

Comparison of regional vs local arterial parameters using new us technology

Authors: Forcada P, Garcia R, Maur R, Florio J, Almada R

Address: CardioArenales , Buenos Aires ARGENTINA

ENVIRONMENT

It has been described that muscular arteries behaviour is different from aorta.

REGIONAL parameters like atherosclerotic plaques burden, c-f PWV and endothelial function are related with age and risk factors and are powerful prognostic markers but it is not the case of **LOCAL** parameters like IMT, wall shear stress (WSS) , local PWV or beta index in muscular arteries like common carotid artery, only just recently available in the clinical practice (IMT excepted).

OBJECTIVE

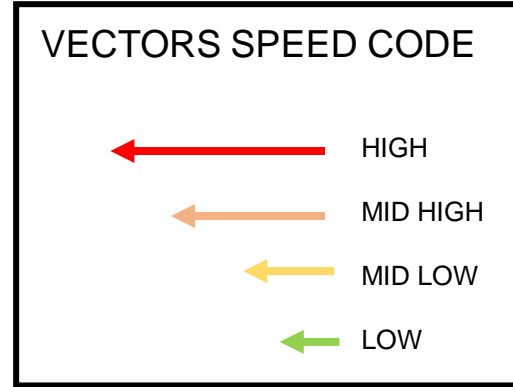
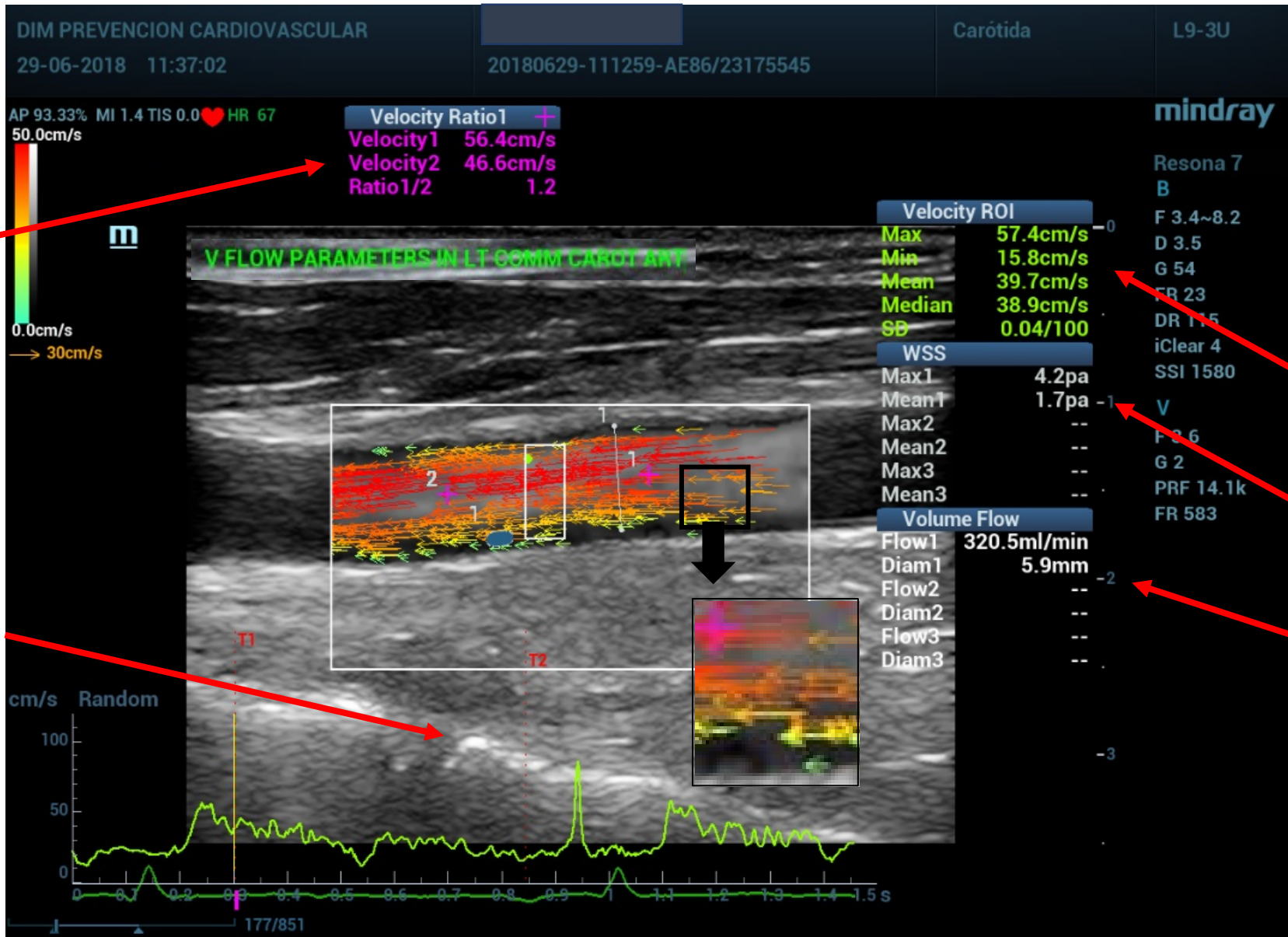
To analyze the relationship of **regional** and **local arterial** parameters with age and its potential use in the clinical practice.

METHODS

We evaluated 100 consecutive patients from april 2019 to february 2020 using a Resona 7 (Mindray) US device with tools to measure IMT, atherosclerotic load, PWV and endothelial function.

We also assessed using **VFlow Doppler**, an innovative multivectorial Doppler technology, the WSS and with radiofrequency edge detectors, stiffness parameters like PWV and beta index in the carotid artery.

VECTOR FLOW IMAGING AND THE VECTOR'S COLOUR CODES



Instantaneous speed gradient across the plaque or different branches.

T1 and T2 are the boundaries of analysis within the cardiac cycle.

Velocity parameters in the main artery trunk.

Wall Shear Stress at different points of plaque Surface or branches.

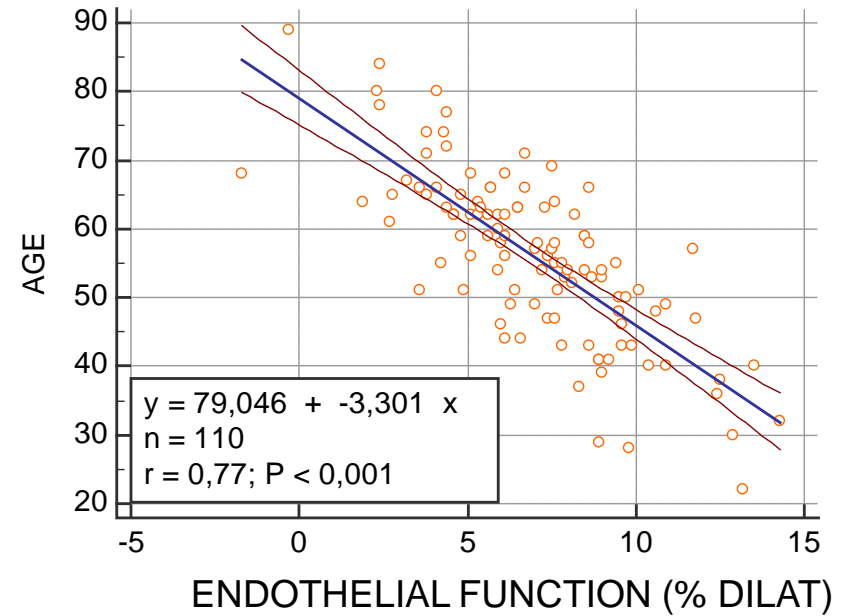
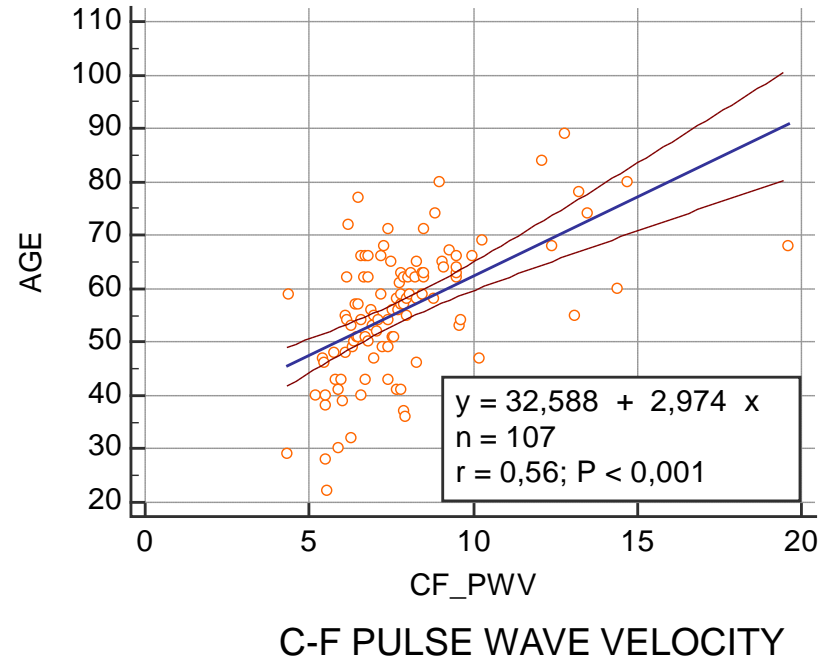
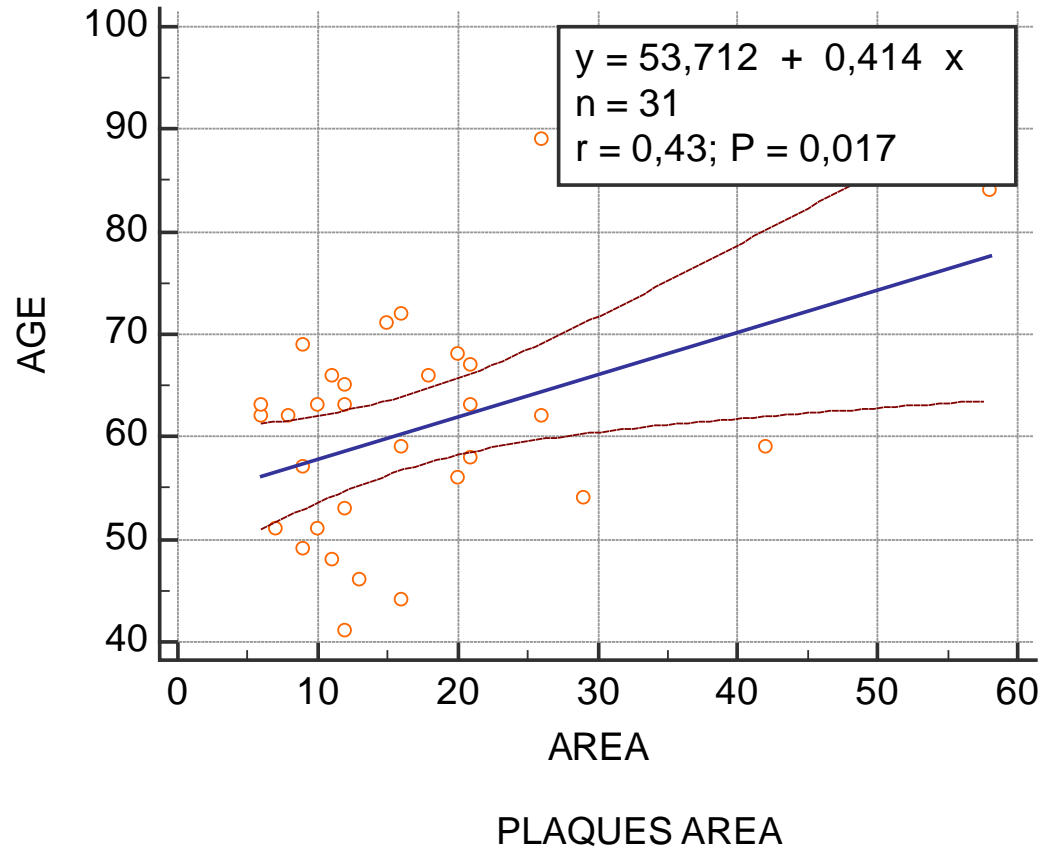
Flow gradient across the plaque or different branches.

RESULTS

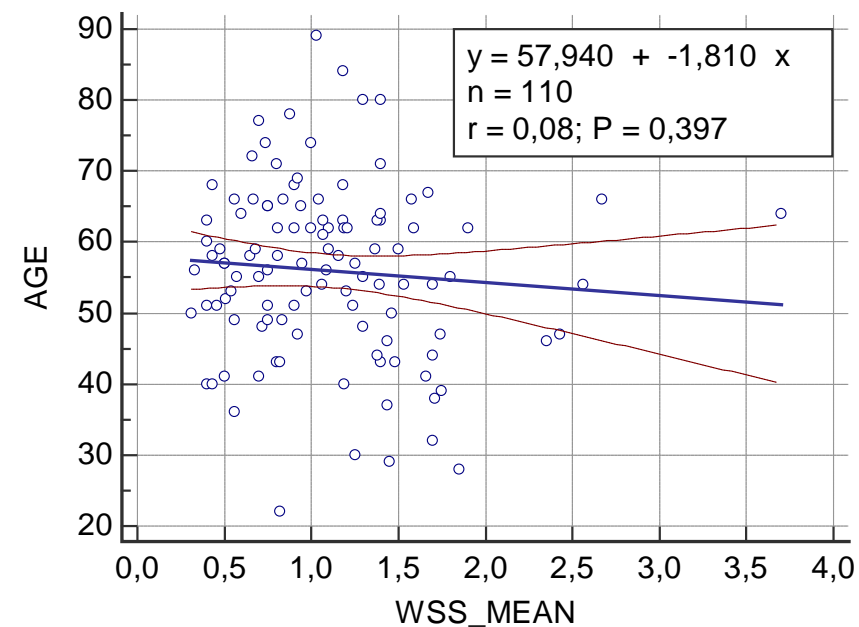
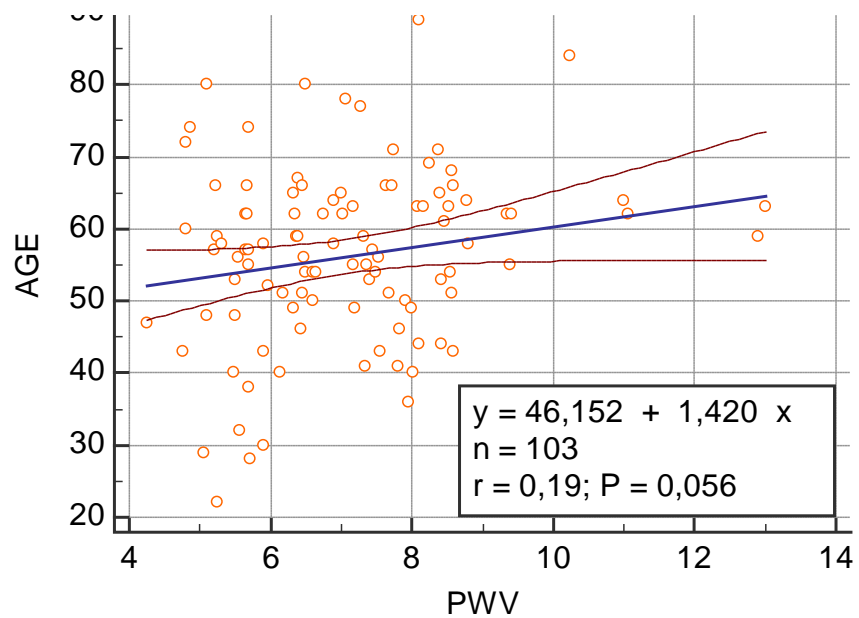
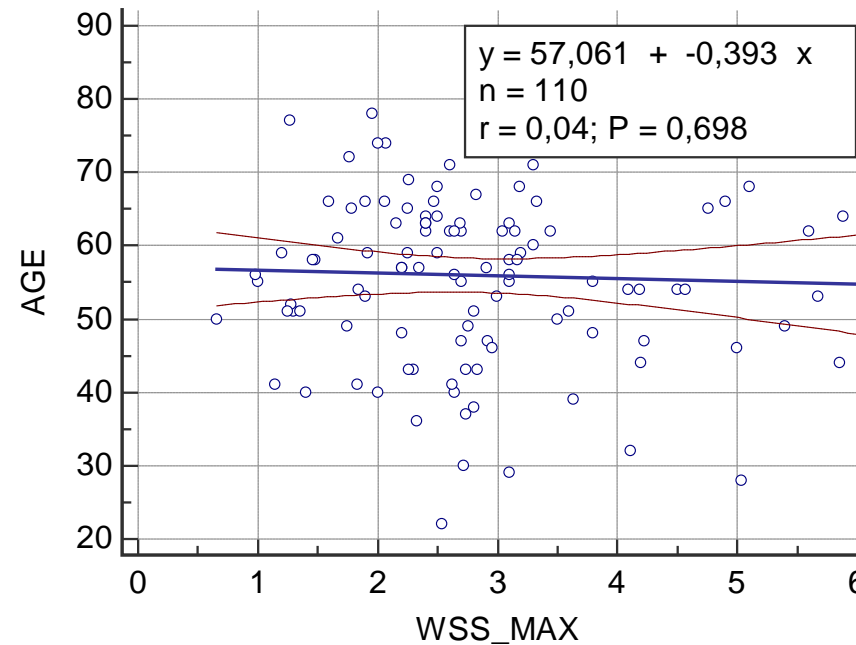
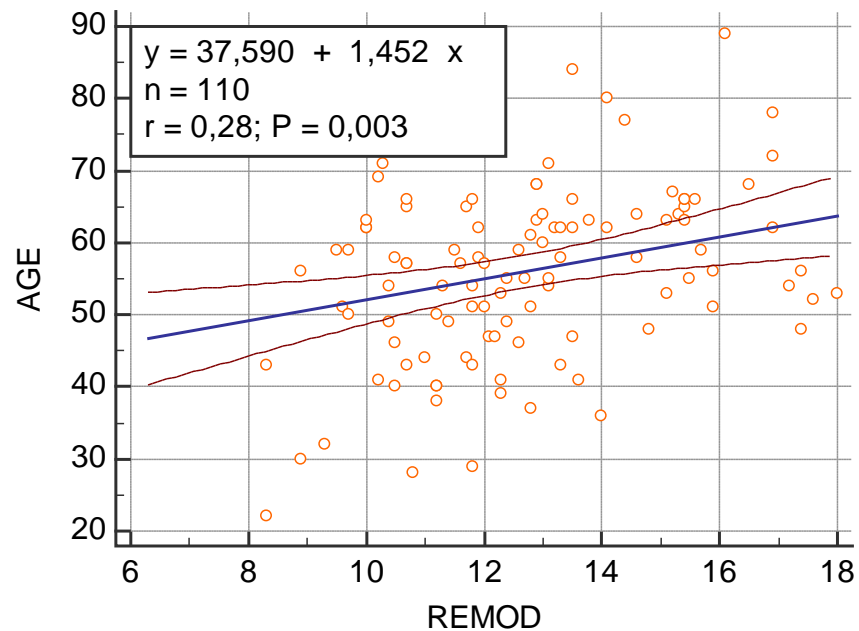
REGIONAL PARAMETERS: plaques burden (r 0,43), c-f PWV (r 0,56) correlated tightly with age and endothelial function did, but inversely (r 0,77).
(all regression $p < 0.05$)

LOCAL carotid parameters: IMT remodelling (r 0,28), like wall shear stress (r 0,08), PWV (0,19) and beta index (0,18) were grouped within a range, independently of age. (all regression p NS).

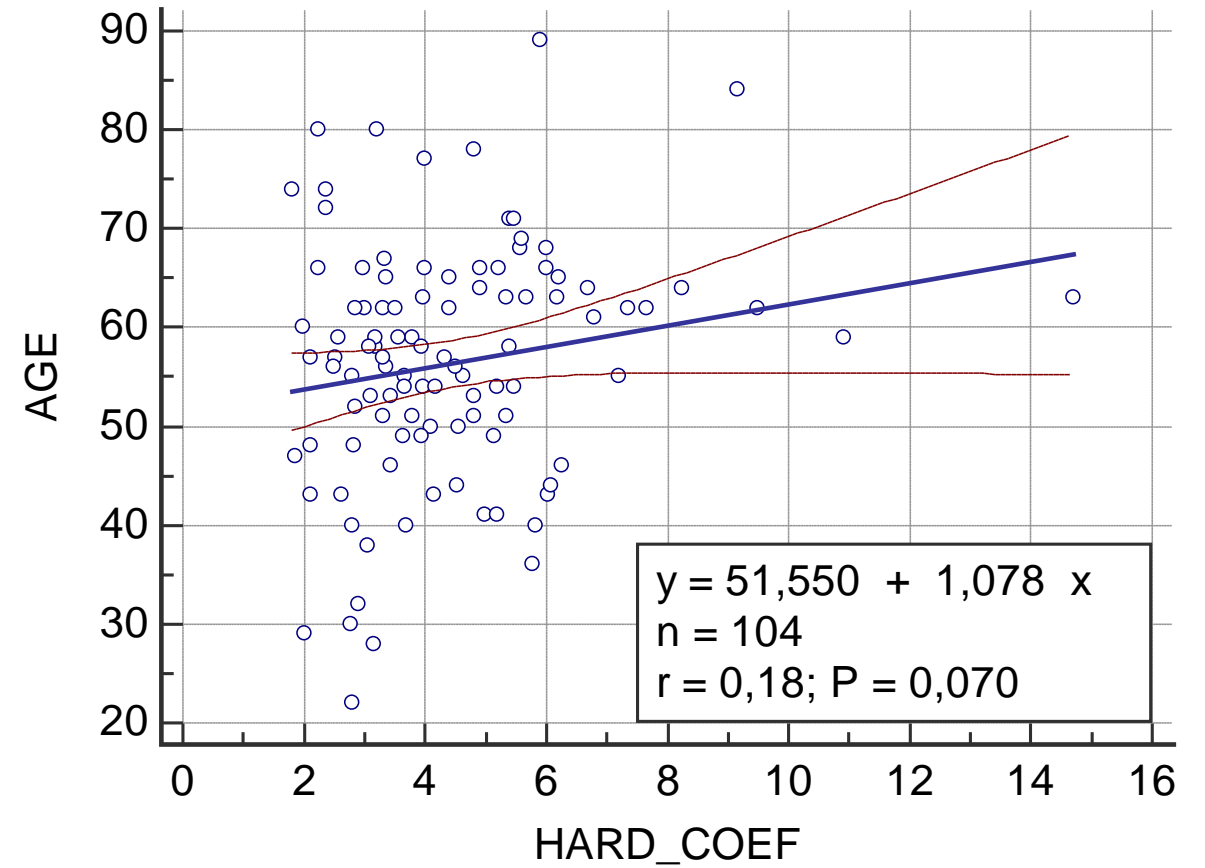
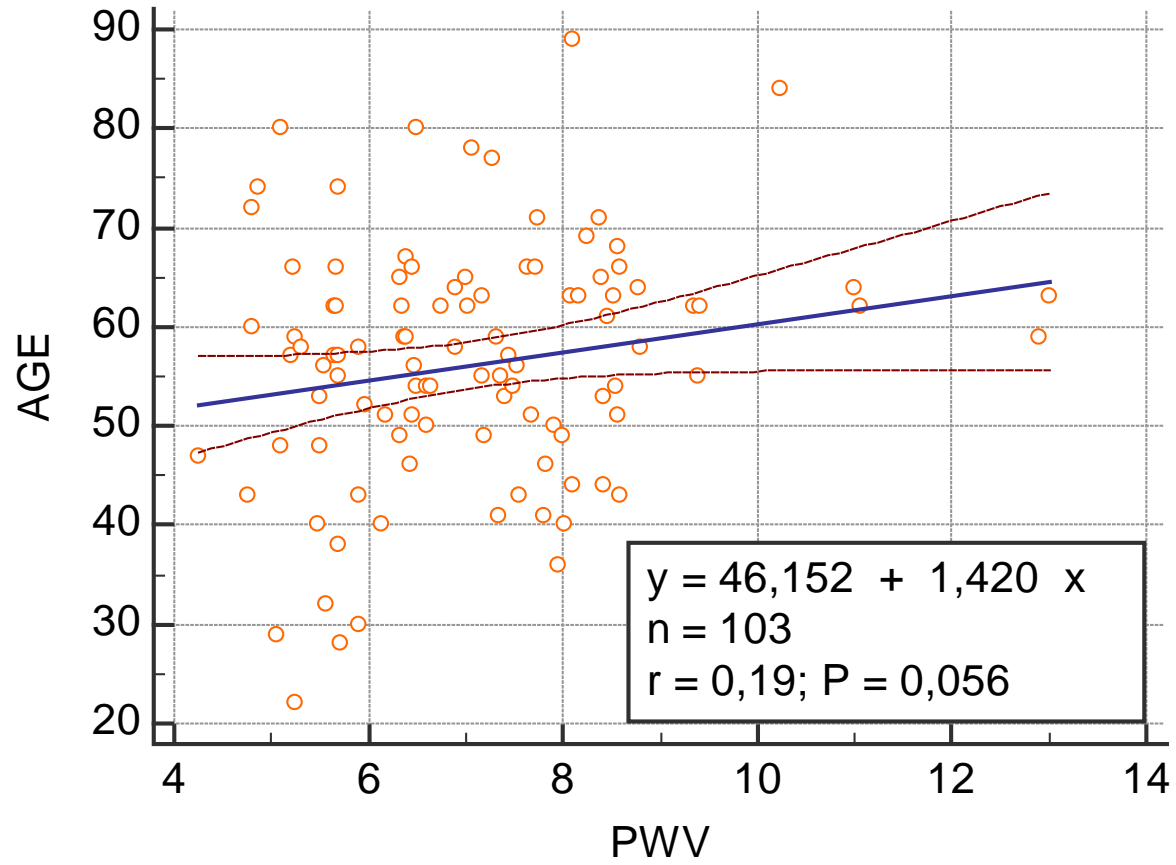
REGIONAL PARAMETERS ACCORDING TO AGE: REMODELLING, PLAQUES , CF-PWV AND ENDOTHELIAL FUNCTION



LOCAL PARAMETERS ACCORDING TO AGE: REMODELLING, CAROTID PWV AND WALL SHEAR STRESS



LOCAL PARAMETERS ACCORDING TO AGE: REMODELLING, CAROTID PWV AND WALL SHEAR STRESS



CONCLUSION

Regional parameters like plaques burden, PWV and Endothelial Function have been demonstrated clearly as CV risk biomarkers.

The evaluation of local parameters has been proposed as markers of arterial disease and they are relatively independent of age which makes it easier to detect abnormal values out of range, as early markers of vascular disease, even before atherosclerosis is present.

WSS is used for the first time in the current clinical practice.