Clinical, histological, histomorphometry and immunohistochemical evaluation of curcumin effect on preventing gingival enlargement caused by Phenytoin in rats

Shahriar Eftekharian[1], Safoura Seifi[2], Davood Mohammadi[1], Hosein Taed[1] and Farhad Dabaghsattari[2]
[1]Shahid Beheshti University of Medical Sciences and Health Services, Iran
[2]Babol University of Medical Sciences, Iran

Introduction: Phenytoin intake in patients with epilepsy causes unwanted gingival enlargement. Curcumin is a polyphenylene and active component of turmeric root which acts as an anti-oxidant, anti-inflammatory and anti-cancer.

Method: In this experimental study 50 male rats of Wistar race, aged four weeks were divided in three groups. Group-1 and 2 rats were given phenytoin 100 mg/kg every day and group 2 rats received intraperitoneal curcumin 20 mg/kg. Control group received solvent of curcumin (Dimethyl sulfoxide) instead of phenytoin by injection. Dimensions of gingiva were measured in the beginning and end of study. Changes in the size of gingiva tissue were prepared and measured by photography and photoshop software. In order to investigate the pathology, rats were killed and biopsies were collected from incisor gingiva of lower jaw and put in formalin. Hematoxylin and eosin staining and morphometry were done in order to evaluate the inflammation grade, epithelium width, cross-sectional area and number of blood vessels. Ki67 (epithelium proliferation marker) and αSMA (indicating myofibroblasts) immunohistochemical staining were performed. Data were analyzed using related statistical tests including ANOVA, Paired T-test, Mann-Whitney and Kruskal-Wallis.

Results: Phenytoin resulted gingival hypertrophy in group-1 in compare with control group (solvent of curcumin) (P=0.002). No significant gingival enlargement was observed in group-2 (curcumin and phenytoin) before and after of study. Inflammatory infiltration was moderate to severe in group-1 but it was mild in most cases in group-2. There was a statistically significant difference in the number of blood vessels between group-1 (phenytoin) and group-2 (Curcumin and phenytoin) (P=0.001) but there was no difference in the number of blood vessels between group-2 (Curcumin and phenytoin) and group-3 (control) (P=0.64). The highest epithelial thickness was in group-1 (phenytoin) and there was a statistically significant difference between three groups in term of epithelium thickness (P=0.002). Mean expression of Ki 67 in group-1 was 60.4 % which has a statistically significant difference with group-2 and control group (P=0.001). αSMA expression showed score 2 in group-1 and 2 and score 1 in control group.

Conclusion: It seems like that curcumin is effective in prevention of gingival enlargement resulted from phenytoin in rats by decreasing inflammatory infiltration, decreasing number and cross-sectional area of blood vessels, decreasing epithelium width and decreasing the expression of Ki 67 and α SMA.

Biography

Shahriar Eftekharian is pursuing MDS in the Department of Orthodontics, Dental School, Shahed University of Medical Sciences, Tehran, Iran.

shahriar_lambert@yahoo.com