

Case Report: Pigment Recovery Following Postinflammatory Hypopigmentation Secondary To Cryotherapy Treatment

EHIA GHE L ANABA FWACP, FMCP, MSc Dermopath,^a Consultant Dermatologist, ehianaba@yahoo.com

OLUFOLAKEMI M COLE FMCP^a Consultant Dermatologist, fomcole@yahoo.com

RUTH I OAKU FWACP.^a Dermatology Resident, droaku79@gmail.com ^aDepartment of Medicine, Lagos State University Teaching Hospital, Lagos, Nigeria.

Corresponding Author: Anaba L Ehiaghe. ehianaba@yahoo.com, Phone: +2348030495911

^aDepartment of Medicine, Lagos State University Teaching Hospital, 1-5 Oba Akinjobi Way, Ikeja, Lagos, Nigeria.

ABSTRACT

Cryotherapy is one of the treatment modalities in dermatology. Frequently, post inflammatory hypopigmentation occurs following the use of cryotherapy and this is a major drawback of this treatment modality. Patients worry about re-pigmentation following treatment. Case reports and clinical studies on what happens following cryotherapy especially if and how long it takes for re-pigmentation to occur are few. This dearth in literature makes it difficult for practitioners to advice cryotherapy patients. We present a case report of repigmentation in an adult female (one of our colleagues) following cryotherapy.

Introduction

Cryotherapy is a treatment modality in dermatology. Diseases treated with cryotherapy include keloid, seborrheic keratosis, actinic keratosis and warts.¹⁻⁴ Cryotherapy involves the application of liquid nitrogen at a temperature of -196 °C to a lesion.^{1,5} Following cryotherapy, tissue necrosis occurs by vascular damage.⁶ This tissue necrosis is followed by blister formation, ulceration and healing with hypopigmentation.^{6,7} This change in pigment is worrisome to patients of skin of colour due to the stark difference in pigmentation with the surrounding skin and a consequent impairment of quality of life.

Recovery of pigmentation following this post inflammatory hypopigmentation is not readily documented but alluded to.⁷ In literature, this recovery is said to occur after 6 months.⁷ We report the documentation of post cryotherapy events and pigment recovery in a voluntary adult female.

Case Report:

An adult female aged 50 years volunteered and consented to engage in this experimental study. She had no dermatological lesion. Cryotherapy was

done on the dorsum of her left hand at our outpatient clinic. Cryotherapy was done using a Cryogun (0.2mm nozzle) manufactured by Brymil cryogenic systems. The area was cleaned with methylated spirit and infiltrated with 1mm of local anaesthetic (2% xylocaine and adrenaline 0.0125mg). Following anaesthesia, the area was frozen for 20 seconds and allowed to thaw. This was done once. The participant was counselled on what to expect over the following days/weeks (pain, blistering, ulceration, healing, hypopigmentation and re-pigmentation). Furthermore, she was instructed to take analgesics (paracetamol) for pain, not to peel off the roof of the resulting blister to avoid scarring. An antibiotic cream was recommended if an infection occurred.

The participant was pictorially followed up. Cryotherapy was followed 24 hours later by hyperpigmentation and surrounding erythema, figure 1A. Seventy-two hours later, there was blister formation (**measuring 2 x 1 x 0.2cm**). This was followed by rupture, desquamation and ulceration over a two-week period (**superficial ulcer measuring 2 x 1cm**), figure 1B. Healing two weeks later was followed by post inflammatory hypopigmentation, figures 1C and 1D. **There was**



no infection of the blister nor the resulting ulcer. Gradual repigmentation was observed over several months (figures 2A, B, C and D) with complete repigmentation at seven months. Figures 3A and B.



Figure 1a
Hyperpigmentation and a
rim of erythema 24 HOURS



Figure 1b Blister formation
after 72 HOURS

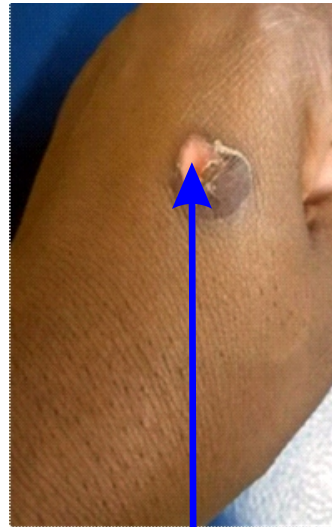


Figure 1c Desquamation
and hypopigmentation
at 2 WEEKS



Figure 1d Post-inflammatory
hypopigmentation at
3 WEEKS



Figure 2A Repigmentation
at 2 months



Figure 2B Repigmentation
at 3 months



Figure 2C Repigmentation
at 4 months



Figure 2D Repigmentation
at 5 months



Figure 3A
Re-pigmentation
at 6 months



Figure 3B
Complete
re-pigmentation
at 7 months

Discussion:

Skin pigmentation is dependent on melanocytes.^{8,9} Melanocytes are skin cells in the epidermis specialized in the production and distribution of melanin pigment to keratinocytes thereby giving the skin its colour.⁸⁻¹⁰ Extreme cold leads to damage of melanocytes. Irreversible damage of melanocytes occurs at -4 to -7°C and this is due to sensitivity of melanocytes to cold.¹¹ Cryotherapy which involves the use of liquid nitrogen at a temperature of -196°C results in damage of melanocytes with consequent hypopigmentation.^{1,5,11}

Transient hypopigmentation due to blockage of melanin pigment transfer from melanocytes to keratinocytes occurs following cryotherapy as observed in our patient (figure 1D).¹² This hypopigmentation is hypothesized to be due to; a decrease in melanocyte number, reduction in melanosome synthesis in keratinocytes and melanocytes being separated by oedema with a consequent block in melanin transfer.^{11,12}

Following this loss of melanocytes, melanocytes from the surrounding skin migrate into the lesion, resulting in an area of hypopigmentation with a hyperpigmented rim as seen in our patient (figure 1D).⁷ Re-pigmentation probably results from the transfer of melanin from these melanocytes. Recovery of pigment is said to occur after at least 6 months.⁷ In our patient, pigment recovery occurred after 7 months. This is adjudged not to be too different from that already documented.

We have documented this case in order for practitioners to objectively re-assure their cryotherapy patients of re-pigmentation following treatment. In addition, to enable practitioners give a true timeline to re-pigmentation following cryotherapy induced hypopigmentation.

Conclusion: Full re-pigmentation occurs following post inflammatory hypopigmentation induced by cryotherapy after a few months.

DECLARATION

Funding: None

Conflict of interest: None

REFERENCES

1. Abdel-Meguid AM, Weshahy AH, Sayed DS, Refaiy AEM, Awad SMI. Intralesional vs. Contact Cryosurgery in Treatment of Keloids: a Clinical and Immunohistochemical Study. *Int. J. Dermatol.* 2015;54:468–475.
2. Wollina U. Seborrheic Keratoses – The Most Common Benign Skin Tumor of Humans. Clinical Presentation and an Update on Pathogenesis and Treatment Options. *J. Med. Sci.* 2018;6:2270–2275.
3. Costa C, Scalvenzi M, Ayala F, Fabbrocini G, Monfrecola G. How to Treat Actinic Keratosis? An Update. *J Dermatol Case Rep.* 2015; 9: 29–35.
4. O'Mahony C, Gomberg M, Skerlev M, Alraddadi A, de las Heras-Alonso ME, Majewski S et al. Position Statement for the Diagnosis and Management of Anogenital Warts. *J. Eur. Acad. Dermatol. Venerol.* 2019;33:1006–1019
5. Bijlard E, Timman R, Verduijn GM, Niessen FB, van Neck JW, Busschbach JJV, Mureau MAM. Intralesional Cryotherapy Versus Excision and Corticosteroids or Brachytherapy for keloid Treatment: Study Protocol for a Randomised Controlled trial. *Trials* 2013, 14:439.
6. Lee HJ, Jang YJ. Recent Understandings of Biology, Prophylaxis and Treatment Strategies for Hypertrophic Scars and Keloids. *Int. J. Mol. Sci.* 2018;711: 19pgs.
7. Vachiramon V, Thadanipon K. Postinflammatory Hypopigmentation. *Clin. and Exper. Dermatol.* 2011;36:708–714.
8. Weiner L, Fu W, Chirico WJ, Brissette JL. Skin as a Living Coloring Book: How Epithelial Cells Create Patterns of Pigmentation. *Pigment Cell Melanoma Res.* 2014; 27: 1014–1031.
9. Bastonini E, Kovacs D, Picardo M. Skin Pigmentation and Pigmentary Disorders: Focus on Epidermal/Dermal Cross-Talk. *Ann Dermatol* 2016; 28:279
10. Fitzpatrick TB, Breathnach AS. The Epidermal Melanin Unit System. *Dermatol Wochenschr.* 1963;147:481–489
11. Gage AA, Meenaghan MA, Natiella JR, Greene GW Jr. Sensitivity of Pigmented Mucosa and Skin to Freezing Injury. *Cryobiology* 1979; 16: 348–61
12. Burge SM, Bristol M, Millard PR, Dawber RP. Pigment Changes in Human Skin after Cryotherapy. *Cryobiology* 1986; 23: 422–32.