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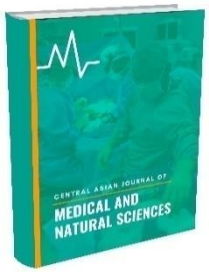

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Literature Review of the Effectiveness of Treatment and Prevention of Generalized Periodontitis in Women in the Menopausal Period

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Abstract: Menopause is a physiological process that occurs in a woman's life, the result of irreversible changes in the hormonal functions of the ovaries. During the reproductive period of a woman's life, estrogens have a controlling effect on various organs and tissues through interaction with their binding sites - estrogen receptors [Suri V., Suri V., 2014]. In addition to the uterus and mammary glands, these receptors are located in the urethra, vagina, brain, heart cells, mucous membrane of the oral cavity, larynx, periodontal tissues and other places [Leimola-Virtanen R, 2000; Lopez V.S. et al., 2011]. Pathological changes can occur in any of the listed organs, including the periodontium, against the background of estrogen deficiency during menopause.

Key words: physiological process, periodontal tissues, estrogen receptors.

Introduction

Estrogens have a direct or neuroendocrine effect on the oral mucosa, changing the condition of the gums in menopausal women [Sao M, et al., 2007]. As a result of the violation of the controlling effect of estrogens on the salivary glands, the secretion of saliva decreases, which creates conditions for the development of caries, dysesthesia, change in taste, mouth opening syndrome, atrophic gingivitis, periodontitis [Sashkina T.I. et al., 2001; Oreshaka O.V. et al., 2003; shcherbakov I.V. et al., 2014].

According to the results of a number of statistics, 45-60% of postmenopausal women have obvious disorders of the periodontium, including its bone tissue [Varshavsky B.Ya. et al., 2003; Portillo G.M., 2002; Baelum V., Lopez R., 2013]. At this stage of the development of clinical dentistry, the diagnosis of periodontal pathology does not cause special difficulties. At the same time, determining the nature of its clinical course, predicting the development of the disease, determining its correlation with the general condition of the patient, studying the ratio of changes in the dental-alveolar complex and the entire bone system requires a thorough analysis.

Chronic periodontitis is a multifactorial disease, in its formation, microbial caries, oral cavity factor that creates conditions for the formation of tooth rash and affects the virulence of microflora; and systemic factors determining periodontal homeostasis are important [Tebloeva L.M. Gurevich K.G.,

2014; Michikawa M., 2014]. It is recognized that the state of stagnation between bacterial aggression and the resistance of tissues in the oral cavity and the whole body determines the development and progression of periodontal lesions [Kulakov A.A. et al., 2010].

Main part

Microbial tooth decay and its metabolic products are important factors in periodontal tissue damage [Zorina O.A. et al., 2011]. Dental plaque consists of microbial cells of various taxonomic groups, but only some of them are important in the etiology of periodontitis. The main parodontopathogens are facultative anaerobic Actinobacillus actinomycetemcomitans, obligate anaerobic group Bacteroides - Prevotella species, Porphyromonas species, as well as gram-positive Peptostreptococcus, Streptococcus [Zorina O.A. et al., 2011; Lovegrove J.M., 2004].

The importance of anaerobic microorganisms in the formation of inflammatory diseases of the periodontium is confirmed by the results of cultural and molecular-genetic research on the composition of the bacterial pocket, which show that the severity of periodontitis increases in accordance with the degree of colonization with spirochetes, Prevotella and Porphyromonas bacteria and the frequency of their detection [Kosenko K.N . et al., 2000; Grudyanov A.I. et al., 2014; Leder R.G. et al., 2007].

In the development of chronic periodontitis, factors that ensure the retention of tooth rash, in addition to the infectious agent of pathogenesis, are involved. Among them: hereditary determination, peculiarities of the metabolism of connective tissue components, anomalies in the state of teeth; nature of food, composition and properties of saliva, disorders of IgA secretion, injuries, disorders in the structure of soft tissues in the oral cavity [Tebloeva L.M. Gurevich K.G., 2014].

Currently, it is generally accepted that systemic hormone replacement therapy using combined preparations with both natural estrogens and progestins (progesterone) is considered a suitable method for the prevention and treatment of tissue homeostasis disorders occurring in postmenopausal women, which, according to numerous data, is effective on the cardiovascular system and tissue, primarily in the prevention of similar disorders in certain parts of lipid metabolism [Lünenfeld B., 2014]. In a large study of 42,171 postmenopausal women in the USA, it was found that those who received hormone replacement therapy had 24% less tooth loss [Grodstein et al., 1998]. R. Meisel et al. (2008)]. When comparing the dental status of men and women, it was found that the number of teeth was higher in women receiving hormone replacement therapy than in men of the same age group.

A number of studies have shown that the use of estrogen replacement therapy in women with natural and surgical menopause reduces the production of inflammatory cytokines of the type ILe-Sh, IL-6 and TNFα by blood mononuclear cells, as well as lipid mediators of inflammation [Leimola-Virtanen R. et al., 2000; Tarkkila L; et al., 2010].

Changes in the microcirculation system are also an important factor in the development of periodontal diseases during postmenopause [Scardina GA, Messina R., 2012]. Dispersion of the microvascular lodge, on the one hand, can cause chronic hypoxia in periodontal tissues, disturbances in their nutrition, which leads to the destruction of tissue structures in periodontal diseases. On the other hand, microvessels, especially their endothelial walls, are considered a barrier that protects tissues from excessive damage in inflammation, ischemia, etc. Disruption of this barrier in microcirculatory disorders can cause a high reaction of the defense systems and cause them to change into one of the pathomechanisms of periodontal diseases [Rudneva E.V. et al., 2005].

Traditionally, periodontal diseases are associated with systemic processes in the body. There are a number of diseases that are absolutely associated with periodontal damage; diabetes, arterial

hypertension, ischemic heart disease, chronic diseases of the gastrointestinal tract, these are often observed in postmenopausal women [Kuznetsova N.L. et al., 2009; Arutyunov S.D. et al., 2011].

Thus, by analyzing the data in the literature, it can be concluded that a large number of etiopathological factors leading to the development of periodontal diseases in postmenopausal women to one degree or another are identified. The lack of female sex hormones is important in the formation of these factors. During this period, precisely due to the lack of sex hormones, immunological, hemostasiological, endocrine, metabolic and other changes are observed in the female body, which are an organizational part of the etiopathogenesis of periodontal diseases.

In the literature, the question of the relationship between osteoporosis and periodontal diseases is the cause of active discussions. There are suggestions that osteoporosis can be a risk factor for the acceleration of periodontitis [Mukhamedjanova L.R., 2005; Jeffcoat M.K. et al., 2000; Tezal M. et al., 2000; Bertulucci A. et al., 2012]. On the contrary, other researchers did not find a correlation between systemic osteoporosis and periodontal bone tissue condition [Shrout M.K. et al., 2000; Darcey J. et al., 2013]. Osteoporosis is a systemic disease of the skeleton, which is characterized by a decrease in the density of bone tissue and a violation of its microarchitecture, and is observed by the fragility of bones and an increased risk of their fracture [Rojinskaya L.Ya., 2000; Kanis J.A. et al., 2013; Kondo T. et al., 2014]. Osteopenia is a condition characterized by a decrease in bone mineral density and bone tissue mass. Thanks to modern diagnostic methods that allow quantitative assessment of bone mass in different parts of the skeleton, it is possible to distinguish between the concepts of "osteopenia" and "osteoporosis" [Kanis J.A. et al., 2013].

According to modern concepts, osteoporosis is a heterogeneous group of conditions with different causes and pathogenetic mechanisms that are often related to each other. According to the classification, primary and secondary osteoporosis are distinguished. The term "primary" is usually applied to patients whose cause of osteoporosis is menopause or aging. The term "secondary" is applied to patients with osteoporosis caused by various diseases, factors or types of drug therapy that lead to a decrease in bone mass [Volojin A.I. Oganov V.S., 2005; Lane NE, 2006].

Primary osteoporosis is the most common systemic pathology in bone tissue [Benevolenskaya L.I., 2003; Kondo T. et al., 2014].

Bone is a dynamic organ capable of rapid regeneration, maintaining body mass, and resisting the effects of various physical loads. It is constantly formed (restored) and restructured (remodeled). The phenomenon of remodeling determines the adaptation of bone mechanical properties to the constantly changing conditions of the environment [Frost N.M., 2000]. Growth and renewal of the skeleton is observed by the regeneration of microdamages and the support of the transfer of minerals into the blood and vice versa. The ratio between the resorption of bone tissue and the formation of a new one is controlled by a number of hormonal factors involved in calcium homeostasis: parathyroid hormone, calcitonin, metabolites of vitamin D, as well as sex and thyroid hormones, glucocorticoids, growth hormone and insulin, postaglandins, and compatible local effects of cytokines [Endo I., Matsumoto T., 2009; Nakashima T., 2013; Kondo T. et al., 2014].

The process of bone remodeling occurs due to the interaction of two cell lines - osteoblasts and osteoclasts and includes a series of successive stages: activation, resorption, reversion, formation, relaxation. Remodeling of bone tissue is carried out in accordance with the loads acting on the bone. About 4-10% of the total bone mass is renewed every year. It is accepted to consider the remodeling of dense and porous bone in terms of the functioning of the Basic Multicellular Unit (BMU) or Bone Remodeling Unit (BRU).

This term was coined by N.M. Frost (1990) introduced it to science to define the interaction of osteoblasts, osteoclasts and their precursors in the process of bone remodeling. The basic multicellular

unit is formed by osteoclasts, osteoblasts, active mesenchymal cells and capillary rings. About a million units have been identified that are active in the human skeleton at any given time. They are much greater in trabecular bone, where the ratio of surface area to tissue volume is significantly higher than in dense bone. Therefore, in osteoporosis, the disruption of remodeling processes is more pronounced in cancellous bone than in cortical bone [Frost N.M., 2000].

According to modern ideas, the highest level of osteoclast activity is caused by a system disorder that produces osteoprotegerin (OPG), RANK (Receptor Activator of NF-kB), which expresses the surface receptors of osteoblasts. RANKL is considered the main factor that activates osteoclasts. The RANK osteoclast receptor expresses the receptor activator of the nuclear factor RANKL, the activation of which after binding to RANKL stimulates the resorptive activity of these cells. OPG, by binding RANKL, prevents its activating effect of osteoclasts on RANK, which reduces both osteoclastogenesis and osteoclast activity [Boyce B.F., Xing L., 2007].

The RANKL-RANK-OPG system is central to the interaction of bone cells, in particular, to the control of the resorptive function of osteoclasts. This system is the most important link in the local paracrine mechanism of controlling the work of bone tissue cells and can be a molecular mediator for other mediators of bone remodeling [Sagalovski S. et al., 2012; Boyce V.F., Xing L., 2008; Walsh MS, Choi Y., 2014]. Established risk factors for osteoporosis include old age, female sex, low body mass index, anorexia, smoking, insufficient intake of calcium and vitamin D, taking medications, glucocorticoids, and anticonvulsants [Akimova D.V., 2014; Lane NE, 2006].

The triggering condition in the pathogenesis of postmenopausal osteoporosis is estrogen deficiency, as a result of which the production of bone resorbing factors is activated and the production of bone-forming agents is reduced. When estrogens are in sufficient quantity, they affect osteoblasts by local production of growth factor (insulin-like growth factor 1, osteoprotegerin, transforming growth factor P) and the reduction of interleukin-1 and RANKL-ligand nuclear receptor activator of κ-P-factor formation. [Ermakova I.P. et al., 2008; Imai Y., 2014].

Observed in menopause, in conditions of deficiency of sex steroids, the processes of bone resorption begin to prevail over the processes of bone tissue remodeling, which leads to the development of osteopenia and osteoporosis [Smetnik V.P., Smetnik A.A., 2013]. In addition, in the genesis of postmenopausal osteoporosis, a decrease in calcium absorption in the intestine and a secondary conditioned deficiency of vitamin D may be important [Dedov I.I. et al., 2002].

Osteoporosis goes without symptoms for a long time. The disease is manifested by fractures or sudden injuries that occur with minimal trauma. Osteoporosis is characterized by fractures of the thoracic and lumbar spine, the distal part of the wrist and the proximal part of the hip [Rao S.K., Rao A.R., 2014]. Changes in the bones also pass to the jawbones, aggravate the destruction of the alveolar part of the cavity and the periodontal connective tissue, and cause tooth loss [Mukhamedjanova L.R., 2005; Gorbunova I.L., Marshalok O.I., 2014; Megson E. et al., 2010; Brunton R., 2013].

A number of clinical observations are devoted to peculiarities in the course and prognosis of periodontal diseases in individuals with general osteoporosis [Tsimbalistov A.V. et al., 2007; Dmitrieva L.A., Atrushkevich V.G., 2009; Martinez-Maesrte M.A. et al., 2010]. Against the background of systemic osteoporosis, it has been shown that inflammatory diseases of the periodontium have a general character and are quite severe [Dmitrieva L.A. et al., 2009; Atrushkevich V.G., 2008; Megson E. et al., 2010; Passos J.S. et al., 2013; Guiglia R. et al., 2013].

Postmenopausal patients form a separate group. Yu.M. Maksimovsky et al. According to (1991), patients with postmenopausal osteoporosis who do not suffer from periodontal disease have a decrease in the height of the interdental wall, osteoporotic foci in the body of the lower jaw, and a decrease in the density of the alveolar barrier.

Summary:Thus, data in the literature indicate a close relationship between periodontal damage and osteoporosis, but to date this issue remains understudied and relevant. The state of bone tissue remodeling plays an important role in the development and exacerbation of periodontitis in postmenopausal women.

Conclusion

There are several pilot studies in the literature using bisphosphonates in periodontitis, suggesting that bisphosphonates may be a useful adjunct in the treatment of periodontitis. The use of osteotropic drugs in the treatment of patients with general periodontal diseases allows to stop the rapid reduction of the alveolar edge and to achieve effective results in stimulating reparative regeneration processes. However, thorough research is needed regarding the drug, the actual delivery system, the effective dose and frequency of administration, and possible side effects.

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