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PREDICTION OF THE SEVERITY OF THE CLINICAL COURSE OF PARODONTITIS IN PATIENTS WITH HYPERTENSION

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ABOUT ARTICLE

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Abstract: The main task of diagnostics is to identify pathology at the earliest possible stages of its development, before the appearance of severe forms and complications. However, given the low awareness of the population and the long-term chronic course of periodontal diseases, patients with advanced periodontitis at a severe stage seek treatment. In these conditions, individual assessment and prediction of the risk of periodontitis in patients with arterial hypertension is relevant. Such studies will serve as a basis for identifying patients with a high risk of developing periodontal diseases, grouping them for the purpose of dental monitoring and implementing measures to neutralize the negative effects of periodontal diseases on the course of hypertension.

INTRODUCTION

Currently, the prognosis of pathology is an important part of all branches of healthcare. [3,4,5]. However, despite the importance and scientific and practical significance of forecasting in dentistry, at present we have not found information about prognostic models of individual risk of periodontitis in patients with hypertension.

The need to solve this problem served as the basis for this study.

The purpose of which is to develop and evaluate the effectiveness of an individual model for predicting the risk of periodontitis in patients with arterial hypertension.

Materials and methods. The study was conducted on the basis of SamMI clinics. A retrospective prospective case-control study was conducted. 162 patients with hypertension aged 36 to 65 years (average age 45.32±0.22 years) who were admitted to the Department of maxillofacial surgery for inpatient treatment were examined

The diagnosis of hypertension and periodontitis was carried out according to the criteria and recommendations of WHO, in accordance with the International Classification of Diseases of the 10th revision.

The inclusion criteria were patients who had previously been diagnosed with hypertension, who had been receiving antihypertensive therapy for the last 6 months with a recorded blood pressure level > 140 90 mmHg at the time of examination.

The criteria for exclusion from the study were the presence of acute or exacerbation of a chronic inflammatory or immune process, dermatological or autoimmune conditions, infections (HIV tuberculosis, hepatitis B and hepatitis C), lung diseases, liver and malignant neoplasms over the past 5 years. The study did not involve patients receiving therapy with drugs that can affect periodontal status (phenytoin and cyclosporine); patients who received systemic or local immunosuppressive therapy (including steroids) during the last 6 months; as well as patients with secondary arterial hypertension, regardless of the cause of its occurrence.

After the diagnosis of hypertension, all patients underwent office blood pressure screening, as well as a complete dental examination. To identify the degree of hypertension in patients after the first visit, control measurements of A / D were carried out within 3-14 days after the visit. Oral fluid and blood samples were collected.

After a complete dental examination, a dental patient's medical card was filled out for each patient (form 043/y), and data was copied from the inpatient's medical card (form 003/y).

Taking into account the purpose of the study, patients with hypertension were divided into two groups: the main group - with periodontitis (patients) and the control group (patients) - and without periodontitis. In accordance with the principles of evidence-based medicine, when compiling the main and control groups, persons identical in gender and age composition were selected. All patients signed

an informed consent to participate in the study. The research protocol has been verified and approved by the ethics committee.

When determining risk factors, the multifactorial nature of hypertension and periodontitis and their conditionality by a complex of medical and social risk factors and metabolic disorders of the most important homeostatic systems of the body were taken into account.

In this connection, medical risk factors and the nature and changes in the lipid profile were studied, with the determination of the indicators that have the most significant effect on the course of both pathologies studied. The severity of periodontal lesion was assessed using the indices of periodontal inflammation and destruction and oral hygiene (PMA, PI, Muhlemann, OHI-S).

The content of total cholesterol (OHC), triglycerides (TG) of high-density lipoproteins (HDL) and low-density lipoproteins (LDL) was determined using a set of reagents from Vector-Best CJSC (Novosibirsk).

Qualitative and quantitative indicators were adapted to the tasks of the study, for which they were given a numerical form by calibration. After calibration, the values of the indicators were in the range from 0 to 4. At the same time, the worst value corresponds to 4, and the best value is 0.

The assessment of the prognostic significance of risk factors for periodontal diseases in patients with hypertension was carried out using the Kulback information measure with the determination of the value Ji (K). Given that the dependent variable - the presence or absence of periodontal diseases, can be characterized by only two values from 0 to 1 (there is periodontitis / no periodontitis), the assessment of the probability of periodontitis In patients with arterial hypertension, it was carried out on the basis of a prognostic model constructed by the method of binary logical regression.

MS Excel 2007, MS Access 2007, Statistica 8.0 and Statgraphics Centurion XVI (Version 16.2.04) were used for statistical processing and analysis of the data obtained.

RESULTS

Significant but statistically unrelated risk factors were selected as dependent variables. The selection of risk factors was carried out by the method of "discrete correlation pleiades", which takes into account the main feature (pleiade) with the maximum significance of the effect on the risk of periodontitis compared with other similar indicators. That is why the model did not include many parameters that have a significant impact on the severity of the pathology, but arose as a result of the existence of the disease, rather than initiating its development. 8

As a result of the calculations, the following indicators were selected to build a model of the risk of periodontitis in patients with hypertension: X1 — age; X2 - hereditary burden of hypertension; X3 – the presence of a bad smoking habit; X4 – the stage of hypertension; X5 – the presence and number of chronic diseases; X6 – total cholesterol; X7 – triglyceride levels and X8 – atherogenicity index (IA). Where

P is the probability of developing generalized periodontitis;

e is the base of natural logarithms 2.71 and

Y is the result of calculating the regression equation.

The following model was obtained for estimating the probability of periodontitis in patients with arterial hypertension (Y):

Y = - 1.2069+ 0.1074X1 + 0.02415X2 + 0.2782X3 +0.1037X4 +0.2156X5 +0.1703X6 + 0.0569X7 + 0.02737X8. The scale of assessment of the probability of periodontitis development: 0-0.39 — low, 0.40-0.69 — medium, 0.70—1.00 — high.

The uniformity of the studies and the uniformity of scaling of the indicators included in the model made it possible to carry out a comparative assessment of their contribution to the risk of periodontal disease in patients with arterial hypertension. According to the obtained coefficients, all of these factors contribute to an increase in the risk of generalized periodontitis in patients with hypertensive whiteness. The statistical significance of the equation was verified using the coefficient of determination and the Fisher criterion. It was found that in the studied situation, 96.98% of the total variability of Y is explained by a change in Xj factors.

The resulting model is a tool for assessing the prognosis of the likelihood of periodontitis in patients with hypertension, taking into account medical characteristics and blood lipid profile parameters.

Examples of forecasting. Patient A. Age - 46 years (X1 = 2); father has hypertension (X2 = 3); smokes at least 20 cigarettes a day (X3 = 3); diagnosis of hypertension is stage 2 (X4 = 3); has chronic pyelonephritis (X5 = 3); cholesterol level is increased in 2 times (X6 =2); triglyceride level – increased three times (X7 =3) and atherogenicity index increased 2 times (X8 = 2);

As a result of calculations, we get:

Y = - 1.2069+ 0.1074 x 2 + 0.02415 x 3 + 0.2782 x 3 + 0.1037 x 3 + 0.2156 x 3 + 0.1703 x 2 + 0.0569 x3 + 0.02737 x 2 = 1.4369

Putting the value Y =1.4369 in the formula

, we get 1/ 1 + 2,71 to the extent of -1,4369 = 1 / 1 +0,369 = 0,73 , this means that the probability of developing generalized periodontitis in this patient with hypertension is 73.00%. This hypertensive patient has a high risk of developing generalized periodontitis. After examination of the periodontal condition, the patient was found to have moderate-severe periodontitis.

Patient B. Age 33 years 46 years (X1 = 1); family history of hypertension is not aggravated; father is ill (X2 = 0); does not smoke (X3 = 0); diagnosis of hypertension – stage 1 (X4 = 1); no chronic somatic pathology was found (X5 = 0); cholesterol level triglycerides and the atherogenicity index are within the normal range (X6=0; X7=0 and X8 = 0).

As a result of calculations, we get:

Y = - 1.2069 + 0.1074 x 1 + 0.02415 x 0 + 0.2782 x 0 + 0.1037 x 1 + 0.2156 x 0 + 0.1703 x 1 + 0.0569 x 0 + 0.02737 x 0 = - 0.8255

By putting the value Y = - 0.8255 in the formula

, we get 1/ 1 + 2,71 to the extent of - (- 0,8255) = 1 / 1 +2,277 = 0,3051, which means that the probability of developing generalized periodontitis in this patient with hypertension is 30.51%%. Or that the probability of developing periodontitis in this patient with hypertension is low. The results of the logical analysis coincided with the results of the dental examination of the patient, in whom periodontitis was not detected.

The clinical evaluation of the constructed model for the prognosis of periodontitis was carried out in 162 patients with hypertension, 122 of whom (75.31% of patients with hypertension) were diagnosed with periodontitis. After a comprehensive examination, 118 (72.84%) patients with hypertension were predicted to have a high probability of periodontitis. The sensitivity of the model of the probability of periodontitis in patients with hypertension was 96.72%.

Of the 40 patients who did not have periodontal diseases at the time of examination, 2 (5.00%) were assigned to the low and medium risk group for periodontitis. Thus, the specificity of the periodontitis development model was 29.50%. The overall diagnostic accuracy of the method was 95.57%.

The results of the research allow us to conclude about the high prognosticability of the developed model and the need for its use in the practice of internists and periodontal dentists to predict the development of periodontitis in patients with hypertension and the formation of groups for dispensary observation.

Based on the constructed equation, it is planned to develop a computer program "Predictive modeling of the probability of developing periodontal diseases in patients with hypertension."

The planned software tool is designed to provide an individual approach to the treatment of periodontal diseases in patients with hypertension, which will make it possible to personalize the therapy of periodontal diseases, carry out targeted interdisciplinary interaction and significantly reduce the negative impact of inflammatory and destructive periodontal lesions on the mechanisms of hypertension.

CONCLUSION

Based on the developed prognostic model, the features of individual medical characteristics of patients with combined pathology of hypertension and generalized periodontitis have been established. The leading risk factors have been identified, including age, hereditary burden of hypertension, bad smoking habit, stage of hypertension, presence and number of chronic diseases, total blood cholesterol, triglyceride levels and atherogenicity index.

The prognosis of the possibility of developing periodontal diseases in patients with hypertension is possible on the basis of the developed equation, which takes into account the minimum set of the most significant medical and laboratory parameters.

The computer program "Prognostic modeling of the probability of developing periodontal diseases in patients with hypertension" after clinical testing can be recommended for use in practical healthcare.

The established risk factors and a computer program for the risk of periodontitis in patients with hypertension are useful for the examination and treatment of patients with hypertension to identify patients with a high risk of periodontitis and timely implementation of therapeutic and preventive measures.

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