EAS16-0140, VASCULAR BIOLOGY: MYOCARDIAL INFARCTION, STROKE, PERIPHERAL VASCULAR DISEASE.
QUANTIFICATION OF MICROVESSELS DENSITY IN CAROTID PLAQUE BY CONTRAST-ENHANCED ULTRASOUND WITH HISTOPATHOLOGIC VALIDATION

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Objectives: More extensive atherosclerotic plaque neovascularization is associated with plaque vulnerability and symptomatic disease. Contrast-enhanced ultrasound (CEUS) is the only non-invasive intravitam technique to demonstrate it. However, there is no data available about the possibility of vessels density assessment using CEUS what became the goal of the study.

Methods: 15 patients underwent carotid endarterectomy after standard ultrasound and CEUS. The number of vessels/cm^2 in the plaque was determined using CEUS images and histopathology specimens. Quantification of neovascularization depending on a vessels diameter has been also performed during histopathologic examination followed by comparison with ultrasound findings.
Results: CEUS and histopathology results concerning vessels location in the plaque structure were in full agreement. The number of vessels/cm^2 in the plaque was 7–46 according to CEUS and 19–420 according to histopathology without correlation between them. Difference was attributed to the predominance of small vessels (<30μm) in the plaque (68%–99%). These vessels frequently formed clusters that could have been detected as 1 vessel using CEUS and probably thus their density obtained by CEUS did not correlate with histopathologic results. However, a correlation between the density of vessels ≥30μm in the diameter and CEUS data was noted (R=0.56, p=0.031) and absolute CEUS values were generally close to those obtained by histopathology. Positive but weaker correlation between ultrasound and histopathology results on density of vessels with a diameter of ≥40, 50, 60, 70 and 80μm was also identified.
Conclusions: CEUS results can probably represent density of plaque vessels with a diameter of ≥30μm.

EAS16-0306, VASCULAR BIOLOGY: MYOCARDIAL INFARCTION, STROKE, PERIPHERAL VASCULAR DISEASE.
REFERENCE VALUES FOR LOCAL ONE-POINT CAROTID STIFFNESS BY ECHO-TRACKING IN A LARGE POPULATION OF HEALTHY SUBJECTS

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Objectives: Parameters of local arterial stiffness can predict cardiovascular mortality and echo-tracking-derived measures have been recently introduced in clinical practice. The aim of this study was to evaluate carotid stiffness parameters obtained by echo-tracking system in a healthy population.

Methods: 1092 subjects aged 2–92 years (586 male, 506 female) were enrolled. Local arterial stiffness was evaluated at the left CCA 1–2 cm before its bifurcation using a high-definition echo-tracking ultrasound (Hitachi Aloka Inc). Local arterial stiffness [(b stiffness, pressure-strain elasticity modulus (EP), arterial compliance (AC) deriving the pressure–diameter curve of the artery and local pulse wave velocity (PWV) from the time delay between two adjacent distension waveforms] was assessed.
Results: EP, b and PWV and a downward trend in AC with ageing was found in both genders (males: b stiffness r=0.655; EP r=0.69; AC r=−0.59; PWV r=0.74 p<0.0001. Females: b stiffness r=0.66; EP r=0.71; AC r=−0.58; PWV r=0.74, p<0.0001).
Nevertheless females had significantly higher stiffness values (and lower AC).
The subjects were then divided into 9 age groups and stratified by gender. Within the single groups, stiffness was not different between gender except AC which was lower in females. In a multivariate model, carotid stiffness were constantly and independently associated with age, gender, mean BP, pulse pressure, heart rate and body surface area.
Conclusions: Results have been used to produce reference values of carotid stiffness parameters obtained by echo-tracking system in a large healthy population.

EAS16-0331, VASCULAR BIOLOGY: MYOCARDIAL INFARCTION, STROKE, PERIPHERAL VASCULAR DISEASE.
INVESTIGATION OF PROTOPORPHYRIN IX-MEDIATED SONODYNAMIC THERAPY ON INTERMEDIATE STAGE ATHEROSCLEROSIS USING A NEW COMPUTERIZED B- MODE ULTRASOUND ANALYZING METHOD

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Objectives: The aim of this study was to evaluate protoporphyrin IX-mediated sonodynamic therapy on intermediate stage atherosclerosis by automatic measurement of arterial wall movement using ultrasound images in an experimental rabbit carotid model.

Methods: Briefly, New Zealand white rabbits were submitted to common carotid intermediate stage atherosclerosis. Then treatment group underwent sonodynamic therapy using electrohydraulic shock waves (10 kV, 0.2 Hz) accompanied by protoporphyrin IX (50 mg/kg) administration. All of the rabbits' arteries were imaged by B-mode ultrasound weekly, after which the rabbits were sacrificed, and their vessels were processed for histopathology. Ultrasound longitudinal view images from three cardiac cycles were processed by a new computerized analyzing method based on dynamic programming and maximum gradient algorithms for measurement of instantaneous changes in arterial wall thickness and lumen diameter in sequential ultrasound images.
Results: Quantitative and morphometric analysis of the mean wall thickness and the percentage of luminal cross-sectional area of stenosis showed a significant correlation between the B-mode ultrasound and the histological measurements at each time point (R =0.923 and R =0.915, p < 0.05, respectively).
Conclusions: It is concluded that the new automatic method enables accurate and repeated evaluation of the regression of intermediate stage atherosclerosis. Also, the results obtained in this study indicate that enhanced cytotoxic effect of protoporphyrin IX, induced by shock waves can cause to reduce the macrophages foam cells in intermediate stage atherosclerotic plaque and significantly dilate the luminal cross-sectional area of stenosis.

EAS16-0376, VASCULAR BIOLOGY: MYOCARDIAL INFARCTION, STROKE, PERIPHERAL VASCULAR DISEASE.
NON-INVASIVE HIGH-FREQUENCY ULTRASOUND USING INTIMA AND INTIMA/MEDIA THICKNESS RATIO (BUT NOT CIMT), CORRECTLY MONITORED EXPECTED BENEFICIAL VASCULAR EFFECTS OF MENOPAUSAL HORMONE THERAPY

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