

D'Aiuto F, Nibali L, Mohamed-Ali V, Vallance P, et al. Periodontal therapy: a novel non-drug-induced experimental model to study human inflammation. J Periodont Res 2004;39:294-9. (34 Refs)

Purpose: The aims of this pilot investigation were i) to describe the changes in systemic inflammatory parameters consequent to an intensive periodontal treatment regimen and ii) to determine the kinetics of changes in inflammatory markers and mediators (CRP, IL-6, IL-1 receptor antagonist: IL-1Ra) in the early days following the treatment-associated bacteremia.

Materials and Methods: In this prospective single-blind intervention trial with 1 month follow-up, subjects with severe (PD>6mm and marginal bone loss >30%), generalized (at least 50% of teeth affected) periodontitis were included. A baseline exam was conducted including presence of plaque, BOP and recession of the gingival margin. Subjects thereafter received sub-gingival mechanical instrumentation using a piezoelectric instrument. Extraction of hopeless teeth was performed during the same session and periodontal outcomes were re-assessed 1 month following completion of periodontal therapy. Serial blood samples were drawn at baseline, 1, 3, 5, 7 and 30 days after periodontal therapy. Serum was obtained by centrifugation and C-reactive protein levels were assessed by an automated immunoturbidimetric high-sensitivity assay; IL-6 and IL-1Ra were measured with ELISA kits. Differential blood counts were performed using an automated analyzer. Statistical analysis was performed.

Findings and Conclusions: 14 medically healthy subjects were included in the trial. 8 patients were females, 10 were Caucasian, 2 subjects were smokers and one was a former smoker. Subjects presented with high levels of gingival inflammation (bleeding scores of 65%) and severe widespread periodontitis (67 pockets 5 mm or deeper per subjects with an average LOA of 4.8 mm). Significant improvements in all clinical parameters were observed 1 month after completion of treatment. A mean of 3 hopeless teeth were extracted. At day 1 all participants reported a series of symptoms occurring the evening after the treatment, including headache, rise in body temperature, tiredness, chills and general malaise. No significant changes were observed in participants' body temperature between the various time points. IL-1Ra kinetics showed a significant increase of its concentration only 1 day after treatment. No changes were observed at later time points for this early marker. IL-6 concentrations were sharply increased at day 1 and remained higher than baseline for the first week. Clear significant increases in CRP concentrations were observed between baseline and 1, 3, 5 and 7 days after treatment. With respect to hematological parameter, early changes in differential leukocyte counts were observed at day 1: circulating neutrophils significantly increased. An increase in the number of circulating monocytes was also observed at days 1 and 3. Lymphocyte numbers fell at day 1 and then increased 7 and 30 days after treatment. Interestingly a reduction in total leukocyte counts was detected 1 month after completion of treatment. At 5 and 7 days after treatment, erythrocyte numbers, hematocrit and hemoglobin concentration decreased. The number of platelets was significantly increased on day 5. On the basis of these results, it is concluded that intensive periodontal treatment induced an acute systemic inflammatory response of 1 week duration and might represent an alternative to classic endotoxin-challenge or drug-induced models to study acute inflammation in humans. Since the observed response seems to share many of the features of the well-characterized

endotoxin, vaccination and strenuous exercise models, periodontal therapy may represent a useful non-drug induced model to study human inflammation. Its relevance may be particularly evident when researchers wish to study the functional relevance of specific genetic variants or the effect of pharmacological interventions that require relatively large sample sizes and when the use of the other established models maybe impractical or unethical.