THE INFLUENCE OF METABOLIC DISORDERS ON CLINICAL SIGNS OF OSTEOARTHRITIS AND PREDICTION METHOD FOR ITS COURSE

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Purpose: The study was designed to investigate the influence of indicators of metabolic syndrome on clinical signs of osteoarthritis (OA) and to develop the method of prediction of OA severity, depending on the components of metabolic syndrome.

Methods. The study involved 84 patients (20 males), aged 57.03±0.69 with OA in Regional Hospital of Kharkov. Control group included 20 patients. The survey plan included anthropometric data (WC), global knee pain [visual analog scale (VAS)], the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), indices of carbohydrate exchange (insulin, glucose, HbAlc, HOMA-IR), lipid metabolism [the levels of total cholesterol (TC), low-density lipoprotein cholesterol (LDL), very LDL (VLDL), triglycerides (TG), high-density lipoprotein cholesterol (HDL)]. The level of HbA1C was <7.5% in all patients. The X-ray of knees was performed for all patients. Model prediction of total score for the WOMAC scale was build using the characteristics of metabolic syndrome. The best (most accurate) model was obtained using the technique of building a regression tree using the method of CART (Classification And Regression Trees) with a choice of rule for stopping by FACT method with the percentage of unclassified observations less than 1%.

Results. While assessing the anthropometric data of patients with OA we have noted that the value of BMI in patients with OA averaged 30.07±0.76 kg/m^2 and exceeded the similar index in the control group (M-W Z=–5.16351, $p<0.05$). While analyzing the impact of metabolic syndrome indicators on WOMAC index, significant influence of these indicators on the clinical course of OA was found, viz a significant correlation was determined between WOMAC index and waist circumference ($r=0.48$; $p<0.05$), SBP ($r=0.56$; $p<0.05$), LDL ($r=0.35$; $p<0.05$), TG ($r=0.24$; $p<0.05$), HbA1c ($r=0.54$; $p<0.05$), duration of OA ($r=0.24$; $p<0.05$). Tree regression model for predicting the total score for the WOMAC scale was constructed based on the characteristics of the metabolic syndrome: waist circumference, HbA1c, LDL, TG, and blood pressure values. Age of patients and duration of OA were used as additional predictors of OA severity. This method allows to predict the severity of pain and lack of joint function with 86.1% probability, i.e. to determine the number of points that patient would get by using of WOMAC scale, without questioning, only by assessing the parameters of metabolic syndrome.

Conclusion. The presence of significant correlation between WOMAC index and waist circumference, SBP, LDL, TG, HbA1c has proved that metabolic changes can be an important factor for the development of immune, metabolic disorders as

well as for the progression of OA. A regression tree model for the prediction of total score by WOMAC scale was created depending on the characteristics of metabolic syndrome.

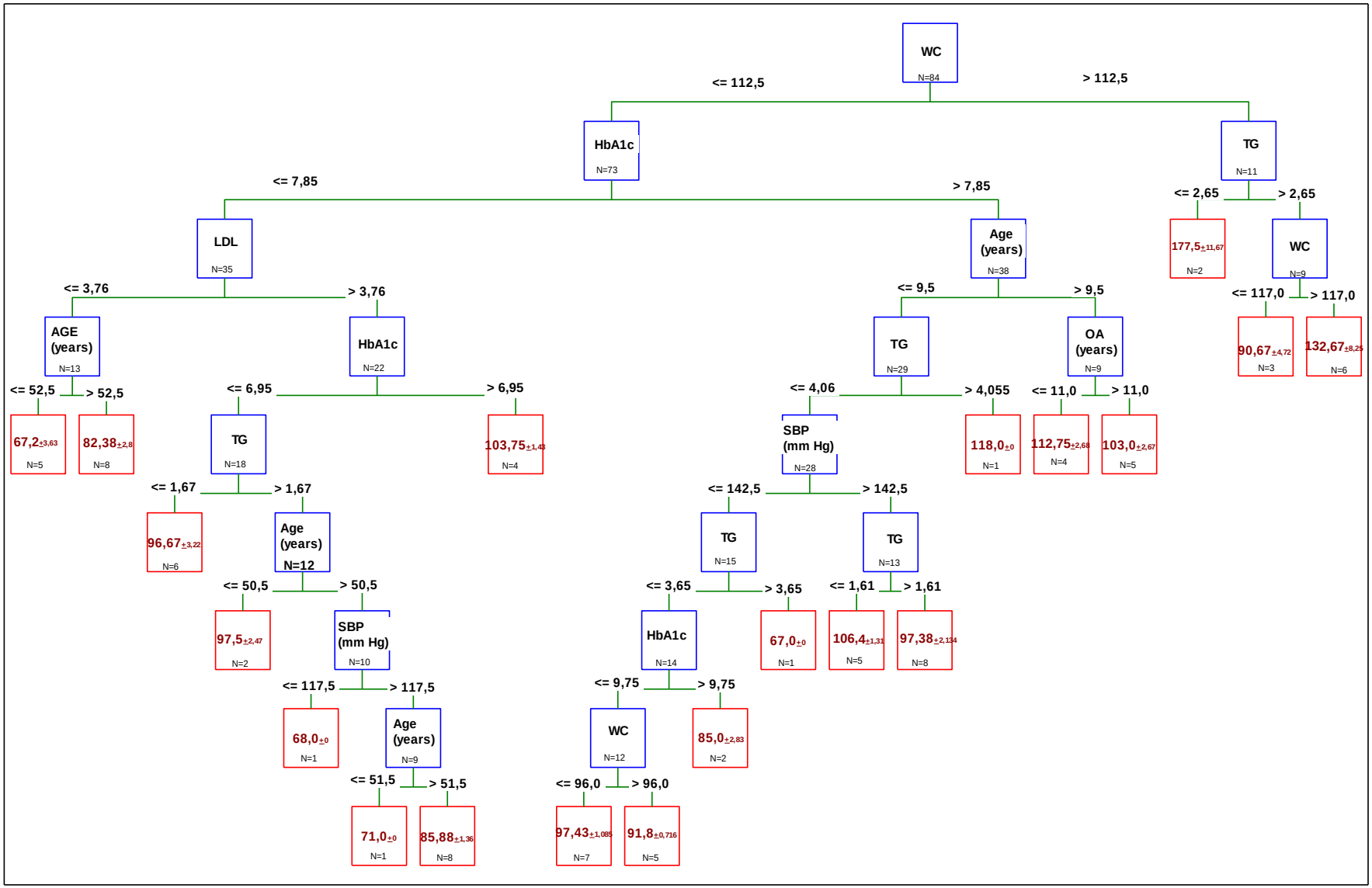

Fig. 1. Regression tree for prediction of total points for the WOMAC scale depending on the parameters of metabolism