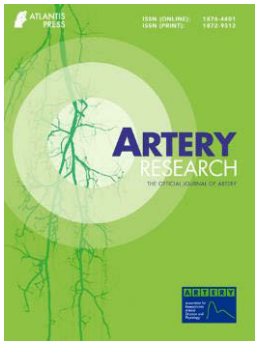

Artery Research

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

P4.03: SUB-ACUTE EFFECTS OF BLOOD PRESSURE LOWERING WITH AMLODIPINE OR LISINOPRIL ON LOCAL CAROTID ARTERY HAEMODYNAMICS

B. Ariff, F. Glor, L. Crowe, Y. Xu, W. Vennart, D. Firmin, S. Thom, A.D. Hughes

To cite this article: B. Ariff, F. Glor, L. Crowe, Y. Xu, W. Vennart, D. Firmin, S. Thom, A.D. Hughes (2009) P4.03: SUB-ACUTE EFFECTS OF BLOOD PRESSURE LOWERING WITH AMLODIPINE OR LISINOPRIL ON LOCAL CAROTID ARTERY HAEMODYNAMICS, Artery Research 3:4, 170–171, DOI: https://doi.org/10.1016/j.artres.2009.10.044

To link to this article: https://doi.org/10.1016/j.artres.2009.10.044

Published online: 14 December 2019

Artery Research (2009) 3, 170–176

available at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/artres

Poster Presentation Abstracts
Therapeutic Aspects 1

P4.01
EFFECTS OF TOCOLYTICAL MEDICATIONS ON THE PERIPHERAL AND CENTRAL HEMODYNAMICS OF HEALTHY FEMALE VOLUNTEERS

I. G. M. Fabry [2], P. De Paepe [1], L. Van Bortel [1]
[1]*Heymans Institute of Pharmacology, Ghent University, B-9000 Ghent, Belgium*
[2]*Drug Research Unit Ghent, Ghent University Hospital, B-9000 Ghent, Belgium*

Objective: Atosiban and ritodrine are frequently used tocolytics . Only a few studies investigated the hemodynamic effects of atosiban. We therefore aimed to study the central and peripheral hemodynamics of both medications.
Methods: Twenty healthy female volunteers (19-41 yrs) were given atosiban (300 μg/min over 2 h) and placebo intravenously (IV) in a random crossover design. Eight of them also received ritodrine IV in escalating doses up to 400μg/min over 2 h. The hemodynamics were investigated at steady state using blood pressure (BP) at the brachial artery (BA), pulse wave analysis on the common carotid artery and echocardiography for cardiac output (CO). Statistical analysis was done using Friedman and Wilcoxon tests (value of significance at 0.05).
Results: Effects on atosiban/placebo on N = 20 did not differ from N = 8.

Parameters	*Ritodrine (n = 8)*	*Atosiban (n = 8)*	*Placebo (n = 8)*	p-value[$]
CI (l/min/m^2)	$3.15 \pm 0.92^{*\#}$	1.91 ± 0.47	1.75 ± 0.36	0.002
SI (ml/m^2)	$28.19 \pm 6.34^{*\#}$	32.47 ± 7.07	30.40 ± 4.27	0.325
HR (bpm)	$111 \pm 20^{*\#}$	59 ± 10	57 ± 9	0.002
TPRI (mmHg.ml^{-1}.s)	$1.53 \pm 0.48^{*\#}$	2.69 ± 0.85	2.93 ± 0.66	0.005
MAP(mmHg)	$76 \pm 10^{*\#}$	84 ± 8	82 ± 6	<0.001
AGPP (mmHg)	-8.67 ± 12.30	2.29 ± 17.35	4.38 ± 13.67	0.368

CI (cardiac index); SI (stroke index); MAP (mean arterial pressure); TPRI (total peripheral resistance index); HR (heart rate); AGPP (augmentation index at HR 75).
[$] Friedman-test; [*] significant vs. atosiban; [#] significant vs. placebo.
Conclusion: Ritodrine has important hemodynamical effects reflected by cardiac stimulation (increase in CI through HR increase) and a decrease in peripheral resistance (TPRI) with a trend for decreasing wave reflections (AGPP). The effect of atosiban on central and peripheral hemodynamics did not differ from placebo.

P4.02
EFFECTS OF TOCOLYTICAL MEDICATION ON BLOOD PRESSURE AND BLOOD PRESSURE AMPLIFICATION

I. G. M. Fabry [2], P. De Paepe [1], L. Van Bortel [1]
[1]*Heymans Institute of Pharmacology, Ghent University, B-9000 Ghent, Belgium*
[2]*Drug Research Unit Ghent, Ghent University Hospital, B-9000 Ghent, Belgium*

Objective: Atosiban (oxytocin-antagonist) and ritodrine (β-agonist) are frequently used tocolytics. Only a few studies investigated the hemodynamic effects of atosiban. We therefore aimed to study the effects on the blood pressure (BP) and BP-amplification.
Methods: Twenty healthy female volunteers (19-41 yrs) were given atosiban (300 μg/min over 2 h) and placebo intravenously (IV) in a random crossover design. Eight of them also received ritodrine IV in escalating doses up to 400μg/min over 2 h. The brachial artery (BA) blood pressures (BP) were taken by an oscillometric device (OMRON 705-IT) and the BP at the common carotid artery (CCA) and the radial artery (RA) were calculated using applanation tonometry. This was done at the steady state of the highest dose. Statistical analysis was done using Friedman and Wilcoxon test setting value of significance at 0.05.
Results: *Effects on atosiban/placebo on N = 20 did not differ from N = 8.*

Parameters (mmHg)	*Ritodrine (n = 8)*	*Atosiban (n = 8)*	*Placebo (n = 8)*	p-value[$]
SBP_{CCA}	$113 \pm 13^{*\#}$	105 ± 10	100 ± 6	0.012
SBP_{BA}	$114 \pm 13^{*\#}$	106 ± 10	103 ± 6	0.004
SBP_{RA}	$115 \pm 15^{*\#}$	110 ± 13	110 ± 7	0.368
DBP_{BA}	$55 \pm 11^{*\#}$	69 ± 6	68 ± 5	0.008
MAP	$76 \pm 10^{*\#}$	84 ± 8	82 ± 6	<0.001

SBP (systolic BP), DBP (diastolic BP), MAP (mean arterial pressure). [$] Friedman-test; [*] significant vs. atosiban, [#] significant vs. placebo.
Conclusion: The data show increased SBP at the CCA and BA and lower DBP and MAP under ritodrine. The effects of atosiban did not differ from placebo. Although not statistically significant, the data suggest a nearly absent pressure amplification between CCA-RA during ritodrine administration.

P4.03
SUB-ACUTE EFFECTS OF BLOOD PRESSURE LOWERING WITH AMLODIPINE OR LISINOPRIL ON LOCAL CAROTID ARTERY HAEMODYNAMICS

B. Ariff [1], F. Glor [2], L. Crowe [3], Y. Xu [2], W. Vennart [4], D. Firmin [3], S. Thom [1], A. D. Hughes [1]
[1]*International Centre for Circulatory Health, National Heart and Lung Institute Division, Faculty of Medicine, Imperial College London, & Imperial College Healthcare NHS Trust, London, United Kingdom*
[2]*Department of Chemical Engineering, Faculty of Engineering, Imperial College London, London, United Kingdom*
[3]*Cardiovascular Magnetic Resonance Unit, Royal Brompton Hospital & National Heart and Lung Institute Division, Faculty of Medicine, Imperial College London, London, United Kingdom*
[4]*Pfizer Ltd, Global Research and Development, Sandwich Laboratories, Sandwich, Kent, United Kingdom*

Introduction: Anti-hypertensive agents differ in their ability to slow progression of the increase in carotid artery intima-media thickness (IMT) with

disease and have different effects on the lumen diameter (LD) of the carotid artery. We hypothesised that changes in flow and shear stress in the common carotid artery may contribute to these differences in remodelling.
Methods: 10 treatment naïve hypertensive subjects were recruited into a double blind, placebo controlled, randomised 3-way cross-over study comparing the effects of 7 days treatment with amlodipine or lisinopril. Brachial and carotid blood pressure (BP), common carotid artery (CCA) flow rate, IMT and LD were measured at the end of each treatment period. Magnetic resonance imaging-based computational fluid dynamics was used to calculate time averaged wall shear stress (WSS) in the carotid artery bifurcation.
There were significant reductions in brachial and carotid BP with both active treatments compared to placebo, but brachial and carotid BP did not differ significantly between the antihypertensive agents. CCA flow rate was significantly lower and distal vascular resistance was higher following lisinopril treatment compared with amlodipine. WSS on the inner wall of the CCA was significantly lower after lisinopril treatment compared with amlodipine.
Conclusion: Amlodipine causes increased carotid blood flow and increased WSS compared with lisinopril, probably as a result of greater cerebrovascular vasodilatation. These effects could account for differences in arterial remodelling caused by these agents.

P4.04
LONG-TERM REDUCTION IN AORTIC STIFFNESS IN HYPERTENSIVE PATIENTS IS PARTLY INDEPENDENT OF MBP REDUCTION

C. Collin [1], H. Ait-Oufella [1], K. T. Ong [1], H. Beaussier [1], E. Bozec [1], C. Dufouil [2], P. Boutouyrie [1], S. Laurent [1]
[1]*Hôpital Européen Georges Pompidou, Inserm U907, Paris, France*
[2]*Hôpital Salpétrière, Inserm U708, Paris, France*

Purpose: A decrease in aortic stiffness could theoretically occur after several years of treatment but reduction has never been unequivocally demonstrated in clinical practice. Association with changes in blood pressure remained unclear.
Methods: This longitudinal observational study was conducted in 97 patients (63 ± 1 yrs, 47 women) with treated essential hypertension attending the outpatient hypertension clinic at Pompidou Hospital. Aortic stiffness and carotid pulse pressure (CPP) were determined through carotid-femoral PWV and applanation tonometry. The first measurement of PWV was performed when brachial SBP was lowered below 140 mmHg under treatment. 66 patients had 3 PWV measurements, and 31 patients had 2 measurements during an extended follow-up (5.3 ± 1.2 yrs).
Results: The reduction in PWV (from 14.2 ± 4.2 to 11.1 ± 2.4 m/s, linear mixed model, $P < 0.0001$) was associated with a reduction in central SBP (from 132 ± 2 to 122 ± 2 mmHg, $P < 0.0001$) and central PP (from 59 ± 2 to 54 ± 2, $P < 0.001$), whereas brachial SBP and PP did not significantly change. In multivariate analysis, the decrease in PWV was significantly associated with age ($P < 0.005$), duration of follow-up ($P < 0.0001$), presence of diabetes ($P < 0.005$) and reduction in brachial MBP ($P < 0.005$), independently of gender, changes in brachial PP, glomerular filtration rate and hypercholesterolemia.
Conclusion: These results indicate that a large decrease in aortic stiffness (-22%) can be observed in the long term when hypertensive patients were treated under conditions of routine clinical practice. This reduction of aortic stiffness was associated with a reduction in central SBP and PP contrasting with no change in brachial SBP and PP.

P4.05
NONINVASIVE PULSE WAVE ANALYSIS FOR MONITORING THE CARDIOVASCULAR EFFECTS OF PNEUMOPERITONEUM DURING LAPAROSCOPIC CHOLECYSTECTOMY

Sz. Lengyel [1], P. Sarkany [2], E. Szelei [2], E. Komonyi [1], M. Juhász [1], E. Katona [1], G. Paragh [1], B. Fülesdi [2], D. Páll [1]
[1]*First Department of Medicine, Debrecen, Hungary*
[2]*Anesthesiology and Intensive Care, Debrecen, Hungary*

Aim of Study: Due to absorption of carbon dioxide and elevated intraabdominal pressure, pneumoperitoneum during laparoscopic cholecystectomy has potentially harmful intraoperative cardiovascular effects. Our aim was to test the usefulness of a non-invasive method for detecting these hemodynamic parameters.
Methods: A total of 35 patients, with low anaesthesia risk (ASA 1 and 2) who underwent laparoscopic cholecystectomy were investigated using SphigmoCor arterial wave analyzing system. Conventional pneumoperitoneum was performed, insufflation using carbon dioxid to an intraabdominal pressure of 8-12 mmHg. We determined the estimated central aortic pressure, augmentation pressure, augmentation index, ejection duration and subendocardial viability ratio throughout the surgery. These parameters were recorded after induction of anaesthesia and during the inflation period of surgery.
Results: A significant increase in mean arterial blood pressure (84.5 ± 22.1 vs. 94.0 ± 14.4 mmHg, $p = 0{,}04$), aortic pulse pressure (29.5 ± 9.2 vs. 32.7 ± 11.5 mmHg, $p = 0.04$), augmented pressure (5.9 ± 4.1 vs. 11.0 ± 6.9 mmHg, $p < 0.001$) and corrigated augmentation index (20.1 ± 13.3 vs. 32.8 ± 12.9, $p < 0.001$) were recorded after insufflating the abdomen. After deflating the abdomen the measured parameters tended toward normalization.
Conclusions: The derived parameters suggested an increased mechanical cardiac activity and a raised peripheral vascular resistance along with increases in left ventricular end-systolic wall stress. SphigmoCor arterial wave analysis successfully documented hemodynamic changes occurring during laparoscopic surgery. Our results from this non-invasive technique correspond to data reported previously, using invasive hemodynamic monitoring.

P4.06
DIFFERENTIAL EFFECTS OF NEBIVOLOL AND ATENOLOL ON CAROTID ARTERIAL WAVE INTENSITY

C. Park, J. Sever, A. W. Khir, C. L. Chang, S. Thom, A. D. Hughes, N. Poulter
Imperial College London, London, United Kingdom

Background The hemodynamic effects of the vasodilator β-blocker nebivolol may differ from those of a conventional agent. Wave intensity analysis can describe the energy transported by wavefronts in the arterial system in the direction of wave propagation. A non-invasive ultrasound-based technique [1] was used to compare the effects of nebivolol and atenolol on carotid arterial wave intensity in patients participating in a hypertension treatment study.
Methods 38 hypertensive patients (age 63 ± 11yrs, 21 female) took part in a double-blind randomised cross-over study. All received bendroflumethazide 2.5 mg for 6 weeks in advance, and throughout the study. We compared effects of nebivolol 5 mg and atenolol 50 mg on the magnitude of the initial systolic forward compression wave (S), the protodiastolic forward decompression wave (D) (both generated by the heart), the reflected compression wave (c_i) and local wave speed.
Results. The S and D waves were significantly smaller with atenolol than with nebivolol treatment but wave reflection and wave speed did not differ.

Wave parameter	Nebivolol (n = 38)	Atenolol (n = 38)	p
S wave, kW m^{-2} s^{-2}	735 (586, 1049)	612 (443, 885)	0.007
D wave, kW m^{-2} s^{-2}	220 (183, 284)	164 (106, 225)	0.001
c_i wave, kW m^{-2} s^{-2}	122 (74, 168)	97 (76, 150)	0.4
Wave speed, ms^{-1}	6.67 (5.70, 9.28)	6.61 (5.22, 8.40)	0.4

*Medians (25^{th}, 75^{th} percentiles), * Wilcoxon's signed rank test*
Conclusions: In hypertensive patients nebivolol has a more favourable effect than atenolol on left ventricular wave generation without increasing wave reflection.
1. Niki K, et al., Heart Vessels 2002; 17:12-21.

P4.07
INFLUENCE OF LONG-ACTING ISOSORBIDE-5-MONONITRATE ADMINISTRATION ON LARGE ARTERIAL STIFFNESS IN PATIENTS WITH ESSENTIAL HYPERTENSION

F. T. Ageev, E. M. Seredenina, I. A. Orlova, A. G. Plisuk, I. V. Barinova
Cardiology Research Center, Moscow, Russian Federation

AIM of this study was to evaluate the clinical efficacy of long-acting nitrates, isosorbide-5-mononitrate (ISMN), in addition to ACE inhibitor on artery stiffness in patients with essential hypertension. MATERIALS AND METHODS. 40 hypertensive patients (mean age 61.3 ± 7.4 years, 9 male, 31 female, mean SBP/DBP = $158{,}1 \pm 17{,}9/91{,}7 \pm 9$ mmHg) received moexipril in individual titrated doses (mean dose $11{,}7 \pm 4{,}8$ mg daily) for 3 months. 20 patients, which retained SBP > 140 and/or DBP > 90 mmHg, received additional ISMN (50 mg daily) for 4 weeks. Other patients formed the control