

Gelling Your Dermatology Nursing Practice

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A Practical Guide for Managing the Treatment of Mycosis Fungoides Cutaneous T-Cell Lymphoma With Mechlorethamine Gel

Sue A. McCann, Allister Benjamin Chase, Marianne C. Tawa

ABSTRACT: Mycosis fungoides is the most common form of cutaneous T-cell lymphoma. Stage IA and IB mycosis fungoides cutaneous T-cell lymphoma can be effectively controlled by skin-directed therapies such as the mechlorethamine gel approved by the Food and Drug Administration. Dermatology nurses play a key role in promoting good patient compliance through patient education about mycosis fungoides cutaneous T-cell lymphoma disease, proper administration of mechlorethamine gel, and connecting patients with patient assistance programs or other supportive services. This article provides the dermatology nurse with a background about early-stage mycosis fungoides cutaneous T-cell lymphoma, skin-directed treatment options, questions that a patient may ask about mycosis fungoides cutaneous T-cell lymphoma and mechlorethamine gel, and patient edu-

cation tools such as questions dermatology nurses may ask of their patients and a patient handout outlining mechlorethamine gel administration.

Key words: Cutaneous T-Cell Lymphoma, Mechlorethamine Hydrochloride, Mycosis Fungoides, Practical Nursing Guide, Review

Dermatology nurses often serve as the primary contact for patients with mycosis fungoides cutaneous T-cell lymphoma (MF-CTCL) and are integral in patient education, setting patients' expectations about disease symptoms, outcomes, and response times after treatment. Each practice setting generally follows its own protocol for MF-CTCL diagnosis and treatment, patient follow-up, and maintenance plans. The goal of this practical guide is to provide a brief review of early-stage MF-CTCL and its treatment with mechlorethamine gel. In addition, we will discuss having patient access to treatment, optimizing response, addressing compliance issues, managing side effects, and providing practical knowledge to patients for proper use of mechlorethamine gel.

Cutaneous lymphomas are a rare occurrence in the United States. That being said, CTCLs, primarily non-Hodgkin's lymphomas, represent approximately 70%–80% of the lymphomas in the United States (Bradford, Devesa, Anderson, & Toro, 2009; Imam, Shenoy, Flowers, Phillips, & Lechowicz, 2013). The two most common types of CTCLs are mycosis fungoides, which represent 50%–70% of all CTCL cases (Cutaneous Lymphoma Foundation, 2011), and Sézary syndrome, a more aggressive leukemic variant in approximately 1%–3% of all CTCL cases (Bradford et al., 2009; Criscione & Weinstock, 2007;

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Imam et al., 2013). There are approximately 20,000 cases of MF-CTCL reported in the United States (Lymphoma Research Foundation, 2012) and 1,000 (Stanford School of Medicine Multidisciplinary Cutaneous Lymphoma Group, 2015) to 1,500 (Bradford et al., 2009) new MF-CTCL cases diagnosed per year.

Patients with mycosis fungoides present with varying manifestations including erythroderma, cutaneous patches, plaques, and tumors. The pathogenesis of MF-CTCL is not well understood, but it is believed that T-cells home to the skin, are activated, and develop into a clonal state (Figure 1; Girardi, Heald, & Wilson, 2004; Kim et al., 2005). Briefly, clonal T-cells home to the skin and, depending on the stage, infiltrate the skin in various manners (patch and plaque lesions have CD4+ malignant T-cells and CD8+ T-cells home to the epidermis; tumors contain primarily malignant T-cells). A chemokine gradient (e.g., CC chemokine ligands 17 and 27) attracts chemokine receptors on the malignant T-cells (e.g., CC chemokine receptor 4) and helps T-cell migration to the epidermis. These CD4+ T-cells cluster around antigen-presenting dendritic cells (e.g., Langerhans cells) and form Pautrier's microabscesses, which results in activation of T-cells and release of inflammatory cytokines, such as interleukin (IL)-4, IL-5, and IL-10 (Edelson, 2001; Hwang, Janik, Jaffe, & Wilson, 2008; Kim et al., 2005).

Dermatology nurses often encounter new patients with earlier stages of MF-CTCL. For the purposes of this practical guide, we assumed that a diagnosis of MF-CTCL has been established; therefore, we focused on a skin-directed therapeutic option for Stage IA and Stage IB MF-CTCL (Table 1). Patients with early-stage disease typically have a more favorable prognosis (median survival of 10–35 years; Scarisbrick et al., 2014). Stage 1A is characterized by limited patches, papules, and/or plaques; no clinically abnormal peripheral lymph nodes; no visceral organ involvement; and absence of significant blood involvement (representative photos found in Figure 2; Olsen et al., 2007). Stage 1B is characterized by patches, papules, or plaques covering $\geq 10\%$ body surface area (BSA); no clinically abnormal peripheral lymph nodes; no visceral organ involvement; and absence of significant blood involvement (representative photos found in Figure 2; Olsen et al., 2007). For more information about MF-CTCL, please refer to the guidelines published by the International Society for Cutaneous Lymphomas (Olsen et al., 2007) and the European Organization of Research and Treatment of Cancer (National Comprehensive Cancer Network, 2015).

Goals of treatments for MF-CTCL are to relieve symptom(s) and to achieve remission or delay progression, while minimizing treatment-emergent side effect(s). Common skin-directed therapies for early-stage MF-CTCL include topical treatments such as corticosteroids, mechlorethamine and carmustine, localized radiation, retinoids, imiquimod, phototherapy such as psoralen plus ultra-

violet A or ultraviolet B, and total skin electron beam (Table 2; Girardi et al., 2004; National Comprehensive Cancer Network, 2015; Reavely & Wilson, 2004). For advanced stages, systemic treatments such as oral retinoids, interferons (INF- α , INF- γ), histone deacetylase inhibitors, extracorporeal photopheresis, or single-agent or multiagent chemotherapy regimens may also be employed (National Comprehensive Cancer Network, 2015).

Topical mechlorethamine (nitrogen mustard, mechlorethamine hydrochloride, chlormethine, methyl-bis (2-chloroethyl)amine hydrochloride) is one of the earliest approved treatments for cancer (Goodman et al., 1946). Initially, lyophilized mechlorethamine (Mustargen) was dissolved in water (Zhang, Trissel, Johansen, & Kimball, 1998) or compounded by pharmacists in a petrolatum-based ointment such as Aquaphor (Kim, Martinez, Varghese, & Hoppe, 2003; Price, Hoppe, & Deneau, 1983) and used in the treatment of various malignancies including Hodgkin's disease and lymphomas. Recommended as a primary treatment option for MF-CTCL (National Comprehensive Cancer Network, 2015; Trautinger et al., 2006), mechlorethamine is an alkylating agent that inhibits quickly proliferating cells (Actelion Pharmaceuticals US, Inc., 2013) and may affect interactions of keratinocyte, Langerhans cell, and T-cell via immune mechanisms (Kim et al., 2005). Mechlorethamine gel (VALCHLOR) received U.S. Food and Drug Administration approval in 2013 for the treatment of Stage IA and IB MF-CTCL in patients who have received prior skin-directed therapy (Actelion Pharmaceuticals US, Inc., 2013). In contrast to mechlorethamine compounded in ointment, mechlorethamine gel has longer stability, is quick-drying, is developed under good manufacturing practice (meets industry standards) with consumer-grade materials, and is a greaseless gel that is designed to be easier to apply (Lessin et al., 2013). In clinical trials, mechlorethamine gel has been shown to have consistent potency and to be generally well tolerated and noninferior versus mechlorethamine compounded in ointment (Kim, Duvic, Guitart, & Lessin, 2014; Lessin et al., 2013). Pruritus, dermatitis, and hyperpigmentation were the most common adverse effects seen in the clinical trials and were mild to moderate in severity and manageable. It is important to monitor patients for redness, inflammation, swelling, itchiness, blisters, secondary skin infections, ulceration, and nonmelanoma skin cancers during and after treatment with mechlorethamine gel (Actelion Pharmaceuticals US, Inc., 2013). Mechlorethamine gel may be used commonly as a second-line agent if the patient has tried and failed topical steroids or other skin-directed therapies.

PATIENT EDUCATION

MF-CTCL is a lifelong, potentially life-threatening disease. As such, dermatology nurses play a key role in setting patient expectations about MF-CTCL disease and treatment

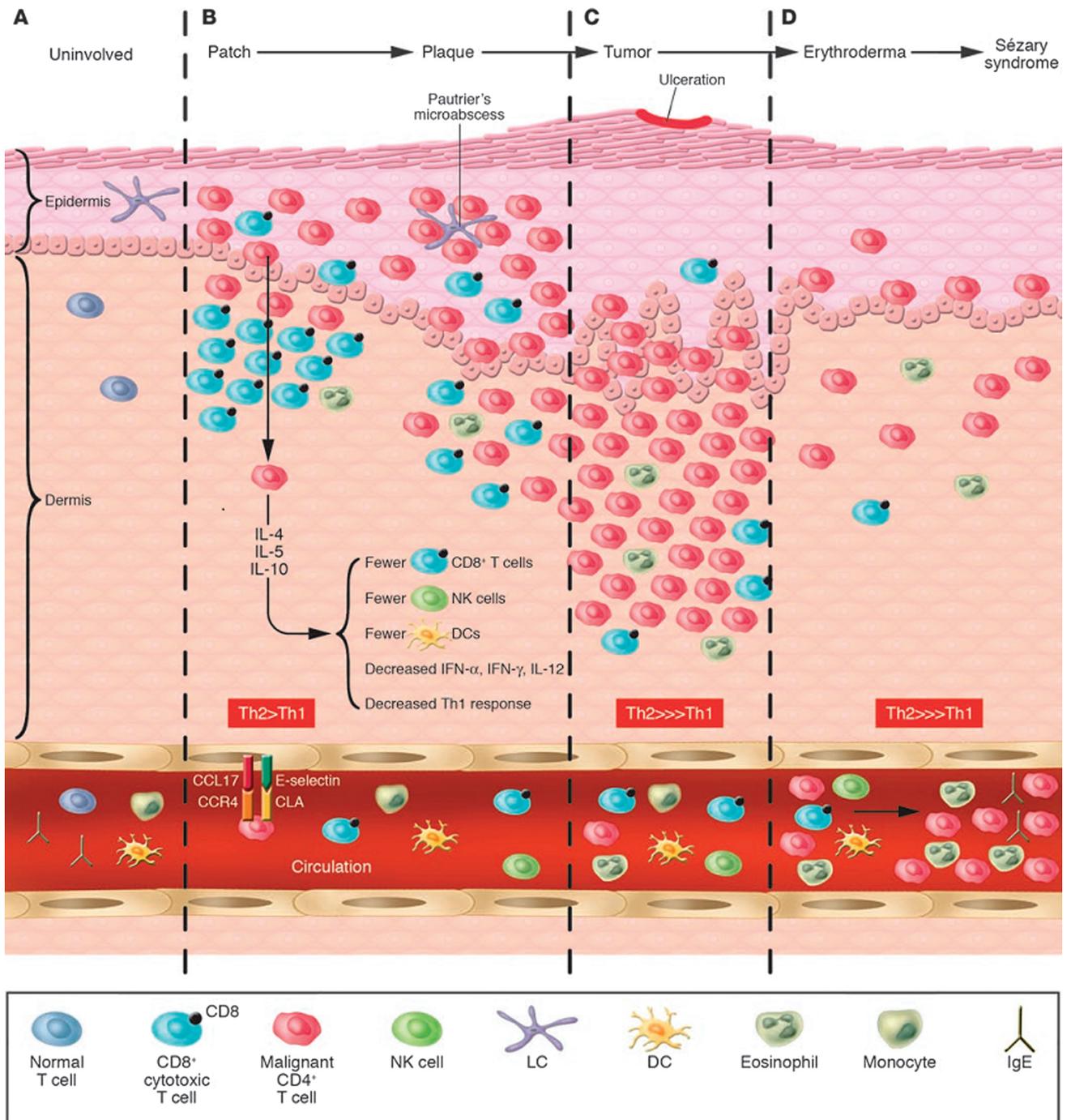


FIGURE 1. Pathogenesis of MF-CTCL (adapted from Kim et al., 2005). The skin microenvironment in mycosis fungoides (MF) progression. (A) Normal skin showing resident Langerhans cells in the epidermis and skin-homing T-cells in the dermis and circulation. (B) Patch and plaque MF in which the CD4+ malignant T-cells home to the epidermis and collect around Langerhans cells. Of note, in these stages, the epidermal and dermal infiltrates frequently have abundant CD8+ T-cells as part of the host immune response. (C) Tumor MF in which the tumor occupies the dermis and subcutaneous tissue and is composed of primarily malignant T-cells and few CD8+ T-cells. (D) Erythrodermic MF and Sézary syndrome with detectable circulating malignant T-cells that elaborate Th2 cytokines that affect CD8+ T-cell, NK cell, and DC numbers and function and, consequently, the host immune response.

and often encounter many questions from patients. Providing a patient handout, such as the one described in Figure 3, may be helpful in addressing patient concerns;

however, patients need to assume an active role in the management of their disease. As described by Ersser (2010), "Treatment effectiveness depends not only on

TABLE 1. MF-CTCL Clinical Stage (Adapted From the International Society for Cutaneous Lymphomas [Olsen et al., 2007])

Clinical Stage	Classifications			Blood	Description
	Skin	Lymph Nodes	Viscera		
IA	T1	N0	M0	B0–B1	<ul style="list-style-type: none"> Limited patches, papules, and/or plaques (<10% BSA) No clinically abnormal (palpable; ≥1.5-cm diameter) peripheral lymph nodes No visceral organ involvement Either absence of significant blood involvement (≤5% of peripheral blood lymphocytes are atypical/Sézary cells) or low blood tumor burden (>5% of peripheral blood lymphocytes are atypical/Sézary cells) but does not meet criteria of B2
IB	T2	N0	M0	B0–B1	<ul style="list-style-type: none"> Patches, papules, or plaques covering ≥10% BSA No clinically abnormal (palpable; ≥1.5-cm diameter) peripheral lymph nodes No visceral organ involvement Either absence of significant blood involvement (≤5% of peripheral blood lymphocytes are atypical/Sézary cells) or low blood tumor burden (>5% of peripheral blood lymphocytes are atypical/Sézary cells) but does not meet B2 criteria
IIA	T1–T2	N1–N2	M0	B0–B1	<ul style="list-style-type: none"> Limited patches, papules, and/or plaques Clinically abnormal lymph nodes (histopathology Dutch grades 1 or 2 or National Cancer Institute (NCI) lymph nodes (LNs)₀₋₃) No visceral organ involvement Either absence of significant blood involvement (≤5% of peripheral blood lymphocytes are atypical/Sézary cells) or low blood tumor burden (>5% of peripheral blood lymphocytes are atypical/Sézary cells) but does not meet criteria of B2
IIB	T3	N0–N2	M0	B0–B1	<ul style="list-style-type: none"> ≥1 tumor(s) ≥1 cm in diameter Either no clinically abnormal (palpable; ≥1.5-cm diameter) peripheral lymph nodes or clinically abnormal lymph nodes (histopathology Dutch grades 1–2 or NCI LN₀₋₃) No visceral organ involvement Either absence of significant blood involvement (≤5% of peripheral blood lymphocytes are atypical/Sézary cells) or low blood tumor burden (>5% of peripheral blood lymphocytes are atypical/Sézary cells) but does not meet criteria of B2
IIIA	T4	N0–N2	M0	B0	<ul style="list-style-type: none"> Generalized erythroderma (≥80% BSA) Either no clinically abnormal (palpable; ≥1.5-cm diameter) peripheral lymph nodes or clinically abnormal lymph nodes (histopathology Dutch grades 1–2 or NCI LN₀₋₃) No visceral organ involvement Absence of significant blood involvement (≤5% of peripheral blood lymphocytes are atypical/Sézary cells)
IIIB	T4	N0–N2	M0	B1	<ul style="list-style-type: none"> Generalized erythroderma (≥80% BSA) Either no clinically abnormal (palpable; ≥1.5-cm diameter) peripheral lymph nodes or clinically abnormal lymph nodes (histopathology Dutch grades 1–2 or NCI LN₀₋₃) No visceral organ involvement Low blood tumor burden (>5% of peripheral blood lymphocytes are atypical/Sézary cells) but does not meet criteria of B2

(continues)

TABLE 1. MF-CTCL Clinical Stage (Adapted From the International Society for Cutaneous Lymphomas [Olsen et al., 2007]), Continued

Clinical Stage	Classifications				Description
	Skin	Lymph Nodes	Viscera	Blood	
IVA ₁	T1–T4	N0–N2	M0	B2	<ul style="list-style-type: none"> Any skin involvement (patches, papules, and/or plaques; ≥1 tumor(s) ≥1 cm in diameter; and/or generalized erythroderma (≥80% BSA)) Either no clinically abnormal (palpable; ≥1.5-cm diameter) peripheral lymph nodes or clinically abnormal lymph nodes (histopathology Dutch grades 1–2 or NCI LN₀₋₃) No visceral organ involvement High blood tumor burden defined as one of the following: ≥1000 Sézary cells/μL with positive clonal rearrangement of TCR, CD4:CD8 ratio ≥ 10 with positive clone, or CD4⁺CD7⁻ cells ≥ 40% or CD4⁺CD26⁻ cells ≥ 30% with positive clone
IVA ₂	T1–T4	N3	M0	B0–B2	<ul style="list-style-type: none"> Any skin involvement (patches, papules, and/or plaques; ≥1 tumor(s) ≥1 cm in diameter; and/or generalized erythroderma (≥80% BSA)) Clinically abnormal lymph nodes (histopathology Dutch grades 3–4 or NCI LN₄; clone positive or negative) Either absence of significant blood involvement (≤5% of peripheral blood lymphocytes are atypical/Sézary cells) or presence of cancerous cells in the blood (low blood tumor burden: >5% of peripheral blood lymphocytes are atypical/Sézary cells; or high blood tumor burden defined as one of the following: ≥1000 Sézary cells/μL with positive clonal rearrangement of TCR, CD4:CD8 ratio ≥ 10 with positive clone, or CD4⁺CD7⁻ cells ≥ 40% or CD4⁺CD26⁻ cells ≥ 30% with positive clone)
IVB	T1–T4	N0–N3	M1	B0–B2	<ul style="list-style-type: none"> Any skin involvement (patches, papules, and/or plaques; ≥1 tumor(s) ≥1 cm in diameter; and/or generalized erythroderma (≥80% BSA)) Either no clinically abnormal (palpable; ≥1.5-cm diameter) peripheral lymph nodes or abnormal lymph nodes (histopathology Dutch grades 1–4 or NCI LN₀₋₄; clone positive or negative) Visceral involvement (pathology confirmation of specific organ involved) Either absence of significant blood involvement (≤5% of peripheral blood lymphocytes are atypical/Sézary cells) or presence of cancerous cells in the blood (low blood tumor burden: >5% of peripheral blood lymphocytes are atypical/Sézary cells; or high blood tumor burden defined as one of the following: ≥1000 Sézary cells/μL with positive clonal rearrangement of TCR, CD4:CD8 ratio ≥ 10 with positive clone, or CD4⁺CD7⁻ cells ≥ 40% or CD4⁺CD26⁻ cells ≥ 30% with positive clone)

BSA = body surface area; MF-CTCL = mycosis fungoides cutaneous T-cell lymphoma; TCR = T-cell receptor.

having evidence of beneficial treatments and making discerning clinical judgments but also on the patient’s interpretation of the treatment plan, their motivation and understanding of it and how in practice they apply it to their lifestyle. Therefore, effective treatment fundamentally depends on people taking an active role in

learning about their therapy and knowing how to utilize it correctly.”

A patient’s quality of life is most often impacted by the manifestations of MF-CTCL. Patients may experience limitations with day-to-day activities as well as general emotional and social well-being (Demierre, Gan, Jones,



FIGURE 2. Photos of Stage IA and Stage IB MF-CTCL. (A) Stage IA. Patches are flat, possibly scaly, rash-like lesions (provided by Marianne C. Tawa, Dana–Farber Cancer Institute, Boston, MA). (B) Stage IB. Plaques are thicker, raised lesions (provided by Marianne C. Tawa, Dana–Farber Cancer Institute, Boston, MA). (C) Example of a mild reaction to mechlorethamine gel (provided by University of Pittsburgh Medical Center, courtesy of Dr. Akilov). (D) Example of a moderate to severe reaction to mechlorethamine gel (provided by Marianne C. Tawa, Dana–Farber Cancer Institute, Boston, MA). (E) Example of severe hypersensitivity or blistering (provided by Kristen Markel, Multidisciplinary Cutaneous Lymphoma Program, Stanford University School of Medicine).

& Miller, 2006). Coexisting symptoms such as pruritus, ulceration of tumors, and/or pain may exist as well as secondary events such as skin infections or other cancers (Demierre et al., 2006) could also reduce a patient’s quality of life. In addition to the support dermatology nurses can provide to patients, support groups both nationally—Cutaneous Lymphoma Foundation (www.clfoundation.org), Leukemia and Lymphoma Society (www.lls.org), Lymphoma Research Foundation (www.lymphoma.org), T-cell Leukemia Lymphoma Foundation (<http://tcllffoundation.org>), and Cancer Care (www.cancercare.org)—and locally could also help patients accept and manage their disease. It is important for the dermatology nurse to recognize the impact MF-CTCL has on a patient’s quality of life and to address these issues along with providing options for additional support as discussed above.

Questions From Patients

Patient education is critical to treatment compliance and success. Common patient questions are a useful guide that

the dermatology nurse can use during patient education opportunities. The following questions may be helpful in

TABLE 2. Skin-Directed Therapies in the Treatment of MF-CTCL

- Topical corticosteroids
- Topical chemotherapy
- Topical imiquimod
- Mechlorethamine (nitrogen mustard)
- Topical retinoids (bexarotene gel, tazarotene)
- Phototherapy
- Narrowband ultraviolet B
- Psoralen and ultraviolet A (PUVA)
- Radiation
- Total skin electron beam therapy

MF-CTCL = mycosis fungoides cutaneous T-cell lymphoma.

1 Open the tube
Apply gel right away or within 30 minutes after it has been taken out of the refrigerator.

2 Gently spread a small (pea-sized) amount of gel in a thin layer onto dry skin
Caregivers must wear disposable nitrile gloves when applying gel.

3 Apply 4 hours before or 30 minutes after showering or washing
Use moisturizers either 2 hours before or 2 hours after applying gel.

4 Allow gel to dry before getting dressed
Let the treated areas dry for 5 to 10 minutes after applying gel before covering with clothing.

5 Throw away empty tubes in the trash
Safely throw away used nitrile gloves in the household trash.

6 Wash hands with soap and water after applying gel
With clean hands, place the tube of gel back in its box and return it to the refrigerator (away from food).

APPLY WITHIN 30 MINUTES

Treatment

Mechlorethamine gel can be used to treat mycosis fungoides with great success. The topical mechlorethamine gel does not get into your bloodstream, therefore, it does not result in systemic toxicity.

It is important that you do not share your mechlorethamine gel with anyone else and it is very important to follow these safety guidelines and use caution when applying the medication to your skin.

Safety Guidelines

- Wear **nitrile** gloves only to apply. Any other glove type (latex, for example) will allow the medication to leak through the glove.
- Gloves will prevent getting medication under your fingertips that might accidentally get in your mouth or eyes.
- Ask your caregiver to help you with areas you can't reach, like your back. Make sure they wear nitrile gloves and wash their hands thoroughly for 15 minutes with soap and water afterwards.
- If you or your caregiver accidentally get mechlorethamine gel in the eyes, nose, or mouth, rinse the areas right away for at least 15 minutes with a large amount of water, normal saline, or an eyewash solution and contact your healthcare provider right away.

Other Safety Tips

- Keep soiled gloves in a lined garbage container away from children and pets. When you remove the gloves, pull the gloves to turn them inside and double-bag before placing in the garbage for routine collection.
- Avoid fire, flame and smoking until mechlorethamine gel has dried, which usually dries within 10 minutes after applying.

FIGURE 3. Patient handout: how to apply VALCHLOR (mechlorethamine gel, referred to as "the gel").

Storage of the Medication

- Keep the mechlorethamine gel tube in the refrigerator away from food in a separate container or bag until you are ready to use.
- If you plan to let the mechlorethamine gel tube sit at room temperature to warm up before applying, set an alarm and be sure to then return mechlorethamine gel to the refrigerator within 30 minutes. If the mechlorethamine gel tube has been left at room temperature longer than an hour, contact your pharmacist prior to using again.

Disposal of the Medication

- Safely (in a lined trash container away from children or pets) throw away any mechlorethamine gel that is not used within 60 days. This is best done by double-bagging the unused medication and place in a lined garbage can for routine collection.

Application of the Medication: Do's

- Wash and dry your skin completely before applying.
- Apply at least 4 hours before or 30 minutes after showering or washing.
- Apply only a thin film to be effective. A thicker layer (think of shaving cream) is wasteful and does not make it work better.
- Apply a thin film to your specific patches or plaques once a day to start.
- For patches and plaques spread over your body, it may be difficult to treat each individual spot. You can then apply to the general areas that need to be treated as directed by your nurse or doctor.
- Allow treated areas to dry for 5 to 10 minutes before covering with clothing. It is fine to wear clothing once the mechlorethamine gel has dried but remove any clothing that has been contaminated with wet mechlorethamine gel.
- Moisturizers may be applied to the treated areas either 2 hours before or after applying gel.
- Mechlorethamine gel can cause skin irritation; if you are not noticing any irritation using it once a day after 3-4 weeks, you may try using it twice a day. First check with your HCP to make sure you should increase the frequency.

Application of the Medication: Don't

- Use air or water-tight bandages, such as compression socks, on areas of the skin where the gel has been applied.
- Use the gel if you have had a previous allergic reaction to it.
- Panic if you begin to see new faint lesions appearing during the first month of the treatment. Mechlorethamine gel may pull out some of the underlying lesions that were not visible yet and bring them to the skin's surface. Just treat these new lesions along with the old lesions until you follow-up with your doctor.

FIGURE 3. Patient handout: how to apply VALCHLOR (mechlorethamine gel, referred to as "the gel"), Continued.

developing and relaying educational content for patients using mechlorethamine gel.

What Kind of Skin Response Can I Expect During Treatment With Mechlorethamine Gel?

Patients may be concerned by not knowing how their disease will respond or if it will respond to treatment or when the disease will return. Patients may observe an increase in new patches or plaques; however, they should not stop their treatment. It is important for dermatology nurses to have discussions with patients that how the skin responds to treatment is often representative of how well the disease is responding. As stated in Booher, McCann, and Tawa (2011), “the skin provides a transparent window to disease status and is a reflective mirror of therapeutic response.” For this reason, the patient’s skin response will be closely monitored at each visit and as needed during the course of therapy.

It is important for patients to report to dermatology nurses any concerns. If patients experience any adverse reactions or any changes in disease appearance, patients should notify the dermatology nurse or other healthcare provider immediately. Patients should also return for regularly scheduled follow-up visits. Questions dermatology nurses can ask of patients to determine treatment efficacy, compliance, and side effects at follow-up visits are included in Table 3. For additional questions patients have, encourage them to contact the dermatology nurse with any concerns.

TABLE 3. Top 10 Questions to Ask Patients With MF-CTCL at Follow-up Visit

1. Have you had any severe reactions, namely, hypersensitivity? What were the circumstances?
2. Have you experienced any dermatitis? If so, how severe? Mild, moderate, or severe
3. Do you have new patches or lesions?
4. How itchy are the patches or lesions on a scale of 1–10?
5. How do you apply mechlorethamine gel?
6. How do you remind yourself to apply mechlorethamine gel? Do you set an alarm?
7. Are you sleeping at night?
8. What makes the patches or lesions better/worse?
9. Are there any roadblocks in the past or in the future (i.e., daily schedule, travel) that applying mechlorethamine gel will not fit into your lifestyle?
10. Has MF-CTCL or applying mechlorethamine gel affected any social interactions?

MF-CTCL = mycosis fungoides cutaneous T-cell lymphoma.

How Do I Apply Mechlorethamine Gel?

Dermatology nurses need to educate patients about how to apply mechlorethamine gel. The following pearls should be conveyed to the patient:

- Start small and apply “a pea-size” amount until the patch or lesion is covered in a very thin layer.
- The gel should glide on and feel only slightly tacky.
- If the gel is not dry in 5 minutes, then the patient has applied too much to the patch or lesion.
- Apply only to clean, dry, and intact skin.
- Avoid mucosa, open wounds, and skin folds (increased risk of irritation, burning, dermatitis).
- Advise patients to keep in mind the activity for the day to help avoid side effects. For example, if patients are going to exercise, they should exercise first if possible and then shower before applying mechlorethamine gel (see also timeline diagram in the patient handout; Figure 3).
- For hard-to-reach areas, patients could apply mechlorethamine gel by using a back applicator or asking a caregiver for help. Caregivers should wear disposable nitrile gloves when applying. More directions about how to apply mechlorethamine gel are found in the Patient Handout (Figure 3).

What Should I Do If My Skin Becomes Irritated?

Dermatitis may be common in patients with MF-CTCL. When using mechlorethamine gel, patients should be prepared for the possibility and not be alarmed if dermatitis is experienced; however, patients should contact the dermatology nurse about what next steps to take. The dermatitis observed within the first couple of weeks after the use of mechlorethamine gel has, in some patients, been followed by a clearing of the lesion. If any of the following are noticed, mechlorethamine gel should be stopped or temporarily discontinued, and patients could apply a topical corticosteroid until symptoms have resolved:

- Intense hyperpigmentation (especially in patients with darker skin)
- Erythema (redness)
- Swelling
- Increased sensitivity
- Blisters
- Ulceration, pain, or burning.
- Mild hyperpigmentation or inflammation may be a positive response to treatment.

Treatment of Dermatitis: Corticosteroids

Delayed contact hypersensitivity, that is, allergic contact dermatitis from mild (Figure 2) or moderate dermatitis (Figure 2) to blistering (Figure 2), may occur after topical mechlorethamine administration and has been more often noted after application of aqueous formulations versus

TABLE 4. Ask the Expert Section

(A) How does mechlorethamine gel fit within the armamentarium of therapies for MF-CTCL? Could mechlorethamine gel be a first-line treatment? Is there a time when patients should use mechlorethamine gel when using other therapies to treat MF-CTCL (i.e., adjuvant vs. monotherapy)? (Marianne C. Tawa)

Dermatology nurses should consider using topical mechlorethamine gel in early-stage disease (Stages IA–IB) either as monotherapy or sometimes used in concert with other skin-directed modalities (adjuvant approach) such as topical steroids (at least initially) and phototherapy with NB-UVB or PUVA. We might employ topical mechlorethamine gel to localized spots/regions that have not cleared with phototherapy or in some cases topical corticosteroid use.

As far as using topical mechlorethamine gel as first-line therapy, it would be atypical in our practice setting because we are a referral center for cutaneous lymphomas. Patients present for care with a presumptive or confirmed MF-CTCL diagnosis without prior exposure to at least one skin-directed treatment modality. In the vast majority of cases, topical corticosteroids have been tried in varying potency rankings and time intervals. We might incorporate a 3-month trial of pulse alternating Class 1 and Class IV/V topical corticosteroids and show disease resistance or treatment failure, before moving on to topical mechlorethamine gel therapy.

That being said, topical mechlorethamine gel is FDA approved for the topical treatment of Stage IA–IB MF-CTCL in patients who have received prior skin-directed therapy; therefore, there may very well be circumstances in MF-CTCL clinical care whereby topical mechlorethamine gel might be selected over another skin-directed option. This may be in the setting of prior topical corticosteroid use (not for MF-CTCL) with documented localized cutaneous side effect(s), such as atrophy, acne form eruptions, pigmentary changes, and so forth.

In more extensive Stage IB disease (such as BSA > 50%) or later stage (II/III/IV) MF-CTCL, we often add topical mechlorethamine gel (adjuvant approach) to systemic therapies. Once again, this would be to address localized/recalcitrant sites of disease. Examples of systemic therapies combined with topical mechlorethamine gel may include oral bexarotene and other classes of biological agents, antibodies, and less often, chemotherapy. Sometimes, we make the decision to use topical mechlorethamine gel on persistent fixed patches or plaques, before moving on to localized radiation therapy.

(B) How important is the dermatology nurse's assessment in treating the patient? How do you align the dermatology nurse's goals with patient's goals for treatment? How do you manage the patient's expectations? (Sue A. McCann)

For the patient being treated with mechlorethamine gel, the dermatology nurse plays a significant role in patient assessment, identification of treatment goals, and management of treatment expectations. The nursing assessment, often done before the provider's assessment or as part of telephone triage between visits, can help establish several key factors that are important to the ongoing and successful use of mechlorethamine gel. In a nonjudgmental way, the nurse needs to determine how the patient is using the medication and if the nuances of application are understood and assess for side effects as well as signs of efficacy. By taking the time to thoroughly explore these issues, the nurse will gain very important information about the overall impact the medication has on the patient. As an example, when reassessing a patient using mechlorethamine gel, we noted an unusual red patch slightly below the lesion where it was being applied (Figure 2), which is an example of a mild reaction. The nurse asked a simple question: "After you put on the gel, are you waiting for it to dry?" When the patient responded, "not exactly—I usually put on a pair of pajamas soon after I apply it," it was determined that the gel was being smeared to nontreatment areas. At the point of care, the correct application technique was discussed, and any additional barriers to proper application were explored.

The nursing goals and patient goals for treatment with mechlorethamine gel are hopefully one in the same. This may not be the case when the patient first starts therapy, but it is only through the provision of education, reeducation when needed, assessment of patient satisfaction/dissatisfaction, and close follow-up that these goals come into alignment. Open and honest discussion about the therapy and patient compliance are essential for the realization of treatment goals. This discussion needs to happen each time the nurse interacts with the patient. The patient's attainment of treatment goals is closely related to the patient's expectations for treatment.

Patient expectations for therapeutic outcomes need to be addressed at the onset of therapy and throughout the treatment course. The nurse can help to establish realistic patient expectations while establishing timelines to response and extent of expected response. With realistic expectations, patient motivation to properly apply the medication and their ultimate compliance with the treatment plan is more likely to have positive outcomes.

(continues)

TABLE 4. Ask the Expert Section, Continued

(C) How likely is the patient to develop nonmelanoma skin cancer or secondary cancers a mechlorethamine gel treatment? Which patients are at a higher risk? (Allister Benjamin Chase)

As the package insert clearly lists, this a possible adverse reaction, albeit one of lower incidence; it is certainly an important discussion point that should be addressed as a component of the dermatology nurse's educational approach. In my practice, I prefer to reference the data from the clinical trial, which evidenced that 3 of 128 patients (2%) developed a nonmelanoma skin cancer either during the trial or during 1 year of posttreatment follow-up (Actelion Pharmaceuticals US, Inc., 2013). After topical mechlorethamine application, nonmelanoma skin cancers have been reported in patients who received treatments known to cause nonmelanoma skin cancer such as long-term phototherapy (especially PUVA), radiation, and immunosuppressive chemotherapy; however, topical mechlorethamine did not show an increased risk of secondary cancers and comorbidities (Lindahl, Fenger-Grøn, & Iversen, 2014).

What is important to understand about the patients on the trial and also within our practices is that many of these patients have received prior treatment, such as phototherapy, which is known to cause nonmelanoma skin cancers. Patients who have received previous phototherapy and also those who receive a fair amount of natural light exposure should be considered at a possible higher risk.

Statistics have been released by the Archives of Dermatology that reveal that more than 2 million people per year within the general population are diagnosed with nonmelanoma skin cancers (Rogers et al., 2010). It is vital to reinforce the importance of sun protection and respect the longitudinal risk of exposure, especially within the MF-CTCL patient group.

mechlorethamine gel. If dermatitis is noted after treatment with mechlorethamine gel, the patient should consult the dermatology nurse about the next steps. Mechlorethamine gel treatment may be applied less frequently (i.e., every other day instead of every day) or stopped, and depending on the degree of the reaction and skin sensitivity, there may be several options the dermatology nurse could suggest as next steps. Topical corticosteroid treatment could be applied continuously (e.g., for 2–3 months) or as pulse therapy (e.g., 2–3 weeks on treatment followed by 2–3 weeks off treatment). Once symptoms have resolved, topical corticosteroids could be stopped or given intermittently with mechlorethamine gel, such as corticosteroids given in the morning and mechlorethamine given at night. At the health-care professional's discretion, mechlorethamine gel could then be reinitiated possibly at a reduced frequency (every other night or twice a week).

TREATMENT OF DERMATITIS: OTHER MEASURES

- Soak in cool water for 10–20 minutes and then apply emollients, mentholated cooling topical agents
- Wet wraps
- Oatmeal baths
- Cool compress or ice packs
- Daily moisturization since dry skin tends to itch more
- Infection prevention in select cases: a technique that may help to reduce bacteria load on the skin and prevent infections; some healthcare practitioners suggest a bleach bath for their patients (two teaspoons of bleach per gallon of water).
- Patients may also consider washing their clothes in fragrance-free laundry detergent.

What Can I Do If My Treated Areas Become Itchy?

Addressing the underlying disease process may help to relieve localized or generalized itching. Symptoms can

be alleviated by use of over-the-counter preparations (e.g., emollients, anti-infectives, antipruritics, cold compresses) and/or systemic antihistamines, steroids, doxepin, gabapentin, aprepitant, selective serotonin reuptake inhibitors, naltrexone, or mirtazapine (National Comprehensive Cancer Network, 2015). Patients should also pay attention to the fabrics they are wearing and how tight the clothing is at the treatment sites.

How Much Medication Should I Be Using in a Month?

Generally, prescribing one tube of mechlorethamine gel per month could cover approximately 10% BSA. This is based on the calculations from the results of the randomized controlled clinical trial in 260 patients with MF-CTCL that studied the efficacy of mechlorethamine gel (Lessin et al., 2013). In that trial, the mean daily use of mechlorethamine gel was 2.8 g (one to two tubes per month); maximum daily use was 10.5 g (five to six tubes per month; Actelion Pharmaceuticals US, Inc., 2013).

When Should I Expect to See a Positive Skin Response to Treatment?

Patients may not see a response until 2–3 months from the start of treatment and should not be worried if a response is not seen until that time. To help patients keep track of their response, dermatology nurses could measure response after treatment via photo documenting, BSA measurements, global physician assessment, lesion size, narrative documentation, and/or changes in pigmentation.

Do I Still Need to Continue Treatment Once my Skin Clears?

If there are no adverse reactions and the disease has cleared, the patient could be treated with mechlorethamine gel for an additional month. A gradual decrease

in dosing may also be recommended. For example, maintenance treatment could be reduced to less frequent applications from nightly to two or three times a week over a period to ensure ongoing response that can be evaluated by nursing assessment. This may help a patient take a break from worrying about their disease if they have had an adequate clinical response and are able to take a “drug holiday.” If the disease reoccurs, mechlorethamine gel could be reinitiated. Patients can then be reevaluated at the next follow-up visit.

When Do I Need Follow-up in the Office Once I Start Treatment?

The initial follow-up visit may be scheduled at the 2- to 3-month time point. If the patient is responding well to treatment with mechlorethamine gel, subsequent follow-up visits may be scheduled every 3–6 months. Treatment with mechlorethamine gel as part of longer-term maintenance regimens may be of benefit to the patient. Patients who have applied topical mechlorethamine as a maintenance treatment had a longer enduring response during maintenance therapy than those who did not apply topical mechlorethamine as part of maintenance treatment (Kim et al., 2003). Patients may also respond well to mechlorethamine gel application after relapse after use with more aggressive therapies (Kim et al., 2003).

What If I Have Had a Reaction in the Past With Using Mechlorethamine?

If patients have had a hypersensitive reaction to previous compounded mechlorethamine ointment, it would be wise for the patient to test a small area with mechlorethamine gel initially. This patch test includes patients applying mechlorethamine gel nightly on a small area of a patch or on a small section of normal skin for up to 10 days before applying to all areas of disease. If there are no signs of dermatitis and mechlorethamine gel appears to be tolerated well, treatment with mechlorethamine gel may be titrated (applied three times weekly initially and adding an additional day of treatment each subsequent week until the patient is applying every day).

Is Mechlorethamine Gel Expensive?

The patient access program offered by Actelion Pharmaceuticals, Inc., could help with costs of mechlorethamine gel. This program can be accessed at <https://www.valchlor.com/valchlor-support-patient-program>.

What Time of Day Should I Apply Mechlorethamine Gel?

Some patients would rather apply earlier in the day, and some would rather apply before bedtime. Dermatology nurses can ask patients about their lifestyles and home situations to help manage the best choice for the patient.

In addition, take note of the timeline figure in the patient handout (Figure 3) for other timing considerations.

Can I Travel While Using Mechlorethamine Gel?

Patients’ travel schedules could be a challenge because of the refrigeration and storage requirements of mechlorethamine gel. Mechlorethamine gel may be carried in a cooler with ice on shorter trips and coordinate refrigeration at the destination. For flight travel, dermatology nurses may need to provide patients with a note to the airline or Travel Security Administration to allow the patient to bring the mechlorethamine gel on the plane. If a patient will be traveling for a longer period and refrigeration is not available, a topical corticosteroid could be prescribed instead for the duration of the trip and then switch back to mechlorethamine gel when the patient returns home.

The authors have addressed some of the major issues that dermatology nurses will encounter in the treatment of patients with MF-CTCL with mechlorethamine gel (Table 4).

CONCLUSION

Dermatology nurses play a vital role with promoting good patient compliance through patient education about MF-CTCL disease, proper administration of mechlorethamine gel, and connecting patients with patient assistance programs or other supportive services. This article provides the dermatology nurse with a foundational awareness of early-stage MF-CTCL, skin-directed treatment options, a list of questions that patients may ask the dermatology nurse, questions dermatology nurses may ask of their patients, and a patient handout outlining mechlorethamine gel administration. The dermatology nurse’s understanding and education of patients with MF-CTCL about mechlorethamine gel could help to encourage patients to be responsible for self-care and could lead to improving patient outcomes and quality of life.

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