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Early vascular ageing and acute coronary syndromes in young patients

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Purpose: To evaluate the prevalence of atherosclerotic coronary lesions in young patients from a very high CV risk country, presented with a first ACS episode and to analyse the association between arterial stiffness, arterial age and the severity of CAD.

Methods: Sixty consecutive patients with age = 45 years (mean age 41,25±3.99 years; range 22-45 years; 81.7% males) admitted in our department for a first ACS between January 2016 – January 2018 and underwent coronary angiography for evaluation of CAD were enrolled in the study after signing a written informed consent (ACS group) and compared with 60 healthy subjects, age and sex-matched, randomly selected from the SEPHAR III national representative survey’s data base. Arterial stiffness parameters and arterial age were measured with an oscillometric device (Arteriograph). Association between arterial age and arterial stiffness and the severity of CAD was assessed by bivariate correlation analysis with adjustments for major confounders.

Results: The main pathogenic mechanism of ACS was represented by the coronarian atherosclerotic lesions (46 cases, representing 76,7%, p<0,001) and the most frequent clinical form was the ST-segment elevation myocardial infarction (53 cases, representing 88,3%, p<0,001). Of all those 46 patients from the SCA that have atherosclerotic lesions, most had univascular disease (univascular-25 cases, 54.3 % vs. bivascular: 14 cases, 30,4% vs. trivascular: 7 cases, 15.2%, p =0.005). ACS group had significantly higher PWVao values than CONTROL group, on average of 2, 87m/s [9,49 ± 1,92 m/s vs. 6,62±1,12/s, p < 0.0001; 95%CI = (-3,43m/s; -2,29m/s)]. Arterial age of ACS patients was significantly higher than their own biological age, on average with 5.78years [mean arterial age 47.03 vs. biological age:41.25; p<0.0001; 95%CI = (3.91ani; 7.66ani)] while arterial age and biological age were similar in CONTROL group [mean arterial age 40,53 ani vs. mean biological age: 39,63 ani; p = 0.207; 95%CI = (-0.73ani; 3,29ani)]. In ACS group, while among patients with normal coronaries, the arterial and biological age were statistically similar (43.25 years vs. 41.53 years; p = 0.500), in patients with atherosclerotic lesions (uni-, bi or tri vascular), arterial age was significantly higher compared to biological age, on average with 5.7 years , 5.7 years and 7.5 years respectively. Also, in STEMI group, the severity of CAD was correlated with both PWVao values [rs= 0,521 rs2 = 0.271; p < 0,0001] and arterial age [rs= 0,512 rs2 = 0.262; p = 0.035].

Conclusions: The results of our study shows that young ACS patients experience an early vascular ageing process reflected by an increased arterial stiffness and significantly higher vascular age compared with normal healthy age and sex-matched controls, leading to an early onset of CAD.