Antifungal properties of Chlorhexidine digluconate and Cetylpirinidinium chloride on Oral Candida

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Introduction: The genus Candida forms part of the normal oral flora. With a low carriage rate of about 2% in the mouth of asymptomatic adults, the possible pathogenic role of Candida is usually underestimated. Several non-Candida albicans Candida (NCAC) are now known to be of major medical importance in humans in that they can contribute to opportunistic infections in patients with mucositis in the oral cavity. Incidence of candidal infection in the mouth is reportedly high in immuno-compromised hosts as well as in neonatal and terminally ill patients. C. tropicalis and C. krusei are two examples of the NCAC that have emerged as virulent species. Both these have developed resistance to commonly prescribed azole antifungal agents. The use of mouth rinses with antimicrobial agents has been suggested as useful alternative to topical antymycotics. The objective of our study was to determine the minimal inhibitory concentrations (MIC) towards C. tropicalis and C. krusei of mouth rinses containing chlorhexidine (CHX), cetylpirdinium chloride (CPC) and the combination of CHX-CPC. We studied growth curves of C. tropicalis and C. krusei in the presence of mouth rinses to determine their mechanism of action as antifungal agent. Methodology: The MIC of the mouth rinses was determined using the broth dilution method. Both Candida sp. were then treated with the mouth rinses at the identified MIC values and their responses to the treatments were monitored periodically by measuring the changes in the turbidity of culture solutions to assess growth of the organisms. The growth curves of C. tropicalis and C. krusei following each treatment were plotted and the profiles were compared with those of the untreated organisms. The effect of each mouth rinse treatment on the morphology of the candidal colonies following an overnight incubation was also recorded. Results and Discussion: MICs of CPC were lower than those of CHX for both C. tropicalis and C. krusei. In the mixed formulation, CPC doubled the inhibitory effect of CHX towards both Candida sp., while CHX quadrupled the activity of CPC towards C. tropicalis. The growth curves showed profound suppression of growth for both C. krusei and C. tropicalis following treatment with all the three mouth rinses suggesting a fungicidal effect of CPC, CHX and CPC-CHX. The growth inhibitory effect of the mouth rinses was also observed by changes in the morphology of the growth colonies. They appeared coarse, wrinkle and dry after the mouth rinse treatments. Gargling using mouth rinses with such fungicidal activity would enhance a rapid reduction in the candidal population of patients with fungal infection. Conclusion: Antimicrobial mouth rinses incorporating CHX, CPC or their combination exhibited strong antifungal activities towards C. tropicalis and C. krusei.

Keywords C. tropicalis; C. krusei; chlorhexidine digluconate; cetylpirinidinium chloride