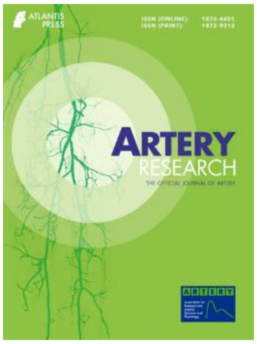

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P6.06: AORTIC REFLECTIONS-RELATED TIME AND MAGNITUDE INDICES ESTIMATED FROM THE SUPERIMPOSITION OF CENTRAL PRESSURE AND FLOW WAVEFORMS

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Conclusion: Within patients, short-term changes in arterial stiffness of ~1 m/s in the presence of >10 mmHg BP lowering can be deemed entirely pressure dependent. This pressure dependency of arterial stiffness increases with age, in part explaining the well-established pattern between stiffness, BP and age at (reference) population level.

P6.06
AORTIC REFLECTIONS-RELATED TIME AND MAGNITUDE INDICES ESTIMATED FROM THE SUPERIMPOSITION OF CENTRAL PRESSURE AND FLOW WAVEFORMS

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Objectives: While in young subjects, central pressure and flow peaks occur simultaneously and before time to return of reflected pressure (Tr), Tr progressively shifts towards early systole with aging, and eventually occurs before pressure peak. Consequently such parameters along with the corresponding augmentation index (AIx) have been previously shown as relevant indices of arterial aging. However, Tr accurate determination using pressure alone remains challenging, especially in elderly subjects. Accordingly, our aim was to combine central pressure and flow waveforms to provide objective and reproducible reflections-related indices.
Methods: We studied 50 healthy subjects (24 women, age: 46±15years), who underwent ascending aorta velocity-encoded magnetic resonance (1.5T) and carotid aplanation tonometry. For each subject, , time delays between Tr and peak flow ($T_{Qmax\text{-}Tr}$) and between pressure and flow peaks ($T_{Q\text{-}Pmax}$), which are related to the overlap between incident and reflected pressure waves, were automatically estimated using a custom software that enables superimposition of pressure and flow waveforms. Conventional AIx was also measured from carotid pressure waveform. Forward and backward pressure components obtained using aortic characteristic impedance were used to estimate reflection magnitude (RM) as the ratio between backward and forward pressure magnitudes.
Results: The obtained correlations for comparison against age, AIx and RM were higher for $T_{Q\text{-}Pmax}$ than for Tr or $T_{Qmax\text{-}Tr}$ (Table). Importantly association with RM, which is known to be a pure index of wave reflection, was superior for the combined index $T_{Q\text{-}Pmax}$.
Conclusions: Superimposition of pressure and flow waveforms helps for an objective and reproducible evaluation of central reflections-related indices.

Table. Comparison of reflection indices against age, augmentation index (AIx) and reflection magnitude (RM).

r (p)	Tr	$T_{Qmax\text{-}Tr}$	$T_{Q\text{-}Pmax}$
Age	-0.51 (p=0.0002)	-0.42 (p=0.003)	0.69 (p<0.0001)
AIx	-0.77 (p<0.0001)	-0.60 (p<0.0001)	0.82 (p<0.0001)
RM	-0.46 (p=0.001)	-0.52 (p=0.0001)	0.84 (p<0.0001)

P6.07
A STUDY TO DETERMINE IF THE REFLECTED WAVE TRANSIT TIME FROM BRACHIAL SUPRASYSTOLIC WAVEFORM ANALYSIS IS REPRESENTATIVE OF LARGE ARTERY STIFFNESS

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Background: Aortic stiffness is clinically important, but measurement can be time consuming. The 'reflected wave transit time' (RWTT) is thought to represent aortic stiffness and, since this can be measured quickly by brachial cuff oscillometry, could be a useful new test. This study aimed to compare RWTT with directly measured aortic (as well as brachial) stiffness in non-diabetics and also diabetics where there would be an expectation of increased stiffness (lower RWTT).
Methods: Aortic and brachial stiffness were recorded using tonometric pulse wave velocity (PWV; SphygmoCor) in 68 non diabetic (age 54.9±8.6 years,64.7% male) and 20 patients with type 2 diabetes (T2DM; age 60.5±9.6 years,55% male). RWTT was measured using brachial cuff oscillometry and suprasystolic waveform analysis (Pulscor®) as the time between the first and late systolic waves. Aortic PWV was also calculated from path length/RWTT in a subgroup of 69 patients.
Results: T2DM patients had significantly higher aortic PWV (9.6±2.7 vs 7.7±1.6 m/s, p=0.005), but no difference in brachial PWV (7.6±1.1 vs 8.1±1.4 m/s, p=0.14). RWTT between T2DM and non-diabetics was not significantly different (0.16±0.02 vs 0.17±0.02 s, respectively p=0.12). There were no significant correlations between RWTT and aortic PWV or brachial PWV in either T2DM or non-diabetic groups (r>-0.05, p>0.05 all). Furthermore, calculated aortic PWV was not significantly related to actual aortic PWV (p>0.05).
Conclusions: While brachial artery cuff oscillometric waveform analysis offers potentially useful clinical information, the transit time of pulse waves is not representative of large artery stiffness and, therefore, needs to be measured directly.

P6.08
EVALUATING THE HEMODYNAMIC IMPACT OF ISOLATED NON-DISTENSIBILITY AND RESIDUAL NARROWING AFTER COARCTATION REPAIR USING A COMPUTATIONAL STUDY

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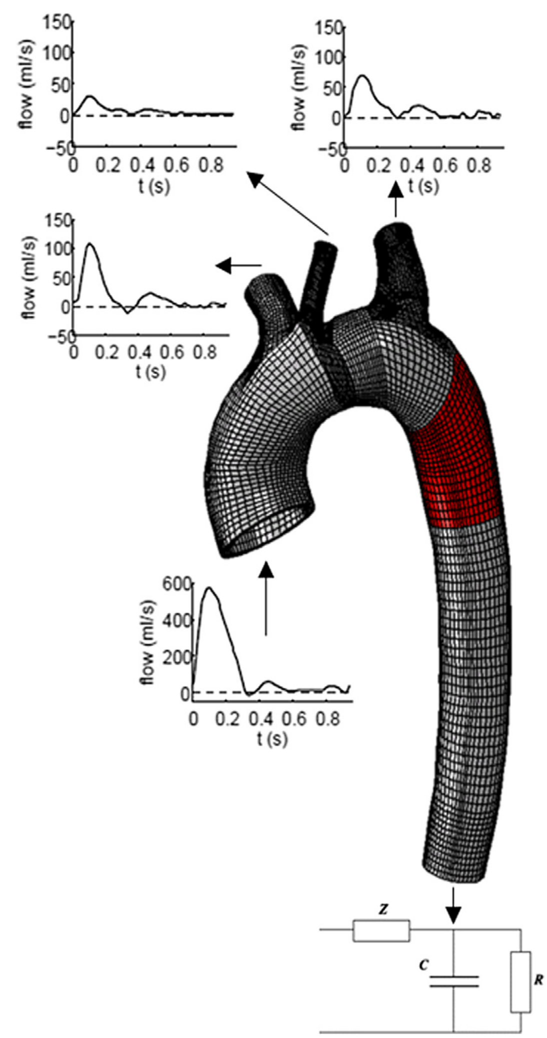

Figure 1 Patient specific model.

Background: Even after successful treatment of aortic coarctation, a high risk of cardiovascular morbidity and mortality remains. Uncertainty exists on the factors contributing to this increased risk among others the presence of (1) a residual narrowing, leading to an additional resistance in the arterial