Glutaraldehyde solution

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Key Words: Glutaraldehyde, Palmoplantar warts, Palmoplantar hyperhidrosis

Glutaraldehyde is a water-soluble liquid with high bactericidal, sporicidal, fungicidal and viricidal activity. It does not cross-react with formaldehyde.[1] Glutaraldehyde solution is an underutilized gem for treating recalcitrant palmar, plantar and periungual warts.[2-3] It has also been utilized for plantar hyperhidrosis with moderate success,[4] for pitted keratolysis and the predisposing factor of hyperhidrosis,[6] and for onychomycosis.[7]

PREPARING GLUTARALDEHYDE SOLUTION

Glutaraldehyde 25% solution is available in one litre bottles. To make a 10% solution 15 ml water is added to 10 ml of the 25% glutaraldehyde solution.[8] Unbuffered glutaraldehyde 10% or 20% is utilized for treating warts. Sodium bicarbonate 1.65 g is added to 100 ml of the 10% glutaraldehyde solution to buffer to pH 7.5.[8] Buffering the glutaraldehyde serves to diminish the irritating properties, but is likely to diminish the efficacy. Glutaraldehyde solution may remain stable for as less as half an hour after buffering.[8]

USES

Glutaraldehyde's viricidal properties have been used to good effect for treating warts. The treated skin hardens and is colored brown, but the fact that glutaraldehyde dries into the skin without a surface deposit makes it particularly useful for warts on the feet.[5] Hirose, et al achieved a 72% cure rate using 20% glutaraldehyde in twenty-five patients with resistant warts,[2] but later there was a French report[9] of a 7-year-old boy who developed cutaneous necrosis after application of 20% glutaraldehyde in combination with cryotherapy. Hence, after 1995, 10% unbuffered glutaraldehyde is preferred for the treatment of warts.

Buffered glutaraldehyde in different strengths is preferred for treating hyperhidrosis. Aldehydes reduce perspiration by denaturing keratin in the superficial keratinocyte, thereby blocking the sweat gland pores.[10] Glutaraldehyde 10% buffered to pH 7.5 is helpful for plantar hyperhidrosis.[5] It is swabbed onto the feet thrice a week for 2 weeks and then once weekly or as needed. It may cause a temporary brown discoloration, but this pigmentation diminishes as the frequency of application decreases. A 2% solution does not stain and may be used on the palms; however, this concentration produces a less marked diminution in sweating.[10]

Buffered glutaraldehyde 2% has been used to treat

How to cite this article: Shah MK. Glutaraldehyde solution. Indian J Dermatol Venereol Leprol 2004;70:319-20.
Received: June, 2002. **Accepted:** August, 2004. **Source of Support:** Nil.

pitted keratolysis and the predisposing factor of hyperhidrosis.[6] Glutaraldehyde has also been advocated for treating onychomycosis.[7]

ADVERSE EFFECTS

The brownish discoloration produced by application precludes application to all areas on the body. A potential risk is contact sensitization, particularly when used long term to treat hyperhidrosis.[11] The author has never encountered allergic contact dermatitis in practice, the longest follow up being three years in a 21-year-old man who has been applying glutaraldehyde 10%.

GLUTARALDEHYDE IN CONTEMPORARY PRACTICE

Glutaraldehyde is an excellent alternative in patients with palmar, plantar or periungual warts who do not respond to or do not tolerate lactic acid-salicylic acid in flexible collodion. The author often combines the two, by asking patients to apply glutaraldehyde solution (10%) in the morning and lactic acid-salicylic acid in flexible collodion at night. The patient is instructed to apply the lactic acid-salicylic acid solution after soaking the wart in water for 5-10 minutes and then scraping with a nail file or scraper. After applying the solution carefully to the wart surface, it is covered with an adhesive tape. The patient removes the adhesive tape before bathing and repeats the procedure daily for severe weeks. This routine is combined with paring at the dermatologist's office every 2 weeks, when after paring, the warts are subjected to two freeze-thaw cycles of liquid nitrogen applied by a cotton-tipped applicator. This combination approach often yields gratifying results in otherwise obstinate warts.

Glutaraldehyde has a limited role in treating palmar and plantar hyperhidrosis. It may be helpful in cases that do not respond to aluminium chloride topically. It does continue to be useful since there is hardly any other option considering the fact that botulinum toxin is frightfully expensive, painful and needs to be used repeatedly. Iontophoresis is available only at a few centres and involves multiple patient visits. Sympathectomy is performed by a handful of surgeons and is not devoid of side effects or relapses.

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