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Assessment of the Hormonal Background of Saliva and Blood in Patients with an Inflammatory-Destructive Process in the Periodontium Against the Background of Hepatitis C

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ABSTRACT

The aim of this study was to elucidate the role of the hormonal background of the oral fluid and blood in patients with pathological conditions in periodontal tissues against the background of hepatitis C. 62 patients aged 26 to 40 years with a diagnosis of hepatitis C were examined. Using the enzyme immunoassay method, the content of blood sex hormones and mixed saliva. There was a decrease in the concentration of testosterone by 35%, estradiol - by 32% and progesterone by 2.5 times in the blood relative to the indicators of the control groups. In the mixed saliva of the examined, a decrease in the content of testosterone by 44%, estradiol - by 59% and progesterone - by 52% was revealed.

Keywords: *periodontitis, sex hormones of blood and saliva.*

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INTRODUCTION

Numerous recent studies indicate that chronic liver diseases associated with hepatotropic viruses are a serious socio-economic and clinical and epidemiological health problem in all countries of the world [1,3,8,10,13,15]. The reason for this is the widespread prevalence of liver pathology (from 3 to 15 per 1,000 examined), the steady increase in morbidity, disability and mortality, which determine the relevance of this problem [1,4,7,9,10,11,20].

It should be noted that changes in the oral mucosa, periodontal tissues in acute and chronic infectious liver lesions, in particular in viral hepatitis, have attracted the attention of many researchers [3,5,6,13,14,17,18]. It is known that the receptors of the oral mucosa are a powerful source of reflexes that affect the secretory activity of the salivary glands. In diseases of the liver in the oral cavity, changes are noted that are manifested by dryness of the mucous membrane, often its swelling, foci of diffuse hyperemia in the region of the vestibular surface of the lips. Vascular disorders are also noted - multiple telangiectasias, bleeding gums, hemorrhages [7,8,11,12,13,19].

Recently, the nature of chronic generalized periodontitis, which involves the main links in the regulation of homeostasis (hormones - growth factors - cytokines - signaling molecules - the metabolic pool of cell membranes), allows us to consider it as a local manifestation of a generalized metabolic disease of functional cellular homeostasis, and the regulator plays an important role in this process. metabolic processes - hormones, the significance of which in the etiopathogenesis of CFH is practically not studied [1,7,8,9.14,17,19,20]. It should be noted that receptors were found in periodontal tissues not only for parathyroid hormone and calcitonin, but also for all sex hormones. Summing up, we can point out that the systemic imbalance of the endocrine system can play an important role in the development of periodontal diseases [5,6,7,8,9,11,19,20].

However, information regarding periodontal changes is scarce, sometimes contradictory. In the literature available to us, we did not find a description of a separate study of the state of the oral mucosa and periodontal disease in viral hepatitis C. It is natural that another important aspect of the problem remains out of sight - the development of recommendations for the provision of specialized dental therapy to this group of patients [1,3,6,9,11.13,18].

Thus, the increase in morbidity, the increase in government spending on their treatment, the high degree of disability and mortality of patients determine the relevance of this problem, its medical, social and economic significance.

The aim of this study was to elucidate the role of the hormonal background of oral fluid and blood in patients with pathological conditions in periodontal tissues against the background of hepatitis C.

MATERIAL AND RESEARCH METHODS

62 patients aged 26 to 40 years with a diagnosis of viral hepatitis C were examined (main group). The control group consisted of 18 healthy individuals. The average age of which was 30.8±1.71 years.

Criteria for exclusion from the study: the presence of severe somatic pathology, diabetes mellitus, kidney disease and others, in the stage of decompensation, immunodeficiency states, acute infectious diseases, oncology, pregnancy, lactation, postmenopause, alcohol and drug addiction, smoking, refusal to participate in the study.

In the process of work, all patients were determined the content of the following hormones in the blood serum and oral fluid. Unstimulated mixed saliva of 5 ml was collected by spitting into a sterile test tube in the morning on an empty stomach before brushing your teeth.

The content of testosterone, estradiol, prolactin and progesterone was studied. An analysis of hematological parameters of blood and biochemical blood tests were also carried out.

The level of the above hormones was assessed by enzyme immunoassay using the MINDRAY equipment in the clinical diagnostic laboratory of the TSDI. Blood sampling for hormone levels was carried out in the morning, on an empty stomach from the cubital vein.

Statistical studies were performed using the Statistica program. Data are presented as arithmetic means and mean error (M±m). Significance of differences in mean values was assessed by Student's t-test. The critical level of significance "p" when testing statistical hypotheses was taken equal to 0.05.

RESEARCH RESULTS AND DISCUSSION

The analysis of literature sources showed that sex hormones play a key role in the progression of periodontal diseases and the healing of its wounds, since hormones are specific regulatory molecules that determine the reproduction, growth and development of the body, maintaining its internal environment, as well as the production, use and storage energy. Recently, target receptors for the action of a number of hormones, such as androgens, estrogens, and progesterone, have been found in periodontal tissues. It was also found that hormones such as estrogen, progesterone and testosterone are most associated with the pathogenesis of periodontal disease [3,4,5,9,10,12].

Despite a fairly large number of studies devoted to the study of the hormonal status in dental diseases, some of the mechanisms of the effect of sex hormones on the course of periodontal disease remain to be elucidated.

TABLE 1: Indicators of the hormonal blood profile in patients with hepatitis C in the compared groups

Name of indicator	Groups	
	Main group (n=62)	Control group (n=18)
Testosterone, nmol/l	1,78±0,12*	2,74 ±0,19
Prolactin, honey/l	479,62±22,15*	321,25±18,42
Estradiol, nmol/l	117,68±9,78	172,93±9,24
Progesterone, nmol/l	7,41±0,58*	18,28±1,13

Note: * - indicator of reliability of data differences in the compared groups

As can be seen from the results of the studies, presented in Table 1, the content of sex hormones in the blood of patients with hepatitis C had a peculiar dynamics relative to the indicators of the control groups. Thus, a decrease in the concentration of testosterone by 35%, estradiol - by 32% and progesterone by 2.5 times in the blood relative to the parameters of the comparison groups was revealed.

On the contrary, the content of prolactin in the blood of the examined patients with hepatitis C increased by 49% relative to the indicators of the control groups. One of the complications of hyperprolactinemia is osteopenia (secondary osteoporosis). In addition, an increased level of prolactin suppresses the hypothalamic-pituitary-gonadal system, as a result of which the secretion of sex steroids decreases, which we observe in our studies.

Research by T.P. Vavilova (2014) showed that saliva contains a certain level and set of hormones, but the rate and possibility of their entry from blood plasma into the secretion of the salivary glands is regulated by their cells [3,4,5].

Free steroid hormones from the blood plasma enter the cells of the salivary glands, and then into the salivary duct by diffusion along the concentration gradient. At the same time, the content of steroid hormones in saliva differs from their content. In addition, the advantage of performing hormonal analysis in saliva is the painless collection of samples. High or low levels of gonadal hormones may be one of the reasons for functional and morphological changes in the hypothalamic-pituitary system, which affects the state of periodontal tissues.

TABLE 2: Indicators of the hormonal profile of mixed saliva in patients with hepatitis C in the compared groups

Name of indicator	Groups	
	Main group (n=62)	Control group (n=18)
Testosterone, pg/ml	0,14±0,02*	0,25±0,02
Estradiol, pg/ml	12,28± 0,21*	20,94±1,86
Progesterone, pg/ml	0,13±0,05*	0,27±0,01

Note: * - indicator of reliability of data differences in the compared groups

At the same time, primary disturbances in the function of this system affect the activity of the endocrine glands and can be the cause of the formation of a pathological process in periodontal tissues, the development of hormone-dependent periodontitis. Studies have shown that in periodontal tissues there are receptors not only for parathyroid hormone and calcitonin, but also for all sex hormones. This indicates an important role in the development of periodontal disease systemic imbalance of sex hormones.

As can be seen from the presented research results (table 2), the testosterone content in the mixed saliva of patients with hepatitis C was 44% lower than the initial values. Considering that specific testosterone receptors were found in the periodontal tissue and the number of receptors is closely related to the hormone level, the observed dynamics of the hormone in the mixed saliva of patients with hepatitis C may affect the functional state of the periodontium. Low testosterone levels can activate bone destruction associated with osteoclast activity.

Recently, the presence of specific estrogen receptors in osteoblast-like cells has been proven, through which a direct effect on the soft tissues of the periodontium is carried out, which is carried out through receptors located in the periosteal fibroblasts and fibroblasts of the lamina propria and periodontal ligament.

At the same time, estrogens affect the differentiation of cells of the stratified squamous epithelium, as well as the synthesis and formation of collagen. Analysis of the results presented in table 2 indicate a decrease in the level of estradiol in the mixed saliva of patients with hepatitis C by 59% relative to the control group. As is known, low levels of estradiol indicate not only increased bone resorption under the action of parathyroid hormone, but also the activation of pro-inflammatory cytokines due to an increase in prostaglandin E, swelling and vacuolization of mitochondria in vascular endothelial cells, which leads to platelet adhesion.

Progesterone receptors were also found in the soft tissues of the gums, which indicates that they function as a target organ. At the same time, progesterone affects the production of tumor necrosis factor alpha, angiogenetic factors and endothelial growth factors. The low level of progesterone observed by us in the mixed saliva of CFH patients by 52% is apparently one of the reasons for the activation of osteoblast receptors for glucocorticoids, stimulation of the production of prostaglandins (PGE2), inhibition of the process of osteoclast apoptosis and activation of the osteoporosis process. In this case, not only the loss of bone mass occurs, but also the activation of inflammation in the periodontal tissue. Thus, the study of hormonal levels in the blood and mixed saliva is a promising area of predictive medicine in patients with hepatitis C.

CONCLUSION

1. In patients with hepatitis C, there was a decrease in the concentration of testosterone by 35%, estradiol by 32% and progesterone by 2.5 times in the blood relative to the control group.

2. In the mixed saliva of the examined, a decrease in the content of testosterone by 44%, estradiol - by 59% and progesterone - by 52% was revealed.

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