

Increased carotid cross-sectional area is a marker of organ damage in young hypertensive patients

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Funding Acknowledgement: Type of funding source: None

Background: Common Carotid artery (CA) cross sectional area (CCSA) is strictly related to vessel remodelling stimulated by mechanical stress due to arterial hypertension. Accordingly, increased CCSA might represent an early marker of vascular target organ damage independently of presence of atherosclerotic plaque.

Purpose: To assess early correlates and prognostic impact of CCSA in a large population of young treated HTN patients.

Methods: We selected 970 hypertensive patients, 18 to 40 years old (mean age 34±5 yrs; 30% women) of the Campania Salute Network registry with available CA ultrasound and follow-up data, free of overt cardiovascular (CV) disease. CCSA was computed as:

$$CCSA = \pi [(CA_d/2 + IMT)^2 - (CA_d/2)^2]$$

where CA_d = CA diameter and IMT = mean intima media thickness. Participants were compared by CCSA tertiles.

Results: Compared to the lowest and intermediate tertiles, patients in the highest tertile were more often male, smokers, older, and had higher body mass index (BMI), diastolic blood pressure (BP), higher fasting glucose, triglycerides, LDL cholesterol and uric acid, with lower level of HDL cholesterol. They also exhibited higher left ventricular mass index and IMT and had more often carotid atherosclerotic plaque (all $p < 0.05$). During a median follow-up of 45 months, 22 incident composite CV events occurred. In Cox-Regression analyses, adjusting for the above covariates, presence of carotid plaque and classes of antihypertensive medications, increased CCSA was significantly associated with increased CV risk (HR 1.08/mm²; 95% CI 1.02–1.13; $p < 0.01$).

Conclusions: In a population of young hypertensive patients, increased CCSA is related to metabolic and atherosclerotic disease and is associated with increased CV risk, also independently of overt carotid plaque.