Histological changes in tongue of rabbits with iron deficiency state

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ABSTRACT

Background: Many oral symptoms can be contributed to iron deficient state. The present study was designed to show the effect of iron deficiency in histological feature of tongue.

Materials and methods: Fifteen rabbits were used, 9 of them were given carrot only for duration of 2 months, they represent experimental group. Six of fifteen of rabbits were given normal food with all nutrient and vitamin supplement, for 2 months duration too, they represent the control group.

Results: The result shows histological changes in tongue including atrophy and depapillation of experimental group.

Conclusion: Iron element is important in epithelization of tongue and to keep tongue healthy.

Keywords: Iron deficiency, tongue. **(J Coll Dentistry 2005; 17(2):53-55)**

INTRODUCTION

Iron deficiency represents a public health recognized throughout the world. It can trigger a wide range of mucocutaneous alteration resulted to a pathological condition. (1)

Many oral symptoms can be contributed to iron deficient state. Patients with iron deficiency complain of sore tongue especially when eating hot or spicy foods. On clinical examination they may not reveal any obvious abnormality although in long standing cases mucosal atrophy is apparent [2], smooth tongue, (3) swelling of the tongue with papillary atrophy and surface ulcerations are also possible in most deficiency states. (4) In severe cases of iron deficiency a carcinogenic states can be reported. (5)

MATERIALS AND METHODS

Fifteen albino male rabbits had been used in this study. Six of them were given normal food as contain all the nutrients and vitamins, they represented the control group. While the other nine rabbits were given only carrot, they represented the experimental group. Serum iron level were estimated at beginning of study (day 0) and after 2 months.

Tongue biopsies were taken from control group and experimental group after 2 months for histological evaluation by using hematoxlin and eosin stain and observed under light microscope. (6)

RESULTS

The present result shows that serum iron level for both control and experimental group at day 0 is within normal range (80–85 μg/dl). After 2 months of the study serum iron level for control group shows to be within its normal range (75–80 μg/dl). While serum iron level of experimental group shows to be low, range (45–50 μg/dl), which represents an iron deficient state. Histological features of the tongue of control group rabbits show normal papillae, filiform and fungiform (fig 1 and 2). The papillae are covered with keratinized epithelium (fig 3). Histological features of the tongue of experimental group of rabbits (rabbits with iron deficiency) show depapillated tongue, smooth and atrophy of filiform and fungiform papillae (fig 4 and 5). Fig. 6 shows high magnification of papillae of experimental rabbit. The papillae lack keratinization and with laceration of the epithelium.

DISCUSSION

The normal histological feature of the tongue shows numerous fine pointed cone shaped papillae named as filiform papillae while other form as a mushroom – shaped, round papillae called fungiform papillae. These papillae are keratinized epithelium structures containing a core of a connective tissue. The connective tissue contains blood vessels which gives nourishment to epithelia cell. (6)

In the present study, nutritional iron deficiency caused decrease in production of normal red blood cells which led to decrease in

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nourishment to epithelium through connective tissue and at same time it will reduce oxygen supply that affect the metabolic activity of the epithelial cell, these changes caused atrophy to the papillae.

This finding agrees with the findings of Cawson, [7] Huber et. al., [4] Enwald et. al. [8] and Moher et. al. [9] who reported atrophy in the tongue due to iron deficiency state. Reduction in tissue oxygen supply will made the tissue liable to infection and that explains the presence of laceration in the tongue. This result coincides with results of William et. al. [10]

REFERENCES

1- Sato S. Iron deficiency: Structural and microchemical changes in hair, nails and skin. Semin Dermatol 1991; 10 (4): 313-9.

2- Lamey PJ, Lewis MAO. The tongue: infection and mucosal atrophy. Dental update 1985; 12 (7): 429-436.

3- Geerlings SE, Statius V EPS. Sever deglutition disorders and iron deficiency, Plummer Vinson syndrome. Ned Tijdschr Geneeskd 1991; 135(45): 2136-7.

4- Huber MA, Hall EH. Glossodynia in patients with nutritional deficiencies. Ear nose throat J 1989; 68(10): 771-5.

5- Maresky LS, de Waal J, Pretorius S, Van Zyle AW, Wolfardt P. Epidemiology of oral precancer and cancer J Dent Ass Suppl 1989;1: 18 – 20.

6- Tencate's A, Nanci, A. Text book of oral histology, development, structure. Sixth edition. Mosby, St. Louis, Missouri 2003;p: 65-70.

7- Cawson RA. Systemic diseases in relation to dentistry, essentials of dental surgery. Oral pathology J 1987; 30: 393- 412.

8- Enwald CV, Drinka PJ, Swortz C, Langer EH, Vorks Sk. Iron status in atrophic glossitis: a pilot study. Wis Med J 1993;92 (10): 570 – 3.

9- Maher R, Aga P, Johnson NW, Sankaranrayanan R, Warnakulasuriya S. Evaluation of multiple micronutrient supplementation in the management of oral submucous fibrosis. Nutr Cancer 1997;27 (1): 41-7.

10- William G, Shafer, Maynard K, Hine and Barnet M. Levy. Diseases of the blood and blood forming organs. A text book of oral pathology. 4th ed. WB Saunders Com. 1983;719-59.

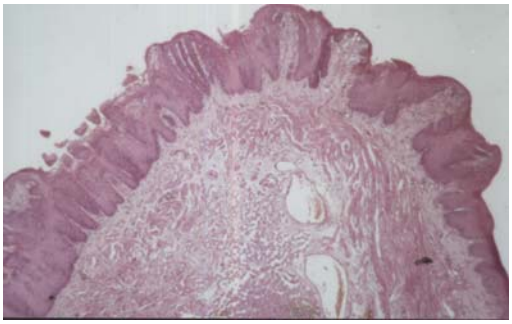

Figure 1: Normal histological feature of rabbit tongue showing filiform and fungiform papillae (H and E X40).

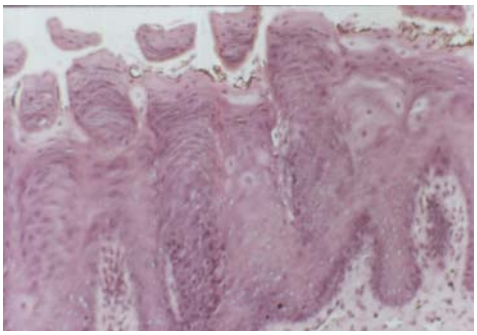

Figure 2: High magnification of papillae of normal tongue (H and E X100)

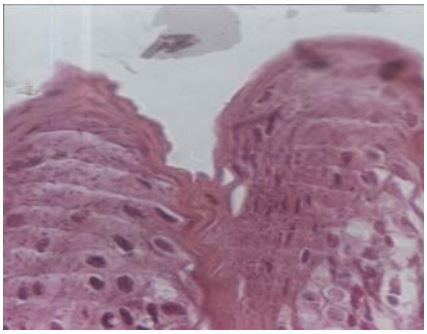

Figure 3: Filiform papillae of normal tongue coverd with keratinized epithelium (H and E)X400).

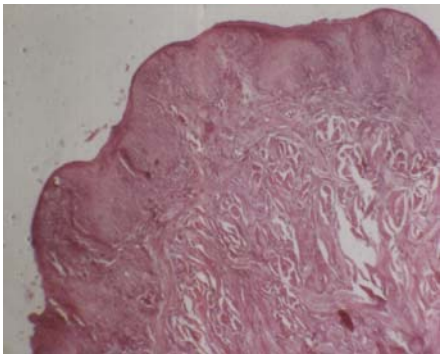

Figure 4: Depapillated tongue of rabbit with iron deficiency anemia (H and E X40)

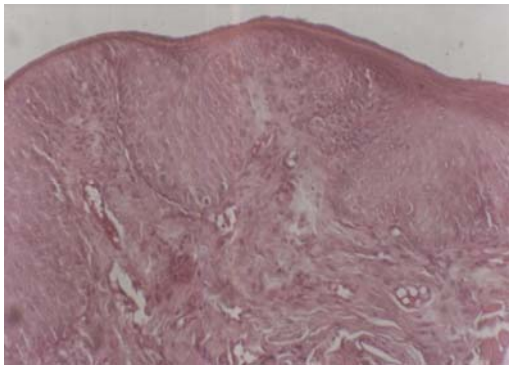

Figure 5: High magnification of fig.4 (H and E X100)

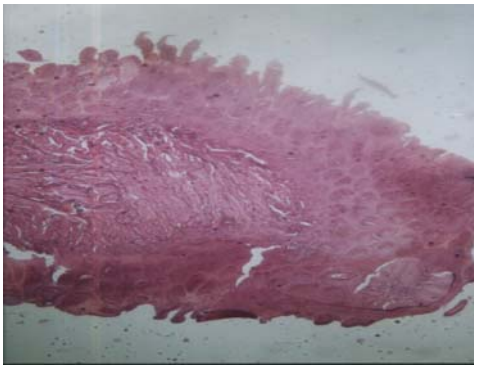

Figure 6: Papillae of experimental rabbit (iron deficiency anemia)shows lack of keratinization with laceration In the epithelium (H and E X400).