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Chlorhexidine Mouthwash- A Review

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Abstract

Chlorhexidine is main component of the mouthwash. It is used because of its antiseptic and antimicrobial action. Chlorhexidine gluconate oral rinse can significantly reduce plaque bacteria and prevent the development of gingivitis. A study estimates that over 50% of the adult population in the USA suffers from gingivitis on an average of 3 to 4 teeth. Chlorhexidine gluconate oral rinse therapy should be initiated directly following a dental prophylaxis in patients with gingivitis. The usual dose is 15 ml of undiluted chlorhexidine gluconate oral rinse, swished in the mouth for 30 seconds, and expectorated. Brief explanations of these actions have been discussed here.

Key words- Chlorhexidine, mouthwash, Anti-microbial, Gingitivitis, Fluoride, Bacteriostatic

INTRODUCTION

A mouthwash is a flavored, usually antiseptic solution used for cleaning the mouth and freshen the breath. Mouthwash or mouth rinse is an antiseptic solution used as an effective home care system by the patient to enhance oral hygiene. Some manufacturers of mouthwash claim that antiseptic and anti-plaque mouth rinse kill the bacterial plaque causing cavities, gingivitis, and bad breath. Anti-cavity mouth rinse uses fluoride to protect against tooth decay. It is, however, generally agreed that the use of mouthwash does not eliminate the need for both brushing and flossing. Chlorhexidine is an ideal broad-spectrum antimicrobial. It is effective against Gram-positive bacteria, Gram-negative bacteria and fungi. These organisms are commonly associated with Healthcare-Associated Infections (HAIs).With its low toxicity level, chlorhexidine offers a safe side effect profile. For nearly 60 years, chlorhexidine has been used by hospitals and clinics as a disinfectant and antiseptic for topical and hard-surface applications. Chlorhexidine has become an integral part of the strategy to prevent the transmission of disease and nosocomial infections. Chlorhexidine is used to kill bacteria that cause infections. It is found in many medicines that are applied directly to the affected area of the body. It is an antiseptic treatment. It is used to treat and prevent infections. In general this drug is used where infections of the skin, mouth or throat are present or may arise. The treatment and prevention of infections of minor cuts, grazes, burns and scalds, athlete's foot, blisters, stings and insect bites, spots, chapped or rough skin and minor infections of the mouth or throat. It is also used for cleaning the skin before injections and small operations. (1)

MECHANISM OF ACTION

Chlorhexidine is a broad-spectrum biocide effective against Gram-positive bacteria, Gram-negative bacteria and fungi. Chlorhexidine inactivates microorganisms with a broader spectrum than other antimicrobials (e.g. antibiotics) and has a quicker kill rate than other antimicrobials (e.g. povidone-iodine). It has both bacteriostatic (inhibits bacterial growth) and bactericidal (kills bacteria) mechanisms of action, depending on its concentration. Chlorhexidine kills by disrupting the cell membrane. Upon application in vitro, chlorhexidine can kill nearly 100% of Gram-positive and Gram-negative bacteria within 30 seconds. Since chlorhexidine formulations can destroy the majority of categories of microbes, there is limited risk for the development of an opportunistic infections.

Bacteria

Chlorhexidine is a positively-charged molecule that binds to the negatively-charged sites on the cell wall; it destabilizes the cell wall and interferes with osmosis.5 The bacterial uptake of the chlorhexidine is very rapid, typically working within 20 seconds. In low concentrations it affects the integrity of the cell wall. Once the cell wall is damaged, chlorhexidine then crosses into the cell itself and attacks the cytoplasmic membrane (inner membrane). Damage to the cytoplasm's delicate semipermeable membrane allows for leakage of components leading to cell death. In high concentrations, chlorhexidine causes the cytoplasm to congeal or solidify.

Fungi

The mechanism of action for fungi is very similar to bacteria. The fungus uptakes chlorhexidine in a short amount of time1 and impairs the integrity of the cell wall and the plasma membrane entering the cytoplasm resulting in leakage of cell contents and cell death.

Biofilm

Biofilms are a complex aggregation of microorganisms growing on a solid substrate. They can occur on organic (e.g. dental plaque) or inorganic surfaces. Biofilms are characterized by structural heterogeneity, genetic diversity, complex community interactions, and an extracellular matrix of polymeric substances. This matrix protects the cells within it and increases their resistance to antimicrobials. Many antimicrobial agents have a difficult time eliminating organisms in a biofilm. Chlorhexidine has shown some ability to help inhibit adherence of

microorganisms to a surface thereby preventing growth and development of biofilms.

Other Microbial Organisms

Unlike other antimicrobials, chlorhexidine has demonstrated some effectiveness against microorganisms in other forms and states as well. This includes bacterial spores and protozoa. It has also shown activity against enveloped viruses in vitro (e.g., herpes simplex virus, HIV, cytomegalovirus, influenza, and RSV) but has substantially less activity against nonenveloped viruses (e.g., rotavirus, adenovirus, and enteroviruses).

ANTISEPTIC ACTION

Chlorhexidine is a cutaneous antiseptic. This antiseptic belongs to the biguanides (metformin) group and is very active against a large number of micro-organisms. Its systemic absorption is practically null, thus, it lacks any systemic toxicity. As a cutaneous antiseptic it has a rapid, long-lasting effect and is not inactive in the presence of organic matter and, due to its transparency it does not hide the evolution of wounds. Due to these properties, its recommendations for use have grown and consolidated over time until it has converted into one of the most effective, active and safe antiseptics for daily clinical practice.(2)

IN DENTISTRY

Chlorhexidine (CHX) is one of the most commonly prescribed antiseptic agents in the dental field. It has a long-lasting antibacterial activity with a broad-spectrum of action and it has been shown to reduce plaque, gingival inflammation and bleeding. Its use is considered a powerful adjuvant to mechanical oral hygiene (brushing and flossing), especially in those cases in which it cannot be performed correctly. Available as mouthwash, gel, aerosol, spray and disks, CHX is considered a safe compound, with minimal and transitory local and systemic side effects. Data support its periodic use as an adjuvant to normal brushing and flossing in subjects unable to maintain proper oral hygiene due to physical and/or mental impairment, or lack of motivation, or decreased salivary rate. CHX is also a useful alternative to mechanical oral hygiene procedures in those cases in which they are contraindicated, e.g. after a surgical procedure, or as a preoperative rinse before procedures in which use of a dental dam is not possible.(3)Chlorhexidine gluconate oral rinse can significantly reduce plaque bacteria and prevent the development of gingivitis.(4,5,6,7,8,9).The immediate antimicrobial activity of chlorhexidine gluconate can be beneficial to the dental professional as well as to the patient. Several studies support the use of a chlorhexidine gluconate pre-rinse to decrease bacterial aerosol contamination during in-office dental procedures.(10,11,12,13)

OTHER SIGNIFICANCE

In topical applications, chlorhexidine is shown to have the unique ability to bind to the proteins present in human tissues such as skin and mucous membranes with limited systemic or bodily absorption.24 Protein bound chlorhexidine releases slowly leading to prolonged activity. This phenomenon is known as substantivity6 and allows for a longer duration of antimicrobial action against a broad spectrum of bacteria and fungi. In fact, chlorhexidine's antimicrobial activity has been documented to last at least 48 hours on the skin. Unlike povidone-iodine, chlorhexidine is not affected by the presence of body fluids such as blood. In oral applications, chlorhexidine binds to the mouth tissue, oral mucosa and teeth. It is then released over time to kill bacteria and fungi. This helps to reduce the bacterial count and prevents dental plaque. It has become the gold standard in dentistry due to its ability to adhere to soft and hard tissue and maintain a potent sustained release. Chlorhexidine has also been applied to medical devices such as dental implants, vascular catheters, needleless connectors and antimicrobial dressings. Chlorhexidine, when applied to or impregnated in medical devices kills organisms and protects against microbial colonization and subsequently biofilm development.

ADVERSE EFFECTS

The most common side effects associated with Chlorhexidine gluconate oral rinses are: 1) an increase in staining of teeth and other oral surfaces; 2) an increase in calculus formation; and 3) an alteration in taste perception. Oral irritation and local allergy-type symptoms have been spontaneously reported as side effects associated with use of Chlorhexidine gluconate rinse. The following oral mucosal side effects were reported during placebo - controlled adult clinical trials: aphthous ulcer, grossly obvious gingivitis, trauma, ulceration, erythema, desquamation, coated tongue, keratinization, geographic tongue, and short frenum. Each occurred at a frequency of less than 1.0%. Among post marketing reports, the most frequently reported oral mucosal symptoms associated with Chlorhexidine gluconate oral rinse are stomatitis, gingivitis, glossitis, ulcer, dry mouth, hypesthesia, glossal edema, and paresthesia. Minor irritation and superficial desquamation of the oral mucosa have been noted in patients using Chlorhexidine gluconate oral rinse. There have been cases of parotid gland swelling and inflammation of the salivary glands (sialadenitis) reported in patients using Chlorhexidine gluconate oral rinse.(14)

DEACTIVATION

Chlorhexidine is deactivated by forming insoluble salts with anionic compounds, including the anionic surfactants commonly used as detergents in toothpastes and mouthwashes, anionic thickeners such as carbomer, and anionic emulsifiers such as acrylates/C10-30 alkyl acrylate crosspolymer, among many others. For this reason, chlorhexidine mouth rinses should be used at least 30 minutes after other dental products.(15) For best effectiveness, food, drink, smoking, and mouth rinses should be avoided for at least one hour after use. Many topical skin products, cleansers, and hand sanitizers should also be avoided to prevent deactivation when chlorhexidine (a topical itself or the residue from a cleanser) is meant to remain on the skin.

CONCLUSION

Chlorhexidine is a germicidal mouthwash that reduces bacteria in the mouth. Chlorhexidine oral rinse is used to treat gingivitis (swelling, redness, bleeding gums). Chlorhexidine is usually prescribed by a dentist. Chlorhexidine oral rinse is not for treating all types of gingivitis. Use the medication only to treat the condition your dentist prescribed it for. Do not share this medication with another person, even if they have the same gum symptoms you have. Chlorhexidine may also be used for purposes not listed in this medication guide.

REFERENCE

1. Thomas Güthner et al. (2007), "Guanidine and Derivatives", Ullman's Encyclopedia of Industrial Chemistry (7th ed.), Wiley, p. 13
2. Chlorhexidine: the ideal antiseptic (PMID:16238008) Ibáñez N, Casamada N
3. Chlorhexidine (CHX) in dentistry: state of the art. Varoni E1, Tarce M, Lodi G, Carrassi
4. Overholser CD, Meiller TF, DePaola LG, Minah GE, Niehaus C. Comparative effects of 2 chemotherapeutic mouthrinses on the devopment of supragingival dental plaque and gingivitis. J Clin Periodontol 1990;17(8):575-579.
5. Charles CH, Mostler KM, Bartels LL, Mankodi SM. Comparative antiplaque and antigingivitis effectiveness of a chlorhexidine and an essential oil mouthrinse: 6-month clinical trial. J Clin Periodontol 2004;31(10):878-884.
6. Loe H, Schiott CR. The effect of mouthrinses and topical application of chlorhexidine on the rdevelopment of dental plaque and gingivitis in man. J Periodont Res 1970;5:79-83.
7. Banting D, Bosma M, Bollmer B. Clinical effectiveness of a 0.12% chlorhexidine mouthrinse over two years. J Dent Res 1989;68:1716-1718.
8. Siegrist BE, Gusberti FA, Brecx MC, Weber HP, Lang NP. Efficacy of supervised rinsing with chlorhexidine digluconate in comparison to phenolic and plant alkaloid compounds. Jour of Periodont Res 1986;16:60-73.
9. Gultz J, Kaim JM, DeLeo J, Scherer W. An in vivo comparison of the antimicrobial activities of three mouthrinses. J Clin Dent 1998;9:43-45.
10. Veksler AE, Kayrouz GA, Newman MG. Reduction of salivary bacteria by pre-procedural rinses with chlorhexidine 0.12%. J Periodontol 1991;62:649-651.
11. Logothetis DD, Martinez-Welles JM. Reducing bacterial aerosol contamination with a chlorhexidine gluconate pre-rinse. J Am Dent Assoc 1995;126:1634-1639.
12. Szymanska J. Dental bioaerosol as an occupational hazard in a dentis's workplace. Ann Agric Environ Med 2007;14:203-207.
13. Harrel SK, Molinari J. Aerosols and splatter in dentistry: A brief review of the literature and infection control implications. JADA 2004;135:429-437.
14. Chlorhexidine drug review
15. Denton, Graham W (2000). "Chlorhexidine". In Block, Seymour S. Disinfection, Sterilization, and Preservation (5th ed.). Lippincott Williams & Wilkins. pp. 321–36. ISBN 978-0-683-30740-5.