



# **Pulse wave velocity measurements by 3T cardiac magnetic resonance - comparison with applanation tonometry.**

**ID 1276**

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## Background:

Arterial stiffness is one of the most potent prognostic factors of cardiovascular morbidity and mortality. Its surrogate parameter, pulse wave velocity (PWV), can be assessed by carotid-femoral applanation tonometry (AT), which is currently a gold standard.

However, limited availability of the AT equipment prevents its wider application in clinical practice. Cardiac magnetic resonance (CMR) study can include robust arterial stiffness assessment at no extra cost, without significant protocol extension. However, comparison data of these two methods of PWV measurement are limited.



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### **Purpose**

To compare AT- and CMR-derived PWV measurements in our initial set of ten consecutive subjects aged  $28 \pm 8$  (16-44) yrs in whom cardiovascular disease was excluded based on clinical assessment and CMR result.

### **Methods**

Ten consecutive subjects underwent CMR as screening for genetic/familial disease. PWV measurements were done with AT by the carotid [C] and femoral [F] applanation pulse wave recording and body surface approximation of the distance travelled (suprasternal notch to [F] - suprasternal notch to [C]), using SphygmoCor, (AtCor Medical, Australia), and with 3T CMR (Philips Achieva 3T TX, Eindhoven, the Netherlands), based on ascending and thoracic aortic flow data and direct aortic length measurements (Segment, Medviso, Sweden).

### **Results**

Mean AT-PWV and mean CMR-PWV were  $5,54 \pm 0,65$  m/s and  $4,15 \pm 0,79$  m/s, respectively). Good correlation was found between these two methods ( $R=0,7$ ;  $P<0,05$ ). Interobserver variability of CMR-PWV was very good ( $R=0,93$ ;  $P<0,05$ ) as was intraobserver variability ( $R=0,98$ ;  $P<0,05$ ). Determination coefficients [R<sup>2</sup>] are shown on graphs.



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## Conclusions:

These preliminary results indicate that aortic PWV measurements incorporated in the routine 3T CMR examination correlate well with carotid-femoral AT-PWV measurements in individuals without detectable cardiovascular disease. CMR-derived PWV analysis appears to have excellent intraobserver and interobserver variability. Further research is needed in a variety of clinical conditions.

