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Intermediate cardiovascular risk patients in population with extremely high cardiovascular mortality: The role of coronary artery calcium scoring for risk reclassification

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According to the 2017 European Society of Cardiology statistical report Ukraine has one of the highest mortality rates from cardiovascular disease as well as severe gender discrepancy: mortality rates for men and women in Ukraine are respectively 14 and 23 times greater than in France.[1] Local validated risk estimation systems should be evaluated for regions where Systematic Coronary Risk Evaluation (SCORE) underestimates cardiovascular risk.[2] Among additional cardiovascular risk modifiers the coronary artery calcium score (CACS) has shown the greatest impact on conventional models of prediction of cardiovascular events both for the general population and for patients with specific conditions (e.g. chronic kidney disease).[3,4] Cardiac computed tomography (together with the CACS) is supposed to be the first-line and the most cost-effective diagnostic method for patients with new-onset chest pain.[5] The 2016 Society of Cardiovascular Computed Tomography and Society of Thoracic Radiology (SCCT/STR) guidelines recommend reporting the CACS of all patients undergoing chest computed tomography scanning.[6] CACS measurement is recommended for cardiovascular risk reclassification in patients with intermediate cardiovascular risk.[7] Individuals with intermediate cardiovascular risk should be offered lifestyle advice,[2] and often fall out of focus of primary care physicians. The aim of our study is to investigate the role of CACS in cardiovascular risk reclassification for patients with intermediate risk in high-risk countries.

Among patients who underwent the CACS at Dnipropetrovsk Mechnikov Regional Hospital, Dnipro, Ukraine from December 2017 to June 2018 ($n = 297$) we selected 66 patients (37 men and 29 women) who fulfilled the criteria of moderate (SCORE of $\geq 1\%$ and $< 5\%$) risk.[2] Exclusion criteria were: symptomatic cardiovascular disease ($n = 157$), diabetes mellitus ($n = 34$), age greater than 65 years ($n = 29$), total cholesterol greater than 8 mmol/l ($n = 1$), glomerular filtration rate (GFR) less than 60 ml/minute ($n = 10$). CACS scoring was performed using the Agatston score, patients were classified into four groups according to Coronary Artery Calcium Scoring – Position Statement: CACS = 0, very low risk; CACS = 1–100, low risk; CACS = 101–400, intermediate risk; CACS greater than 400, high risk.[7] Computed tomography scans were performed using Optima CT660 (GE Healthcare, WI, USA; 2017). GFR was calculated using the CKD-EPI equation. This retrospective non-interventional study was carried out in accordance with the ethical principles of the Declaration of Helsinki and was approved by the ethics committee of Dnipropetrovsk Mechnikov Regional Hospital. All patients gave their written consent on data collection and processing.

Subdivision of patients by total CACS has shown that only 28.8% of patients had zero CACS and 16.7% had CACS of over 400 (Table 1). Women were more prevalent in groups with low CACS (82.5%). Patients with CACS greater than 400 had the highest frequencies of arterial hypertension, left ventricular hypertrophy, elevated intima-media thickness and the presence of plaque on carotid ultrasound imaging, and there were also slight trends towards a rise of the mentioned parameters with elevation of CACS. Age increased significantly with elevation of coronary

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