:

- Assess depth and extent of creases during normal positional changes:
  - For mild to moderate depth, select Option 1
  - For significant depth select Option 2
- Option 1:
  - Select flexible absorbent adhesive dressings which conform to body contours.
  - Consider use of compact hydrocolloids, foams, transparent films or composite dressings.
  - Apply liquid skin barriers to peri-wound area to enhance dressing adhesion.
  - Gently stretch skin to remove creases prior to applying dressing.
  - Mold dressing into area starting at the center and moving outward to edges.
  - Hold in place for several minutes to ensure adherence is established.
- Option 2
  - Fill creases to prevent outward migration of drainage:
    - Small rolls of gauze
    - Small pieces of foam
    - Skin barrier pastes or wafers, layered into area
    - Cover with appropriate flexible outer dressing

Multiple Dressings:

- Manage creases as previously described.
- Dress each area individually if possible. This permits heavily draining areas to be treated more frequently when necessary without disturbing adjacent dressings.
- If dressings overlap apply the one with the longest wear time prior to others. Label dressing to indicate change dates.
- Assure underlying dressing is moisture resistant. Enhance moisture resistance by covering with transparent film, thin hydrocolloid, or by carefully applying waterproof tape.
- In areas with large volumes of drainage, minimize disruption of other dressings by using products with greater absorbency, or consider pouching.
- Contact Enterstomal Therapy Nurse, Symptom/Palliative Care Nurse Clinician, or CNS for problem situations.

Mobile Areas with Flexion and Extension (neck, axilla, groin):

- Select a dressing large enough to adequately cover area in its maximum position of extension.
- Self-adhesive dressings may provide the best attachment.
- Customize fit by cutting slits into edges of dressing:
  - Place slits at major points of stress to achieve best results
  - Reduce size by overlapping slit edges such as in areas of extension
- Mold the dressing to the area from the center outwards:
  - Add slits as necessary to ensure complete dressing contact with uneven body contours during range of motion.
- Reinforce outer dressing edges with non-sensitizing flexible tape, transparent film or thin hydrocolloid, using short overlapping strips.
- Improve stability of large dressing by applying extra tape along the axis, usually at midline.

Areas with Bulky Extrusive Tumor

- Reinforce area around tumor with absorbent padding to control drainage:
  - An alginate or hydrofiber may be useful
  - Tuck close to tumor edge to create a dam-like effect
- Slit edges of cover dressing to increase conformity.

Perineal Area

- A sensitive approach when caring for patients with wounds in this private area can help to lessen the intrusive effect. Take care to maintain the patient's dignity as much as possible.
- Adherence of dressings in this area is especially challenging:
  - Natural lubrication in the area compromises adhesive dressings
    Use liquid skin barriers to increase adherence
  - Skin folds compromise dressing stability. Refer to Aesthetic Dressing Stabilization in this section.
  - Perineal hair affects dressing adherence. Trimming hair and wearing a supportive pant increases dressing security
- The pressure of sitting on a dressing can increase pain, potentially damage underlying tissue and dislodge dressings:
  - Avoid rigid, bulky dressings
  - Select non-traumatizing, soft, pliable packing such as alginates, hydrofibers or foams
- Use bordered hydrocolloids, foams and transparent films as cover dressings

Fistula (neck, trunk, perineum)

- Fistulas can develop in irradiated areas or when tumor erodes into adjacent organs such as the esophagus, bowel, bladder or vagina. This often results in copious foul drainage.
- Prevent peri-skin breakdown by meticulous skin care.

- Avoid topical irritants such as soap, alcohol or perfumes.
- Cleanse gently with tepid water or surfactant skin cleansers, compress, gentle spritz, sitz bath or shower.
- Apply generous amounts of barrier pastes, replenishing frequently.
- For greater protection use solid barrier sheets.
- Absorb drainage with form fitting dressings.
- Select products containing gel beads for increased efficiency.
- Consider feasibility of pouching area/low suction if copious drainage is persistent. Trim hair prior to applying pouch. Use skin barrier paste to fill uneven skin surfaces creating a flat surface to apply pouch. Consult Enterstomal Nurse or Clinical Nurse Specialist.
- Use liquid barriers to increase the adherence of pouch.
- When hair is present avoid possible trauma from shaving.
- Trim hair prior to pouch application.
- Assessment of fluid and electrolyte imbalances is essential due to the copious amounts of fluid drainage. In particular the patient with a small bowel fistula is at risk for fluid volume depletion or dehydration and metabolic acidosis due to the loss of large volumes of alkaline small bowel contents.

APPENDIX A

Patients at Risk of Cutaneous Metastasis (Manning, 1998)

Type of Cancer	Incidence	Location and Presentation
Lung	Most common in men (24%)	Chest wall, posterior back or abdomen, localized painless clusters of cutaneous nodules (5mm-6cm)
Breast	69%	Anterior chest wall; plaques, nodules or inflammatory telaniectasis
Colorectal	Male (19%) Females (9%)	Abdomen or perianal region
Ovarian	4%	Umbilicus, vulva or upper thigh with a herpetiform pattern or erysipleus like features
Cervix	2%	Abdominal wall, vulva or anterior chest wall, plaques, nodules or inflammatory telangietasia
Melanoma	Females 51% Males 13%	Heavily pigmented or subcutaneous nodularities

APPENDIX B

Malignant Wound Sites – summary of data from two surveys (Naylor, 2000)

SITE	INCIDENCE (% percent)	
	Thomas 1992	**Wilkes el al 2001**
Breast	62	39
Head/Neck	24	33.8
Back/trunk/abdomen	3	1.0
Groin/axilla	3	7.4
Genital	3	5.1
Other	8	3.7

APPENDIX: C Edmonton Symptom Assessment Scale

(Modified ESAS)

Date: _____

PLEASE MARK THE NUMBER THAT BEST DESCRIBES: Addressograph

No pain	0 1 2 3 4 5 6 7 8 9 10	Worst possible pain
Not fatigued	0 1 2 3 4 5 6 7 8 9 10	Worst possible fatigue
Not nauseate	0 1 2 3 4 5 6 7 8 9 10	Worst possible nausea
Not depressed depression	0 1 2 3 4 5 6 7 8 9 10	Worst possible
Not anxious anxiety	0 1 2 3 4 5 6 7 8 9 10	Worst possible
Not drowsy drowsiness	0 1 2 3 4 5 6 7 8 9 10	Worst possible
Best appetite	0 1 2 3 4 5 6 7 8 9 10	No appetite
Very good sense of well-being	0 1 2 3 4 5 6 7 8 9 10	Poor sense of well-being
No shortness breath	0 1 2 3 4 5 6 7 8 9 10	Very short of breath
_____	0 1 2 3 4 5 6 7 8 9 10	_____

Completed by:

Patient: _____ Family: _____ Nurse_____ (check one)

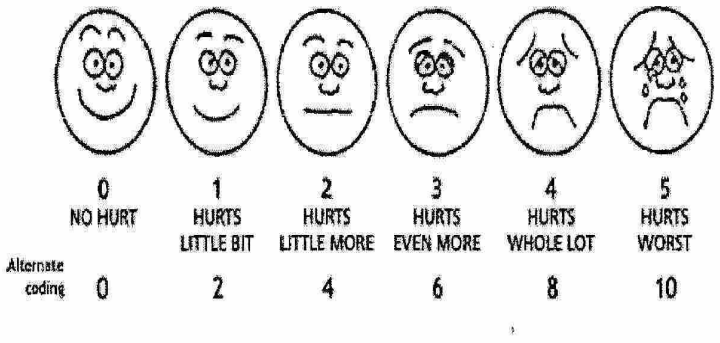
APPENDIX: D *Palliative Care Performance Scale (PPS)*

%	Ambulation	Activity and Evidence of Disease	Self-Care	Intake	Conscious Level
100	**Full**	**Normal Activity No Evidence of Disease**	**Full**	**Normal**	**Full**
90	**Full**	**Normal Activity Some Evidence of Disease**	**Full**	**Normal**	**Full**
80	**Full**	**Normal Activity with Effort Some Evidence of Disease**	**Full**	**Normal**	**Full**
70	**Reduced**	**Unable to do Normal Job/Work Some Evidence of Disease**	**Full**	**Normal or Reduced**	**Full**
60	**Reduced**	**Unable to do Hobby/Housework Significant Disease**	**Occasional Assistance Required**	**Normal or Reduced**	**Full or Confusion**
50	**Mainly Sit/Lie**	**Unable to Do Any Work Extensive Disease**	**Considerable Assistance Required**	**Normal or Reduced**	**Full or Drowsy or Confusion**
40	**Mainly in Bed**	**As Above**	**Mainly Assistance**	**Normal or Reduced**	**Full or Drowsy or Confusion**
30	**Totally Bed Bound**	**As Above**	**Total Care**	**Reduced**	**Full or Drowsy or Confusion**
20	**As Above**	**As Above**	**Total Care**	**Minimal Sips**	**Full or Confusion**

10	**As Above**	**As Above**	**Total Care**	**Mouth Care only**	**Drowsy or Coma**
0	**Death**	**-**	**-**	**-**	**-**

APPENDIX: E

Wong- Baker Faces Scale



From Wong D.L., Hockenberry-Eaton M., Wilson D., Winkelstein M.L., Schwartz P.: Wong's Essentials of Pediatric Nursing, ed. 6, St. Louis, 2001, p. 1301. Copyrighted by Mosby, Inc

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CANCER TREATMENT-RELATED WOUNDS

Introduction:

Patients with cancer receiving radiation therapy and / or chemotherapy and other medications are at risk of developing acute and chronic skin reactions.

Approximately sixty per cent of oncology patients will receive radiation treatments. (Naylor et al, 2001) Skin toxicity related to irradiation can be acute or delayed but generally begins two to three weeks after the start of treatment and persists up to four weeks following completion of treatment. Discomfort ranges from mild irritation to severe pain.

Drug-related skin reactions can occur very quickly following the administration of the medication (e.g. L-asparaginase) or over the course of many days (e.g. interferon). The effects of chemotherapy on skin and mucous membranes can be profound.

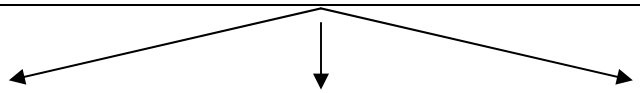
Combination therapy (i.e. administering chemotherapy and irradiation concurrently) can be expected to result in more significant cutaneous reaction. (Phillips TL, 1976) (See A, et al, 1998)

One of the side effects of hematopoietic stem cell transplant (bone marrow transplant / peripheral blood stem cell transplant) is graft versus host disease (GVHD). GVHD of the skin can range from mild to life-threatening.

RADIATION THERAPY-RELATED WOUNDS ALGORITHM

ASSESSMENT / DIAGNOSIS

- Nursing history (including smoking and alcohol use; personal and family history of photo-sensitive conditions; pre-existing skin conditions; co-morbidities; use of medications which cause photosensitivity)
- Physical examination including thorough skin assessment
- Assess nutritional status
- Assess patient's knowledge and learning needs
- Wound / skin reaction assessment (utilizing RTOG / EORTC or similar scale)



TREAT THE CAUSE

- Individualized preventative strategies
- Patient Education / Self-Care Teaching
- Monitor skin reactions and consider serial colour photos
- Assess medications that may increase photosensitivity

TREAT PATIENT CONCERNS

- Manage Pain / promote comfort
- Manage Itching
- Prevent Infection
- Maintain Quality of Life

Refer to: Recommendations on Care of the Wound Bed

TREAT THE WOUND

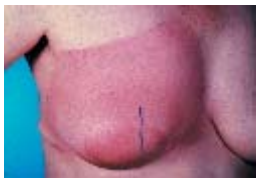
- Promote moist wound healing
- Treatment principles as for first and second degree burns
- Wound cleansing
- Use non-adherent dressings

Refer to: Recommendations on Care of the Wound Bed

Part 1: Radiation Therapy-related wounds:

Definitions:

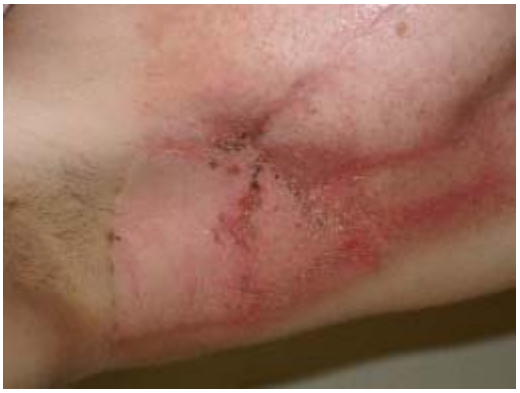
Radiation-induced dermatitis**:**



The skin is a multilayered system originating from basal cells. Basal cells are acutely radiosensitive. Radiation therapy-induced skin toxicities are directly related to the volume of tissue treated, total daily treatment dose (fraction size), total dose delivered, dose distribution, duration, modality, and technique. Skin within the treatment area may get pink, dry, and itchy and the patient may feel a burning sensation and mild discomfort. This is caused by obliteration of the sebaceous glands and the sweat glands within the treatment field. The skin is susceptible to further injury from scratching and there is an increased risk of infection and, rarely, tissue necrosis.

Erythema is caused by dilatation of capillaries in the dermal layer resulting in increased blood flow to the skin; an inflammatory reaction. Leukocyte infiltration and erythrocyte extravasation result in dermal edema. (Heggie S et al, 2002)

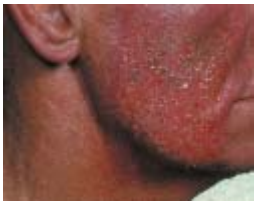
Dry Desquamation:



With each fraction of irradiation, a fixed percentage of actively proliferating basal cells in the epidermal layer of the skin will die. Remaining basal cells undergo cornification and shed at an increased rate. Radiation inhibits mitotic activity in the germinal layer of the

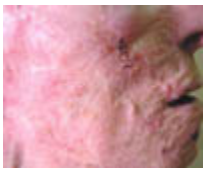
sebaceous glands resulting in dryness. This itching, scaling, peeling of the skin is defined as dry desquamation. Hyper-pigmentation may also occur. Hyper-pigmentation is probably due to the body's attempt to protect the dermal layer with an increased production of melanin by the melanocytes in response to x-rays and electrons.

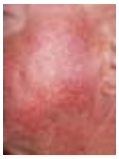
Moist Desquamation:



Peeling of the skin continues, and the dermis and nerves are eventually exposed, resulting in moist desquamation (serous drainage), leading to discomfort and pain, increased risk of infection, and the potential necessity of interrupting treatment which may compromise the final outcome of the cancer therapy. Bleeding may occur.

Late Skin Reaction:





A skin reaction occurring more than three months after the completion of radiation treatment is defined as a delayed or late reaction.
Following the resolution of the acute reaction the skin will appear "normal" for a period of time (up to years). The late effect changes will then develop and, in many cases, continue to progress. The degree of the late reaction is dependent on the total dose, the dose given per day, and the size of the radiation field.
The skin seldom returns to its previous state. In serious cases damage to the dermal layer results in subcutaneous fibrosis, giving the skin a pale, firmer, rougher appearance. The epithelial layer thins and becomes more susceptible to injury and there is decreased healing of future injuries. Telangiectasis develops under the thin epidermis. Capillaries appear dilated, prominent, and thin-walled. (Archambeau J, et al, 1995) Necrosis occurs in less than 3% of patients treated with radiation therapy.

Radiation Recall:

Patients who have had previous radiation therapy and are now receiving chemotherapy may be at risk of developing a cutaneous reaction referred to as "radiation recall". (It is

important to also recognize that radiation recall reactions may occur at deeper levels including internal organs.) During, or shortly following administration of certain antineoplastic drugs, the skin within the radiation field will become erythematous. The skin may blister and peel. This reaction may last hours or even days and may progress rapidly to moist desquamation with significant discomfort.

Incidence:

Acute radiation dermatitis is a common side effect with the majority of patients receiving radiation therapy developing some degree of skin toxicity.
Radiation therapy-induced skin toxicities are directly related to the volume of tissue treated, total daily treatment dose, dose distribution, duration, modality, and technique.

There is an increased incidence of skin toxicities seen in the obese, debilitated, malnourished, people receiving steroids, and in those with pre-existing skin conditions. Radiation fields that include skin folds (breast, axillae, perineum, natal cleft, and gluteus) have increased reactions (O'Rourke ME, 1987) (Faithful S, et al, 2003) due to buildup of radiation on the surface because of the tangential beam.

Because of the anatomy of the perineal-rectal area, patients receiving radiation treatment for gynecologic, colorectal, and penile cancers are at increased risk of moist desquamation and infections due to moisture and friction. (Haisfield-Wolfe, 2000)
For patients receiving radiation treatments for anal canal or certain gynecological tumours, the expected incidence of dermatitis is 100%, with a frequency of Grade 3 to 4 dermatitis of 43% – 78%. (Vuong T et al, 2004)

Approximately 87 % of women undergoing radiation treatment for breast cancer will develop some degree of radiation dermatitis. (Fisher J, 2000)

Obese patients with pendulous breasts are at higher risk for late skin reactions. (Gordils-Perez J et al, 2003)

Standards / outcomes:

Minimize radiation skin reactions
Maintain patient's quality of life
Enhance patient comfort
Promote completion of oncology treatment
Moderate aggravating factors
Maintain or restore skin integrity
Prevent infection

Assessment & Investigations:

The nursing history should include:

- smoking and alcohol use
- nutritional status
- a personal and family history of radio-sensitive conditions
- pre-existing skin conditions
- co-morbidities, as many conditions can magnify pruritis and xerosis and interfere with healing (e.g. diabetes, hyper/hypothyroidism, multiple sclerosis, iron-deficiency anemia)
- use of medications which cause photosensitivity (e.g. antidepressants, antimicrobials, steroids, Imuran, antipsychotics, St. Johns Wort)

The physical examination should include:

- thorough skin assessments at baseline and at regular intervals throughout treatment
- wound assessment including location, size of wound, colour, type and amount of any discharge / drainage
- consider serial colour photos of chronic wounds (to be of benefit must be taken with the same camera, by the same person, in the same conditions – place, lighting, position) – to satisfy the PHIA, a written consent is required prior to each photo
- assessment of any signs and symptoms of infection
- degree and specific type of patient discomfort

A classification of radiation morbidity scoring criteria that is commonly used is the Radiation Therapy Oncology Group (RTOG) / European Organisation for Research and Treatment of Cancer (EORTC) scale:

Skin:

Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
No change over baseline	Follicular, faint or dull erythema, epilation, dry desquamation, decreased sweating	Tender or bright erythema. Patchy moist desquamation, moderate edema	Confluent, moist desquamation other than skin folds, pitting edema	Ulceration, hemorrhage, necrosis

Late Radiation Morbidity Scoring Scale:

Skin:

Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
None	Slight atrophy, pigmentation change, some hair loss	Patchy atrophy, moderate telangiectasis, total hair loss	Marked atrophy, gross telangiectasis	Ulceration

Prevention Strategies:

1) Sucralfate cream (2 x / day during treatment and for 2 weeks following completion of treatment) (Maiche A et al, 1994) (Wickline MM, 2004)

2) 3M Cavilon ™ No Sting Barrier Film (2 – 3 x / week during treatment and for 2 weeks following completion of treatment) (Graham et al, 2004)

3) Calendula extract ointment (at least 2 x / day during treatment) (Pommier P, et al, 2004)

4) Aqueous cream (3 x / day throughout treatment and for 2 weeks following completion of treatment) (Heggie S et al, 2002)

5) Aloe Vera gel (6 – 8 x /day throughout treatment) (Olsen DL et al, 2001)

6) Silver-leaf nylon dressing (SLND) (remove dressing during treatment - throughout treatment and for 2 weeks following completion of treatment) (Vuong T, et al, 2004)

7) Patient Education / Self-Care Teaching: (Faithful S et al, 2003)
   - Skin hygiene

   (Roy I, et al, 2001) (Boot-Vickers M et al, 1999)

   -skin care regimen should begin on the first day of radiation treatment
   -short showers or baths with warm water (avoid hot or cold)
   -avoid using wash cloth
   -use mild skin cleansers with no perfume (e.g. Cetaphil)
   -avoid using alcohol-based hand sanitizers
   -pat skin dry – do not rub
   -if the head is in the treatment field:
   -use a mild shampoo

-dry hair by air or use a hair dryer on cool setting
-avoid hairspray, mousse, gel, and other styling products
-avoid hydrogen peroxide, povidone-iodine or other drying agents
-avoid chlorinated swimming pools in presence of skin breakdown or rinse and moisturize immediately after swimming if skin intact (Boot-Vickers M et al, 1999)

- Rehydrate the skin
-ensure good nutrition and hydration (up to 3 L / day unless contraindicated)
-use hydrophilic preparations with no perfumes or alcohol or menthol (e.g. Lubriderm) (Boot-Vickers M et al, 1999)
-try moisturizing cream (Boot-Vickers M et al, 1999) (e.g. Cetaphil – lipid base; glaxal base; lubriderm)
-consider normal saline compresses
-can try non-adherent dressings (e.g. Adaptic dressings) (avoid if wound is infected)
- avoid using cornstarch especially in moist areas (e.g. axillae, groin) as it promotes fungal growth and secondary infections (may be suggested to assist in preserving marking)
-avoid talcum
-avoid trolamine, chamomile cream, almond ointment, topical vitamin C, gentian violet

- Prevent infections
-good hand washing
-skin care
-avoid smoking (interferes with healing)

- Protect from Trauma
-avoid tape or band aids in the treatment field
-avoid scratching
-avoid wearing jewelry over the skin in the treatment field
-protect from temperature extremes (avoid ice packs, heating pads, hot water bottles) (Boot-Vickers M et al, 1999)
-avoid hot tubs and saunas
-avoid friction (rubbing the skin)
-patients receiving radiation treatments in the perineal / perirectal area may wish to limit walking to decrease friction between legs
-consider scrotal support to decrease friction
-avoid shaving (or use an electric razor) (Boot-Vickers M et al, 1999)
-wear loose fitting, cotton clothing (Boot-Vickers M et al, 1999)

-use cotton bed sheets
-use low residue laundry soaps

- Protect from the environment

-protect from sun and wind (Boot-Vickers M et al, 1999)
-use sunscreen or cover the area with clothing
-avoid tanning parlours
-protect from frostbite

8) Patients receiving Radiation Therapy to the Head and Neck:
    - Arrange dental assessment and provision of care prior to treatment

    - Preventive oral hygiene

    -rinse mouth 5-6 times a day with saline or baking soda solution
    -use non-alcohol mouth wash (e.g. Biotene – may also consider Biotene toothpaste)

    - Maintain nutrition

    -avoid spicy foods
    -avoid temperature extremes
    -consider early referral to dietician

    - Maintain hydration

    -drink 2 to 3 litres per day unless contraindicated
    -avoid citrus fruits and juices
    -avoid alcohol

Treatment Strategies:

An individualized approach to skin care during radiation may offer improved quality of life to patients and, in some cases, may decrease the acute skin reactions. (Zimmermann et al, 1998) Best clinical practice should be guided by patient comfort.

Interventions are based primarily on clinicians' clinical experience.
No standard of care exists for the prevention and treatment of radiation-induced skin toxicity. (RTOG 97-13, Fisher, 1998)

There are no comprehensive evidence-based consensus guidelines for prevention and management of radiation dermatitis. (Wickline MM, 2004)

Treat the cause:

- monitor skin closely, particularly skin folds within the treatment field

- assess need to continue medications that increase photosensitivity (e.g. antidepressants, antimicrobials, antipsychotics, St. Johns Wort)

Erythema and dry desquamation (RTOG/EORTC grades 1 & 2):

Treat the patient-related concerns:

1) Manage Pain / promote comfort:

- Non steroidal anti-inflammatory medications
- Acetaminophen with codeine (Tylenol #3)
- Topical analgesics (see Appendix)
- Topical steroids to reduce inflammation (inhibits upregulation of IL-6, a proinflammatory cytokine)
- Maintain skin hydration (promote use of hydrophilic lotions or creams)
- Control the environment (cool, humid)

2) Manage Itching:

- hydrocortisone 1% cream used sparingly and avoiding areas of breakdown or infection for relief of itchy, irritable, burning skin (short term use only as it can cause dermal atrophy and interfere with healing) (Boot-Vickers M et al, 1999)
- topical benadryl
- oral antihistamines
- consider non-adherent dressings (e.g. Adaptic) (avoid if wound is infected) (may become adherent if left in place for prolonged periods)
- avoid smoking (in one arm of a Phase III study comparing efficacy of aloe vera gel to aqueous cream on irradiated breast tissue, smokers were significantly more likely to experience itching) (Heggie S, et al, 2002)

3) Prevent Infection:

- monitor closely for clinical signs of infection – fever, odour, purulent discharge, swelling, increased pain
- promote good skin hygiene
- promote hand washing
- sitz baths for patients receiving radiation therapy in the perineal/rectal area (10-15 minute tepid normal saline soaks up to 4 times per day or following each bowel movement)
- stool softeners for patients receiving radiation therapy in the perineal/rectal area
- cleanse with baby wipes following each bowel movement for patients receiving radiation therapy in the perineal/rectal area

- patient teaching as above

4) Maintain Quality of Life:
- manage symptoms according to patient priority
- enhance the patient's personal sense of value and safety
- promote feelings of control with patient education / self care teaching / information sharing
- provide emotional support / counselling to the patient and family
- referral to psychosocial oncology, counseling services, social work, child life program as appropriate
- facilitate access to pain and symptom clinic, art therapy, yoga, dietician, as indicated

<u>Treat the wound</u>:
- promote moist wound healing
- principles for treatment are similar to those for first and second degree burns (the mechanism of injury is much different but the resulting wound is comparable)
- normal saline irrigation with syringe for wound cleansing
- semi-permeable film dressings can be used (and left in place throughout treatment) on areas of low or no exudates
- consider 3M Cavilon ™ No Sting Barrier Film (foam, swab stick, or spray) - may be left on during radiation treatments as it does not interfere with treatment nor does it cause a bolus effect
- use non-adherent dressings (e.g. Mepital, Adaptic) (avoid if infection is present) (may become adherent if left in place for prolonged periods)
- hydrogel sheets (e.g. RadiaCare Gel Sheet) for dry or moist desquamation – can remain on for up to 3 days

Moist desquamation (RTOG/EORTC grades 2 & 3):

<u>Treat the patient-related concerns</u>:

1) Manage Pain / promote comfort:
- Tylenol #3
- Morphine elixir
- Fentanyl patches
- Topical analgesics (see Appendix)
- Maintain skin hydration (promote use of hydrophilic lotions or creams)
- Control the environment (cool, humid)

2) Manage Itching:
- oral antihistamines for itching

- avoid smoking (in one arm of a Phase III study comparing efficacy of aloe vera gel to aqueous cream on irradiated breast tissue, smokers were significantly more likely to experience itching) (Heggie S, et al, 2002)

3) Prevent Infection:

- monitor closely for clinical signs of infection – fever, odour, purulent discharge, swelling, increased pain
- consider silver-sulphadiazine cream (Flamazine) daily dressings (unless allergic to sulpha drugs)
- consider non-adherent dressings (e.g. Mepatil, Adaptic) (avoid if infection is present) (may become adherent if left in place for prolonged periods)
- patient teaching as above

4) Maintain Quality of Life:

- manage symptoms according to patient priority
- enhance the patient's personal sense of value and safety
- promote feelings of control with patient education / information sharing / self care teaching
- provide emotional support to the patient and family
- offer counselling to the patient and family
- offer spiritual support
- referral to psychosocial oncology, counselling services, social work, child life program as appropriate
- facilitate access to pain and symptom clinic, art therapy, yoga, dietician, as indicated

<u>Treat the wound</u>:

- promote moist wound healing
- principles for treatment are similar to those for first and second degree burns (the mechanism of injury is much different but the resulting wound is comparable)
- normal saline irrigation with a syringe for wound cleansing
- consider non-adherent dressing (e.g. Mepatil, Adaptic) - for comfort for both dry and moist desquamation – apply, cover with abdominal pad if necessary and secure with 'burn net' (avoid if infection is present) (may become adherent if left in place for prolonged periods)
- moisture retentive dressings
- hydrogel sheets (e.g. RadiaCare Gel Sheet) for dry or moist desquamation – can remain on for up to 3 days
- hydrocolloid (e.g. duoderm) for moist desquamation
- consider vacuum assisted closure therapy for chronic, slow-healing wounds
- swab any odourous lesions and treat infections promptly
- consider silver-sulphadiazine cream (Flamazine) (unless allergic to sulpha)

- consider sofra-tulle (contraindicated in patients allergic to lanolin) dressings or bacitracin for patients with sulpha allergies

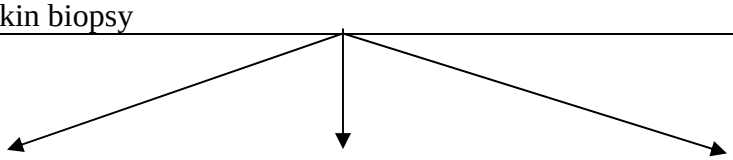
Ulceration, hemorrhage, necrosis (RTOG/EORTC grades 4):

- skin necrosis and chronic ulceration may require skin grafting (rare)
- refer to Malignant Wounds section

CHEMOTHERAPY-RELATED WOUNDS ALGORITHM

ASSESSMENT / DIAGNOSIS

- Nursing history (including a thorough medication history, history of allergies or drug sensitivities and history of past skin reactions)
- Physical examination including thorough baseline skin assessment
- Assess nutritional status
- Assess patient's knowledge and learning needs
- Wound / skin reaction assessment (type, colour, distribution, extent)
- Assess for potentially serious reactions and / or evidence of systemic involvement including bloodwork
- Assess need for chest x-ray
- Consider skin biopsy



TREAT THE CAUSE

- Limit vesicant administration to specially trained nurses
- Administer vesicants through CVAD if possible
- Careful selection of peripheral veins
- Patient Education / Self-Care Teaching
- Stop / withdraw implicated drug

TREAT PATIENT CONCERNS

- Manage Pain / promote comfort
- Manage Itching
- Prevent Infection
- Maintain Quality of Life

Refer to: Recommendations on Care of the Wound Bed

TREAT THE WOUND

- Promote moist wound healing
- Treatment principles as for first and second degree burns
- Wound cleansing
- Prompt identification & treatment of infections
- Consider referral to advanced wound clinician, plastic surgeon, dermatologist, ophthalmologist, burn unit

Refer to:
Recommendations on Care of the Wound Bed

Part 2: Chemotherapy-related wounds:

Definitions:

Chemotherapy-induced skin reactions:

Many antineoplastic drugs can potentially cause cutaneous reactions. Patients receiving chemotherapy frequently report dry skin and scaling, probably due to effects on sebaceous and sweat glands. (Dunagin WG, 1982) (Hood AF, 1986). .

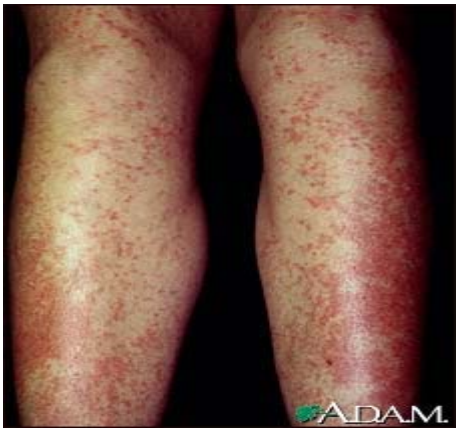
Hypersensitivity reactions vary and may include: pruritis, edema, urticaria, erythema, and facial flushing. Hypersensitivity reactions are not dose dependent. Agents most commonly associated with hypersensitivities include doxorubicin, daunorubicin, cytarabine, L-asparaginase, paclitaxel, and cisplatin as well as biologic modifiers (e.g. interferons, interleukins, colony-stimulating factors, monoclonal antibodies). Allergic dermatitis may cause localized or generalized pruritis which can be overwhelming and distressing, interfering with rest and sleep. It may result in skin breakdown and secondary infections.

Aminoglutethimide (Cytadren) commonly causes morbilliform (resembling measles) maculopapular rash, sometimes accompanied by fever, which can progress to desquamation.

Gefitimab (Iressa) can cause a dry, red, raised, acne-like rash.

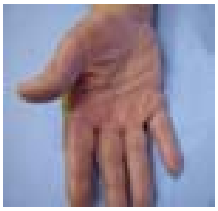
Photosensitivity is an enhanced skin response to the ultraviolet rays of the sun. It may present like a sunburn with erythema, edema, blisters, hyperpigmentation, desquamation or peeling, and pruritis. Photosensitivity is associated with dacarbazine, trans-retinoic acid, vinblastine, 5-flurouricil, high-dose methotrexate.

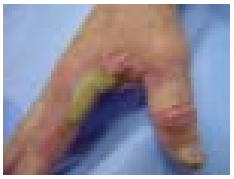
Chemotherapy can interfere with healing.



drug reaction

Palmar-Plantar Reaction:



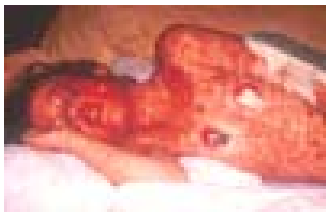


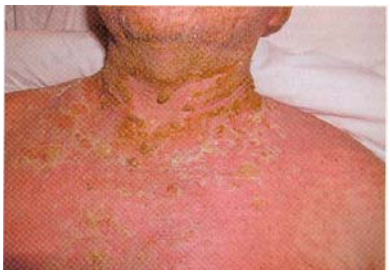
Hand-foot syndrome (or palmar-plantar erythrodysesthesia, or acral erythema) is a chemotherapy-induced cutaneous reaction typically characterized by painful erythema of the palms and soles followed by desquamation and exfoliation in those areas. The palms and soles may start to tingle, become red, numb, painful, or swollen. Skin may become dry or itchy and may blister. Severe pain or ulcers may occur. Hand-foot skin reactions are very commonly seen with a few drugs such as 5-flurouracil, doxorubicin, high-dose cytarabine, paclitaxel, and capecitabine. The severity of this reaction may necessitate the discontinuation of treatment.

Erythema Multiforme:

A rare reaction, more common with high-dose combination chemotherapy. It is associated with busulfan, etoposide, procarbazine, hydroxyurea, bleomycin, methotrexate, cytarabine. It is characterized by pink-red macules with clear centres over the extremities and often involves the mucous membranes. Occasionally it progresses into generalized blistering.

Stevens-Johnson Syndrome (SJS) / Toxic Epidermal Necrolysis (TEN):





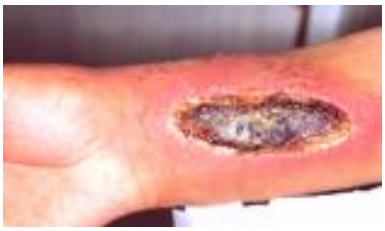
Considered to be a variant of erythema multifome, a rare but serious skin reaction characterized by erythematous macular eruptions often referred to as target lesions. These lesions rapidly evolve into blisters and erosions of the skin with detachment

of less than 10% of the epidermis in Stevens-Johnson Syndrome. Ocular and oral mucosal involvement with hemorrhagic erosions can occur. More severe cases involving more than 30% of the body surface is referred to as toxic epidermal necrolysis. Skin detachment in both syndromes is similar to a second-degree burn. Some commonly associated medications include: carbamazepine, phenytoin, sulfa preparations, allopurinol, corticosteroids, non-steroidal anti-inflammatory drugs, alkylating agents, methotrexate, thalidomide, rituximab. Patients who are also receiving immunosuppressive agents such as steroids may not develop overt manifestation of the syndrome. Instead the patient will have a delayed presentation once the immunosuppressive drug is tapered. When this syndrome occurs in a patient with cancer it must be treated as an oncologic emergency (Hockett KC, 2004).

Extravasation:

An extravasation is the leakage of intravenously administered medication out of a vein into the surrounding tissues. It can be due to a secondary puncture of the needle or cannula through the vein wall or occur as a result of multiple punctures in the same vein. It can be due to an unanticipated backflow of blood or regurgitation of IV fluid around the venipuncture site.
In cases of extravasations from central venous access devices the cause may be catheter tear, rupture or fracture; incomplete needle placement; needle dislodgment; thrombus or fibrin sheath formation or perforation of the superior vena cava.

-Irritant: Extravasation of drugs classified as irritants can cause aching, tightness, or phlebitis, occurring at the site of the injection or along a vein, with or without an inflammatory response. (A flare is described as a local reaction usually accompanied by red blotches along the vein generally subsiding within 30 minutes.) Healing of extravasations of irritants may be complicated by cellulitis or infection. Some drugs known to be irritants that are commonly administered include: acyclovir, amphoterecin B, cisplatin, dacarbazine, dopamine, erythromycin, etoposide, foscarnet, mitoxantrone, potassium, taxotere, and vancomycin.



-Vesicant: Extravasations of vesicants can lead to blistering, cell death and tissue necrosis. Symptoms usually occur within 48 hours of extravasation but may develop

over weeks to months. Vesicants can be divided into two groups: DNA binding and non-binding. Extravasation of a DNA binding vesicant will more often require surgical intervention. Examples of DNA binding vesicants: adriamycin, epirubicin, dactinomycin, daunorubicin, melphalan. Non-DNA binding vesicants include: vinblastine, vincristine, vinorelbine. Extravasation of a known vesicant is a medical emergency**.** Following vesicant infiltration, dry desquamation occurs within 24 to 48 hours and an ulcer will begin to form. As superficial edema resolves, cement-like compounds develop producing painful ulcer formation in the soft tissue. Ulcer progression becomes more prominent and necrotic tissue can be seen by the 7th day. At, or before, this point surgical intervention is crucial. Approximately 1/3 of all extravasations proceed to ulcer formation that requires surgical intervention (Bertelli, et al, 1995).
Central venous access devices are believed to have greatly reduced incidence however injury and extravasation can still occur. Vesicant infiltration into the chest or neck can have greater morbidity than peripheral infiltration.

Incidence:

It is felt there is an increased incidence of drug-related cutaneous toxicity in the elderly who also experience increased morbidity and mortality.

Between 53% and 57% of patients receiving capecitabine develop hand-foot syndrome of varying degrees with 11% - 17% classified as severe (BC Cancer Agency web site www.bccancer.bc.ca).

Aminoglutethimide rash occurs in 26 % - 33% of patients and is usually transient (BC Cancer Agency web site www.bccancer.bc.ca).

Between 16 % and 26 % of patients receiving thalidomide will develop a rash involving less than fifty percent of total body surface. Cutaneous ulcers and Stevens-Johnson Syndrome are serious but occur rarely.

Extravasation injury accounts for 0.5% to 6% of adverse effects related to chemotherapeutic administration. (Kassner, E. 2000) However, it is believed that many, if not most, incidences of vesicant extravasations go unreported.

Etiology:

Many of the skin toxicities related to chemotherapy are caused by cellular damage, chemotherapy-induced effects on the sebaceous and sweat glands, chemotherapy-induced enhanced response to UV rays, a hypersensitivity or allergic reaction.

Direct damage to the tissues occurs with inadvertent infiltration of drug. Vesicants belong to one of two classes or drugs: the nucleic acid binding agents or the nonbinding agents.

Agents that bind to DNA include anthracyclines, mitomycin, and melphalan. These agents lodge intracellularly and are released on cell death, expanding the area of damage and prolonging healing rates. Extravasation of non-binding agents results in damage similar to a chemical burn which is followed by a normal healing course.

The etiology of chemotherapy-related hyper-pigmentation is poorly understood.

Standards / outcomes:

Maintain patient's quality of life
Enhance patient comfort
Promote completion of oncology treatment
Moderate aggravating factors
Promote healing
Prevent infection

Assessment & Investigations (prior to initiation of any chemotherapeutic agent):

- a medication history (including prescription, non-prescription, herbal, naturopathic, and recreational drugs)
- history of any allergies or drug sensitivities
- history of any past skin reactions
- history of prior radiation treatment
- a thorough skin exam at baseline and at regular intervals throughout the course of treatment
- as soon as toxicity is noted, assessment must include a thorough and timely evaluation of all possible causes and contributing factors
- determine the temporal relationship between drug exposure and onset of symptoms. (Knowles S et al, 2003)
- identify the type, colour, distribution, and extent of the skin reaction
- dated, labeled, colour photographs of the wound is considered the most reliable documentation (to be of benefit must be taken with the same camera, by the same person, in the same conditions – place, lighting, position) – to satisfy PHIA a written consent must be obtained prior to each photo
- assess for signs of a potentially serious reaction (e.g. facial edema) and evidence of systemic involvement (e.g. fever)
- bloodwork for patients with systemic involvement should include CBC, LFT's, serum creatinine
- patients with dyspnea should have chest x-ray
- consider skin biopsy particularly if SJS or TEN is suspected
- SJS or TEN is an oncologic emergency

Grading Toxicities From Chemotherapeutic Agents (Yarbo et al, 2000)
Dermatologic

Toxicity	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
Skin	None	Scattered macular or papular eruptions or erythema Asymptomatic	Scattered macular or popular eruptions or erythema with pruritis or other associated symptoms	Generalized symptomatic macular, popular, or vesicular eruptions	Exfoliative dermatitis
Local	None	Pain	Pain and swelling with inflammation or phlebitis	Ulceration	Plastic surgery indicated

Prevention Strategies:

There is no known single preventative therapy for extravasations and treatment remains highly controversial.

1) Administration of vesicants must be limited to nurses who are specially trained and knowledgeable.

    - All subjective information from the patient should be carefully evaluated and NEVER dismissed. Patients may complain of feeling a burning sensation, feeling funny, different or itchy with peripheral extravasations.
    - Extravasations from central venous access devices (CVAD) have included complaints of dull, aching pain in the shoulder area, tingling, burning or a sensation of warmth in the chest wall and fever of unknown origin.
    - Vesicants should be administered through a central venous access device if possible.

- Peripheral vein selection is critical. Large, pliable veins in the forearm are generally preferred. Avoid veins in the hand as extravasation will cause severe damage.
- Technique is important. Prior to initiating vesicant infusion reevaluate access and ensure a good blood return.

2) Patient Education / Self Care Teaching (Faithful S et al, 2003):

- It is essential to educate the patient and family about the potential risks prior to each infusion. Encourage the patient to immediately report any feeling of pain, burning, or irritation during or following the infusions.
- Monitor for skin toxicities and signs and symptoms of infection
- Report toxicities promptly to nurse or physician
- Infection control – hand washing
- Skin hygiene – mild cleansers (e.g. Cetaphil)
- Avoid alcohol-based hand sanitizers
- Avoid trauma, irritation, and friction
  - Avoid perfumes
  - Wear loose-fitting cotton clothing
  - Avoid tight-fitting shoes
  - Use cotton sheets
  - Use mild / hypoallergenic laundry soap
  - Avoid starch-based powders
  - Practice sun safety
- Pain management

Treatment Strategies:

Treat the cause:

- for hypersensitivity reactions promptly withdraw the implicated chemotherapeutic drug
- for extravasations through a central venous access device, arrange for prompt removal of CVAD
- for extravasations through peripheral sites, consider insertion of CVAD for subsequent drug administration
- consider thermal manipulation and antidote administration for extravasations as per institution policy
- consider hospital admission for severe skin toxicities (e.g. SJS, extravasation from CVAD)

Treat the patient-related concerns:

1) Manage Pain / promote comfort
- appropriate analgesia
- anaesthetic creams
- control the environment (cool, humid)
- elevate the limb where the extravasation occurred

2) Manage Itching
- antihistamines
- corticosteroids
- medicated baths
- emollients
    - cutaneous stimulation techniques to avoid scratching
- distraction therapy (music, imagery, relaxation)

3) Prevent Infection
- promote good nutrition and hydration
- promote good skin hygiene
- use mild non-perfumed skin cleansers (e.g. Cetaphil)
- practice cutaneous stimulation to avoid scratching (gentle massage, pressure)
- avoid friction / harsh rubbing

4) Maintain quality of life
- Manage symptoms according to patient priority
- Enhance the patient's personal sense of value and safety
- Promote feelings of control with patient education / information sharing / self care teaching
- Provide emotional support to the patient and family
- Offer spiritual support
- Referral to psychosocial oncology, counselling services, social work, child life program as appropriate
- Facilitate access to pain and symptom clinic, art therapy, yoga, dietician, as indicated

Treat the wound:

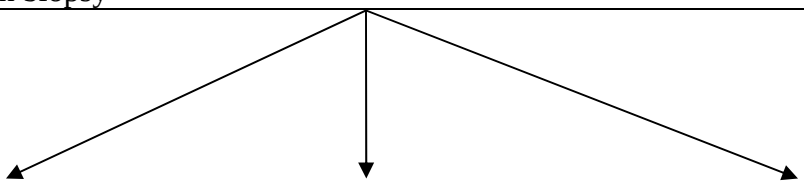
- moist wound healing
- principles of burn management
- extravasation of a vesicant requires surgical intervention
- swab all suspicious wounds
- prompt identification and treatment of infections

- consider referral to advanced wound clinician, plastic surgeon, dermatologist, ophthalmologist, burn unit
- consider vacuum assisted closure therapy for chronic, slow-healing wounds

GRAFT VS HOST DISEASE ALGORITHM

ASSESSMENT / DIAGNOSIS

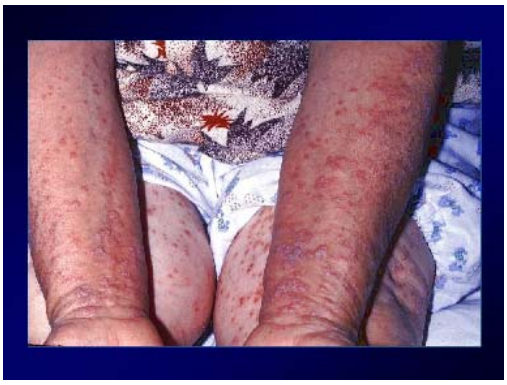
- Assess compliance with immunosuppressive prophylaxis
- Nursing history (including a thorough medication history)
- Physical examination including thorough baseline skin assessment
- Assess nutritional status
- Assess patient's knowledge and learning needs
- Wound / skin reaction assessment (type, colour, distribution, extent – utilizing 'rule of 9's')
- Consider skin biopsy



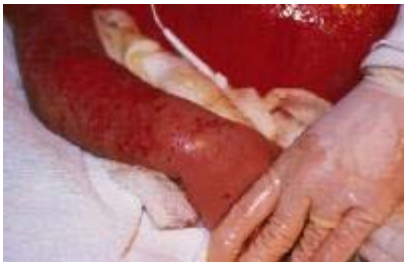
TREAT THE CAUSE	TREAT PATIENT CONCERNS	TREAT THE WOUND
• Daily assessments • Patient Education / Self-Care Teaching • Immunosuppressive medications / High-dose corticosteroids • Extracorporeal photo immunotherapy (ECP)	• Manage Pain / promote comfort • Manage Itching • Prevent Infection • Maintain Quality of Life Refer to: Recommendations on Care of the Wound Bed	• Treatment principles as for first and second degree burns • Prompt identification & treatment of infections • Consider referral to dermatologist for PUVA therapy (psoralen-UVA) Refer to: Recommendations on Care of the Wound Bed

Part 3 Hematopoeitic Stem Cell Transplant (HCST):

Definition:



Early (stage 2)



Severe (stage 4)

Graft vs Host Disease:
Hematopoietic stem cell transplant (HSCT) (i.e. bone marrow transplant or blood progenitor cell transplant) is a widely used modality which offers the potential for long term survival to some patients with previously fatal diseases. The patient receives high-dose chemotherapy with or without radiation therapy followed by stem cell rescue. One of the side effects of this procedure is graft versus host disease (GVHD). This side effect is commonly seen in patients who have received stem cells from a related or unrelated donor. GVHD affects the gut, the liver, the lungs, the skin (and may involve the vaginal and oral mucosa). It can be acute (within the first one hundred days after transplant) or chronic (the most common delayed complication). Acute and chronic GVHD should be considered two separate diseases.

Morbidity and mortality is highest for patients who develop chronic GVHD directly following acute GVHD.

Reported skin changes include dryness and pruritic, erythematous, maculopapular rashes. There can be alterations in skin colour, tightening of the skin, and muscle cramping. Onset can be subtle or sudden; severe GVHD of the skin can present with generalized erythema, fever, aching and desquamation and can progress to scleroderma and contracture.

Incidence:

The incidence of skin GVHD in patients receiving hematopoietic stem cells from a donor is reported to be as high as 80% (Yarbro et al, 2000). Symptoms vary in severity and

type. Chronic oral GVHD primarily affects the oral and pharyngeal mucosa. GVHD is more likely to occur in older patients and in recipients of stem cells from unrelated or mismatched donors.

Etiology:

Presence of immunocompetent donor T cells can lead to the recognition of host tissue as foreign.

Standards / outcomes:

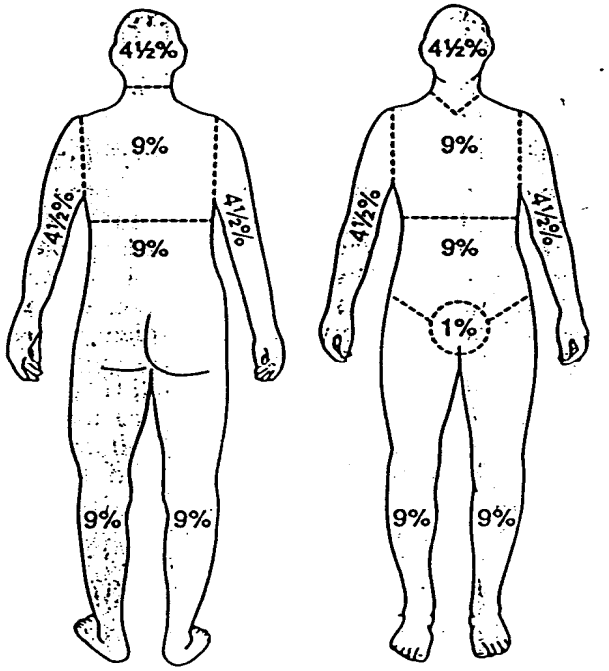
Minimize / control GVHD skin
Promote treatment compliance
Maintain patient's quality of life
Enhance patient comfort
Moderate aggravating factors
Maintain or restore range of motion in affected limbs
Maintain or restore skin integrity
Prevent infection

Assessment & Investigations:

Skin biopsy is essential to confirm diagnosis. Frequent monitoring of the skin is essential and measurement of degree of involvement utilizing the 'rule of 9's'.

Rule of 9's (adult):

- Head (9%)
- Chest/abdomen (18%)
- Back (18%)
- Each arm (9%)
- Each leg (18%)
- Genitalia (1%)



Rule of nines.

GVHD Skin: (Yarbro et al, 2000)

Stage 0	Stage 1 (mild)	Stage 2 (moderate)	Stage 3 (severe)	Stage 4 (life-threatening)
None	Maculopapular rash involving less than 25 % of the body surface	Maculopapular rash involving 25 % - 50 % of the body surface	Generalized erythroderma	Desquamation and bullae

Prevention Strategies:

- Immunosuppressive prophylaxis
- Early identification and treatment
- Arrange dental assessment and provision of care prior to transplant

- Patient Education / Self-Care Teaching (Yarbro et al, 2000)
  -Monitor for skin involvement
  -Monitor for signs and symptoms of infection
  -Report any problems promptly to nurse or physician
  -Infection control – hand washing

-Oral hygiene
-Skin hygiene – mild cleansers (e.g. Cetaphil)
-Avoid alcohol-based hand sanitizers
-Avoid perfumes
-Loose-fitting cotton clothing
-Avoid tight-fitting shoes
-Cotton sheets
-Mild / hypoallergenic laundry soap
-Sun safety
-Pain management

Treatment Strategies:

Treat the cause:

- Immunosuppressive medications
- High-dose corticosteroids
- Extracorporeal photoimmunotherapy (ECP)
- Daily assessments

The patient-related concerns:

1) Manage Pain / Promote Comfort
    - Analgesia
    - Topical analgesics (see Appendix)
    - Control the environment (cool, humid)
    - Encourage relaxation techniques
    - Encourage soft, bland diet

2) Manage Itching
    - antihistamines
    - medicated baths
    - emollients
    - use mild non-perfumed skin cleansers (e.g. Cetaphil)
    - avoid scratching (gentle massage, pressure)
    - avoid friction / rubbing
    - loose-fitting cotton clothing

3) Prevent Infection

- monitor for signs and symptoms of infection (viral infections, primarily varicella zoster virus, are responsible for more than 40% of skin infections)
- swab suspected skin / mucosal infection for both viral and bacterial cultures
- provide prompt treatment of infections
- promote good nutrition and hydration
- promote good skin hygiene
- promote meticulous oral hygiene

4) Maintain quality of life

- Manage symptoms according to patient priority
- Enhance the patient's personal sense of value and safety
- Promote feelings of control with patient education / information sharing / self care teaching
- Provide emotional support to the patient and family
- Offer spiritual support
- Referral to psychosocial oncology, counselling services, social work, child life program as appropriate
- Facilitate access to pain and symptom clinic, art therapy, yoga, dietician, as indicated
- Gentle exercise to delay / prevent tightening of the skin

<u>Treat the wound:</u>

- burn management principles
- consider silver-sulphadiazine cream (Flamazine) (unless allergic to sulpha drugs)
- consider 3M Cavilon ™ No Sting Barrier Film (foam, swab stick, or spray)
- prompt identification and treatment of infections
- refer to dermatology for PUVA treatments (psoralen – UVA)
- consider referral for extracorporeal photophoresis

APPENDIX A

Radiation-Induced Skin Reaction Assessment Scale (RISRAS):
(Noble-Adams, 1999) (incorporates a patient-rated symptom scale with a health-care professional assessment scale)

Patient symptom scale

Symptoms	Not at all	A little	Quite a bit	Very much
Do you have any tenderness, discomfort, or pain of your skin in the treatment area?	1	2	3	4
Does you skin in the treatment area itch?	1	2	3	4
Do you have a burning sensation of your skin in the treatment area?	1	2	3	4
To what extent has your skin reaction and your symptoms affected your activities	1	2	3	4

Health care professional scale (record of treatment details included here – dose, fractions, etc.)

Erythema (E)	0 (normal skin)	1 (dusky pink)	2 (dull red)	3 (brilliant red)	4 (deep red-purple)
Dry desquamation (DD)	0 (normal skin)	1 (<25%)	2 (>25-50%)	3 (>50-75%)	4 (>75-100%)
Moist desquamation (MD)	0 (normal skin)	1.5 (<25%)	3.0 (>25-50%)	4.5 (>50-75%)	6.0 (>75-100%)
Necrosis (N)	0 (normal skin)	2.5 (<25%)	5.0 (>25-50%)	7.5 (>50-75%)	10 (>75-100%)

Ongoing assessment scale

Date	No.	E	DD	MD	N	Pain	Itch	Burn	Activities	Total
Treatments:										

APPENDIX B

Cancer Treatment-Related Wounds
Glossary Terms

- Antineoplastic
  Inhibiting or preventing the development of neoplasms. Checking the maturation and proliferation of malignant cells.

- Cellulitis
  An acute, diffuse, spreading, edematous, suppurative inflammation of the deep subcutaneous tissues and sometimes muscle which may be associated with abscess formation.

- Chemotherapy
  The treatment of disease by means of chemicals that have a specific toxic effect upon the disease producing microorganisms (antibiotics) or that selectively destroy cancerous tissue (anticancer therapy)

- CVAD
  Central venous access device: central line, port-a-cath, PICC (peripherally inserted central catheter)
  A central line is a long, hollow tube made from silicone rubber. The central line is inserted (tunnelled) under the skin of the chest into a vein. The tip of the tube sits in a large vein just above the heart.

- Cytokine
  Small proteins or biological factors that are released by cells and have specific effects on cell-cell interaction, communication and behaviour of other cells.

- Extracorporeal
  Outside the body.

- Irradiation
  Treatment by ionizing radiation such as x-rays or radioactive sources such as radioactive iodine seeds.

- Photosensitivity
  An abnormal cutaneous response involving the interaction between photosensitizing substances and sunlight or filtered or artificial light

- Radiation therapy (radiotherapy)
  Treatment with high energy radiation from x-rays or other sources of radiation. The use of controlled amounts of a form of energy, aimed at a particular part of the body to treat disease.

- Radiosensitive
  Responsive to radiation therapy.

- Radiosensitisers
  Drugs which enhance the effect of radiation.

- Telangiectasis
  Dilatation of the capillary vessels.

- Xerosis
  Pathologic dryness of the skin (xeroderma)

APPENDIX C

Cancer Treatment-Related Wounds
Topical Anaesthetics

- Emla Cream (lidocaine 2.5% and prilocaine 2.5%)
- Xylocaine 2% jelly (lidocaine 2%)
- Ametop (tetracaine 4% w/w)
- Afterburn (lidocaine hydrochloride 0.5%)
- Boil Ease Pain Relieving Ointment (benzocaine 20%)
- Johnson & Johnson Burn Cream (benzocaine 5 %)
- Lidodan (lidocaine 5 %)
- Nupercainal Ointment (dibucaine 1 %)
- Solarcaine Lidocaine Spray (lidocaine hydrochloride 0.5 %)
- Xylocaine ointment (lidocaine 5 %)

APPENDIX D

Cancer Treatment-Related Wounds
Topical Analgesics

- Morphine Sulfate 3% to 10% gel (If odor and infection involved, add Metronidazole 2% to gel) Apply gel bid to qid prn

- Hydromorphone 0.1% gel (If odor and infection involved, add Metronidazole 2% to gel) Apply gel bid to qid prn

- Hydromorphone 10mg/mL Spray (1 spray to painful area tid to qid prn or 10 to 15 minutes prior to dressing change)

For pressure ulcer type wound pain:

- Phenytoin 5%, Hydromorphone 0.1% gel, fill wound with gel bid with dressing change (If infection or odor involved, add Metronidazole 2% to gel)

- Hydromorphone with Lidocaine Base 2% or Tetracaine 2 to 4% (If infection or odor involved, add Metronidazole 2% to gel)

- Metronidazole powder insufflator to puff 1 to 2 puffs to wound (affected area) tid.

Note: can also add misoprostol 0.0024% if necessary to speed up healing

For radiation burn type wound pain control:

Ketoprofen 5%, Tetracaine or Lidocaine 2 to 4%, Misoprostol 0.0024%, Pluronic 20% to 30% gel apply tid to qid to area

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