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, Gingivitis, 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
systemic or bodily absorption. Protein bound tissues such as skin and mucous membranes with limited OTHER SIGNIFICANCE procedures.(10,11,12,13) contamination during in-office dental gluconate pre-rinse to decrease bacterial aerosol beneficial to the dental professional as well as to the antimicrobial activity of chlorhexidine gluconate can be development of gingivitis.(4,5,6,7,8,9) The immediate significantly reduce plaque bacteria and prevent the possible.(3) Chlorhexidine gluconate oral rinse can used 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, glosseal 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.

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