Immunohistochemical analysis of Th1/Th2 cytokine profiles and androgen receptor expression in the pathogenesis of nifedipine-induced gingival overgrowth

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Abstract

BACKGROUND: Numerous studies have demonstrated that gingival overgrowth may be associated with androgen and cytokine expression in tissues. OBJECTIVES: The aim of this study was to compare the expression of androgen receptor-presenting cells (AR+ cells) and Th1/Th2 cytokine [Th1: interleukin (IL)-2, interferon-gamma (IFN-gamma); Th2: IL-4, IL-10, IL-13] expression cells in tissue sections of patients with gingival overgrowth. MATERIALS AND METHODS: Tissue samples were collected from patients with healthy periodontium (H group), adult periodontitis (P group), surgically extracted teeth (S group), and nifedipine-induced gingival overgrowth (NIGO group). The clinical periodontal parameters of pocket depth (PD), bleeding on probing (BOP), and plaque control record (PCR) were measured around selected sample teeth. Gingival biopsies were further processed by immunohistochemical staining method. The expressions of cells positive for AR, IL-2, IFN-gamma, IL-4, IL-10, and IL-13 were counted by predetermined semiquantitative methods. RESULTS: Our results indicated that AR, IL-2, IFN-gamma, IL-4, IL-10, and IL-13 were intensively expressed in the nuclei of inflammatory cells and fibroblasts of gingival connective tissue. Stronger expressions of AR, IL-2, and IFN-gamma were found in the NIGO group. The AR+ cells/0.01 mm2 in gingival fibroblasts were significantly higher in the NIGO group (80.2 +/- 10.7) than those of the periodontitis group (52.5 +/- 11.8) and control group (37.4 +/- 11.3) ($P < 0.05$). The cytokine expression of the NIGO group showed a trend towards Th1-type expression (IL-2; $P = 0.0001$). In the surgically extracted tooth group, a stronger expression of Th2-type cytokine (IL-4, Il-10, IL-13; $P < 0.05$) was found in inflammatory cells. In a comparison of the IL-2/IL-4-labeled cell ratio of the four groups, a descending sequence was discovered as NIGO group (0.92 +/- 0.97) > H group (0.81 +/- 0.61) > P group (0.77 +/- 0.82) > S group (0.58 +/- 1.77). CONCLUSIONS: Our data support the following: (i) taking

nifedipine may elevate the expression of AR in susceptible oral tissue, e.g. gingiva; (ii) the cytokine profile of T-cells in NIGO tissue indicates a trend preferentially towards Th1 activity; and (iii) elevation of AR expression cells and prominent Th1 cytokine-labeled cells are two significant factors in the pathogenesis of NIGO.