

Treatment of oral thrush in HIV/AIDS patients with lemon juice and lemon grass (*Cymbopogon citratus*) and gentian violet[☆]

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Abstract

Purpose: The purpose of the study was to investigate the safety and efficacy of lemon juice and lemon grass (*Cymbopogon citratus*) in the treatment of oral thrush in HIV/AIDS patients when compared with the control group using gentian violet aqueous solution 0.5%. Oral thrush is a frequent complication of HIV infection.

In the Moretele Hospice, due to financial constraints, the treatment routinely given to patients with oral thrush is either lemon juice directly into the mouth or a lemon grass infusion made from lemon grass (*Cymbopogon citratus*) grown and dried at the hospice. These two remedies have been found to be very efficacious therefore are used extensively. Gentian violet, the first line medication for oral thrush in South Africa, is not preferred by the primary health clinic patients due to the visible purple stain which leads them to being stigmatized as HIV-positive. *Cymbopogon citratus* and *Citrus limon* have known antifungal properties.

Methods: The study design was a randomised controlled trial. Ninety patients were randomly assigned to one of three groups: gentian violet, lemon juice or lemon grass. Inclusion criteria included being HIV-positive with a diagnosis of oral thrush. The study period was 11 days and patients were followed up every second day. International ethical principles were adhered to during the study.

Results: Of the 90 patients, 83 completed the study. In the intention-to-treat analysis, none of the *p*-values were significant therefore the null hypothesis could not be rejected. In the analysis of the participants who actually completed the trial, the lemon juice showed better results than the gentian violet aqueous solution 0.5% in the treatment of oral thrush in an HIV-positive population ($p < 0.02$). The null hypothesis in terms of the lemon grass and gentian violet could also be rejected on the basis of the Chi-square test and the likelihood ratio test ($p < 0.05$).

Conclusions: Though the patient population was small, the use of lemon juice and lemon grass for the treatment of oral candidiasis in an HIV population was validated by the randomised controlled trial.

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Keywords: Oral candidiasis; HIV-positive; Lemon juice; Lemon grass; *Cymbopogon citratus*; Gentian violet

[☆]Statement of Phytomedicine editors: Although the present (printed) pilot study does not fulfill the requirement of Good Clinical Practice (GCP), the editors have decided to publish the results of this observation study (pilot study) to encourage other doctors to test this preparation and to motivate pharmaceutical firms to develop a chemically standardized phytopreparation based on the proved herbcombination. It should be not too difficult to improve the efficiency because all constituents of both herbal drugs are known and more pharmacological investigations than listed in the paper do exist describing the antifungal (anticandida) activities of lemon juice and lemon grass infusion.

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Introduction

Oral thrush is a common, and if severe, debilitating complication of immuno-suppressed individuals. In South Africa, the first line of treatment in primary care clinics is gentian violet 0.5% solution that is applied to the inside of the mouth three times a day to be continued for 2 days after cure (Department of Health, 2003). In practice, however, several barriers exist that makes the use of gentian violet problematic. The first problem is that the person has to be able to afford transport to the nearest clinic and feel healthy enough to attempt the trip. A second problem is the visible nature of the medication. The purple stain is a visible evidence of thrush therefore it exposes the person to be stigmatised due to HIV/AIDS.

Oral thrush is caused by *Candida albicans*, the predominant causative agent of all forms of mucocutaneous candidiasis. According to Fichtenbaum et al. (2000), *Candida* is part of the normal flora of the human gastro-intestinal tract and may be recovered from up to one third of the mouths of normal individuals and two thirds of those with advanced HIV disease. Erköse and Erturan (2007) found oral *Candida* colonisation in 82.8% of asymptomatic HIV-positive individuals. The importance of oral thrush, especially in more severe cases, is that the person finds it difficult to swallow. This further compromises the individual's nutritional status and ability to swallow medication. The symptoms of oral thrush include a burning pain, altered taste sensation, and difficulty swallowing liquids and solids. Less commonly, persons may present with acute atrophic candidiasis or chronic hyperplastic candidiasis involving the tongue, or angular cheilitis (Arendorf et al., 1998; Ranganathan et al., 2000; Shobhana et al., 2004, p. 152).

As is well known, Sub-Saharan Africa has the highest number of people living with AIDS and in South Africa alone, 1500 individuals are infected daily with the HIV virus. In the Moretele Hospice, due to financial constraints, the treatment routinely given to patients with oral thrush is either lemon juice directly into the mouth or a lemon grass infusion made from lemon grass (*Cymbopogon citratus*) grown and dried at the hospice. These two remedies have been found to be very efficacious; therefore they have been used extensively since the hospice opened in 1997. Literature is available on the antifungal properties of lemon grass (Pedroso et al., 2006; Fiori et al., 2000; Lorenzetti et al., 1991). In addition Caccioni et al. (1998) and Wang et al. (2007) have reported on the antifungal characteristics of lemon juice. However, no literature could be found on the use of lemon juice or lemon grass for the treatment of oral thrush.

The Moretele Hospice has a daily support group for people living with AIDS. A pre-condition for joining the support group is the willingness to disclose their HIV

status. It was therefore feasible to conduct the study at the hospice. A randomised control trial was designed to obtain objective proof of the safety and efficacy of the two remedies when compared with the first line treatment prescribed by the Essential Drug List of South Africa (Department of Health, 2003). Proving safety and efficacy is important because either establishing a lemon tree or growing lemon grass is easy for every household, as well as being cost-effective.

The study was undertaken to investigate the safety and efficacy of lemon juice and lemon grass (*Cymbopogon citratus*) in the treatment of oral thrush in HIV/AIDS patients when compared with the use of gentian violet aqueous solution 0.5%.

Two hypotheses were designed for the study:

H01. Gentian violet aqueous solution 0.5% is equal to lemon juice and lemon grass in the treatment of oral thrush in HIV/AIDS patients in the intention-to-treat analysis.

H02. Gentian violet aqueous solution 0.5% is equal to lemon juice and lemon grass in the treatment of oral thrush in HIV/AIDS patients.

Materials and methods

The study design was a randomised control trial. Ninety patients were randomly assigned to one of three groups: gentian violet, lemon juice or lemon grass. Randomisation was done prior to the start of the study and stored in sealed, opaque, identical envelopes, which were numbered sequentially. Patients were recruited from the HIV/AIDS support group at the Moretele Hospice. A flow chart of the participants in the study is provided in Fig. 1.

The ineligible patients did not have thrush at the time of the study. The target population for the study fulfilled the criteria for inclusion: a positive diagnosis of oral thrush, currently not on any medication for oral thrush, HIV-positive and willingness to participate. The oral thrush was diagnosed and graded according to the oral thrush scale provided in Table 1.

Informed consent was signed before participation in the study. Patients who were not expected to remain alive for the study period of 10 days were excluded. The study period continued for 11 days with a final evaluation on the 11th day. The study was an open label study as, once the patient was assigned to a group, the treatment was known to the patient and the registered nurses.

Study treatments

The study participants received one of three treatment schedules:

Control treatment: Gentian violet aqueous solution 0.5%

Gentian violet aqueous solution 0.5% is prescribed as a first line treatment for oral thrush in the Standard

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