**EDITORIAL**

# Editor's choice to the January 2022 issue

## Pulse wave velocity

**Johan H. C. Reiber¹**

Dear reader,

For this January 2022 issue, I would like to recommend two papers on the values of Pulse Wave Velocity(PWV), the first one the "Estimated pulse wave velocity (ePWV) as a potential gatekeeper for MRI-assessed PWV: a linear and deep neural network based approach in 2254 participants of the Netherlands Epidemiology of Obesity study" by Dr MJ van Hout and co-authors from the Leiden University Medical Center [1], and the second one "Determinants and prognostic relevance of aortic stifness in patients with recent ST-elevation myocardial infarction" by Dr I Lechner and co-authors from the Medical University of Innsbruck [2].

It is well-known that the Pulse-Wave-Velocity (PWV) as assessed by magnetic resonance imaging is a prognostic marker of cardiovascular events. In an attempt to decrease the actual number of MRI's to be performed, the team from Leiden developed an estimated PWV (ePWV) marker based on clinical and anthropometric values; they used a basic and expanded linear ridge regression model as well as a basic and extended Deep Neural Network (DNN); the Study overview is presented in Fig. 1 below. A total of 2254 participants from the Netherlands Epidemiology of Obesity study were included (age 45–65 years, 51% male). An optimal threshold was found to be 6.7 m/s for the PWV. Although all models showed good discriminative performance, the expanded linear ridge regression model showed the best performance. For all models it became also clear that the measurements would deviate above a PWV value of about 9 m/s.

This is the first report to provide a threshold of PWV that could function as a gate keeper for those that would benefit for further detailed MRI investigations. And with that the limited available MRI scan time and healthcare costs can be saved for those patients with an ePWV < 6.7 m/s.

In the study by Lechner et al., they enrolled prospective a total of 408 patients who sustained a first STEMI and underwent primary PCI; a follow-up took place after 13 months. In this work they demonstrated that age and hypertension are the key-determinants of aortic stiffness in patients with recent STEMI [Fig. 2]. In a multi-variable Cox-regression analysis, the median PWV of 6.6 m/s significantly and independently predicted the occurrence of MACCE after adjustment for patient characteristics.

I wish you much pleasure in reading these and the other papers in this issue of the International Journal of Cardiovascular Imaging, and of course wish you all the best in general and health in particular at the start of this new year 2022.

Johan HC Reiber, PhD
Editor-in-chief
e-mail: J.H.C.Reiber@lumc.nl

✉ Johan H. C. Reiber
   J.H.C.Reiber@lumc.nl

1  Dept of Radiology, Leiden University Medical Center, Leiden, The Netherlands
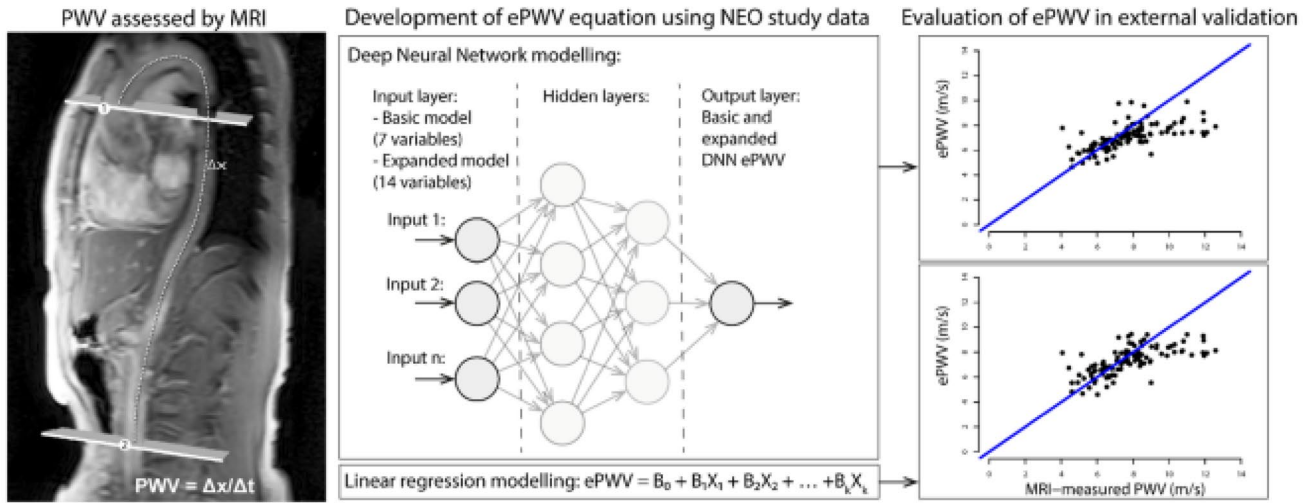
**Fig. 1** Study overview: left panel: PWV measurement by MRI; middle panel: illustration of production mode ldevelopment neural networks and linear regression; right panel: illustration of ePWV model performance evaluation in the external validation dataset
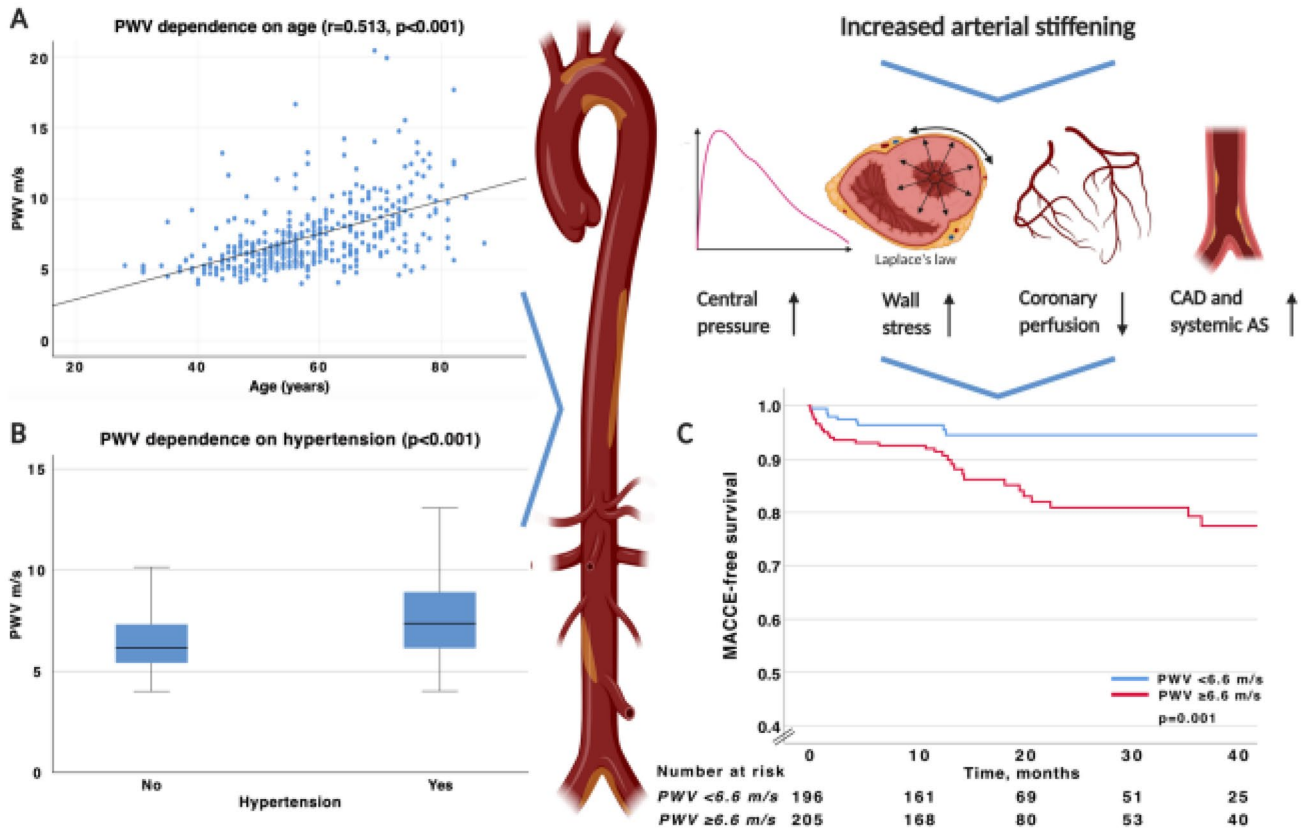


**Fig. 2** Association of aortic PWV in relation to age, hypertension and clinical outcome. *PWV* pulse wave velocity, *STEMI* ST-elevation myocardial infraction, *CAD* coronary artery disease, *AS* atherosclerosis, *MACCE* major adverse cardiac and cardiac events (Created with Biorender0

## References

1. van Hout MJ, Dekkers IA, Lin L et al (2021) Estimated pulse wave velocity (ePWV) as a potential gatekeeper for MRI-assessed PWV: a linear and deep neural network based approach in 2254 participants of the Netherlands Epidemiology of Obesity study. Int J Cardiovasc Imaging. https://doi.org/10.1007/s10554-021-02359-0
2. Lechner I, Reindl M, Tiller C et al (2021) Determinants and prognostic relevance of aortic stiffness in patients with recent ST-elevation myocardial infarction. Int J Cardiovasc Imaging. https://doi.org/10.1007/s10554-021-02383-0

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.