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Cytomorphological Analysis of Burning Mouth Syndrome among Individuals with Hypochromic Anemia.

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ABSTRACT

The insufficient data for the associations between hypochromic anemia as an etiological factor and pathogenetic events responsible for the clinical manifestation of burning mouth syndrome was the greatest motivation for us to show the biochemical events found in the oral mucosa due to iron deficiency, through cytological analysis of the tongue epithelium (keratinisation, parakeratosis, degenerated epithelial cells, acanthosis and mitotic activity). Cytomorphological analysis was done in 30 patients with burning mouth syndrome and hypochromic anemia in the experimental group. For comparation of the results, the same analysis was done in 30 patients of the control group, as well, with burning mouth syndrome, but without hypochromic anemia. The prepared slides were cytomorphologicly analyzed with light (optical) microscope under immersion. Among the patients with hypochromic anemia and burning mouth syndrome, some cylotogical changes in the tongue epithelium were found. Besides impaired keratinisation and presence of degenerated epithelial cells, some reduction in the tongue epithelium thickness, acanthosis and mitotic activity were found, as well. Our point is that these findings are due to reduced oxygenation of the oral mucosa, as a result of impaired biochemical and metabolic processes in the body that appear in hypochromic anemia. On the basis of the results from the cytological analysis, it can be concluded that the iron deficiency-induced hypoxia, which is a reason for number of systemic changes (biochemical, metabolic etc.) is the main reason for subjective and objective changes in the oral cavity in patients with burning mouth syndrome and hypochromic anemia to appear, as well.

Keywords: burning mouth syndrome, tongue epithelium, cytological analysis, hypochromic anemia.

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INTRODUCTION

The syndrome of oral dynias and pyrosis is one of the most common symptoms in the oral pathology [1]. The symptoms of this syndrome can be manifested either only as subjective disturbances, or to be associated with objective clinical changes demonstrated with atrophic changes of the tongue epithelium [2]. By its genesis, burning mouth syndrome is not a disease on its own, but a complex clinical symptom that hides other pathological entities [3 – 5]. One of the most common identified etiological factors responsible for clinical manifestation of the oral pyrosis as a symptom is hypochromic (iron-deficient) anemia [6 – 9].

Some of the studies that analyze the problem of glossodynia and burning mouth syndrome show that in their basis there are cytological changes. In their cytological analysis of the oral epithelium done in 20 patients with oral burning and sore symptoms, Orlov S. et al. [10] have concluded that the higher sensitive sensibility of the oral epithelium in these patients is due to disruption in the cell's keratinisation and increased number of epithelium cells.

In another study that has covered cytological analysis of the oral epithelium in 12 patients with burning mouth syndrome with general genesis, treated with vitamins (Vit. B1, B2, B6 and B12), Obradovik B. and Cekik A. [11] have concluded that exfoliative and cytological findings in all species after the treatment were changed. Increased number of cells with nucleuses in the oral mucosa structure was found. Therefore, hyperkeratosis turns in hyperorthoparakeratosis, with improvement in the subjective oral symptoms at the same time.

However, the scientific medical explanations for the associations between hypochromic anemia as an etiological factor and the pathogenetical mechanisms responsible for clinical manifestation of the burning mouth syndrome are still not fully elucidated. Therefore, further researches that will contribute in resolving this problem are needed [12 – 13].

Aim

The aim of this study is the possible biochemical events found in the oral mucosa due to iron deficiency in patients with burning mouth syndrome and hypochromic anemia, through cytological analysis of the tongue epithelium to be demonstrated.

MATERIAL AND METHOD

The cytological examination covered cytomorphologial analysis of the tongue epithelium, whereupon several findings were noted:

- Acanthosis
- Level of keratinisation
- Intensity of parakeratosis
- Intensity of mitotic activity
- Presence of degenerated epithelial cells

Cytomorphological analysis was done in 30 patients with burning mouth syndrome and hypochromic anemia in the experimental group. For comparation of the results, the same analysis was done in 30 patients of the control group, as well, with burning mouth syndrome, but without hypochromic anemia.

The cytological examination was done by taking specimens with flat plastic filling instrument from the tongue sites where the symptoms were most intensive. The specimens were immediately fixed with 96% ethanol (in no longer than 15 minutes), then stained with Papanicolaou. For the needs of Papanicolaou stain, solution of five reagents was used, in which three were different by concentration of eosin, Bismarck brown color and jade green color.

The prepared slides were cytomorphologicly analyzed with light (optical) microscope under immersion.

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The results from the cytological analysis for each parameter were noted in this manner:

- No change
+ Mildly positive
++ Moderately positive
+++ Severely positive

The evaluation of the results from the cytological analysis was done by percentage counting, with the results showen graphically, with original pictures.

RESULTS AND DISCUSSION

Table 1: Table description of cytomorphological findings in the tongue epithelium in the control and experimental group.

	Control group				Experimental group			
	P	Mp	Mop	Sp	P	Mp	Mop	Sp
	%				%			
hyperkeratosis	100.0	30.0	40.0	30.0	100.0	0.0	60.0	40.0
parakeratosis	100.0	80.0	20.0	0.0	90.0	55.5	33.3	0.0
degenerated epithelial cells	70.0	71.4	28.5	0.0	70.0	71.4	28.5	0.0
acanthosis	20.0	33.3	66.6	0.0	80.0	71.4	28.5	0.0
mitotic activity	30.0	100.0	0.0	0.0	60.0	100.0	0.0	0.0

P- Positive findings
Mp-Midly positive
MoP- Moderately positive
Sp- Severely positive

In the table 1, the percentage of hyperkeratosis, parakeratosis, degenerated epithelial cells, acanthosis and mitotic activity in the patients from the control and examination groups is shown.

The results show that there is high percentage of hyperkeratosis and parakeratosis (90%-100%) in both groups.

The control group showed up with nearly equal intensity levels of hyperkerathosis: mildly positive (30%), moderately positive (40%) and severely positive (30%). Experimental group showed up only with moderately and severely positive findings of the level of hyperkeratosis, with 60% and 40%, respectively.

The presence of parakeratosis in patients from the control group was mostly mildly positive (80%), with only 20% of moderately positive finding. In 55,5% of the patients in the experimental group mildly positive result of parakeratosis was found, whereas 33,3% showed up with moderately positive result.

The presence of degenerated epithelial cells was noted equally in both of the groups (70%). In most of patients it was mildly positive (71,4%), followed with moderately positive finding of 28,5%.

Acanthosis in the control group was found in 20% of the patients, whereas the presence of this parameter in the experimental group was found in 70%. Moderately positive finding was dominantly detected (66,6%), followed with mildly positive finding of 33,3%.

Presence of mildly positive finding of increased mitotic activity of the epithelial cells was found in 60% of the patients in the experimental group. These changes were present in 30% of the patients in the control group.

Results showed in this table indicate that there are not significant differences in the final finding of hyperkeratosis, parakeratosis and degenerated epithelial cells between the groups.

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Significant differences in the results between control and experimental group about the presence of acanthosis and mitotic activity were found.

Next figures show the findings from the cytological analysis.

Figure 1: Cytological changes in the tongue epithelium: (a) hyperkeratotic cells; (b) parakeratotic cells

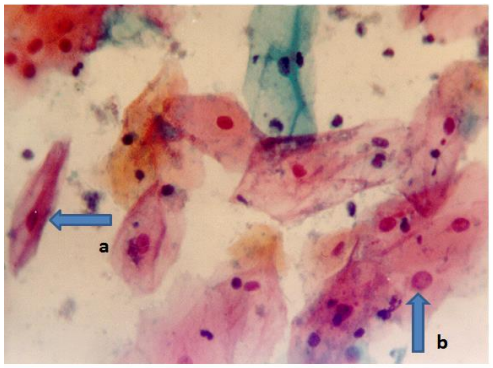
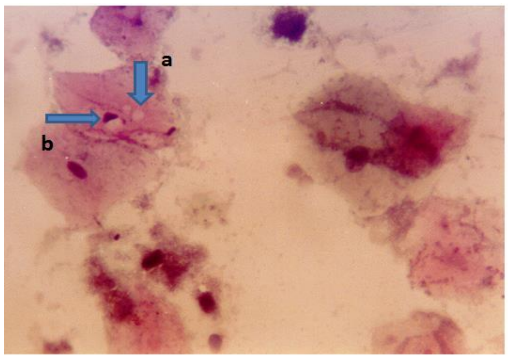


Figure 1 shows the cytological finding of hyperkeratotic and parakeratotic epithelial cells in patients from the control group. These cells in high percentage were found in both groups. The cytoplasm in these cells contains keratin, but all its structures are kept.

Figure 2: Degeneration process in a tongue epithelial cell: (a) vacuole degeneration; (b) karyolysis.



Fugure 2 shows epithelial cell in degenerative process. The presence of vacuoles in the cytoplasm and a nucleus found in phase of decomposition (karyolysis) indicate degenerative changes in the cell. This is a finding from a patient from the experimental group, but such cells were found in patients from the control group, as well.

Figure 3: Degenerated tongue epithelial cell.

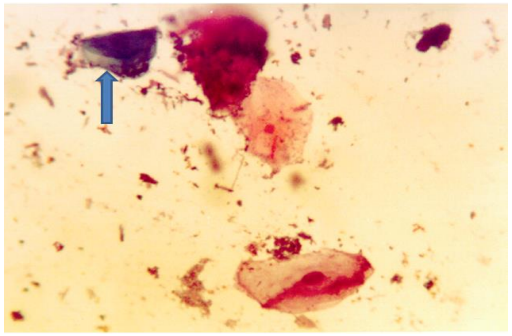


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Figure 3 shows fully degenerated epithelial cell with no structure. This was found in a patient from the experimental group, but such cells were present in both groups.

Figure 4: Acanthotic cells in the tongue epithelium. The interrupted ratio nucleus : cytoplasm is clearly noted, with reduction in the cell layers.

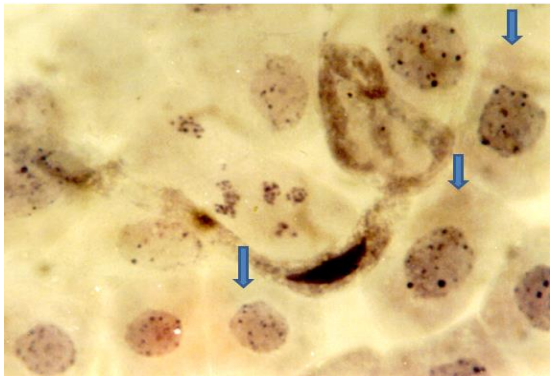

Figure 4 shows the presence of acanthotic epithelial cells which were found in great number in the tongue epithelium in the patients from the experimental group. The ratio nucleus : cytoplasm is interrupted. Some level of reduction in the cell layers can be noted as well, which indicates atrophic changes in the tongue epithelium in these patients.

Figure 5: Epithelial cell in preparation for mitotic division.

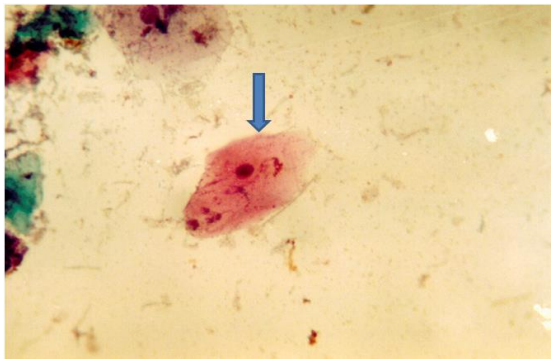

Figure 5 shows epithelial cell with two nucleuses, which indicates its preparation for mitotic division. Such cells were found in higher number in the patients from the experimental group. This finding indicates increased mitotic activity of the tongue epithelial cells in these patients.

Cytology as a science marks a significant elation which is very important in uncovering the regularities in the functioning of the whole organic world which is a base for creation, growth and structure of living organisms, their cells, tissues and organs.

The results of our cytological anysis indicate some differences in the thickness of the epithelium between the control and experimental group, which is in accordance with the findings of number of authors [14 – 17]. Such results indicate atrophic changes in the epithelium.

Results of the cytological analysis showed significant presence of hyperkeratosis and parakeratosis in the tongue epithelium in the patients from both experimental and control group, which indicates impaired keratinisation which according to us is another reason for higher sensitive sensibility in the patients with burning mouth syndrome.

The increased number of degenerated tongue epithelial cells in our patients is connected with their age and sex. Most of the patients from the control and experimental group were females in menopause. The

increased number of degenerated epithelial cells in women in menopause is an addition to the explanation why the oral symptoms in these patients were more intense.

Acanthosis is a term that explains the increased hyperplasia or hypertrophy of the epithelial cells in the spinous layer and it is thought that it represents a reactive response to the reduced oxygenation. The presence of mildly and moderately positive findings of acanthosis in patients from the experimental group indicates deficit or lack of oxygen in the oral mucosa.

According to us, the increased mitotic activity in the patients from the experimental group is a successive expression due to reduction or decreasing in the thickness of the tongue epithelium, as a result of presence of control mechanism in the manner of negative feedback.

CONCLUSION

After the analysis of the results from the cytological analysis in the patients from the control and experimental groups, we conclude that:

- In patients with hypochromic anemia and burning mouth syndrome, cytological changes in the tongue epithelium (impaired keratinisation, presence of degenerated epithelium cells, reduction of the epithelium, acanthosis and mitotic activity) are present.
- According to us, this finding is associated with impaired oxygenation in the oral mucosa due to biochemical and metabolic processes in the body, as a result of the presence of hypochromic anemia.

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