

BRIEF REPORT

A Proactive Approach to the Prevention and Management of Postinflammatory Hyperpigmentation

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Postinflammatory hyperpigmentation (PIH) commonly develops after cutaneous inflammation or injury and can persist long after the underlying condition resolves. While PIH can affect patients of all Fitzpatrick skin types, there is a higher prevalence on those with darker skin. PIH can involve the epidermis, dermis, or both with the depth of pigment influencing the appearance and response to treatment. Although topical therapies and selected procedures have been used to improve PIH, the best approach to treatment is prevention. This article reviews the mechanisms and clinical features of epidermal and dermal PIH, management approaches, and risk factors relevant to aesthetic care. It discusses the role of the nurse practitioner in preventing PIH through early recognition and treatment of inflammatory skin conditions, assessment of individual patient risk, careful procedure selection, and conservative treatment planning. **KEYWORDS:** Postinflammatory hyperpigmentation, acne, skin of color, pigmentary disorders, aesthetic procedures, laser treatments, chemical peels, topical therapy, nurse practitioner, prevention

INTRODUCTION

Postinflammatory hyperpigmentation (PIH) is a common skin condition affecting countless individuals. For many patients, this not only affects their outward appearance but also impacts their self-confidence and, many times, their daily lives. A recent review highlights that PIH can not only be persistent, but also difficult to treat, reinforcing the importance of both proper management and the need for preventative strategies.¹ The nurse practitioner (NP) is in a unique position to positively impact the lives of their patients affected by PIH through the application of evidence-based prevention and management strategies. The question to answer is not only how to treat PIH once it has occurred, but also how to prevent it from occurring in the first place.

PIH PREVENTION AND TREATMENT

PIH is an inflammatory condition, referred to as hypermelanosis, caused by cutaneous inflammation or injury.² It commonly follows conditions such as acne, dermatitis, burns, or aesthetic procedures including chemical peels, lasers, and microneedling. This condition can affect all skin types, with worldwide prevalence ranging from 0.42% to 9.99% for darker skin types (Fitzpatrick skin types III–VI), which are among those primarily affected.³ Despite its prevalence, prevention strategies are still not well understood or utilized. Most practitioners tend to use a retroactive treatment approach instead of identifying the cause and how to effectively prevent the occurrence.

Cutaneous inflammation or injury triggers an increase in melanin as a protective response. This increase in melanin production results in visible hyperpigmentation that might persist long after inflammation resolves. The depth of pigment deposition is dependent on the severity and depth of the initial inflammation. This distinction not only

determines clinical presentation but also helps determine the expected therapeutic response.⁴

As described in a clinical overview, PIH in the epidermis occurs when melanin accumulates in the epidermal layers.⁵ Inflammation or injury to the superficial layer of skin results in an increase in melanin production, causing excess pigment to accumulate within keratinocytes, the cells responsible for storing and distributing melanin, while the basement membrane remains intact, preventing pigment from entering the dermis. The lesions affecting the epidermis tend to appear tan to dark brown and have more defined borders. Superficial pigment in epidermal PIH has been proven to respond better to topical therapies and typically resolves within weeks to months. Common causes of epidermal PIH include mild-to-moderate acne, superficial dermatitis, and aesthetic treatments such as mild laser therapy or superficial chemical peels, despite their use for pigmentation correction.

On the other hand, dermal PIH results from deeper injury that disrupts the basal layer of the epidermis, the layer dividing the epidermis and dermis. When this protective barrier becomes compromised, the melanin stored within keratinocytes spills into the dermis, known as pigmentary incontinence. Once this pigment reaches the dermis, the free melanin is taken up by macrophages, forming melanophages.⁵ These pigment-filled macrophages can persist in the dermis for months to years resulting in prolonged hyperpigmentation and slower response to topical therapies. Clinical presentation of dermal PIH appears as gray, blue-gray, or slate-colored lesions with diffuse borders.⁴

The ability to distinguish between epidermal and dermal involvement helps guide PIH management and aids in determining when prevention should take priority over treatment. Epidermal

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involvement will ultimately be more responsive to topical therapies, while dermal involvement requires prevention over correction. Current treatment strategies are used not only to reduce the production of melanin but also to promote cell turnover and reduce inflammation that might result in hyperpigmentation. Common approaches involve the use of topical retinoids, tranexamic acid (TXA), and hydroquinone.⁶ Hydroquinone, a skin lightening topical therapy, is commonly prescribed due to its ability to inhibit melanin. However, this can only be used short-term and under medical supervision due to the potential serious side effects of irritation, sensitization, and ochronosis.⁷ Combination therapy with retinoids and niacinamide can enhance outcomes when used with hydroquinone; however, this is primarily effective in epidermal PIH. Interventions such as superficial chemical peels, lasers with conservative settings, and even microneedling can be considered but must be done selectively. Although these treatments can improve hyperpigmentation, they might also induce or worsen PIH, particularly in individuals with darker skin tones. Treatment selection should be dependent on the depth of pigment, severity of inflammation, and patient risk factors.

The availability of treatment protocols does make treatment efficacy attainable; however, despite numerous treatment options being available, prevention remains the most effective treatment plan (Appendix A). The NP can mitigate the occurrence and severity of PIH through early recognition of individual risk factors and timely treatment. Prompt and effective management of acne, dermatitis, and other inflammatory dermatoses shortens the duration of inflammation, limiting melanocyte stimulation and possible pigment deposition. Furthermore, careful selection of aesthetic procedures and the use of conservative treatment settings can aid in the avoidance of postprocedural hyperpigmentation. Prioritizing proactive prevention over reactive treatment and integrating evidence-based practice with thoughtful procedural planning can reduce the incidence, persistence, and patient burden of PIH while also improving clinical outcomes and patient confidence.

APPENDIX

To access Appendix A, please visit https://jcadonline.com/wp-content/uploads/Morin_Appendix.pdf.

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