

Complete Remission of Refractory Dyshidrotic Eczema with the Use of Radiation Therapy

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Dyshidrotic eczema is a chronic, enigmatic condition that usually affects the hands and feet. Modern-technique radiation therapy using megavoltage equipment for the treatment of dyshidrotic eczema has not been described in the literature before. A dramatic clinical response to low-dose external beam radiation therapy was observed in a patient refractory to multiple forms of topical and systemic agents. Complete resolution of this severe presentation of dyshidrosis occurred within 1 month following therapy, with a durable response at 6 months. Withdrawal of oral steroids, without flare of disease, was possible after 6 weeks, with the patient remaining free of medication at the 6-month interval. Complete remission of severe dyshidrotic eczema is achievable using low-dose external beam megavoltage therapy in situations where other forms of conventional therapies have failed. Lasting remission may allow for the complete withdrawal of oral or topical agents, which may become harmful with chronic use.

Dyshidrotic eczema (pompholyx) is a common, chronic disease primarily affecting individuals between the ages of 20 and 40. Clinically, these patients present with an intensely pruritic, burning, vesicular eruption of the palms, digits, and soles. Often, there is involvement of the dorsal aspect of the distal phalanges, causing skin tightness, fissuring of the skin

at the joints, pain, and a decrease in the range of motion of the fingers that interferes with daily activity.¹

Much like other forms of eczema, this is a benign, chronic, inflammatory disease that causes a decline in the quality of life rather than impacting survival.² Many theories regarding its cause have been postulated but, to date, have not been proved. Histopathologically, the disease demonstrates an acute to subacute superficial, spongiotic dermatitis.¹ This, in combination with its clinical presentation, suggests contact allergy or environmental exposure to internal or external antigens or irritants as the primary cause.³

Dyshidrotic eczema has traditionally been treated with systemic or topical corticosteroids. Although transient regression may occur, many of these patients become refractory to treatment or experience side-effects from long-term steroid use. Withdrawal of medication usually results in an immediate flare of the disease and the return of symptoms.² The hazards associated with chronic steroid use have compelled many clinicians to search for new methods of treatment. As these interventions fail, many patients turn to more aggressive therapy, including systemic chemotherapy or ultraviolet therapy, for relief.

Case Report

A 41-year-old woman presented with a 3-year history of severe dyshidrotic eczema manifested by fissures, recurrent infection, and vesiculation of the skin on the hands bilaterally. She first presented to the dermatology department 4 years prior, without any previous medical history. At that time, a course of tapering low-dose oral and topical steroids with plastic wrap occlusion was initiated. Her condition improved and stabilized for approximately 8 months, when she developed a flare complicated by infection secondary to withdrawal of medication. Oral and topical steroids

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COMPLETE REMISSION OF REFRACTORY DYSHIDROTIC ECZEMA



FIGURE 1. Preradiotherapy photographs of the hands: A and B, right dorsal and palmar surfaces; C and D, left dorsal and palmar surfaces.

were reinitiated in combination with oral antibiotics. Patch testing and irritant avoidance were performed, but failed to reveal an external allergen. She continued to improve on oral steroid therapy for 1 month, when she developed a second flare. This prompted intensification of steroid therapy and trials with multiple agents. Sixteen months later, psoralen ultraviolet A (PUVA) therapy was instituted, which caused a minimal decrease in the scaling and fissure formation on her hands. One month later, “ultrapotent steroids under plastic wrap occlusion” were administered on a weekly basis with no substantial effect. Her disease continued to progress while under therapy. She developed more severe skin tightness, decreased range of motion, and increased pain associated with this exacerbation. Methotrexate therapy was enter-

tained but not initiated because of the potential for systemic side effects. She then presented to the radiation oncology department for consideration of external beam radiation therapy. Pretreatment photographs were obtained (Figure 1).

A course of supervoltage external beam radiation therapy using a Clinac 4 MV linear accelerator through anterior and posterior parallel opposed fields was started. A 1-cm bolus was utilized to even the dose distribution throughout the interphalangeal folds. A dose of 150 cGy was administered twice weekly. The patient was re-evaluated after each 300-cGy increment. In this manner, a total of 900 cGy was delivered in six fractions over 18 days. The patient tolerated treatment without significant acute complications.

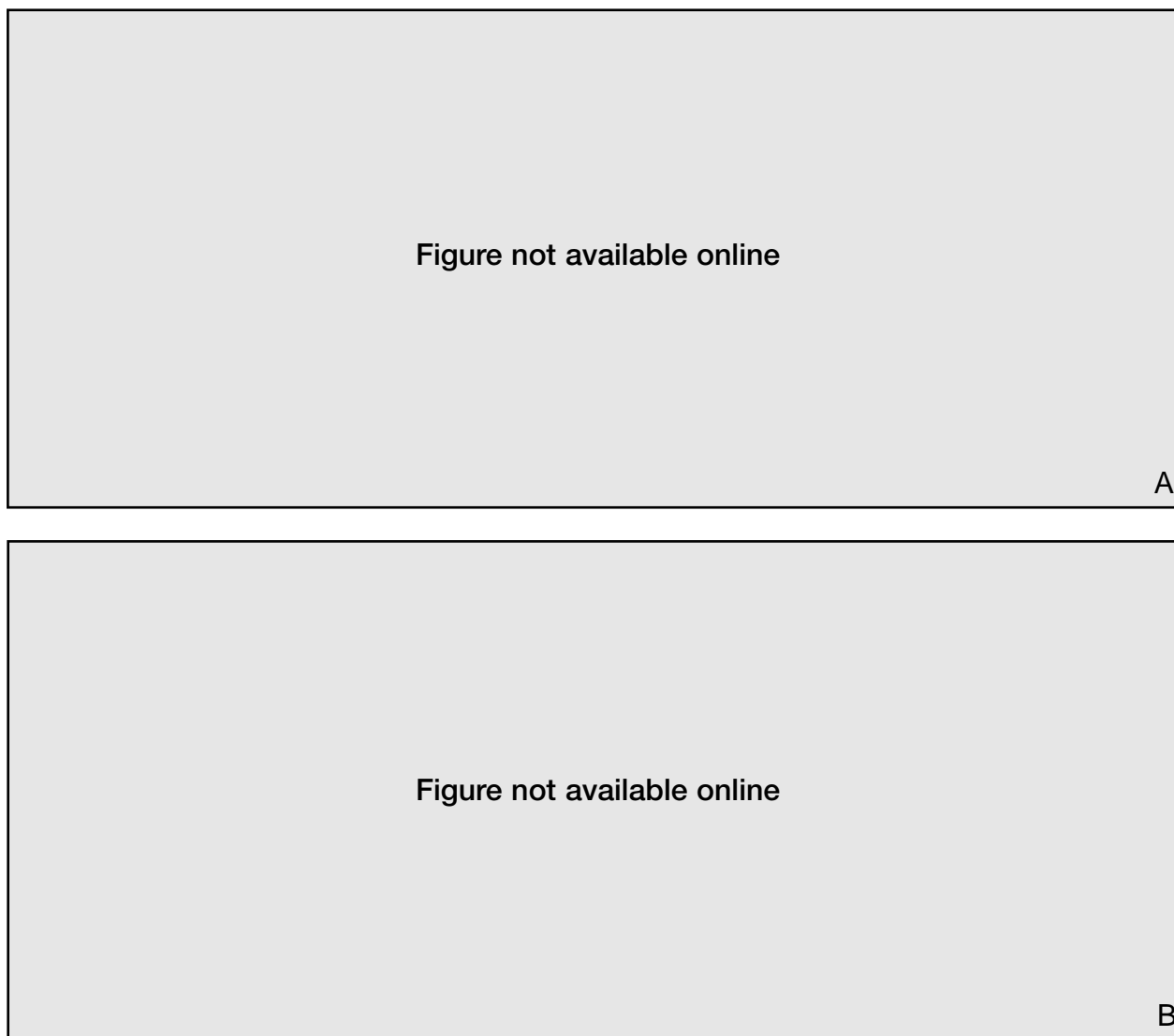


FIGURE 2. Postradiotherapy photographs of the hands: A and B, dorsal and palmar views of the same patient two-months postradiotherapy with a total dose of 900 cGy.

At the 1-month interval, the patient demonstrated a marked improvement in her condition. Her hands did show mild residual dryness, but were without vesicles, fissures, or compounded infection as seen prior to therapy. She was advised to reduce her steroid intake to half of her current dose of 5 mg daily methylprednisolone. Utilization of moisturizing ointments and hand exercises provided improved range of motion. At 3 months, examination of the hands revealed a complete remission of the disease. Oral steroids were completely withdrawn at this time. The patient reported growth of her nails on both hands. Posttreatment photographs were obtained for comparison (Figure 2).

The patient is now 10 months postcompletion of therapy. She reports full range of motion in both hands without limitation in her daily activities. The

xerosis and fissuring, as well as the discomfort from swelling associated with her disease, have completely subsided. To date, she continues without oral steroids.

Comments

Dyshidrotic eczema is commonly a frustrating condition from both the patient’s and the physician’s perspectives. Its chronic nature and severe symptoms, in combination with its relative resistance to most treatments, force many of those afflicted to seek multiple physician opinions and therapies. Escalation of therapy for resistant disease causes many of these patients to undergo more potent, but toxic, forms of therapy, such as high-dose systemic steroids, chemotherapy, and ionizing ultraviolet therapy. PUVA therapy, a commonly utilized “standard,” does provide benefit in

many patients, but may not offer adequate dose characteristics to initiate remission in more refractory cases of dyshidrotic eczema, such as this.

Radiation therapy has been used for benign dermatoses since its discovery in 1895. Concern in the last few decades over the theoretical carcinogenic effect of radiation for benign disease prompted a reduction in the use of radiation therapy for benign disease. However, low doses of radiation, such as that used in this case, have not been shown to significantly increase the risk of malignancy to irradiated tissues, especially in an area as radiotolerant as the extremities.⁵ The tissues of the hands and feet (ie, the muscle, bone, and cartilage) have tolerances of more than 7000 cGy at conventional 180 cGy/day fractions. Trends in radiation suggest a return to the use of external beam therapy for benign disease.

The most recent literature on the use of irradiation for eczematous conditions was published in 1978 by Jansen,⁴ who reported the use of Grenz ray therapy for select cases. By definition, Grenz rays are very low-energy X-rays produced with potentials of less than 20 kv. The beams created from this machine, by nature, deposit most of their total energy at the skin surface. The useful energy would unpredictably reach the underlying immune cells responsible for this condition, with poor reproducibility. Although Jansen⁴ suggested a significant durable remission with Grenz ray irradiation, there have been no follow-up reports. Quite possibly, this is the result of the evolution of radiation therapy away from the standard use of Grenz rays and the elimination of these units from nearly all radiation facilities.

Superficial radiation therapy has also been used in the past. These X-rays have energies in the 50- to 150-kv range. Documentation of the use of superficial radiation therapy to treat any form of eczema over the last 40 years is limited. Superficial irradiation offers the benefit of increased depth of penetration (up to 5 mm) over Grenz ray irradiation or PUVA and can be used in the treatment of these dermatoses. Effective radiation doses can be achieved to adequate depths in the dermal layers. Superficial machines are, however, becoming increasingly harder to find. Many modern radiation facilities have abandoned aging superficial equipment for megavoltage (greater than 1 Mv) external beam photon and electron units, which are capable of producing comparable, but more reliable, dosing.

Modern technique radiotherapy using megavoltage electron or photon beams works much like PUVA, Grenz ray, or superficial radiotherapy in that ionizing radiation is directed only at affected areas. The primary

difference is the increase in intensity and improvement in dose distribution of the photon or electron beam used in megavoltage therapy. Megavoltage therapy also differs in that it is measured in units of absorbed dose (Gray), which cannot be directly compared to the measured unit for Grenz ray therapy (Roentgen). Using tissue compensation and alterations in energy, almost all modern facilities have the capability to reliably administer effective equivalent doses in distributions comparable or superior to superficial or Grenz ray therapy. There are currently no clinical reports utilizing modern technique external beam megavoltage radiotherapy for the treatment of this condition.

The acute presentation and response to steroid therapy seen with this disease suggests the potential for a significant, reproducible response to low-dose radiation therapy similar to other inflammatory dermatoses. The targeted infiltrating immune cells that cause this disease are among the most highly radioresponsive cells in the human body.⁶ The combination of radioresponsive target cells and low doses of radiation allows for multiple retreatments of the same patient, if necessary, for any future recurrence of disease. In this case, low-dose radiation offered a lasting clinical remission with fewer symptoms, an improved range of motion of the hands, and a complete withdrawal of systemic steroids without flare of disease. This outcome was not achievable with steroids or PUVA. This led to a greatly improved quality of life in a situation where all other "standard" therapies, many comparable in risk, failed to relieve patient suffering.

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