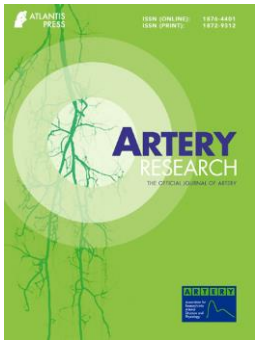

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P2: DETERMINATION OF LOCAL PULSE WAVE VELOCITY DOES NOT AFFECTED BY REFLECTION

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ARTERY 18 Poster Session

Poster Session I — Basic

P1

DETERMINANTS OF PERIPHERAL PULSE PRESSURE AND PULSE PRESSURE AMPLIFICATION

Ye Li [1], Antoine Guilcher [1], Samuel Vennin [1], Jordi Alastruey-arimon [2], Phil Chowienczyk [1]

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Objective: Peripheral (e.g. brachial) Pulse Pressure (Ppp) exceeds central pulse pressure (Cpp) corresponding to the first (Cpp1) or second (Cpp2) peaks in the central waveform. This pulse pressure amplification, attributed to propagation of the pulse wave from aorta to periphery and influence of reflection in the periphery, is measured as Ppp/Cpp2 (when Cpp2 > Cpp1). We examined whether the haemodynamic determinant of Ppp relates more closely to Cpp1 rather than Cpp2.
Methods: We examined the theoretical influence of change in morphology of central aortic waveform on peripheral waveform when applying a reverse transfer function to the aortic waveform. Secondly, we examined the relationship between central and peripheral waveforms during modulation of central pressure with nitroglycerine (GTN). Central pressures were obtained during cardiac atheterization with a Millar catheter placed in the proximal aortic root in patients with non-critical coronary artery disease (n = 15) at baseline and after GTN. The digital arterial pulse was acquired simultaneously with a servo-controlled finger cuff.
Results: In theoretical analysis, Ppp was sensitive only to the portion of the waveform up to the time of Cpp1. Similar results were observed with GTN, which had no significant effect on Cpp1 (38.7 ± 2.0 and 37.1 ± 2.5 mmHg at baseline and after GTN respectively, P = 0.36) nor on Ppp (70.2 ± 5.0 and 69.2 ± 4.7 mmHg at baseline and after GTN respectively, P = 0.47) but reduced Cpp2 by 17.0 ± 1.8 mmHg (P < 0.001).
Conclusions: These results suggest that peripheral pulse pressure is determined by the early systolic portion of the central aortic pressure waveform up to the time of Cpp1 and may be independent of Cpp2.

P2

DETERMINATION OF LOCAL PULSE WAVE VELOCITY DOES NOT AFFECTED BY REFLECTION

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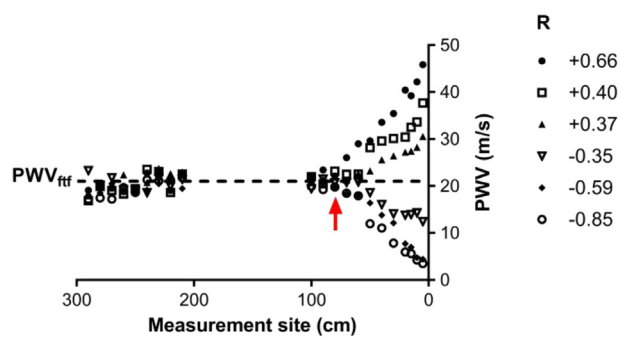
Objective: PWV is an important indicator of arterial stiffness and cardiovascular diseases. Local PWV would provide a more accurate estimation of local stiffness than does regional PWV. Local PWV is commonly determined by loop techniques, such as the PU-loop method and the aim of this study is to examine the effect of reflections on the accuracy of determining local PWV by loop Methods.
Methods: Pressure and flow were measured along a flexible tube that was connected to three positive and three negative reflections. PWV was calculated using the PU-loop method and wave intensity analysis was used to separate the pressure and flow velocity waveforms, using PWV of 20.2 m/s measured determined by the foot-to-foot method. Local reflection coefficient I was calculated as the ratio of magnitudes of backward to forward pressure.
Results: Figure 1 shows local PWV is not affected by the reflection until measurements were taken at 80 cm away from reflection site, when it starts to increase or decrease depending on the type of the reflection. The threshold of R corresponding to the non-affected PWV by reflections is ±0.36 ± 0.05 (mean ± SD).
Conclusions: The results of this study indicate that local PWV determined by PU-loop are only affected by reflections when the local reflection coefficient is greater than ±0.36 ± 0.05, irrespective of the distance to the reflection site. If/given reflections of the current study are comparable to those measured in vivo, PWV would not be affected by reflections in the arterial system.



	R					
Distance from reflection	A	B	C	D	E	F
5 (cm)	0.66	0.40	0.37	-0.35	-0.59	-0.85
80 (cm)	0.40	0.32	0.24	-0.15	-0.45	-0.60

P3

UNDERSTANDING THE ENDOTHELIAL — SMOOTH MUSCLE — FIBROBLASTIC CELLS INTERACTIONS ON A TISSUE-ENGINEERED VASCULAR GRAFT

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There is still a pressing need to develop small-diameter vascular vessels for vascular reconstructive procedures. Tissue Engineering offers the prospect of being able to meet this medical demand, as it allows the development of structurally complex blood vessels substitutes 1. Accordingly, the ultimate aim of this work is to develop small diameter vascular substitutes based on layering multiple cell types. Co-culture systems of human endothelial-smooth muscle cells and fibroblastic-smooth muscle cells were initially established. These co-cultures were then assembled to develop a tri-culture system, which mimics the structural organization of a blood vessel. Electrospun nanofibrous meshes were

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