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Original Research

Effects of Amoxicillin–Metronidazole Combination versus Ciprofloxacin as an Adjunct to Nonsurgical Periodontal Therapy of Chronic Generalized Periodontitis

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***ABSTRACT*:**

Background: Aggressive periodontitis, by definition, causes rapid destruction of the periodontal attachment apparatus and the supporting alveolar bone. It can present in a localized or generalized form. Two common features of both forms are rapid attachment loss and bone destruction in an otherwise clinically healthy patient and a familial aggregation. **Aim of the study:** To study effects of Amoxicillin–Metronidazole Combination Versus Ciprofloxacin as an Adjunct to Nonsurgical Periodontal Therapy of Chronic Generalized Periodontitis. **Materials and methods:** The present study was conducted in the Department of Periodontics of the Dental Institutions. The clinical records of chronic generalized periodontitis patients were seen from April 2018 to August 2019 in the Department of Periodontics were reviewed. The clinical parameters were scored at six sites per tooth (mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual, and distolingual) at baseline at the time of scaling and root planning and 12 weeks after SRP: Probing depth (PD), clinical attachment level (CAL), plaque index (PI), and bleeding on probing (BOP). **Results:** A total of 60 patients were included in this study. 30 patients were in test group and 30 were in control group. We observed that probing depth in test group was 3.12 mm and in control group was 3.58, clinical attachment level was 3.67 in test group and 3.92 in control group, plaque index was 1.23 in test group and 0.81 in control group and bleeding on probing value was 69.21 in test group and was 58.58 in control group. **Conclusion**: Within the limitations of the present study, it can be concluded that both the treatments are fairly efficacious in treating periodontitis.

Keywords: Periodontitis, antibiotic treatment, amoxicillin.

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INTRODUCTION:

Periodontitis, by definition, causes rapid destruction of the periodontal attachment apparatus and the supporting alveolar bone. It can present in a localized or generalized form. Two common features of both forms are attachment loss and bone destruction in an otherwise clinically healthy patient and a familial aggregation.[1, 2] These patients often present with limited microbial deposits that seem inconsistent with the severity of tissue destruction. However, the deposits that are present often have elevated levels of Aggregatibacter (formerly Actinobacillus) actinomycetemcomitans, or Porphyromonas gingivalis.[3] The presence of periodontal pathogens, specifically A. actinomycetemcomitans, has been implicated as the reason that aggressive periodontitis does not respond to conventional therapy alone. These pathogens are known to remain in the tissues after therapy and re-infect the pocket.[4] The identification of A. actinomycetemcomitans as a major culprit and the discovery that this organism penetrates the tissues offered another perspective to the pathogenesis of periodontitis and offered new hope for therapeutic success, namely antibiotics. The use of systemic antibiotics was thought to be necessary to eliminate pathogenic bacteria from the tissues. [5] There is compelling evidence that adjunctive antibiotic treatment

frequently results in a more favorable clinical response than mechanical therapy alone. Indeed, several authors have reported success in the treatment of aggressive periodontitis using antibiotics as adjuncts to standard therapy. [6] Hence, the present study was conducted to study effects of Amoxicillin–Metronidazole Combination Versus Ciprofloxacin as an Adjunct to Nonsurgical Periodontal Therapy of Chronic Generalized Periodontitis.

MATERIALS AND METHODS:

The present study was conducted in the Department of Periodontics of the Dental Institutions. The ethical clearance for the study was approved from the ethical committee of the hospital. The clinical records of chronic generalized periodontitis patients were seen from April 2018 to August 2019 in the Department of Periodontics were reviewed to identify patients diagnosed with "CGP" according the criteria of Armitage [7], who were nonsmokers, systemically healthy, with no medication use in the previous 6 months, and no previous periodontal treatment. The records of 60 patients were examined; and all met the inclusion criteria. The clinical parameters were scored at six sites per tooth (mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual, and distolingual) at baseline at the time of scaling and root planning and 12 weeks after SRP: Probing depth (PD),[8] clinical attachment level (CAL),[9] plaque index (PI),[10] and bleeding on probing (BOP). [11] The control group underwent full-mouth SRP and Ciprofloxacin only, whereas the test group received two systemic antibiotic regimens in addition to SRP. The control group was given C 500 mg, twice per day, for 8 days, and the test group was given MTZ + AMX 250 mg each, 2 times/day.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

RESULTS:

A total of 60 patients were included in this study. 30 patients were in test group and 30 were in control group. Table 1 shows mean levels of different periodontal parameters at baseline. We observed that probing depth in test group was 3.12 mm and in control group was 3.58, clinical attachment level was 3.67 in test group and 3.92 in control group, plaque index was 1.23 in test group and 0.81 in control group and bleeding on probing value was 69.21 in test group and was 58.58 in control group. Table 2 shows average difference in level of periodontal parameters for test group and control group after treatment. In test group, probing depth decreased by mean value of 1.32 and 1.27 in control group. Clinical attachment level decreased by 1.42 in test group and 1.52 in control group. Plaque index reduced by 0.25 in test group and 0.29 in control group. The results compared were statistically significant in for both the groups.

Table 1: Levels of different periodontal parameters at baseline

Parameters	Test group	Control group	p-value
Number of patients	30	30	
Probing depth	3.12	3.58	0.21
Clinical attachment level	3.67	3.92	0.52
Plaque index	1.23	0.81	0.09
Bleeding on probing	69.21	58.58	0.5

Figure 1:

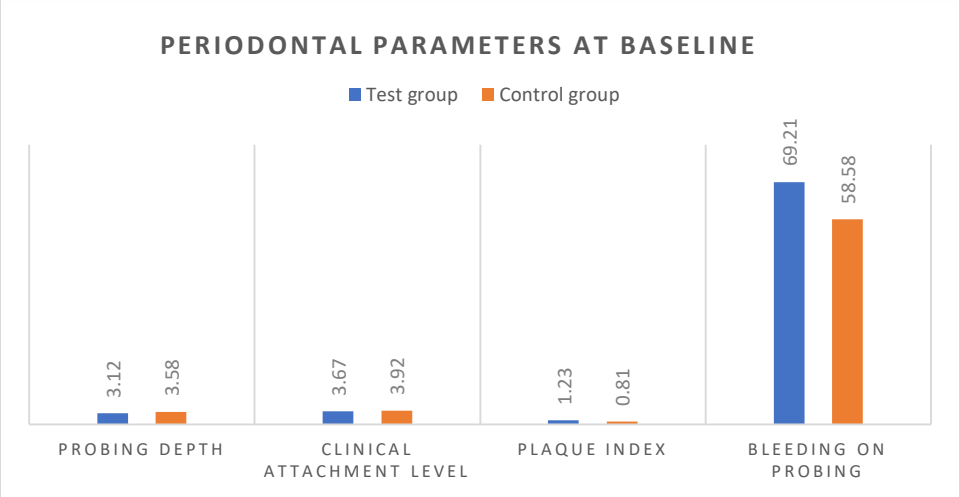

Table 2: Average difference in level of periodontal parameters for test group and control group after treatment

Parameters	Test group	Control group	p-value
Probing depth	-1.32	-1.27	0.02
Clinical attachment level	-1.42	-1.52	0.03
Plaque index	-0.25	-0.29	0.05
Bleeding on probing	-41.32	-48.36	0.005

DISCUSSION:

In the present study, we observed that the differences among groups in terms of age, gender, and initial periodontal parameters were negligible. All patients were nonsmokers. Our data from this study indicate that both therapies improved the PD, CAL, GI, and BOP at the 3-month follow-up. Kaufmann M et al performed search for studies focusing on the evaluation of in vitro antimicrobial efficacy of amoxicillin + metronidazole or azithromycin on bacteria from the subgingival biofilm were included. From 71 identified articles, only three articles were eligible for inclusion. These studies showed heterogeneity in terms of analytical methods and strains explored. However, all studies used multispecies biofilm models for analysis of the antimicrobial activity. Unanimously, studies reported on more pronounced antimicrobial effects when applying the combination of amoxicillin + metronidazole, compared to azithromycin. Based on the few studies available, the combination of amoxicillin + metronidazole seemed to display higher antimicrobial efficacy in vitro than azithromycin. Soares GM et al developed an in vitro multispecies biofilm model that mimics subgingival plaque, to test antimicrobial agents. Biofilms were cultivated using the Calgary Biofilm Device and were exposed to amoxicillin (AMX), metronidazole (MTZ), azithromycin (AZM), and AMX-MTZ at four different concentrations for 12, 24, or 36 h. Chlorhexidine (CHX) (0.12%) was used as the positive control. The compositions of the biofilms were analyzed by checkerboard DNA-DNA hybridization, and the percent reduction in biofilm metabolic activity was determined using 2,3,5-triphenyltetrazolium chloride and spectrophotometry. Thirty-five of the 40 species used in the inoculum were consistently recovered from the resulting in vitro biofilms. After 36 h of exposure at the 1:27 dilution, AMX-MTZ reduced metabolic activity 11% less than CHX but 54% more than AMX, 72% more than MTZ, and 67% more than AZM. Preliminary evidence of a synergistic interaction between AMX and MTZ was also observed. In summary, they developed reproducible biofilms with 35 subgingival bacterial species, and their results suggested that the combination of AMX and MTZ had greater antimicrobial effects on these in vitro multispecies biofilms than expected on the basis of the independent effects of the drugs. [12,13]

Jentsch HF et al compared the effect of systemic adjunctive use of azithromycin with amoxicillin/metronidazole to scaling and root planning (SRP) in a clinical study. Data from 60 individuals with chronic periodontitis were evaluated after full-mouth SRP. Antibiotics were given from the first day of SRP, in the test group, azithromycin for 3 days and, in the control group, amoxicillin/metronidazole for 7 days. Probing depth (PD), attachment level (AL), and bleeding on probing (BOP) were recorded at baseline and after 3 and 12 months. Gingival crevicular fluid was analyzed for matrix metalloprotease (MMP)-8 and interleukin (IL)-1 beta levels. Subgingival plaque was taken for assessment of the major bacteria associated with periodontitis. In both groups, PD, AL, and BOP were significantly reduced. A few significant differences between the groups were found; AL and BOP were significantly better in the test than in the control group at the end of the study. Periodontopathogens were reduced most in the test group. A noninferiority of the treatment with azithromycin in comparison with amoxicillin/metronidazole can be stated. They concluded that administration of azithromycin could be an alternative to the use of amoxicillin/metronidazole adjunctive to SRP in patients with moderate or severe chronic periodontitis; however, a randomized placebo-controlled multicenter study is needed. Guzeldemir-Akcakanat E et al evaluated the effect of systemic administration of moxifloxacin compared to amoxicillin and metronidazole, combined with non-surgical treatment in patients with generalized aggressive periodontitis (GAgP) in a 6-month follow-up. A total of 39 systemically healthy patients with GAgP were evaluated in this randomized clinical trial. Periodontal parameters were recorded at the baseline during the 1st, 3rd and 6th month. Patients received either 400 mg of moxifloxacin per os once daily or 500 mg of metronidazole and 500 mg amoxicillin per os three times daily for 7 days consecutively. No significant differences between groups were found in any parameters at the baseline. Both groups led to a statistically significant decrease in all clinical periodontal parameters compared to the baseline. There were no differences between the 1st and 3rd months or the 3rd and 6th months for clinical parameters in the groups. Also, no intergroup difference was observed in any parameters at any time, except the gingival index at

6th months. They concluded that systemic administration of moxifloxacin as an adjunct to non-surgical treatment significantly improves clinical outcomes and provides comparable clinical improvement with less adverse events to that of combination of amoxicillin and metronidazole in the treatment of GAgP. [14,15]

CONCLUSION:

Within the limitations of the present study, it can be concluded that both the treatments are fairly efficacious in treating periodontitis.

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