8.4: ARTERIAL COMPLIANCE AND CAROTID ATHEROSCLEROSIS IN APOLIPOPROTEIN A-I AMYLOIDOSIS (LEU75PRO)

A. Paini, M.L. Muiesan, M. Salvetti, C. Aggiusti, E. Belotti, C. Agabiti Rosei, G. Gregorini, G. Cancarini, E. Agabiti Rosei


To link to this article: https://doi.org/10.1016/j.artres.2009.10.176

Published online: 14 December 2019
ARTERIAL COMPLIANCE AND CAROTID ATHEROSCLEROSIS IN
APOLIPOPROTEIN A-I AMYLOIDOSIS (LEU75PRO)

A. Panni 1, M. L. Muiesan 1, M. Salveti 1, C. Aglietti 1, E. Belotti 1,
C. Agabiti Rosi 1, G. Gregorini 2, G. Cancarini 2, E. Agabiti Rosei 1
1 Internal Medicine, University of Brescia, Brescia, Italy
2 Nephrology, University of Brescia, Brescia, Italy

Background: Hereditary amyloidosis are late-onset autosomal dominant
disorders characterized by amyloid deposition in various tissues. Among
them, Apolipoprotein A-I amyloidosis (Leu75Pro) is a rare autosomal dominant
condition in which renal, hepatic, and testicular involvement has been demon-
strated. No data are available about vascular alterations in this condition.
Aim of the study was to evaluate arterial stiffness, assessed by pulse wave velocity (PWV) and carotid artery intima-media thickness (IMT), evaluated by ultrasound,
in patients with Apolipoprotein A-I amyloidosis (APO AI). Patients: In 104 patients with APO AI (mean age 52 ± 16 years, 56 F) and in 104 subjects matched
for age, sex, body mass index (BMI) and blood pressure (BP), PWV and IMT were
measured. Results: By definition no differences for age, sex, BMI, BP, heart
rate were observed. PWV was significantly higher in patients with APO AI
than controls (11.5 ± 2.9 and 10.7 ± 2.3, p < 0.05), even after adjusting for cholesterol, creatinine, mean BP and heart rate measured during PWV assess-
ment. In patients with APO AI the prevalence of increased arterial stiffness (defined as PWV > 12 m/sec) was significantly greater than in controls (31% vs 17%, p < 0.05). Mean common bifurcation and internal carotid artery IMT
were comparable in the two groups (0.87 ± 0.21 vs 0.88 ± 0.17; 1.23 ± 0.41 vs
1.25 ± 0.38; 0.95 ± 0.33 vs 0.95 ± 0.28 respectively for APO AI vs controls,
p<0.05). Similar results were obtained for MeanMax IMT and TMax
(1.02 ± 0.29 vs 1.03 ± 0.26 and 1.60 ± 0.69 vs 1.56 ± 0.58 respectively, p<0.05).
Conclusion: In patients with Apolipoprotein A-I amyloidosis (Leu75Pro) a significant increase in arterial stiffness is observed, on the contrary carotid artery IMT is comparable to that of matched control subjects. These results may add
significant information to the clinical features of this rare genetic disorder.

INCREASED ARTERIAL STIFFNESS IN PATIENTS WITH ALPHA 1
ANTITRYPSIN DEFICIENCY

J. M. Duckers 1, D. J. Shale 1, N. S. Gale 1, R. Stockley 2, J. R. Cockcroft 1,
C. E. Bolton 1

Introduction: There is currently no clinical imaging techniques available to
assess the degree of inflammation associated with atherosclerotic plaques.
This study aims at visualising and characterising atherosclerosis using
targeted USPIO as an MRI probe for detecting inflamed endothelial cells.
Method: The in vitro study consists of detection and characterisation of inflamatory markers on activated endothelial cells by immunocytochemistry and anti-E-selectin antibody conjugated USPIO. The ex vivo stage involves characterisation of inflammatory markers on atherosclerotic plaques, and finally the in vivo stage consists of development of a rat model with focal
lesions in carotid arteries to allow targeted molecular imaging by MRI.
Results: We have established an in vitro cellular model of endothelial inflam-
ination induced with TNFα. We have confirmed the inflammation of endothel-
ial cells with both immunocytochemistry and MRI. These preliminary results
revealed a temporal expression of the inflammatory markers, such as, E-selectin
and VCAM-1, and the expression of these markers was dose dependent on
exposure to TNFα. Furthermore, we imaged rat carotid arteries in vivo by MRI.
Conclusion: We successfully developed an in vitro model to detect and char-
terise inflamed endothelial cells by immunocytochemistry and MRI. This will allow us to develop agents and protocols for imaging vascular inflamma-
tion in atherosclerosis in the future. We have also successfully imaged the
carotid arteries in a live rat by in vivo MRI. This pilot study will form the basis
for a translational study to provide clinicians with a novel tool for in vivo assessment of atherosclerosis.

8.4 ARTERIAL COMPLIANCE AND CAROTID ATHEROSCLEROSIS IN
APOLIPOPROTEIN A-I AMYLOIDOSIS (LEU75PRO)

A. Panni, M. L. Muiesan, M. Salveti, C. Aglietti, E. Belotti, C. Agabiti Rosi, G. Gregorini, G. Cancarini, E. Agabiti Rosei

Background: Hereditary amyloidosis are late-onset autosomal dominant
disorders characterized by amyloid deposition in various tissues. Among
them, Apolipoprotein A-I amyloidosis (Leu75Pro) is a rare autosomal dominant
condition in which renal, hepatic, and testicular involvement has been demon-
strated. No data are available about vascular alterations in this condition. Aim
of the study was to evaluate arterial stiffness, assessed by pulse wave velocity
(PWV) and carotid artery intima-media thickness (IMT), evaluated by ultrasound,
in patients with Apolipoprotein A-I amyloidosis (APO AI). Patients: In 104 patients with APO AI (mean age 52 ± 16 years, 56 F) and in 104 subjects matched
for age, sex, body mass index (BMI) and blood pressure (BP), PWV and IMT were
measured. Results: By definition no differences for age, sex, BMI, BP, heart
rate were observed. PWV was significantly higher in patients with APO AI
than controls (11.5 ± 2.9 and 10.7 ± 2.3, p < 0.05), even after adjusting for cholesterol, creatinine, mean BP and heart rate measured during PWV assess-
ment. In patients with APO AI the prevalence of increased arterial stiffness
(defined as PWV > 12 m/sec) was significantly greater than in controls (31% vs 17%, p < 0.05). Mean common bifurcation and internal carotid artery IMT
were comparable in the two groups (0.87 ± 0.21 vs 0.88 ± 0.17; 1.23 ± 0.41 vs
1.25 ± 0.38; 0.95 ± 0.33 vs 0.95 ± 0.28 respectively for APO AI vs controls,
p<0.05). Similar results were obtained for MeanMax IMT and TMax
(1.02 ± 0.29 vs 1.03 ± 0.26 and 1.60 ± 0.69 vs 1.56 ± 0.58 respectively, p<0.05).
Conclusion: In patients with Apolipoprotein A-I amyloidosis (Leu75Pro) a significant increase in arterial stiffness is observed, on the contrary carotid artery IMT is comparable to that of matched control subjects. These results may add
significant information to the clinical features of this rare genetic disorder.

8.5 INCREASED ARTERIAL STIFFNESS IN PATIENTS WITH ALPHA 1
ANTITRYPSIN DEFICIENCY

J. M. Duckers, D. J. Shale, N. S. Gale, R. Stockley, J. R. Cockcroft, C. E. Bolton

Abstracts

Mean (SD) Control (n = 20) Patient (n = 19)

Men n (%) 13 (65) 12 (63)
Age (yrs) 61.1 (9.1) 59.2 (12.1)
Smoke Pack yrs 5.5 (0.70) 10.0 (0.60)
FEV1 (% predicted) 100.8 (12.5) 42.7 (23.3)**
Heart rate (bpm) 68.2 (12.4) 75.7 (12.5)
MAP (mmHg) 100.4 (10.2) 101.5 (9.2)
Aortic PWV (m/s) 8.5 (1.6) 9.9 (2.1)*
AIX (%) 23.7 (8.8) 26.1 (6.5)
IL-6 (pg/ml) 2.18 (1.64) 3.24 (1.62)*

*p < 0.05; ** p < 0.001. † median (range). ‡ geometric mean (SD)

8.6 ELECTRICAL CAROTID BARORECEPTOR ACTIVATION LOWERS RENAL
ARTERY IMPEDANCE AND STIFFNESS IN AN ACUTE CANINE MODEL

P. Segers, D. Wagner, K. Ludwig, A. W. Cates, D. Georgakopoulos

CVRx, Minneapolis, MN, USA

Background: The exact mechanism by which electrical carotid baroreceptor
activation (CBA) lowers blood pressure in patients with hypertension has yet
to be fully elucidated. Given the central role of the kidneys in blood pressure
regulation, the aim of this study was to assess the impact of CBA on renal artery
impedance and hemodynamics.

Materials and Methods: Renal artery pressure (P) and flow velocity (U) were
measured using an intravascular pressure-velocity wire catheter (Volcano Corp.) in 6 anaesthetized dogs at baseline (BL) and during CBA intended to produce a moderate reduction in mean arterial pressure. Mean flow velocity (Umean), systolic (SBP), diastolic (DBP) and mean pressure (MAP) were derived. Local pulse wave velocity (PWV) was derived from the upstroke of the PU-loops, and wave intensity analysis and wave decomposition was applied to assess (the ratio of) the backward and forward pressure wave (Pf/Pb). Renal artery input impedance was derived.

Results (Table) and discussion: CBA lowered blood pressure and reduced Pf,
leading to higher Pb/Pf. CBA lowered the impedance modulus at all frequencies
(VC component by 9%; harmonics on average by 28%). PWV concomi-
tantly decreased significantly.

Conclusions: In an acute canine model, CBA has a profound effect of
decreasing renal artery impedance and stiffness, suggesting that the therapy
modulates renal artery tone and may have renoprotective effects by reducing the pulsatile energy in the microcirculation.