Assessment of Periodontal Tissue Status in Patients with Generalized Periodontitis and Essential Hypertension

T.I. Vivcharenko, M.M. Rozhko

Abstract
Vascular disorders play a significant role in the development of dystrophic inflammatory process. There is a direct correlation between the degree of damage to blood vessels in the jaw and a depth of the destructive process in periodontal tissue. A certain role is played by endogenous factors, such as: age, vitamin deficiency, diabetes mellitus, essential hypertension and others. Clinical and epidemiological studies using pathological techniques showed significant changes in vascular wall of the artery in the periodontium, the interdental artery in particular. Atherosclerosis, essential hypertension and periodontal pathology were proven to occur in individuals older than 40 years.

The objective of the research was to determine periodontal tissue status in patients with stage II hypertension and generalized periodontitis of II degree of severity.

Materials and methods. The study involved 36 patients with stage II hypertension and generalized periodontitis of II degree of severity (the main group). The patients’ age ranged from 35 to 54 years. The control group included 10 patients of corresponding age without generalized periodontitis and somatic pathology. To assess the status of periodontal tissues, we applied the Papillary-Marginal-Attached Index and the Community Periodontal Index of Treatment Needs. When diagnosing periodontal disease, the classification of M.F. Danilevskyi was used.

Results. The analysis of the indicators of the Community Periodontal Index of Treatment Needs index showed the following results: in patients of the main group, the index was 2.38 ± 0.07 points (p < 0.001) pointing out a need for a course of professional oral hygiene. In patients of the control group, the index was 0.5 ± 0.17 points indicating that there was no need for treatment, however, there was a need for improving oral hygiene. The indicators of the Papillary-Marginal-Attached Index in the main group were 55.49 ± 1.96 points pointing out a severe degree of gingivitis.

Conclusions. According to the analysis of the indicators of the Community Periodontal Index of Treatment Needs index (2.38 ± 0.07), the patients of the main group had low hygiene level requiring a course of professional oral hygiene.

Keywords
generalized periodontitis; hypertension; CPITN; PMA

Problem statement and analysis of the recent research
Premature vascular ageing is considered to play a key role in the formation of an unfavorable prognostic profile in patients with arterial hypertension. Vascular ageing is a physiological process when changes which gradually occur in vessels correspond to the person’s age. However, when risk factors are present (smoking, dyslipidemia, hyperglycemia, etc.), structural and functional changes in the arterial wall develop earlier and more rapidly, vascular function becomes abnormal. These premature changes in the structure and function of blood vessels can provoke high blood pressure and complicate its control.

Physiological ageing of blood vessels due to arterial hypertension manifests itself as the same changes at the artery level [5, 8]. The earliest morphological manifestation of vascular ageing is an increase in vascular stiffness due to fragmentation, a reduction in elastin amount and an increase in collagen levels with formation of strong bridges between the fibers.

Vascular disorders play a significant role in the development of dystrophic inflammatory process. A direct correlation between the degree of damage to blood vessels in the jaw and a depth of the destructive process in periodontal tissue was proven. A certain role is played by endogenous factors, such as: age, vitamin deficiency, diabetes mellitus, essential hypertension and others [1, 11]. Clinical and epidemiological studies, using pathological techniques, showed significant changes in vascular wall of the artery in the periodontium, the interdental artery in particular (perivascular sclerosis, vascular thickening, calcination) [2]. This creates optimal conditions for the increase in the degree of pathogenicity of periodontal pocket microflora and enzyme activity changes. Atherosclerosis, essential hypertension and periodontal pathology were
The objective of the research was to determine periodontal tissue status in patients with stage II hypertension and generalized periodontitis of II degree of severity.

1. Materials and methods

The study involved 36 patients with stage II hypertension and generalized periodontitis of II degree of severity (the main group). The patients’ age ranged from 35 to 54 years. The control group included 10 patients of corresponding age without generalized periodontitis and somatic pathology. The diagnosis of periodontal disease was made on the basis of past medical history, dental examination and the data of traditional examination methods. To assess the status of periodontal tissues, we applied the Papillary-Marginal-Attached (PMA) Index and the Community Periodontal Index of Treatment Needs (CPITN) index. When diagnosing periodontal disease, the classification of M.F. Danilevskyi was used.

The obtained results were statistically processed using statistical package Stat Soft 6.0, traditional methods of variation statistics applying averages and the estimation of their statistical significance.

2. Results and discussion

To determine the need for periodontal treatment, the CPITN index is used. To assess the index three factors are considered: bleeding gums, supragingival or subgingival calculus, periodontal pockets. The analysis of the indicators of the CPITN index showed the following results: in patients of the main group, the index was 2.38±0.07 points (p<0.001) pointing out a need for a course of professional oral hygiene. In patients of the control group, the index was 0.5±0.17 points indicating that there was no need for treatment, however, there was a need for improving oral hygiene.

The PMA index is used for assessing gum inflammation. According to the analysis of the indicators of the CPITN index (2.38±0.07), the patients of the main group had low hygiene level requiring a course of professional oral hygiene.

3. Conclusions

According to the analysis of the indicators of the CPITN index (2.38±0.07), the patients of the main group had low hygiene level requiring a course of professional oral hygiene.

References

[1] Dietrich T, Garcia RI. Associations between periodontal diseases and systemic disease: evaluating the strength of the evidence. J. Periodontol. 2005;76:3175-3184. doi: 10.1902/jop.2005.76.11-S.2175

[2] Yarova SP, Mozhova NV. Rol sudynykh zmin u rozvytku i perebihu heneralizovanyho parodontytu. Ukraiinskyi stomatolohichnyi almanakh. 2004;3-4:23-26.

[3] Krenchina EK, Kozlov VI, Maslov VV. Mikrotsirkulyatsiya v tkanyakh desny parodonta. Moscow: GEOTAR-Media; c2007. 80p.

[4] Kuvayev AS, Borysenko AV, Viderskaya AV. Experimental and clinical substantiation of nitric oxide metabolism correction in the complex therapy of patients with generalized periodontitis. Ukrainian Scientific Medical Youth Journal. 2015;91(4):108-112.

[5] Prykhodko VYu, Stadnyuk LA, Kononenko OA. Arterial hypertension and age: prevalence, characteristics of the course and complications. Simeina medytsyna. 2015;1(57):93-98. [published in Ukrainian]

[6] Quyymi AA. Endothelial function in disease: new insights into the genesis of cardiovascular disease. Am. J. Med. 2001;105:32-39.

[7] Riznyk YuB, Chelpanov IV, Nakonechna OV. Ultrastrukturni porushennia hemomikrotsyrkuliatsii yasen u khvorykh na heneralizovanyi parodontyt. Praktychna medytsyna. 2011;XVII(4):3-9.

[8] Svyshchenko YeP, Mishchenko LA. New concept evaluation of cardiovascular risk by Framingham criteria – determination of the age of vessels. The first experience in Ukrainian population of patients with arterial hypertension. Ukraiinskyi kardiologichnyi zhurnal. 2015;5:6-8. [published in Ukrainian]
[9] Vita JA. Endothelial function: a barometer for cardiovascular risk? Circulation. 2002;106:640-642.

[10] Zoellner H. Vascular response in chronic periodontitis. Semin. Thromb. Hemost. 2011;2(37):181-182.

[11] Zheldakova AD. Functional state of vessels and systems periodontal hemodynamics in the patients with generalized periodontitis. Visnyk stomatolohii. 2013;4:20-24. [published in Ukrainian]

[12] Zubachyk VM, Yarychkivska NV, Dovhaniuk VV. Diagnostichne znachennia endotelinu ta oksydu azotu yak markeriv dysfunktsii endoteliiu mikrosudyn parodonta u khvorykh na heneralizovanyi parodontyt. Visnyk stomatolohii. 2016;214-19.

[13] Zubachyk VM, Riznyk YuV. Pathogenic significance of endothelial dysfunction of the periodontal microcirculation in the development and course of generalized periodontitis. Sovremennaya stomatologiya. 2013;4:50-53. [published in Ukrainian]

[14] Zubachyk VM, Yarychkivska NV. The role of nitric oxide in periodontal tissue homeostasis (Review of the references). Bukovynskyi medychnyi visnyk. 2016;2:25-30. [published in Ukrainian]

Received: 2 Apr 2017

Revised: 7 June 2017

Accepted: 19 June 2017