Effectiveness and Safety of Cold Atmospheric Plasma for the Treatment of Cutaneous Warts: A Systematic Review

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ABSTRACT

Introduction: Cutaneous warts are a common dermatological condition, and there are various treatment options available. One innovative approach is the use of cold atmospheric plasma (CAP). Unlike traditional treatments such as cryotherapy or salicylic acid, CAP does not introduce additional complications for patients. Its antimicrobial effect arises from the generation of reactive oxygen and nitrogen species. In this study, we evaluated the efficacy and safety of CAP in treating cutaneous warts.

Materials and Methods: PubMed, the Cochrane library, Embase, PEDro, Web of Science, and PROSPERO were searched for systematic reviews of randomized controlled trials (RCTs). Two reviewers independently screened the studies and extracted data. The risk of bias was assessed using the RoB 2 tool for RCTs and the ROBINS-I tool for non-randomized studies. Any discrepancies were resolved through consensus or with the help of a third reviewer.

Results and Discussion: Studies confirmed that clinical outcomes demonstrated lesion clearance after 5-7 treatment sessions, even with the short duration of plasma exposure. Complete resolution was reported in 51%-61% of cases, while partial resolution occurred in 34%-41% of cases. Tissue regeneration has shown promising therapeutic effects, but challenges remain, including small sample sizes and variability in treatment protocols, highlighting the need for larger multicenter trials.

Conclusion: Evidence gathered so far indicate that CAP enhances tissue repair and lowers recurrence rates through the activity of fibroblasts and keratinocytes, as well as by increasing collagen levels. This issue positions CAP as a safe and effective treatment for cutaneous warts. Patients have reported good tolerance and no significant adverse effects. These findings are expected to inform clinical practice and guide future research in this emerging field.

Keywords: Cold atmospheric plasma, Cutaneous warts, Tissue regeneration

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