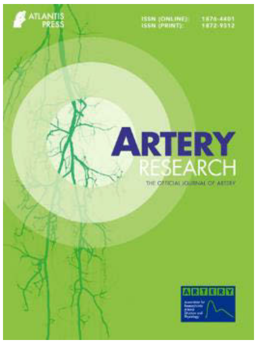


Artery Research

ISSN (Online): 1876-4401 ISSN (Print): 1872-9312
Journal Home Page: https://www.atlantis-press.com/journals/artres

P144: ASCENDING AND DESCENDING THORACIC AORTA PU-LOOPS FOR THE ESTIMATION OF LEFT VENTRICULAR AFTERLOAD

Alex Hong, Jona Joachim, Cedric Buxin, Sandrine Millasseau, Arthur Le Gall, Joaquim Mateo, Etienne Gayat, Fabrice Vallée

To cite this article: Alex Hong, Jona Joachim, Cedric Buxin, Sandrine Millasseau, Arthur Le Gall, Joaquim Mateo, Etienne Gayat, Fabrice Vallée (2017) P144: ASCENDING AND DESCENDING THORACIC AORTA PU-LOOPS FOR THE ESTIMATION OF LEFT VENTRICULAR AFTERLOAD, Artery Research 20:C, 97–97, DOI: https://doi.org/10.1016/j.artres.2017.10.156

To link to this article: https://doi.org/10.1016/j.artres.2017.10.156

Published online: 7 December 2019

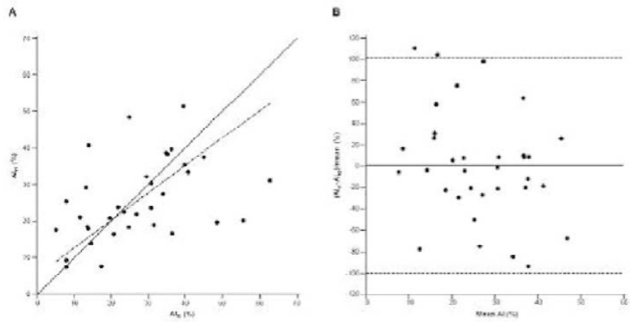


Figure 2. A. Scatter plot showing AI before (AI_{t0}) and after (AI_{t1}) cardioversion. The solid line is the line of identity, the broken line the regression line for AI_{t1} vs AI_{t0} (Passing & Bablok regression). B. Bland-Altman plot showing the proportional difference (%) between AI after (AI_{t1}) and AI before (AI_{t0}) cardioversion. The solid line represents the mean value of AI and the dotted lines mean $\pm$ 2 SD.

Conclusions: Measurement of PWV and CPP is reliable in patients with AF, as they appear unaffected by the presence of arrhythmia.

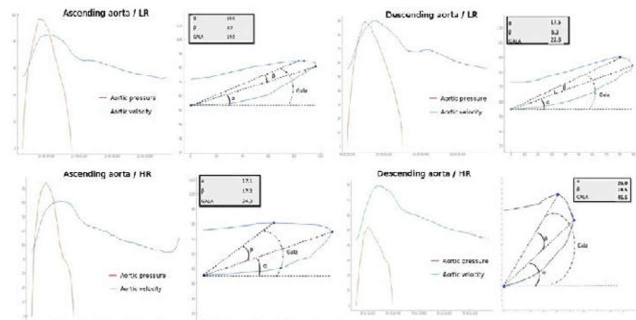
References
1 Kirchhof P, Benussi S, Kotecha D, Ahlsson A, Atar D, Casadei B, Castella M, Diener H-C, Heidbuchel H, Hendriks J, Hindricks G, Manolis AS, Oldgren J, Popescu BA, Schotten U, Van Putte B, Vardas P, Agewall S, Camm J, Baron Esquivias G, Budts W, Carerj S, Casselman F, Coca A, De Caterina R, Deftereos S, Dobrev D, Ferro JM, Filippatos G, Fitzsimons D, Gorenek B, Guenoun M, Hohnloser SH, Kolh P, Lip GYH, Manolis A, McMurray J, Ponikowski P, Rosenhek R, Ruschitzka F, Savelieva I, Sharma S, Suwalski P, Tamargo JL, Taylor CJ, Van Gelder IC, Voors AA, Windecker S, Zamorano JL, Zeppenfeld K. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. European Heart Journal 2016; 37: 2893—2962.
2 Townsend RR, Wilkinson IB, Schiffrin EL, Avolio AP, Chirinos JA, Cockcroft JR, Heffernan KS, Lakatta EG, McEniery CM, Mitchell GF, Najjar SS, Nichols WW, Urbina EM, Weber T. Recommendations for Improving and Standardizing Vascular Research on Arterial Stiffness A Scientific Statement From the American Heart Association. Hypertension 2015; 66: 698—722.
3 Van Bortel LM, Laurent S, Boutouyrie P, Chowienczyk P, Cruickshank JK, De Backer T, Filipovsky J, Huybrechts S, Mattace-Raso FUS, Protogerou AD, Schillaci G, Segers P, Vermeersch S, Weber T, Artery Society, European Society of Hypertension Working Group on Vascular Structure and Function, European Network for Noninvasive Investigation of Large Arteries. Expert consensus document on the measurement of aortic stiffness in daily practice using carotid-femoral pulse wave velocity. J. Hypertens. 2012; 30: 445—448.

P144

ASCENDING AND DESCENDING THORACIC AORTA PU-LOOPS FOR THE ESTIMATION OF LEFT VENTRICULAR AFTERLOAD

Alex Hong [1,2], Jona Joachim [1,3,4], Cedric Buxin [1], Sandrine Millasseau [5], Arthur Le Gall [1,3,4,2], Joaquim Mateo [1], Etienne Gayat [1,2,6], Fabrice Vallée [1,3,4]
[1]*St — Louis — Lariboisière — Fernand Widal University Hospitals, Dept of Anaesthesiology & Intensive Care — Le Temple, Paris, France*
[2]*UMR-S 942 INSERM, Lariboisière Hospital, France*
[3]*M3DISIM — Inria, Université Paris-Saclay, France*
[4]*LMS, Ecole Polytechnique, CNRS, Université Paris — Saclay, France*
[5]*Pulse Wave Consulting, Saint Leu La Foret, France*
[6]*Paris Diderot University, Sorbonne Paris Cité, France*

Introduction: Pressure-Velocity (PU) loops obtained in the descending thoracic aorta (PU-loops_{des}) could estimate left ventricular afterload with two remarkable angles: β and GALA (*Global Afterload Angle*) [1].The aim of this study is to compare PU-loops measured in the ascending aorta (PU-loops_{asc}) versus PU-loops_{des}.
Methods: This study was conducted in patients scheduled for elective interventional neuroradiology. During the procedure, we measured pressures at two different sites:(1) in the ascending aorta where we obtained a transthoracic echocardiogram (TEE) concomitantly to measure ascending aortic blood velocity, (2) in the descending thoracic aorta where blood velocity was obtained using a trans-esophageal Doppler probe. Patients were divided into high risk (HR) and low risk (LR) groups based on their cardiovascular risk factors.
Results: Twenty five patients were included (13 HR, 12 LR). We observed a significant increase in both β and GALA angles between PU-loops_{asc} and PU-loops_{des} (from 7° [0—15] to 13° [5—20] and from 30° [23—37] to 41° [29—54], $p < 0.01$ respectively). This increase was more marked in the HR group compared to the LR group ($p < 0.05$) (Fig 1). Just like in PU-loops_{des}, we found that β and GALA angles in PU-loops_{asc} could also discriminate between LR and HR patients (3° [0.4—6] vs 17° [9—25] and 24° [22—26] vs 38° [34—43], $p < 0.01$ respectively).
Conclusion: PU-loops_{asc} had lower β and GALA angles compared to PU-loops_{des}. However, GALA could discriminate between high and low cardiovascular risk patients in both sites.



References
1. Vallée F et al. Beat-by-beat assessment of cardiac afterload using descending aortic velocity—pressure loop during general anesthesia: a pilot study. Journal of Clinical Monitoring and Computing 2017 Jan 20.

P145

MEASUREMENT OF BLOOD PRESSURE DEPENDENCY OF CAROTID-FEMORAL PULSE WAVE VELOCITY

Mark Butlin [1], Isabella Tan [1], Fatemeh Shirbani [1], Bart Spronck [2], Alberto Avolio [1]
[1]*Macquarie University, Australia*
[2]*Maastricht University, Netherlands*

Background: Carotid-femoral pulse wave velocity (cfPWV) is predictive of cardiovascular outcomes but clinical interpretation is confounded by blood pressure (BP) interaction. This study proposes a method for PWV pressure dependency measurement suitable for routine clinical or research use.
Methods: Carotid tonometry and thigh-cuff volumetric displacement allowed cfPWV measurement in the seated and supine position. Brachial oscillometry gave systemic BP. Solving simultaneous equations describing the seated and supine measurement gave hydrostatic BP change across the carotid-femoral arterial path and the pressure dependency of cfPWV. Stepwise multiple linear regression quantified the association of pressure dependency of cfPWV with demographic and cardiovascular parameters.
Results: Of 88 subjects (19 to 91 years, 41 female), 4 (4.5%) had an unexpected increase in cfPWV with decreased BP from seated to supine position. Cross-sectional analysis in the remaining cohort showed blood pressure dependency of cfPWV correlated with brachial pulse pressure ($\beta = 0.40$, $p < 0.001$), diastolic pressure ($\beta = -0.33$, $p < 0.001$), gender ($\beta = 0.25$ for female/male = 1/0, $p = 0.010$), and heart rate ($\beta = 0.23$, $p = 0.033$).
There was no correlation with supine cfPWV nor age. Average pressure dependency of cfPWV was 0.6 ± 0.3 m/s per 10 mmHg (range of 0.09 to 1.5 m/s per 10 mmHg). Average change in transmural BP across the carotid-femoral arterial path was 20 ± 7 mmHg (diastolic BP change 4 ± 7 mmHg; hydrostatic BP change 16 ± 2 mmHg).