CAROTID APPLANATION TONOMETRY IMPROVES CARDIOVASCULAR RISK PREDICTION SIMILARLY TO CARDIAC AND CAROTID ULTRASONOGRAPHY: A NEW SCREENING TOOL FOR WIDE POPULATIONS OF SUBJECTS AT RISK

ACC Poster Contributions
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Background: Ultrasonographic left ventricular hypertrophy (LVH) and carotid atherosclerosis (ATS) are widely used in cardiovascular (CV) risk stratification. Similarly, functional vascular alterations investigated by carotid applanation tonometry (CAT) have recently emerged as alternative prognostic markers. However, CAT predictive performance in comparison to cardiac and carotid ultrasonography (US) has not been investigated.

Methods: 250 patients (49% males, aged 53±13 years) underwent a baseline US and CAT evaluation and were followed for 11±2 years. LVH and carotid ATS were defined as left ventricular mass >125 g/m2, intima-media thickness ≥0.9 mm and/or presence of plaques, respectively. Cut-off values for tonometric parameters (central pulse pressure, systolic blood pressure, Augmentation Pressure, transit time/ejection time ratio) were assessed by ROC curves. Carotid-femoral pulse wave velocity was considered altered for values >12 m/sec. A score was calculated according to the number of altered parameters (0 to 5) and CAT was considered positive in presence of at least one alteration. Primary end point was all major fatal/not-fatal CV events.

Results: Both altered cardiac (12%) and carotid US (62%) significantly increased the risk of CV events [HR 2.31 (1.28-4.16) and HR 3.67 (1.50-9.01)]. Similarly, positive CAT and the tonometric score independently predicted adverse prognosis [HR 3.02 (1.05-8.67) and HR 1.32 (1.07-1.63)]. Positive CAT showed high sensitivity (85%) for target organ damage while the highest score (>4) showed the best specificity (100%). CAT improved CV events prediction (AUC 0.74 vs 0.78, p<0.05), similarly to cardiac (AUC 0.74 vs 0.80, p<0.01) and carotid US (AUC 0.74 vs 0.81, p<0.01). However, CAT showed the highest negative predictive value (95%) compared to US techniques.

Conclusions: CAT significantly improve CV prediction. Its predictive performance is similar to the more expensive ultrasonographic techniques. An altered CAT strongly reflects the presence of structural organ damage while a normal exam could not suggest further investigations. Thus, CAT could be used as a useful screening tool for wide population of subjects at risk.