07.02: TOWARDS NON-INVASIVE ASSESSMENT OF RENAL ARTERY STENOSIS SEVERITY IN THE INDIVIDUAL PATIENT WITH THE AID OF NUMERICAL COMPUTER SIMULATIONS

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due to an increase in aortic stiffening (pulse wave velocity, $r = 0.77$, $p < 0.001$).

Conclusions: Reflected wave can be followed travelling-back from the proximal aorta into the coronary arteries. These reflected waves augment coronary systolic blood flow. With increasing age the degree of augmentation of systolic coronary blood flow is increased.

Results: The numerical calculations yielded a DP of 11.7mmHg, which was in excellent agreement with the value of 10.5mmHg measured in vivo in the same patient (with pressure guide-wires) and with values measured in a silicon hydraulic bench model of the same geometry. A parameter study demonstrated a rapid increase in DP beyond 60% stenosis. In the post-stenotic dilatation zone, secondary flow patterns with recirculation were observed. Conclusion: These promising results demonstrate the feasibility and utility of patient-specific computer simulations in the diagnosis of individual patients, although further steps will be necessary to include pulsatile blood flow, distensible walls and patient-specific boundary conditions.

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