THERAPEUTIC EFFECT OF TOPICAL APPLICATIONS OF TRICHLOROACETIC ACID, HYDROGEN PEROXIDE FOR APHTHOUS ULCERS MINOR

AHMED M. AL-ABBASI*

SUMMARY: We attempted to evaluate the therapeutic effect of local application of trichloroacetic acid (TCA) and hydrogen peroxide (H_2O_2) for aphthous ulcers minor(AUM).

Fifty four patients with aphthous ulcers minor (AUM) were enrolled in this study between January 2002 and December 2004. They were divided blindly into3 equal groups, 18 patients managed with local application of 30% trichloroacetic acid (TCA), 18 treated by local 6% hydrogen peroxide (H_2O_2) and the last group by 0.9% normal saline locally also(control group), all patients were followed up after 3-7 days. Assessments by clinical examination were performed, depending on 3 criteria, tingling and pain, tenderness, and surrounding erythema.

Thirty two patients = 42.5% belong to (20-29) years age group, the male to female ratio was 0.6:1. Commonest site of aphthous ulcers minor (AUM) was labial and buccal mucosa (14 patients = 25.9%), 38 patients =70% were non smoker , there were 3 male patients and one female affected when they quitted cigarette smoking, 19 out of 54 patients (35%) treated with the three agents went into remission. Treatment success was observed in 13 out of 18 (72.2%) patients with 30% trichloroacetic acid (TCA), whereas only 5 out of 18(28%) patients treated by local application of 6% hydrogen peroxide (H_2O_2) went into remission and only one patient improved in control group (5.5%).

Based on our findings, 30% trichloroacetic acid (TCA) was a potential agent with minimal side effects for treatment of AUM.

Key Words: Trichloroacetic acid, aphthous ulcer, hydrogen peroxide.

INTRODUCTION

Aphthous ulcers are a common and painful problem. The aim of the study is to evaluate the therapeutic effect of local application of trichloroacetic acid (TCA) and hydrogen peroxide (H_2O_2) for aphthous ulcers minor (AUM).

*From Department of Otorhinolaryngology Basrah College of Medicine, Basrah, Iraq.

Benign aphthae tend to be small (less than 1 cm in diameter) and shallow (1). Aphthous ulcers that occur in conjunction with symptoms of uveitis, genital ulcerations, conjunctivitis, arthritis, fever or adenopathy should prompt a search for a serious etiology (1). These treatments include antibiotics, antiinflammatories, immune modulators, anesthetics and alternative (herbal) remedies (1).

Aphthous ulcers can be classified into three different types: minor, major and herpetiform (2). Minor aphthae are generally located on labial or buccal mucosa, the soft palate and the floor of the mouth (2). They can be singular or multiple, and tend to be small (less than 1 cm in diameter) and shallow (3). Major aphthae are larger and involve deeper ulceration. and more likely to scar with healing (2). Herpetiform aphthae frequently are more numerous and vesicular in morphology (2).

Aphthae more commonly affect young adults, and a familial tendency may exist (3). Paradoxically, smoking offers a somewhat protective effect against recurrent aphthae (2). Other etiologic factors such as stress, physical or chemical trauma, food sensitivity and infection have been proposed. Infectious agents such as Helicobacter pylori and herpes simplex virus have been investigated but have not been consistently found in aphthous ulcers (4). The lack of clarity regarding etiology has resulted in treatments that are largely empiric and aimed at symptom reduction.

MATERIALS AND METHODS

Patients and Methods

This is a double - blind controlled pilot study, approved by the Ethical Committee of Basrah Medical College, it is done in Al Mawanee and Basrah General hospitals, in the period from January 2002 and December 2004. Fifty four patients, 33 females and 21 males with aphthous ulcers minor (AUM) were enrolled in this study. More than this number of patients were seen but excluded because of patient refusal, single ulcer, viral infections, diabetes mellitus, allergic process, or those under treatment with anti-infective mouthwashes or drugs that could influence healing of ulcers, pregnant or lactating females were also excluded from the study.

All the studied patients had more than one ulcer and of minor type, the history of the onset of symptoms of ulceration should not exceed 2 days, patients randomly divided into three equal groups, local application of trichlor-oacetic acid (30%) on one ulcer for one group, and for the other, hydrogen peroxide (6%) were applied and normal saline was applied for the control group, (30% TCA was prepared by adding water to 30 gm of TCA crystals until 100 ml of solution was reached, while 6%hydrogen peroxide(H_2O_2) and normal saline were available in market.

The procedure is simple: by wetting the tip of the stick and gently touch it to the ulcer, for about 10 seconds then remove the stick. Patients warn that the procedure may sting for a moment but, considering that they are already in pain, they do not really notice much difference.

All the patients were seen 3-7 days after the local treatment for evaluation, and this is done by comparison of treated ulcers with the nearby ulcer, the parameters for comparison were : erythema, tingling and pain, and tenderness, we considered that there was improvement, if two of these parameters were significantly decreased or abolished.

RESULTS

This study involve 54 patients with AUM, 33 were females and 21 were males (male to female ratio was 0.6:1). The ages of the patients ranged from 5 to 58 years, the majority of them belonged to the third decade. All had a previous history of recurrent oral ulcers and all of them comes with more than one ulcers, with size less than 1 cm (Table 1).

Pain, erythema, and tenderness found in nearly all of the studied patients (Table 1). The median follow-up evaluation time was 5 days, ranging from 3 to 7 days.

Table 1: Characteristics of studied patients.

Characteristics	H_2O_2 (N=18)	TCA(N =18)	Normal Saline (N=18)
Gender (n+%)			
Females	10 (55.5)	12(66.6)	11 (61.2)
Males	8 (44.4)	6(33.3)	7 (38.8)
Age, years (mean ± MSE)	21.6 ± 2.2	28.0 ± 3.1	32.2 ± 2.4
Quantity of lesions	2.09 ± 0.08	3.18 ± 0.06	2.7 ± 0.04
Size (mm^2)	6.20 ± 0.5	5.30 ± 0.4	6.10 ± 0.5
Symptoms (n+%)			
Erythema	18 (100.0)	17 (94.40)	17 (94.40)
Pain	18 (100.0)	18 (100.0)	18 (100.0)
Tenderness	16 (88.8)	18 (100.0)	18 (100.0)

The lesions went into remission in 19 out of 54 patients enrolled in this study (35%). Thirteen patients out of 18 treated by TCA went into remission (72.2%), which was statistically significant ($P < 0.0001$) but only 5 out of 18 patients treated by H_2O_2 went into remission while only one patient in control group went into remission (5.5%).

The treatment was well tolerated with minimal side effects. All patients in non control groups experienced a tolerable burning sensation locally, but only one patient needed an oral analgesic for symptom relief.

DISCUSSION

Several published investigations have proved that TCA can damage HPV DNA to a certain degree at different concentrations (5-7). However, no report has been published to date regarding its therapeutic effect in treating AUM. We demonstrated an excellent result using topical 30% TCA in treating AUM, with minimal side effects. Although its effect in the treatment of AUM was modest in our results, 30% TCA seemed to have the ability to shorten the duration of the ulcers.

The severity of the burn is related to a number of factors, including, the concentration of the agent, the length of the contact time, the volume of the offending agent, and the physical form of the agent (8), it also was used for treatment of acute otitis externa (9), it also was used as an herbicide, etching agent and antiseptic (10).

H_2O_2 is pale blue liquid which appears colorless in a dilute solution, slightly more viscous than water. It is a weak acid. It has strong oxidizing properties and is therefore a powerful bleaching agent that is mostly used for bleaching paper, but has also found use as disinfectant (11). Delivering hydrogen peroxide into wounds kills fibroblasts and occludes local microvasculature (12,13).

We believe that it is unnecessary to treat AUM if the mode of treatment is potentially risky like steroid or immune modulators, but is reasonable and worthwhile to treat if the benefits of the treatment, such as non-invasiveness, low cost and easy application outweigh its disadvantages and this is applicable to TCA. Our results showed that the high efficiency 30% TCA fairly well matched its minimal side effects in treating AUM.

We demonstrated a new treatment without any major adverse effects using topical TCA. The success rate of topical treatment of TCA in our study might be increased by increasing the concentration of the agent since the depth of tissue damage increased with the concentration of TCA (14). The drawback of this study was the short follow-up period, the long follow-up period may enable us to throw light on recurrence. In the future study we must try to use a more concentrated TCA and H_2O_2 treatment with different numbers of applications, and evaluating its therapeutic and adverse effects with this concentration and try to elongate the follow-up period.

CONCLUSION

We have drawn the conclusion that 30% TCA is a suitable agent in the treatment of AUM, and that it offers, as well, the advantages of low costs, no secondary effects, and an easy application and handling. The use of this relatively inexpensive and low-tech approach would be of great advantage for those patients with AUM, particularly in resource-limited developing countries. Further extensive prospective controlled study is warranted to verify our results. Regarding the therapeutic effect of H_2O_2 needs further investigation including the use of different concentrations.

REFERENCES

1. Burgess JA, Johnson BD, Sommers E : Pharmacological management of recurrent oral mucosal ulceration. Drugs, 39:54-65, 1990.

2. Freedberg IM : Fitzpatrick's dermatology in general medicine. 5th ed. Vol 1. New York, NY: McGrawHill, 1999.

3. Cotran RS, Kumar V, Robbins SL : Robbins pathologic basis of disease. 4th ed. Philadelphia: Saunders, 817, 1989.

4. Chapman MS, Cimis RJ, Baughman RD : Lack of association between aphthous ulcers and Helicobacter pylori [Letter]. Arch Dermatol, 134:1634-1635, 1998.

5. Malviya VK, Deppe G, Pluszczynski R, Boike G : Trichloroacetic acid in the treatment of human papillomavirus infection of the cervix without associated dysplasia. Obstet Gynecol, 70:72-74, 1987.

6. Zhu WY, Blauvelt A, Goldstein BA, Leonardi C, Penneys NS : Detection with the polymerase chain reaction of HPV DNA in condylomata acuminata treated in vitro with liquid nitrogen, trichloroacetic acid, and podophyllin. J Am Acad Dermatol, 26:7104, 1992.

7. Boothby RA, Carlson JA, Rubin M, Morgan M, Mikuta JJ : Single application treatment of human papillomavirus infection of the cervix and vagina with trichloroacetic acid: a randomized trial. Obstet Gynecol, 76:278-280, 1990.

8. Nishio CE, Petri V, Narahashi E : Oral hairy leukoplakia (OHL): topical use of trichloroacetic and glycolic acids--results. Int Conf AIDS, 7-12; 10:182, 1994.

9. Ilias Kantas, Dimitrios G Balatsouras, Marinos Vafiadis, Maria Th Apostolidou, Agathokles Pournaras, Vasilis Danielidi : The use of trichloroacetic acid in the treatment of acute external otitis. European Archives of Oto-Rhino-Laryngology, 1:9-14, 2007.

10. Hao Lin, Eng-Yen Huang, Hung-Yaw Chang, Chan-Chao Chang Chien : Therapeutic Effect of Topical Applications of Trichloroacetic Acid for Vaginal Intraepithelial Neoplasia after Hysterectomy. Japanese Journal of Clinical Oncology, 35:651-654, 2005.

11. Drabowicz J et al : in The Syntheses of Sulphones, Sulphoxides and Cyclic Sulphides. Ed by G. Capozzi et al, John Wiley and Sons, Chichester, UK, pp 112-116, 1994.

12. Branemark PI, Ekholm R : Tissue injury caused by wound disinfection. J Bone Joint Surg, 49:48-62, 1967.

13. Lineweaver W, Howard R, Soucy D, et al : Topical antimicrobial toxicity. Arch Surg, 120:267-270, 1985.

14. Brodland DG, Cullimore KC, Roenigk RK, Gibson LE : Depths of chemexfoliation induced by various concentrations and application techniques of trichloroacetic acid in a porcine model. J Dermatol Surg Oncol, 15:967-971, 1989.

Correspondence:
Ahmed M. Al-Abbasi
Department of Otorhinolaryngology,
Basrah College of Medicine,
Basrah, IRAQ.
e-mail: mmalabbasi@yahoo.com