Clinical Evaluation of Subgingival Irrigation with Chlorhexidine and Benzydamine in Periodontitis

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ABSTRACT
Aims and Objectives: To examine the clinical effects of a single sub-gingival irrigation of Chlorhexidine and Benzydamine in advanced Periodontitis. Materials and Method: The study population consists of 30 patients who attended the Department of Periodontia, Madras Dental College, India for the treatment of at least two teeth with Chronic Periodontitis. The experimental site consisted of two teeth with Chronic Periodontitis, pocket depth of 4 to 6 mm and a Gingival Index score of 2. The study population was randomly assigned into three groups with 10 patients each. Group I - Irrigated with physiological saline (Control group), Group II - Irrigated with 0.2 % Chlorhexidine Digluconate solution and Group III - Irrigated with 0.15 % Benzydamine hydrochloride solution. The experimental sites of the three groups were assessed using Pocket Depth, Plaque Index, Gingival Index (Inflammation and bleeding Indexes were recorded separately) and Gingival Fluid Index. Results: The effect of Benzydamine was better when compared to Chlorhexidine while the effect of Saline was negligible. Conclusion: The sub-gingival action of Benzydamine can be favored and preferred to that of Chlorhexidine and Saline because of its sustained progressive response.

Key words: Benzydamine; Chlorhexidine; Periodontitis; Sub-gingival Irrigation

Introduction
Periodontal diseases form a major dental health problem. Various broad spectrum antibiotics have been tried and found to have an inhibitory effect on both caries and periodontitis but their prolonged use is not a practical solution to plaque control as it leads to undesirable side effects like resistant strains and sensitization when tried both systemically and topically. Recent approaches to the problem of sub gingival plaque control include the use of chemical and anti-microbial agents. More interest has been focused towards topical anti-microbials with minimum side reactions and maximum tissue concentration. An antimicrobial agent used as a mouthwash does not affect periodontal pockets deeper than 3mm. It has become evident that this failure is not due to chemical ineffectiveness, but to the failure of mouth rinsing to penetrate periodontal pockets. Even direct irrigation, using a syringe and blunt needle at the gingival margin interdentally failed to achieve penetration of 3mm pockets. However insertion of the irrigation needle even 3mm with in the pocket resulted in penetration of an aqueous solution to the apical plaque border, regardless of pocket depth. This system has been shown to produce reductions in plaque and apparent periodontitis. The Present study was conducted on the clinical effects of sub-gingival irrigation of Chlorhexidine and Benzydamine on a comparative basis in the absence of physical debridement using clinical parameters of periodontal disease.

Materials and Method
Thirty patients who attended the Department of Periodontia, Madras Dental College and clearly satisfying the following clinical criteria have been taken as the population of this study. The inclusion criteria were freedom from systemic diseases, hormonal imbalances, dental caries, hypoplasia, malocclusion and other personal habits like pan chewing and smoking. The patients under any medications were excluded from the study. The experimental site consisted of two teeth with chronic periodontitis, a pocket depth of 4-6 mm and a gingival index score of 2. Selected teeth were radio graphically assessed to notice the extent of alveolar bone loss. The study population was randomly assigned into three groups with 10 patients each. Group I - Irrigated with physiological saline (Control group), Group II - Irrigated with 0.2 % Chlorhexidine Digluconate solution and Group III - Irrigated with 0.15 % Benzydamine hydrochloride solution. The experimental sites of the three groups were assessed using Pocket Depth, Plaque Index, Gingival Index (Inflammation and bleeding Indexes were recorded separately) and Gingival Fluid Index. Results: The effect of Benzydamine was better when compared to Chlorhexidine while the effect of Saline was negligible. Conclusion: The sub-gingival action of Benzydamine can be favored and preferred to that of Chlorhexidine and Saline because of its sustained progressive response.

Results
The data collected were tabulated to exhibit the drug effects and time effects in two rectangular co-ordinates allocating one table each for the following parameters: Gingival Fluid Estimation, Plaque Index, Gingival Inflammation Index, Gingival Bleeding Index and Pocket Depth.

Gingival fluid estimation: The inference is that the level of gingival fluid comes down to 50% significantly at the end of 24 hours and then slowly goes up. This means that the effect of saline can endure up to 24 hours only. In the case of Chlorhexidine the level of gingival fluid comes down to 40% significantly at the end of two weeks and goes up rapidly. In the case of Benzydamine the level of gingival fluid comes down to 50% at the end of two weeks.
The intermittent response for the three groups is as follows:

The durability of saline in sub gingival action is 24 hours with pro-rata response during the subsequent weeks. The durability of Chlorhexidine in sub gingival action is two weeks with rapid response in the subsequent weeks. The durability of Benzydamine in sub gingival action is also two weeks but with a meager sliding response during the subsequent weeks. On comparison it is found that Benzydamine can be considered in terms of response as a more durable drug for sub gingival action than Chlorhexidine. The ratio of response at the end of two weeks of Benzydamine : Chlorhexidine was 5:4.

The final response is measured at the end of four weeks. In case of Saline the gingival fluid goes back to 90% of the pre-irrigation level though not statistically significant. Surprisingly the level of gingival fluid in the case of Chlorhexidine at the end of four weeks goes up to the same 90% of the pre-irrigation level but it is not statistically significant. The behavior of Chlorhexidine during longer interval of time is similar to that of the behavior of Saline on the plane of sub gingival action. So the effect of Chlorhexidine in sub gingival action seems to be secondary as its effect is more or less same as the effect of Saline but the effect of Benzydamine is very emphatic and noteworthy. The level of gingival fluid in the case of Benzydamine at the end of four weeks is 60% of the pre-irrigation level and this marginal increase is highly statistically significant (P<0.01). The level of gingival fluid in the case of Benzydamine comes down to 50% of that of the pre-irrigation level and increases to 60% only at the end of four weeks. Hence Benzydamine can be considered as a safe and steady drug for sub gingival action because of its consistent response during subsequent weeks of irrigation.

Plaque index: The plaque index level is exactly half of that of the pre-irrigation level at the end of 24 hours and the same level is maintained even after one week and till the end of four weeks in the case of all the three drugs. Since there is no element of variation, the question of statistical analysis does not arise. The practice of irrigation sustained by the patients makes them psychologically alert, thus preventing the increase in the Plaque Index Score irrespective of the drug used.

Gingival inflammation index: The behavior of gingival inflammation index is almost similar to that of plaque index. In Gingival Inflammation Index also, in the absence of any variation, statistical analysis is impracticable. In the case of Saline the pre-irrigation position is revived at the end of two weeks and in the case of Chlorhexidine the pre-irrigation position is revived at the end of three weeks. In the case of Benzydamine the pre-irrigation position is never revived and is maintained at 50% level from 24 hours onwards. It is found that in Benzydamine, gingival inflammation index is reduced to 50% within 24 hours and the same level is maintained throughout the subsequent weeks, where as though Saline and Chlorhexidine reduce the gingival inflammation index, the reduction is not maintained and the inflammation is revived during subsequent weeks. Hence Benzydamine seems to be more specific in reducing gingival inflammation index to an appreciable level and controlling it also simultaneously.

Gingival bleeding index: Saline irrigation did not lower the gingival bleeding index in spite of the number of weeks of follow up. Irrigation of Chlorhexidine reduces the gingival bleeding index to 50% at the end of 24 hours and this reduction is maintained up to two weeks and then goes back to the original level. So, action of Chlorhexidine over the gingival bleeding index is temporary and not sustained, where as the irrigation of Benzydamine reduces the gingival bleeding index to 50% at the end of 24 hours and this level is maintained throughout the subsequent weeks of follow up. This leads to the conclusion that the irrigation of Benzydamine reduces gingival bleeding index by 50% and its action is static and perpetual.

Pocket depth: Irrigation of Saline has no effect in minimizing the pocket depth even when followed up to four weeks. Irrigation of Chlorhexidine minimizes the pocket depth by 25% during the first two weeks and this effect disappears from the third week onwards and the pocket depth reverts to the pre-irrigation level. Irrigation of Benzydamine minimizes the pocket depth by 25% during the first two weeks and by 15% during the last week. Even at the end of fourth week the pocket depth does not revert to the pre-irrigation level. When comparing Chlorhexidine and Benzydamine the first is effective for two weeks only, because it becomes ineffective at the end of two weeks and the second is effective for more than four weeks because the pocket depth does not revert to the pre-irrigation level. It can be safely predicted that the effect of Benzydamine in reducing the pocket depth is elastic and it may be effective even after the end of four weeks. Among the three, Saline being a control has no effect, Chlorhexidine has temporary effect and Benzydamine has tapering effect and can be considered as the efficient one among the three.

Discussion

A study by Hardy et al in 1982 showed that the solution reached the apex of the pocket when the syringe tip was placed 3 mm below the gingival margin. Two studies demonstrated a reduction in debris, plaque and gingivitis following the use of a water pressure device. When oral irrigator was added to the oral hygiene regime a reduction in the periodontal index and a reduction in plaque and calculus accumulation was seen by Hoover and Robison. The investigation of Lainson et al proved a reduction in inflammation following the use of irrigating devices. No harmful effects on hard or soft tissues were noted. Derdivanis et al showed that there was a marked delay in the rate of plaque maturation when a mouthwash was delivered by an irrigating device. Cingi et al stated that Chlorhexidine gluconate and benzydamine hydrochloride mouth spray, added to standard antibiotic treatment, significantly alleviate the intensity of clinical signs in patients with streptococcal pharyngitis.

The present study revealed that the level of gingival fluid decreases to 50% significantly at the end of 24 hours and then slowly increases, after an irrigation with Saline. In the case of irrigation with Chlorhexidine, the level of gingival fluid de-
creases to 40% significantly at the end of two weeks and increases rapidly, while with Benzydamine the level of gingival fluid decreased to 50% significantly at the end of two weeks and then does not increase rapidly as in the case of Chlorhexidine. This is in accordance with the study of Coventry and Newman, which indicated a similar reduction in crevicular fluid flow after the use of Chlorhexidine subgingivally. An observation of this study indicated that gingival inflammation index is reduced to 50% within 24 hours and the same level is maintained throughout the subsequent weeks when irrigated with Benzydamine, whereas Saline and Chlorhexidine showed a reduction in the gingival inflammation index but are reverted to the pre-irrigation levels at the end of three weeks with Chlorhexidine and at the end of two weeks with Saline. A trend towards baseline levels might be due to concomitant changes in sub-gingival Plaque associated with increased gingival index as shown by the study of Mouques et al. 1980. The superior performance of Chlorhexidine over Saline is due most probably to the better supra-gingival plaque control achieved by Chlorhexidine. Saline irrigation did not affect the Gingival bleeding index as shown by this study. Irrigation with Chlorhexidine showed a reduction of the Gingival bleeding index score, which was maintained up to two weeks only, while Benzydamine maintained reduced scores till the end of the four weeks. Chlorhexidine irrigation reduced the pocket depth by 25% in the first two weeks while Benzydamine irrigation reduced the pocket depth by 25% during the first two weeks and by 15% during the last two weeks. Saline irrigation showed no change in the pocket depth which is in accordance with the study of Aziz-Gandour and Newman. The reduction in pocket depth may be attributed to the resolution of inflammation by the action of the drugs. The present study revealed that 0.15% Benzydamine hydrochloride solution was more effective than 0.2% Chlorhexidine Digluconate solution, since Benzydamine had an added advantage of being an alcoholic solution, alcohol being antimicrobial and bactericidal to all the common pathogenic bacteria.

Conclusion

In conclusion, 0.15% Benzydamine hydrochloride solution was more effective than 0.2% Chlorhexidine Digluconate solution, since Benzydamine had an added advantage of being an alcoholic solution, alcohol being antimicrobial and bactericidal to all the common pathogenic bacteria.

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