ABSTRACT

Objectives: A clinical trial was carried out to investigate the effectiveness of the mouthwash containing chlorhexidine on caries activity of mutans streptococci in plaque.

Methods: Twenty (20) respondents participated as the subjects on the clinical trial two times treated, before and after mouth washing with chlorhexidine and as subject of control, before and after mouth washing with NaCl 0.9 %. Plaque samples were collected before and after mouth rinsing with NaCl 0.9 % and with chlorhexidine then put directly in a small tube of 2 ml Cariostat (Tau Shimono et al, 1986) Data, which were obtaining from semi-synthetic liquid of Cariostat medium before and after the NaCl 0.9% and Chlorhexidine were analyzed using percentages based on grades changing pH of Cariostat. Results: showed that there is no significant difference in the caries activity levels of Streptococcus mutans between before and after using NaCl 0.9 %. Whereas, a significant difference was found respectively as a result of before and after mouth rinsing with Chlorhexidine, after mouth rinsing with NaCl 0.9% as well as Chlorhexidine. Conclusion: Therefore it could be concluded that Chlorhexidine is effective in inhibiting caries activity of mutans streptococci in plaque.

Key words: Chlorhexidine mouthwash-Caries activity –Mutans streptococci-plaque

INTRODUCTION

Streptococcus mutans has long been associated with dental caries in man and its ability to form dental plaque and known to play a significant role in the etiology of dental caries.

The ability of Streptococcus mutans to form plaque on synthesize extra cellular polysaccharides (dextran) from sucrose might involvement of this microorganism adhered to hard surface of the teeth. Mutans streptococci which harbored in the dental plaque and acid production of mutans streptococci could possibly lead to demineralization of the teeth(Michalek ZM, McGhee JR 1982)¹. Regarding to the caries activity of mutans streptococci in plaque presents a tremendous challenge to the dental profession in population. Antimicrobial agents are widely used to reduce bacterial load in the mouth is chlorhexidine.

It has a potential antimicrobial against gram-positive and gram-negative bacteria and its ability to reduce dental plaque ,caries and gingivitis (Prijantojo, 1992)², Maya Lewerissa and Soeherwin Mangundjaja , 1998)³ in humans.

In epidemiological study, caries activity of mutans streptococci in high caries prevalence in the people of Kelapa Island (Soeherwin Mangundjaja, Abdul Muthalib and Ariadna Djaïs, 1995)⁴, thereby needed anti microbial agent to eradicate Streptococcus mutans in plaque and reduce caries risk in population.
Caries activity of mutans streptococci determined by using colorimeter may show some discrepancies, but this colorimeter (Cariostat of Tzu Shimono, 1986)\textsuperscript{5} showed correlation with the ability of mutans streptococci produced acid in the plaque.

In this study using Minocep mouthwash as antimicrobial agent to reduce the rate of acid production of mutans streptococci in plaque.

**OBJECTIVE**

To examine the effectiveness of chlorhexidine mouthwash on caries activity levels of mutans streptococci in plaque.

**MATERIALS AND METHODS**

This experiment is using Minocep mouthwash containing 1.6-bis-pchlorophenylbiguanidohexane. The analyzed unit was *Streptococcus mutans* in plaque. Semi-synthetic liquid medium consisting of 20 % sucrose, B.C.G, B.CP, NaN\textsubscript{3} NaCl and Tryptose was selected as a colorimeter method (Carisostat) for determining caries activity of mutans streptococci in plaque.

Twenty respondents were participated as a research subject treated two times with Minocep mouthwash.

Collecting samples as followed:

1. Plaque samples were taken from small discrete areas of buccal tooth surfaces of upper and lower jaw and another along the fissures of the molars with the tip of sterile toothpick then the tips were cut off and put directly in a small tube of 2 ml Cariostat. Then tubes - containing Cariostat were incubated in Gas-pack jar for 3 days at 37\textdegree C Celsius degree.
2. Respondents were treated with Minocep mouthwash for a period 15, 30 45 and 60 seconds mouth rinsing.
3. Each of a period mouth rinsing is then plaque samples (stated in item No 2) were taken and the bacteriological procedures is the same as stated in item No 1 above.
4. Mutans streptococci activity determined by Cariostat. After incubating of cariostat - containing plaque samples the color of the test tubes will change and comparing with the control sample with standard test liquid for color sample use preliminary prepared by changing pH.

Estimating by making classification into 4 grades:
- Grade 1 = - blue pH 7.0
- Grade 2 = + green pH 5.4.
- Grade 3 = ++ yellow-green pH 4.7
- Grade 4 = +++ yellow pH 4.0

**Analysis**

The data were analyzed using percentages based on grades changing pH of Cariostat.
RESULTS

Table. Caries activity levels of mutans streptococci in plaque after mouth rinsing using Minocep mouthwash

<table>
<thead>
<tr>
<th>Scores Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Treatment</td>
</tr>
<tr>
<td>0</td>
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<tr>
<td>0</td>
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</tbody>
</table>

The results showed that caries activity of mutans streptococci in plaque after mouth rinsing for a period 15 and 30 seconds have grade 0 pH 7.0 (60 %, 85 %) and after mouth rinsing for a period 60 the highest proportion has grade 0 (95 %).

As well as caries activity of mutans streptococci before mouth rinsing has the highest proportion has grade 2 pH 4.5 (55 %) compared after mouth rinsing for a period 15, 30 and 60 seconds have the lowest proportion have grade 2 pH (25 %, 5 % and 0 %).

DISCUSSION

The percentage of caries activity of mutans streptococci in plaque after mouth rinsing by Minocep mouthwash for a period 15, 30, 45 and 60 seconds showed that caries activity levels of mutans streptococci had decreased.

In the present study of caries activity measured only indicating acid produced by mutans streptococci in the differences site of the tooth.

Caries activity levels of mutans streptococci on teeth showed highest level of acid produced it is early interpreted as caries indicator for caries existence on this site.

To be effective against caries, antimicrobial agent of chlorhexidine have to be given for a sufficient period of mouth rinsing as above stated. At those concentration of chlorhexidine mouth wash can reduce acid production in plaque and strongly suppress the population of mutans streptococci (Soeherwin Mangundjaja et al., 1999).

In the clinical finding that can reduce plaque, caries, gingivitis and periodontal disease in human but it should be noted at prolonged period of use it will cause side-effects such as staining of teeth or change in taste.

One positive property of chlorhexidine is its ability to bind to oral surfaces from where it is released gradually into saliva over many hours at bacteriostatic concentrations and at this concentrations, chlorhexidine can reduce acid production in plaque.(Bratthall, 1998).

CONCLUSION

The results suggest that mutans streptococci are particularly sensitive to chlorhexidine. Regular use of a 0.2 % concentration of chlorhexidine reduces caries activity levels of mutans streptococci in plaque.
SUGGESTION

It is desirable use of Minocep may be a pre-and post surgical mouthwash in dentistry to reduce bacteremia and control plaque during healing.

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