Assessing the safety and complications of cryotherapy in dermatological treatments: A clinical review.

Joanna Lim*

Dermatology Department, University of Rio de Janeiro State, Brazil

Introduction

Cryotherapy is a widely used treatment modality in dermatology, primarily for the management of benign skin lesions, such as warts, seborrheic keratoses, and actinic keratoses, as well as for the treatment of malignant lesions, including basal cell carcinoma and squamous cell carcinoma. This technique involves the application of extreme cold, typically liquid nitrogen, to destroy abnormal skin tissues. While cryotherapy is considered a relatively safe and effective procedure, its use is not without risks. This article provides a comprehensive review of the safety considerations and potential complications associated with cryotherapy in dermatology [1].

Cryotherapy works by causing cell death through the formation of ice crystals within the cytoplasm, which disrupts cellular structures and induces a process called cryonecrosis. The application of liquid nitrogen, usually at temperatures between -196°C and -160°C, leads to the freezing and thawing of targeted tissues. This rapid freezing causes the formation of ice in both extracellular and intracellular spaces, leading to cell rupture and subsequent tissue destruction. This process is beneficial for treating a variety of skin lesions, but the intensity and duration of cryotherapy must be carefully controlled to avoid damage to surrounding healthy tissue [2].

Cryotherapy is commonly employed to treat a wide range of dermatological conditions, including but not limited to warts, precancerous lesions like actinic keratoses, benign tumors such as seborrheic keratoses, and some superficial skin cancers. In addition, it is used to remove skin tags and to treat certain types of vascular lesions, including cherry angiomas. The effectiveness of cryotherapy depends on accurate application and appropriate selection of patients. It is a particularly useful treatment for patients who are unable to undergo surgery or for those with small, localized lesions that can be treated with minimal scarring [3].

Cryotherapy is generally considered safe when performed by trained dermatologists or healthcare providers. The procedure is non-invasive, requires minimal recovery time, and can often be done in an outpatient setting without the need for anesthesia. However, the safety of cryotherapy depends on several factors, including the technique, the skill of the provider, and patient factors such as skin type and lesion location [4].

Proper technique involves the careful application of liquid nitrogen using a spray or cotton-tipped applicator, ensuring that only the lesion and a small margin of surrounding tissue are treated. Overuse or excessive freezing can lead to complications such as scarring or hypopigmentation, while inadequate freezing may result in incomplete lesion eradication and recurrence [5].

Despite its general safety, cryotherapy is associated with certain complications that dermatologists must be aware of. These complications can range from mild side effects to more severe outcomes, particularly if the procedure is not performed correctly [6].

Several patient-related factors can increase the risk of complications following cryotherapy. For example, individuals with darker skin may be at a higher risk for pigmentation changes, while those with a history of keloid scarring may be more prone to abnormal scarring after treatment. Additionally, older adults or individuals with compromised immune systems may have a slower healing response, increasing the risk of infection or delayed wound healing [7].

The location of the lesion is also a critical factor in determining the risk of complications. Lesions near delicate areas such as the eyes or mucous membranes may require extra caution to avoid unintentional damage. Cryotherapy is often avoided in such locations or used with extreme care [8].

To minimize the risk of complications, it is essential for dermatologists to follow established protocols for cryotherapy, including the use of proper freezing times, techniques, and appropriate patient selection. Education regarding post-treatment care is crucial to prevent infection, manage blisters, and reduce the risk of scarring or pigmentation changes [9].

In the case of complications such as scarring or pigmentation changes, early intervention can help improve outcomes. For example, corticosteroid injections can be used to manage hypertrophic scars, and laser therapy may be employed to treat persistent pigmentation changes. If an infection occurs, timely treatment with antibiotics is necessary [10].

Conclusion

Cryotherapy remains a cornerstone of dermatological treatments, offering a safe and effective option for managing a variety of skin conditions. While the procedure is generally well tolerated, it is not without risks. Dermatologists must

***Correspondence to:** Joanna Lim, Dermatology Department, University of Rio de Janeiro State, Brazil, E-mail: j.lim@gmail.com

***Received:** 1-Jan-2024, Manuscript No. aarcd-25-157514; **Editor assigned:** 4-Jan-2024, PreQC No. aarcd-25-157514 (PQ); **Reviewed:** 17-Jan-2024, QC No. aarcd-25-157514; **Revised**: 24-Jan-2024, Manuscript No. aarcd-25-157514 (R); **Published**: 31-Jan-2024, DOI:10.35841/aarcd-8.1.250.*

***Citation:** Lim J. Assessing the safety and complications of cryotherapy in dermatological treatments: A clinical review. Res Clin Dermatol. 2025;8(1):250.*

carefully consider the patient's skin type, lesion characteristics, and other individual factors to minimize complications. By adhering to proper technique and providing appropriate aftercare, the safety and efficacy of cryotherapy can be optimized, ensuring the best outcomes for patients. As with any treatment, a personalized approach and thorough patient education are key to minimizing complications and enhancing the overall treatment experience.

References

1. Sharma VK, Khandpur S. Guidelines for cryotherapy. Indian J Dermatol Venereol. Leprol. 2009;75:90.
2. Kadakia KC, Rozell SA, Butala AA, et al. Supportive cryotherapy: A review from head to toe. J Pain Symptom Manag. 2014;47(6):1100-15.
3. Jun M, Lee NR, Lee WS. Efficacy and safety of superficial cryotherapy for alopecia areata: A retrospective, comprehensive review of 353 cases over 22 years. J Dermatol. 2017;44(4):386-93.
4. Cook DK, Georgouras K. Complications of cutaneous cryotherapy. Med J Aust. 1994;161(3):210-5.
5. Heppt MV, Steeb T, Ruzicka T, et al. Cryosurgery combined with topical interventions for actinic keratosis: A systematic review and meta-analysis. Br J Dermatol. 2019;180(4):740-8.
6. Patel G, Armstrong AW, Eisen DB. Efficacy of photodynamic therapy vs other interventions in randomized clinical trials for the treatment of actinic keratoses: A systematic review and meta-analysis. JAMA Dermatol. 2014;150(12):1281-8.
7. López-Carvajal L, Cardona-Arias JA, Zapata-Cardona MI, et al. Efficacy of cryotherapy for the treatment of cutaneous leishmaniasis: Meta-analyses of clinical trials. BMC infectious diseases. 2016;16:1-1.
8. Marks DH, Qureshi A, Friedman A. Evaluation of prevention interventions for taxane-induced dermatologic adverse events: A systematic review. Jama Dermatol. 2018;154(12):1465-72.
9. Kaufmann R, Spelman L, Weightman W, et al. Multicentre intraindividual randomized trial of topical methyl aminolaevulinate–photodynamic therapy vs. cryotherapy for multiple actinic keratoses on the extremities. Br J Dermatol. 2008;158(5):994-9.
10. Thai KE, Sinclair RD. Cryosurgery of benign skin lesions. Aust J Dermatol. 1999;40(4):175-86.

Citation: *Lim J. Assessing the safety and complications of cryotherapy in dermatological treatments: A clinical review. Res Clin Dermatol. 2025;8(1):250.*