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Quantification of cardiometabolic risk in obesity: Use of artificial neural network

Risk factors that promote cardiovascular disease and/or type 2 diabetes are often cluster, including obesity, insulin resistance, hyperglycemia, lipid and lipoprotein disturbances and hypertension. Obesity has a profound impact on the cardiovascular disease development: the increase of fat mass launches a cascade of adipokine-mediated metabolic, inflammatory and haemostasic disturbances accelerating the process of atherosclerosis. Since each of these factors increases the global risk, the use of total cardiometabolic risk (CMR) is useful. There are numerous software applications for estimation of CMR. In general, a scoring procedure based on score tables is inapplicable for the analysis of complex and unconventional cases.

There has been much interest in the clinical use of artificial neural network (ANN) as a form of artificial intelligence that has been used to simulate the human brain's own problem-solving process and takes previously solved examples and recognize complex patterns between inputs and outputs parameters. ANN inputs are values gender, age, waist-to-height ratio, and body mass index, systolic and diastolic blood pressure. ANN output is cardiometabolic risk-coefficient obtained from the number of disturbances in risk factors: HDL-, LDL- and total cholesterol, triglycerides, glycemia, fibrinogen and uric acid. ANN training and testing are done by dataset that includes 1281 persons, aged 18 to 67 years, with BMI values between 16.60 and 48.00 kg/m^2. The accuracy of this solution is 82.76%. The clinical application of artificial neural network could be a useful tool in both, individual and public health prevention since it can be beneficial in identifying persons with increased cardiometabolic risk in an easy–to-measure and non-invasive way.

Biography

Edita Stokic, M.D., Ph.D. is Endocrinologist and Professor of Internal medicine-Endocrinology, employed in the Clinic of Endocrinology, Diabetes and Metabolic Disorders of the Clinical Centre of Vojvodina in Novi Sad, Serbia. In 2005, she was appointed as Chief of Department. She is currently the vice president of Serbian Association for the Study of Obesity and chairman of the Continuing Education Board (Society of Physicians of Vojvodina of the Medical Society of Serbia). She is also president of the Internal Medicine Section, and (2002-2004) president of Endocrinology Section within same society. She is an author or co-author of 372 scientific articles, and publications on obesity, dyslipidemias and diabetes. She has also published monograph Obesity is treatable disease.

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