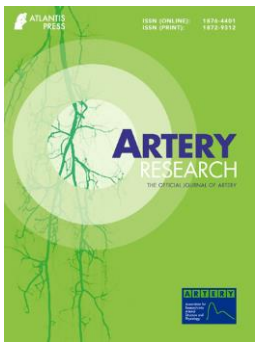

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P.057: EFFECTS OF CORONARY MICROCIRCULATION ON INTRACORONARY PRESSURE WAVEFORMS AS ASSESSED BY FAST FOURIER FRANSFORM ANALYSIS

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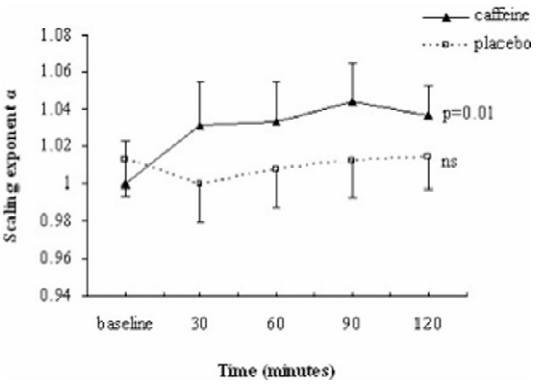
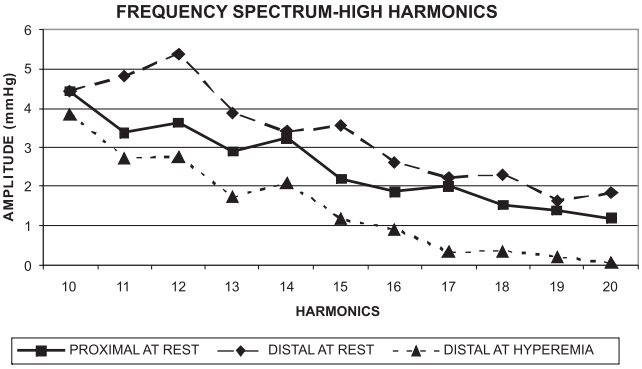


P.057
EFFECTS OF CORONARY MICROCIRCULATION ON INTRACORONARY PRESSURE WAVEFORMS AS ASSESSED BY FAST FOURIER FRANSFORM ANALYSIS

E. Stamatopoulos*, M. Vavuranakis, T.G. Papaioannou, S. Nikolopoulos, C. Stefanadis. *1st Dept. of Cardiology, Unit of Biomedical Engineering, Hippocration Hospital, Medical School, National & Kapodistrian University of Athens, Athens, Greece*

Wave reflections from the periphery of the systematic circulation are known to be important determinants of the morphology of aortic pressure waveforms. Similar data regarding the effects of coronary microcirculation on intracoronary pressure waveforms are limited. We sought to investigate whether drug-induced changes of coronary microcirculation are reflected in the modification of intracoronary pressure waveforms. In eighteen patients with normal myocardial contractile function we studied pressure waveforms recorded by a high-fidelity pressure wire at the ostium and at a distal site of left anterior descending coronary artery, which had to be free of significant lesions in the epicardial and the microvascular segment, i.e. fractional flow reserve >0.75, corrected TIMI frame count <27 and coronary flow reserve by thermodilution >2.5. Pressure recording was performed both at rest and at hyperemia induced by intravenous infusion of adenosine. Analysis of pressure waveforms at the frequency domain was performed with Fast Fourier Transform. At baseline conditions, distal vs proximal pressure waveforms were characterized by higher pulsatility: higher fractional pulse pressure ΔPPf ($p = 0.009$), a higher presystolic wave probably due to atrial contraction ($p < 0.001$) and higher amplitude of the eleventh to the fifteenth harmonics ($p = 0.001$). Hyperemia increased ΔPPf ($p = 0.01$), compressed the notch and decreased the amplitude of higher than the tenth harmonics of distal waveforms ($p < 0.001$) (Figure).



The configuration of intracoronary pressure waveforms is significantly affected by the status of coronary microcirculation. Therefore, their analysis may facilitate assessment of microvascular disease.

P.058
LEFT VENTRICULAR FUNCTION IN RELATION TO ARTERIAL STIFFNESS IN HYPERTENSION. THE PROGNOSTIC IMPORTANCE OF PULSE PRESSURE IN LV REMODELLING - PRELIMINARY REPORT

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Background. Increased arterial stiffness has been reported to affect LV diastolic function in hypertension. Pulse pressure (PP) is independently related to cardiovascular and all-cause mortality. Strain and strain rate deformation parameters can detect subtle changes of the left ventricular (LV) function.
Aim. To investigate the role of arterial stiffness in Systolic LV function and the effect of Pulse pressure in hypertension.
Methods. We studied 55 consecutive hypertensive patients and 25 controls, matched for age (49.7±5.7 vs. 45.5±4.1 yrs), with normal EF (66±2.5 vs. 64±3.3%, NS). All subjects had 2D and colour doppler myocardial imaging of basal and mid LV segments (12) in the longitudinal axis. Mean longitudinal strain (S) and strain rate (SR) were averaged from each of the 12 segments assessed. Pulse wave velocity (PWV) carotid-femoral was used for estimation of arterial compliance in 20 of the hypertensive patients.
Results. The hypertensive group had higher pulse pressure (59.5±16.6 vs. 41.4±7.2 mmHg, $P < 0.001$), and lower mean longitudinal S and SR (S: 18.1±2.2 vs. 20.5±2.0% $P < 0.05$ and SR: 1.34±0.16 vs. 1.54±0.13/s $P < 0.05$) compared to control. The patients with hypertrophy or diastolic dysfunction (DD) had higher PP than those without hypertrophy (65±15 vs. 46±11 mmHg, $P < 0.001$) or DD (63±16 vs. 44±12 mmHg, $P < 0.001$). Pulse pressure was correlated with LVMI ($r = 0.51$, $P < 0.001$), WT ($r = 0.61$, $P < 0.001$), RWT ($r = 0.52$, $P < 0.001$), mean SR ($f = -0.58$, $P < 0.001$), mean S ($f = -0.51$, $P < 0.001$), DT($r = 0.36$, $P < 0.05$), A ($r = 0.45$, $P < 0.05$) and E/A ($f = -0.54$, $P < 0.01$). PWV was correlated with mean S and SR ($f = -0.58$, $P < 0.05$ and $f = -0.49$, $P < 0.05$) and PP ($r = 0.47$, $P < 0.05$).
Conclusion. Pulse pressure is related with functional (S, SR) and structural (WT, LVMI, RWT) components of the left ventricle and with the arterial stiffness. Arterial stiffness seems to affect not only the diastolic, but also the longitudinal systolic function of the left ventricle.

P.059
SEGMENTAL LEFT VENTRICULAR FUNCTION ESTIMATED BY STRAIN ECHOCARDIOGRAPHY IN RELATION TO ARTERIAL STIFFNESS IN HYPERTENSIVES. MRI FINDINGS IN RESPECT TO MYOCARDIAL FIBROSIS - PRELIMINARY REPORT

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Background: Left Ventricular (LV) diastolic function has been reported to be related with the presence of increased arterial stiffness in hypertension. Myocardial fibrosis is one of the main causes of diastolic dysfunction (DD).
Aim: To investigate the role of arterial stiffness in segmental LV systolic function and the presence of fibrosis with Delayed Enhancement (DE) MRI in hypertension.
Methods: We studied 20 consecutive hypertensive patients with mean age 51.6±6.1 years and normal EF 66.3±4.1%, with no history of coronary artery disease. All subjects had MRI with (DE) and 2D and colour doppler myocardial imaging of basal and mid LV segments (12) in the longitudinal axis. Mean longitudinal strain (S) and strain rate (SR) were averaged from each of the 12 segments assessed. Pulse wave velocity (PWV) carotid-femoral was measured.
Diastolic dysfunction was diagnosed based on published criteria regarding DT, IVRT, E/A and TDIEa.
Results: The mean duration of hypertension was 10.4±5.7 yrs. Diastolic dysfunction was evident in 16 out of the 20 patients. PWV was increased in patients with diastolic dysfunction (12.6±2.3 vs. 10.6±1.4 m/s) compared to those without DD. Septal basal and mid segment had the lowest systolic strain (basal: 15±2.7%, mid: 19.5±3.1%) and strain rate value (basal: 1.1±0.2/s, mid: 1.4±0.3/s) in comparison to the other segments. PWV was correlated with septal mid SR ($r = -0.60$, $P < 0.05$) and septal basal and mid S ($r = -0.67$, $P < 0.05$ and $r = -0.69$, $P < 0.05$). PWV was also correlated with mean S and SR ($r = -0.58$, $P < 0.05$ and $r = -0.49$, $P < 0.05$) and PP ($r = 0.47$, $P < 0.05$).MRI with DE detected 2 patients (10%) having replacement fibrosis, but did not detect interstitial or perivascular fibrosis.
Conclusion: Septal wall is the region mainly affected by the presence of hypertension in comparison to other segments. Arterial stiffness is related to global and regional longitudinal systolic function. MRI can exclude replacement but not subtle interstitial or perivascular fibrosis in hypertensive patients.

P.060
AGE-RELATED ARTERIAL STIFFNESS IN PATIENTS WITH WHITE COAT OR ESSENTIAL HYPERTENSION

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Background: It is well documented that arterial stiffness is age-related. The purpose of the present study was to evaluate to what extent age affects