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The gap between "young atherosclerosis" and "young acute myocardial infarction": where are we now? A single case-control study

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Background: premature coronary artery disease (CHD) (< 50 years) is an emerging problem. Most of young patients with CHD present with non-ST elevation myocardial infarction (MI), but the proportion presenting with ST-elevation MI is increasing. The leading cause of acute myocardial infarction (AMI), in the meaning of atherosclerotic disease, is still little known in these patients. Carotid intima-media thickness (IMT) and stiffness measurements, such as Palse Wave Velocity (PWV) and Augmentation Index (AIx), are widely used in observational studies to assess the extent of atherosclerosis.

Purpose: To assess arterial IMT and stiffness in patients experiencing AMI at young age and compare with age and sex-matched healthy controls.

Methods: IMT, PWV and AIx were investigated in thirty young survivors of AMI (25 male and 5 female) occurring before 50 years of age to our Centre from September 2016 to January 2017. They were recruited consecutively for this case control-study and same number of age and sex matched healthy controls were also analyzed. Four weeks after AMI, automatic measurement of far-wall IMT and distension curves were acquired in a carotid segment ~1 cm before the flow divider. Maximum and minimum carotid diameters were acquired using the attained distension curves, and vascular stiffness parameters were calculated after calibration for blood pressure (BP).

Results: Young AMI patients, compared to controls, had considerably higher carotid IMT (673.4 µm vs 395.5 µm, p= 0.0012) and PWV (8.1 m/sec vs 6 m/sec, p= 0.051), while there was no significative difference for AIx (8.2 % vs 7.9%, p= 0.96). Multivariate models established that male gender and smoking were indipendent determinants of carotid stiffness and IMT in young patients experiencing AMI, and in particular experiencing STEMI with interventricular descendant artery involvement.

Conclusion: Even if majority of young patients with AMI fell in low cardiovascular risk class according Framingham risk score, most of them presented abnormal cardiovascular parameters, that are typical expression of atherosclerosis. This important mismatch deals with a more complex and silence form of atherosclerosis wich requires further studies and data for an early detection strategy.