Comparison of Initial Periodontal Therapy Outcome in Aggressive and Chronic Periodontitis

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Summary

Inflammatory periodontal diseases present a global health care problem and are one of the main reasons for tooth loss. We investigated success of the initial periodontal therapy in patients with chronic (CP) and aggressive (AgP) periodontitis, and compared clinical outcome between these groups. We used periodontal pockets probing depth before and after the therapy, being the most important clinical index for prediction of further disease progression. Investigation included 35 patients with AgP, and 71 patients with CP. In the AgP group the therapy included systemic antibiotics and local irrigation with chlorhexidine solution. Subjects with AgP had significantly deeper pockets than subjects with CP (4.49 ± 0.93 mm AgP group, 3.87 ± 0.78 mm CP group). The initial therapy significantly reduced periodontal pocket depth in both groups (p < 0.001). AgP subjects showed significantly higher probing depth reduction than CP subjects (1.05 ± 0.80 za AgP i 0.55 ± 0.69 za CP). When deep and shallow pockets were separated, the difference between the groups was not significant. The combination of mechanical and antimicrobial therapy in the AgP subjects improved clinical periodontal findings, provided good clinical results, and can therefore be used as a clinical protocol for the initial periodontal therapy of these patients.

Key words: *initial therapy, aggressive periodontitis, chronic periodontitis.*

Introduction

Periodontal diseases present a global health problem, whereby the prevalence and severity increase with age (1). Etiologically, they are of bacterial origin and eventually lead to tooth loss. Many species of bacteria identified in the subgingival plaque, are implicated in the etiology of periodontitis (2). A smaller group of bacteria is held responsible for the progressive destruction of periodontal tissues, such as gram negative anaerobes: *Porphyromonas gingivalis, Actinobacillus actinomycetemcomitans, Prevotella intermedia, Fusobacterium nucleatum, Bacteroides forsythus.*

Bacterial deposits and their noxious metabolic products, such as acids and endotoxins, are active components of bacterial plaque and the primary cause of tooth decay and periodontitis (3). Inadequate oral hygiene and the resulting emergence of dental plaque as biofilm on the tooth surface are the main factors for initiation of gingivitis, which can progress to periodontitis in susceptible individuals. Risk factors have been identified, like smoking, stress and positive familial history, which can modify the course of periodontal disease.

Recent classification of periodontal diseases recognises five classes of periodontal diseases of the periodontium: gingivitis, aggressive periodontitis (AgP), chronic periodontitis (CP), periodontitis as a manifestation of systemic diseases or states and necrotizing periodontal diseases (4).

Chronic disease progresses slowly, usually is found in middle-aged or older individuals as a generalized or localized form of the disease. The amount of plaque correlates well with the degree of inflammation and the amount of destruction present. Subgingival calculus and gingival recession are typical findings in chronic forms of periodontal disease (5).

Aggressive periodontitis usually affects younger individuals, is often associated with hereditary factors and inadequate immune / inflammatory response to bacterial challenge (6). The immune and inflammatory reactions are overt, meaning the host response is too highly mounted, which adds further to the rapid disease progression (7). The localised form of the disease is less frequently observed, has a better prognosis, as it seems that the disease course tends to be self-limiting, and the humoral immune response is more efficient than the one observed in the generalised form of the disease (8). Clinically, small amounts of plaque or subgingival calculus are present, but accompanied by rapid attachment loss and the development of vertical osseous defects. The disease progression is difficult to predict and mechanical therapy is insufficient, so the need for antibiotics or surgical treatment arises.

Aim of the study

Since recent literature on the initial periodontal therapy outcome in different forms of periodontitis is relatively scarce, the aim of our study was to investigate the effectiveness of initial periodontal therapy of CP and AgP, and to compare the clinical response between tested groups using probing depth measurements.

Material and methods

This retrospective study included 106 patients, 46 males and 60 females, mean age 41 years, ranging from 23 to 72 years of age, who presented themselves at the Department of Periodontics, Dental Clinic, UHC Zagreb. The data from dental charts on probing depths before and after initial treatment were used. The first group comprised 35 patients diagnosed with AgP, mean age 34.3 years. In the second group were 71 patients with CP, mean age 44.3 years. None of the subjects had any received prior periodontal treatment, and individuals with serious systemic diseases such as diabetes, carcinoma or acute infections were excluded from the study.

Each participant gave written informed consent for the use of data from their dental charts for purposes of this study.

Criteria for diagnosing the periodontal disease as AgP were: positive familial case history, approximal bone loss, including at least 4 teeth, radiographically visible alveolar bone loss and history of frequent exacerbations of the inflammation (8). Criteria for CP were: gingival inflammation, loss of clinical attachment and radiographical finding of alveolar bone loss (5).

Probing depth was measured and recorded on mesial, distal, vestibular and oral aspects of teeth using calibrated manual periodontal probe. Due to the large amount of data, only the values of aproximate probing depths were considered and further analyzed.

The initial therapy consisted of supragingival and subgingival phase. Supragingival phase included: removal of dental plaque and calculus, coronal polishing and detailed oral hygiene instructions. After the supragingival phase, oral hygiene was reevaluated. The subgingival phase of the initial therapy was only performed in patients with adequate oral hygiene, as measured by approximal plaque index. Subingival scaling and root planing of root surfaces

was performed under local anesthesia in four appointments. Patients diagnosed with AgP, were also prescribed chlorhexidine mouth rinse and systemic antibiotic therapy with amoxicillin and metronidazole (500 mg/250 mg, 3x daily) for seven days. In the case of allergy to penicillin, a combination of ciprofloxacine and metronidazole was prescribed (250 mg/400 mg, 2x daily) for seven days. After two to three months, reevaluation of initial periodontal therapy outcome was performed, using periodontal pocket measurement.

Statistical analysis of the data was done using SPSS 10.0 (Statistical Package for Social Sciences) software for Windows. We tested the normality of distribution with Kolmogorov-Smirnov test. Since our sample showed normal distribution, we used parametric statistical tests. For analysis of the therapeutic success in each group we used t-test for dependent samples, and for comparison of outcomes between the groups, independent t-test was used.

Results

This investigation included 106 persons, 35 AgP and 71 CP patients. Mean probing depth in the whole sample was 4.08 ± 0.88 mm, 4.49 ± 0.93 mm in the AgP and 3.87 ± 0.78 mm in the CP group. Mean probing depth values for the whole mouth, quadrants, tooth groups (front teeth, premolars, molars), and jaws were established (Tables 1-3). Independent t-test showed that AgP group had significantly deeper pockets than the CP group, which is true for all quadrants ($p < 0.01$), teeth groups ($p < 0.02$), and jaws ($p < 0.005$).

Effectiveness of the initial periodontal therapy was tested by comparing the probing depth values before and after the therapy with the t-test for dependent samples. When the whole sample was analyzed, t-test for dependent samples showed statistically significant differences in probing depths ($p < 0.001$) for all teeth, each quadrant, each tooth group and for each jaw in the AgP (Table 1). When AgP and CP groups were analyzed separately, for each group there was a statistically significant difference for all teeth, each quadrant, each tooth group and jaw (Table 2).

Effectiveness of the initial therapy was shown quantitatively as the difference in the probing depths before and after the therapy. We performed an analysis for each quadrant, tooth group, and jaw (Figures 1-4). Mean values of probing depth reduction were 1.05 ± 0.80 in AgP and 0.55 ± 0.69 mm in CP patients. We found no statistically significant differences between quadrants or jaws in these two groups, while there was a difference between molars and other tooth groups in the whole sample and in both groups of patients. The failure of the initial therapy was defined as increase in mean probing depths. There were 18 such patients, 3 AgP and 15 CP patients.

We compared the effectiveness of the initial therapy between AgP and CP groups using the t-test for independent samples. Analysis was performed for all teeth, quadrants, tooth groups and jaws. Table 3 shows the results of the independent t-test, and the initial therapy in the AgP group was significantly better than in the CP group ($p = 0.03$). When the probing depths were grouped in shallow (≤ 5 mm) and deep pockets (> 5 mm), the statistically significant difference between these groups disappeared ($p = 0.417$ for shallow, $p = 0.142$ for deep pockets).

Discussion

This study evaluated periodontal condition before and after the initial therapy in aggressive and chronic periodontitis patients, and compared the results between the studied groups. The therapeutical interventions were evaluated by means of probing depth measurement, which objectively records the degree of periodontal tissue destruction and effectiveness of the initial therapy, and residual probing depths after the initial therapy possess predictive value for future disease progression (9).

Mean probing depth value in the AgP group was 4.5 mm, and 3.9 mm in the CP group. Significantly deeper pockets were determined in the AgP group (Tables 1-3). Effectiveness of the initial periodontal therapy, assessed through repeated measurements before and after the treatment, was significantly dif-

ferent for both groups (p < 0.001) (Tables 1, 2), which corresponds with the results of other authors (10).

The success of periodontal therapy in the AgP group equalled 1 mm in pocket depth reduction (mean value 1.05 ± 0.80), which is in accordance with Christan et al. (11), while the probing depth reduction amounted to 0.5 mm (0.55 ± 0.69) in the CP group. This higher reduction in the AgP group is similar to the findings of Purucker et al. (12) and Slots et al. (13), and can be explained by the additional antimicrobial therapy indicated in AgP patients. Difference in probing depths was found between first molars and other teeth in the whole sample. Deeper pockets in the first molar group can be explained by earlier disease initiation (14, 15). Failure of the initial periodontal therapy, more frequently encountered in the CP group, was probably due to insufficient motivation and oral hygiene, in cases of moderate disease (16, 17).

Conclusion

Outcomes of the initial periodontal therapy measures in AgP and CP patients were evaluated by means of probing depth measurements. The results revealed significantly deeper pockets in AgP patients (4.49 ± 0.93 mm in AgP and 3.87 ± 0.78 mm in CP patients). Initial therapy significantly reduced probing depths in both groups (p < 0.001). AgP patients showed greater probing reduction than CP patients (1.05 ± 0.80 in the AgP and 0.55 ± 0.69 in the CP group). When pockets are grouped as shallow and deep, this difference disappears. Initial periodontal therapy in AgP patients seemed to show better outcome than in the CP group. The combination of mechanical therapy, systemic antibiotics and local chlorhexidin irrigation obviously improved clinical periodontal status, provided good clinical results, and can be thus recommended as clinical protocol for initial periodontal therapy in AgP patients.