Below the Surface: Applying Evidenced-Based Practice in Skin Care Management for Hematopoietic Cell Transplant Recipients

Linda Z Abramovitz MSN, RN, CNS, BMTCN, FAAN
Lisa A Pinner MS, RN, CPON, BMTCN®
Nancy A Noonan MS, RN, PCNS-BC, BMTCN®

Learning Outcomes
- Describe a plan for the prevention of skin complications related to HCT
- Apply current management strategies for HCT-related skin complications in your setting
- Identify available resources for management of HCT-related skin complications
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- Structure and Function
- Causes of Skin Complications
- Case Studies
  - Assessment
  - Interventions & Management
  - Skin Care Challenges & Solutions

Best Practices
Evidence-Based Knowledge

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Skin Structure and Function

Skin Functions
- Natural barrier to prevent infection
- Regulates body temperature
- Regulates fluids and electrolytes
- Sensory processing

Alteration in Skin Integrity
- Increased risk of infection
- Fluid Loss
- Pain
- Negative body image
- Impaired temperature regulation

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Manifestations of Skin Injury
- Alopecia
- Pigment changes
- Skin breakdown
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**RISK FACTORS FOR SKIN BREAKDOWN**

- Hospitalization
- Impaired mobility/activity
- Nutrition
- Friction/shearing
- Moisture
- Urine
- Stool (diarrhea)
- Diaphoresis
- Poor hygiene
- Non-adherence

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**WHAT ARE THE POTENTIAL CAUSES FOR SKIN INJURY?**

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**CAUSES OF SKIN COMPLICATIONS**

- Medications
  - Antibiotics
  - Anti-Seizure Meds
  - Chemotherapy
  - Immunosuppressants
- Infection
  - Bacterial
  - Fungal
  - Opportunistic
- CVC
- GvHD
- Co-Morbidities
- Acute
- Chronic
- SCID
- HBS
- Malignancy
- Eczema
- Inflammation
- TB1
  - Positional
  - Dose
  - TN + Chemys
  - Local XRT
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**CAUSES OF SKIN COMPLICATIONS**

*Preparative Regimen Agents*
- Cyclophosphamide
- Cytosine arabinoside
- Busulfan
- Thiotepa
- BCNU
- Melphalan
- Etoposide

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**CUTANEOUS EFFECTS OF SELECTED PREPARATIVE REGIMEN AGENTS**

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**CAUSES OF SKIN COMPLICATIONS**

- **Total Body Irradiation (TBI)**
  - Single dose vs fractionated
  - Timing of TBI dosing
  - Chemotherapy +/- radiation

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**WHAT IS MARSİ?**

- Medical Adhesive Related Skin Injuries
  - Damage to the skin that may occur when medical adhesives are not SELECTED, APPLIED and/or REMOVED properly

**Who is at risk for MARSİ?**

- 8% of hospitalized infants and children
- 15.5% of long-term care patients
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**Evidence-Based Best Practices**

- MARI
- PERINEAL CARE
  - Assessment
  - Guidelines
  - Interventions and Management
  - Challenges and Solutions

**MARSI**

**PERINEAL CARE**

**THIOTEPA**

**TBI**

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**SYSTEMATIC APPROACH TO SKIN CARE MANAGEMENT**

- Assessment
- Intervention
- Evaluation
- Risk factors

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**MARSI CASE STUDY - DAVID**

- 1.5mo old s/p autologous transplant for medulloblastoma
- Tolerated conditioning (Carbo, Etopo, Thiotepa) well with exception of persistent vomiting; now resolved.
- NG placed Day+14 to assist with medications and to initiate trophic feeds.
**Marsi Case Study - David**

- Feeding went well for 2 weeks until he accidentally pulled out NG tube.
- NG replaced on opposite side without event and feeding resumed.
- Securement devise and tape securing original NG tube was then removed. Underlying skin found to be erythematous, shiny, and denuded.

**Definition of Marsi...**

- Medical Adhesive Related Skin Injuries:
  - A medical adhesive related skin injury is an occurrence in which erythema and/or other manifestation of cutaneous abnormality (including, but not limited to, vesicle, bulla, erosion, or tear) persists 30 minutes or more after removal of the adhesive - 3M.
  - Damage to the skin that may occur when medical adhesives are not selected, applied and/or removed properly.

**Marsi Injuries**

Skin Injury in Marsi:
- Skin cell to adhesive attachment is stronger than the skin cell to skin cell attachment.
- Separation or detachment of the layers of the epidermis or the epidermis from the dermis.
- Injury can occur even without visual evidence in the setting of repeated application and removal of adhesives.
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**Types of MARSIs**
- Skin tear
- Skin stripping
- Tension injury
- Maceration
- Folliculitis
- Allergic contact dermatitis
- Irritant contact dermatitis


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**Risk Factors Associated with MARSIs**

**Extrinsic Factors**
- Drying agents to the skin
- Prolonged moisture exposure
- Radiation therapy
- Medications:
  - Chemotherapeutic agents
  - Immunosuppressives
  - Anticoagulants
  - Prolonged corticosteroids
- Photo-damage (e.g., UV-A/B)
- Mechanical issues
- Shearing, pressure, adhesives

**Intrinsic Factors**
- Very young and elderly
- Dermatologic conditions
- Renal failure
- Chronic HT
- Underlying medical conditions
- Infection, poor nutrition, serious cognitive, diabetes
- Dehydration
MARSI RISK-REDUCTION STRATEGIES
- Best product for the clinical need
- Application
- Removal

CASE STUDY – “MARI”

PERINEAL CARE CASE STUDY
- 8mo old with AML CR2
- Day +4 BMT for matched sibling marrow transplant
- i/p Busulfan & Fludarabine
- History of prolific diarrhea during cyclic chemotherapy
- Copious diarrhea for 2 days, now C. diff+
- Red, excoriated (denuded) perineal area under bum cream

Who do you call for help?
**Slide 28**

**KEYS TO PERINEAL CARE**

**BUILDING BARRIERS**

- Cleanse the skin – gentle, alcohol free cleansing
- Prevention - Apply treatments and barriers based on specific skin risk, concerns, and integrity:
  - Zinc oxide and/or petrolatum
  - Cyanoacrylate: alone or in combo with zinc oxide/petrolatum
- Treatment:
  - Apply medicated creams first, then barrier creams or cyanoacrylate.
- Reassess, Evaluate & Modify:
  - Evaluate response after 48 hours, modify if necessary...

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**“STANDARD” SKIN CARE - PREVENTION**

- CLABS/ CVC Care
- Hygiene
- Perineal Care

*What is a healthcare bundle?*

- A set of evidence-based practices that when consistently followed has been shown to lead to better outcomes.

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**HOW DO I SHARE SKIN CARE RECOMMENDATIONS WITH THE NURSING STAFF?**
PERINEAL CARE GUIDELINES FOR DIAPERED AND/OR INCONTINENT PATIENTS

BCHO Skin Champions Committee – Perineal Care Recommendations - 2017

CASE STUDY – “APRIL”
- 5 year old female diagnosed with AML in 2nd CR
- Treatment: PBMTC study using a partially matched family member after a negative selection of TCR alpha/beta depleted graft
- Conditioning regimen:
  - r-ATG 3 mg/kg X 3 doses
  - Busulfan 1 mg/kg X 10 doses
  - Thiotepa 5 mg/kg X 2 doses
  - Cyclophosphamide 60 mg/kg X 2 doses
  - Rituximab 375 mg/m² X 1 dose

Tolerated conditioning well with exception of fever spike during r-ATG
Skin care per APHON recommendations for Thiotepa infusions
- Bathe patient 3-4 times per day
- Change linen with each bath
- Avoid occlusive dressings, adhesive, lotions, and creams
- Wear loose fitting clothing
- If diapered, change diaper every 2 hours

On Day +2, April began complaining of pruritus on her chest, back and upper arms.

On Day +3 she developed diffuse erythema on her trunk, upper arms and neck.

**THIOTEPA**
- Alkylating agent
- Metabolized in the liver
- Half life is 4.9 to 17 hours
- Drug should be cleared within 48 hours
- Excreted through the skin and sweat glands
- Skin toxicity can include
  - Desquamation
  - Erythema
  - Hyperpigmentation
  - Pruritus

Schandevy & Bauters (2019) J Oncology Pharmacy Practice

Assessment of April’s legs and buttocks appear clear.
- All places submerged in the bath water.
- The diffuse erythema appears only above the water line.

WHAT ARE THE STANDARDS OF SKIN CARE FOR THIOTEPA?

THIOTEPA SKIN CARE PRACTICES

- How long do you follow Thiotepa skin care guidelines?
  - 24 hours after the last dose
  - 48 hours after the last dose

- How frequently do patients bathe?
  - Every 8 hours
  - Every 6 hours
  - 3-4 times a day while awake

- Do you allow soap?
  - Mild soap
  - No soap

- Central line dressing
  - Occlusive dressings are removed during the infusion and for 24-48 hours post infusion.
  - Occlusive dressings are allowed but must be changed 24 hours after the completion of the drug.
  - Central line dressing must be changed 24 hours after the completion of the drug.

- There is no consensus on what to use to clean the site.

- Diapered patients
  - Change hourly
  - Change every 2 hours
  - All agree no barrier creams

No clear standards in this country or Europe.

PRECAUTIONS TO PROTECT CAREGIVERS AND STAFF

Precautions aim to prevent exposure to Thiotepa excreted through the urine and/or skin.
TREATMENT
- Pruritus
  - Liberal use of fragrance-free lotions
  - Consider Hydroxyzine or Nalbuphene
- Desquamation
  - Keep area clean
  - Apply moisturizer
  - Apply barrier cream to perineal area
  - Topical steroids

CASE STUDY - “NATHAN”
- 15 year old male diagnosed with ALL with CNS involvement, in CR2, and received a sibling matched related donor transplant
- Conditioning
  - FTBI (1200 cGy) given over 8 fractions on Day -7, -6, -5 and -4
  - Etoposide (60 mg/kg) given on Day -3
- Skin Care Instructions During Fractionated Total Body Irradiation (FTBI)
  - Daily baths with mild soap and water
  - Moisturize every evening with a hospital-provided lotion
  - Avoid deodorants/antiperspirants on the days of radiation
  - Wear loose fitting clothing
  - Avoid sun exposure

NATHAN
- On Day +6 he developed erythema and desquamation to his neck and chest area
- In addition to the FTBI, he received a cranial spinal boost of 2400 cGy to his cranium, cervical spine and thoracolumbar spine
RECOMMENDATIONS FOR SKIN CARE FOR PATIENTS RECEIVING CRANIAL/SPINAL RADIATION

- Patients receiving a Cranial/Spinal Boost
- Wash skin daily with mild soap and warm water
- Avoid shaving
- Apply fragrance-free moisturizer 1-3 times a day
- Wear loose fitting clothing
- Avoid putting any hot or cold on the treated skin
- Protect skin from the sun
- If skin starts to feel sunburnt, apply 100% pure Aloe Vera

WHAT ARE THE KEY EDUCATION POINTS FOR LONG-TERM SKIN CARE AFTER TBI?
SKIN COMPLICATIONS: LONG TERM CONSIDERATIONS

- Key issues
- Awareness and education
- Yearly skin exam and risk assessment for cutaneous cancer
- Importance of sun and skin protection
- Hat
- Sunscreen
- Clothing
- Sunglasses

TEST YOUR KNOWLEDGE & ASSESSMENT SKILLS

WHAT IS YOUR DIAGNOSIS?

- Chemotherapy Effects
- Radiation Effects
- MARSI
- Drug Hypersensitivity
- Viral Infections
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**WHAT IS YOUR DIAGNOSIS?**

- Acute GVHD
- Chronic GVHD

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**WHAT IS YOUR DIAGNOSIS?**

Shearing / friction injury

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**SO WHAT HAS CHANGED?**
Skin care continues to be an issue
- Conditioning regimens
- MARSI
- Acute / Chronic GVHD
- Many new skin products
- EBP to guide care
- Technology

Nurses continue to play a vital role in the management of skin care complications.

A picture is worth a thousand words

Remember, one size does not fit all!