P-4 Effect of Minocycline-Loaded Polylactic Acid Microsphere on the Treatment of Periodontitis

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Local antimicrobial therapy has been considered for the treatment of chronic periodontal disease. The present study describes result of various clinical index and subgingival plaque bacterial morphotype using phase contrast microscope. Change of microbial composition in the periodontal pocket inserted with minocycline-loaded polylactic acid microsphere in dog and adult periodontitis patients were investigated. Seven dogs with experimentally-induced periodontitis on the mandibular 2nd, premolar were treated with minocycline-loaded polylactic acid microsphere. Twelve adult periodontitis patients and control individuals were treated with scaling and root planing. Then minocycline-loaded polylactic acid microsphere was inserted into periodontal pocket. Recording of clinical indicies and microbiological parameter was performed for 4 weeks. The concentration of minocycline in the periodontal pocket was measured using high performance liquid chromatography(HPLC) for 15 days. The activity of gingival fibroblast exposed to minocycline was evaluated by MTT assay.

The results were as followed;

1. The values of plaque index, gingival index, pocket depth and bleeding index in experimental group were significantly decreased compared with those in control group.
2. The ratio of cocci and non-motile rods to motile rods and spirochetes in experimental group was significantly increased compared with that of control group.
3. The number of bacteria cultured in aerobic and anaerobic blood agar plate and of black-pigmented Bacteroides was significantly reduced in experimental group compared with that of control group.
4. The activity of gingival fibroblasts exposed to minocycline at the concentrations of 3.49㎍/ml, 5.46㎍/ml and 65.1㎍/ml was evaluated. The activity of gingival fibroblast exposed to minocycline exclusively at the concentration of 65.1㎍/ml decreased significantly at 48 and 72 hours.

5. The concentration of minocycline in periodontal pocket was maintained over 8μg/ml for 15 days.

These results suggested that minocycline-loaded polylactic acid microsphere can be used as an ideal agent for a local drug delivery system to treat periodontal disease.