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Common Dermatologic Manifestations in Patients Undergoing Chemotherapy: A Clinical Review

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Abstract **Review Article**

Chemotherapy is an essential component of cancer therapy, but its impact on rapidly dividing cells frequently results in a variety of cutaneous adverse effects. These skin manifestations can significantly affect patient quality of life and interfere with adherence to oncologic treatment. This review summarizes the most common dermatologic reactions associated with specific chemotherapeutic agents, including hand-foot syndrome, alopecia, mucositis, acneiform eruptions, pigmentation changes, nail alterations, and photosensitivity. Understanding these manifestations is crucial for timely diagnosis and management, ensuring improved outcomes and continuity of care.

Keywords: Chemotherapy, Cutaneous adverse effects, Skin toxicity, Oncodermatology, Cancer treatment, Dermatologic complications.

INTRODUCTION

Chemotherapy is widely used as a primary modality in the treatment of various malignancies. While effective in targeting cancer cells, its lack of specificity also affects normal rapidly dividing cells, including those in the skin, hair follicles, and mucous membranes. Dermatologic toxicities are among the most frequent non-hematologic side effects of chemotherapy, with reported incidence rates ranging from 30% to 70% depending on the agents used and patient characteristics (Lacouture, 2006). These manifestations not only cause physical discomfort but may also lead to psychological distress, negatively impacting the patient's quality of life. Moreover, severe cutaneous adverse events can result in treatment delays, dose reductions, or discontinuation, potentially compromising therapeutic outcomes. The early identification and appropriate management of these conditions are critical components of comprehensive cancer care.

1. Hand-Foot Syndrome (Palmar-Plantar Erythrodysesthesia)

Hand-foot syndrome (HFS) is characterized by painful erythema, swelling, and sometimes desquamation or blistering of the palms and soles. It is most commonly associated with capecitabine, 5-fluorouracil (5-FU), liposomal doxorubicin, and cytarabine (Lokich & Moore, 1984). The pathogenesis is thought to involve drug leakage from capillaries in areas of increased pressure or friction, causing local tissue damage. HFS typically presents within weeks of initiating treatment and follows a dose-dependent course. Preventive measures include the use of emollients, avoidance of heat and pressure, and dose modification. Topical corticosteroids and analgesics may provide symptomatic relief in more severe cases (Kollmannsberger *et al.,* 2002).

2. Chemotherapy-Induced Alopecia

Alopecia is one of the most emotionally distressing side effects for cancer patients. It occurs due to damage to rapidly proliferating hair matrix cells, leading to anagen effluvium. Agents commonly implicated include anthracyclines (e.g., doxorubicin), taxanes (e.g., paclitaxel), and alkylating agents. Hair loss typically begins within 1 to 3 weeks after the start of chemotherapy and is usually reversible. However, persistent alopecia may occur with certain regimens, especially those including docetaxel or cyclophosphamide (Freites-Martinez *et al.,* 2019). Scalp cooling caps have emerged as a preventive strategy, particularly in breast cancer patients, showing efficacy in reducing hair loss and improving patient satisfaction (Rugo *et al.,* 2017).

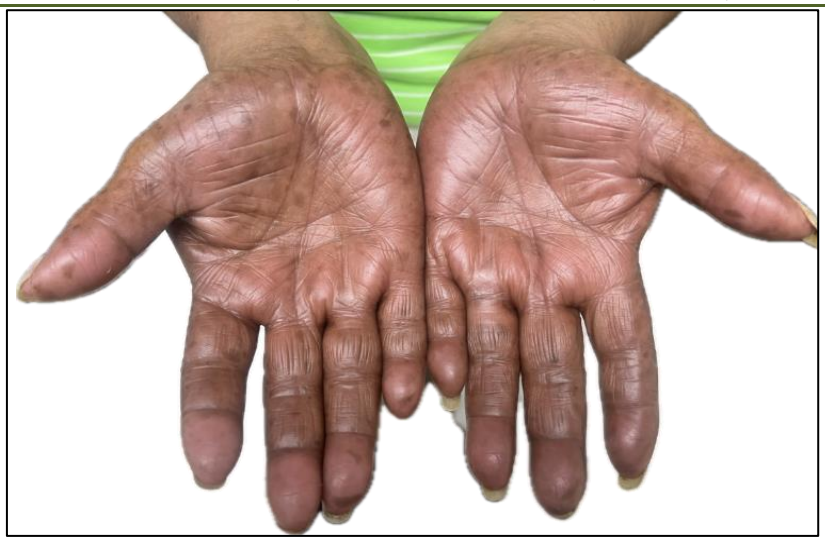


Figure 1: Palmar surfaces with diffuse hyperpigmentation, particularly over the creases and pressure points, consistent with acral melanosis associated with chemotherapeutic treatment

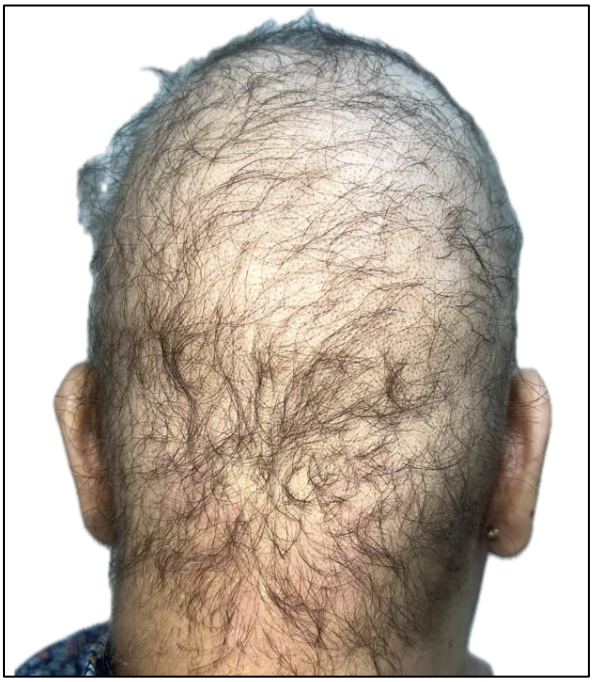


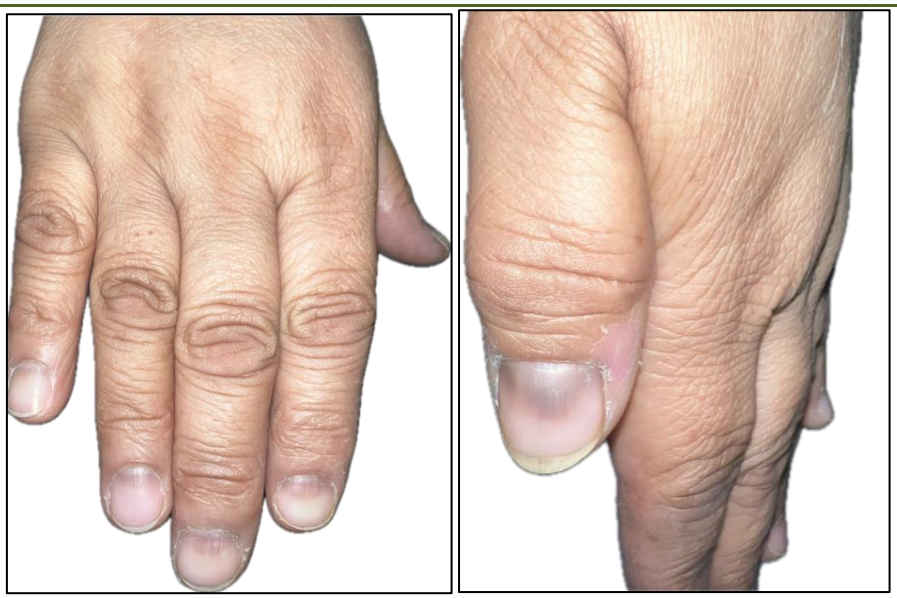
Figure 2: Posterior view of the scalp showing extensive non-scarring alopecia with sparse, thin, and dystrophic hair shafts, suggestive of chemotherapy-induced alopecia

3. Mucositis Oral

Mucositis is a common and painful complication of chemotherapy, particularly with agents such as methotrexate, 5-FU, and doxorubicin. The condition results from direct cytotoxic effects on the mucosal epithelium, leading to inflammation, ulceration, and risk of secondary infection (Sonis, 2004). Symptoms typically develop within 5 to 10 days of chemotherapy administration. Management includes good oral hygiene, topical anesthetics, antimicrobial mouthwashes, and systemic analgesics. Palifermin, a recombinant keratinocyte growth factor, has shown efficacy in reducing the incidence and severity of mucositis in high-risk patients (Spielberger *et al.,* 2004).

4. Nail Changes

Nail toxicity is a frequent but often overlooked side effect of chemotherapy. Common changes include Beau's lines, onycholysis, melanonychia, and paronychia. Taxanes and anthracyclines are commonly associated with these changes. EGFR inhibitors can cause painful periungual inflammation and pyogenic granuloma-like lesions. Preventive strategies include gentle nail care, use of antiseptic soaks, and topical corticosteroids. In severe cases, surgical intervention may be required (Macdonald *et al.,* 2015).



5. Pigmentation Disorders

Chemotherapy-induced pigmentation changes can affect the skin, hair, nails, and oral mucosa. Agents such as cyclophosphamide, busulfan, and 5-FU are known to cause hyperpigmentation, while others may lead to hypopigmentation or depigmentation (López *et al.,* 2020). These changes are usually benign and reversible but can be distressing for patients. Management focuses on patient education and reassurance, as treatment is rarely required.

6. Photosensitivity and Phototoxicity

Certain chemotherapeutic agents, including methotrexate, dacarbazine, and fluorouracil, can cause photosensitive reactions. Clinical features include erythema, edema, and vesiculation confined to sun-exposed areas. Preventive measures include strict photoprotection, use of broad-spectrum sunscreens, and avoidance of sun exposure during peak hours (Sánchez *et al.,* 2018).

7. Less Common Reactions

Other less common but clinically significant dermatologic reactions include flagellate dermatitis with bleomycin, urticarial eruptions, vasculitic lesions, and radiation recall dermatitis. These reactions require a high index of suspicion and may necessitate biopsy or laboratory evaluation to exclude other etiologies (Shah *et al.,* 2013).

CONCLUSION

Dermatologic complications are among the most prevalent and impactful adverse effects of chemotherapy. Their early recognition, accurate diagnosis, and timely management are essential to maintain patient quality of life and ensure uninterrupted oncologic treatment. As the therapeutic landscape continues to evolve with targeted therapies and immunotherapies, the role of dermatologic evaluation in oncology care becomes increasingly vital. Multidisciplinary collaboration between dermatologists and oncologists is imperative to optimize patient outcomes and reduce morbidity associated with chemotherapy-induced skin toxicities

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