Cardiovascular Outcomes After First-Ever Treatment of Hypertension With Angiotensin Converting Enzyme Inhibitors or Calcium Channel-Blockers in Primary Care

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Background: At the Glasgow Blood Pressure Clinic, a secondary and tertiary referral centre, treatment with ACE inhibitors (ACEI) is associated with cardiovascular mortality lower than that following calcium channel blocker (CCB) treatment. The purpose of this study was to compare cardiovascular outcomes in patients receiving these regimens in primary care.

Methods: The United Kingdom General Practice Research Database contains validated demographic and prescription information on 3.5 million patients in primary care. From these, we identified prior to treatment, all treated with 105,965 treated hypertension eligible for a retrospective cohort analysis. Only those who received ACEI (n = 11249) or CCB (n = 12494) as first-ever therapy between 1988 and 1998 and without evidence of cardiovascular disease prior to treatment were included. Cardiovascular outcomes rates in ACEI and CCB during an average of 6 years follow-up were compared as relative hazard ratios (RHR) with 95% confidence intervals (CI) using Cox proportional hazards model with adjustment for age, gender and year of entry.

Results: Compared with CCB, first-line treatment with hypertension with ACEI was associated with higher significant reductions in cardiovascular outcomes - RHR for coronary artery disease, 0.63 (95% CI 0.58, 0.69) and for cerebrovascular events, 0.87 (95% CI 0.78, 0.97). A trend in favour of ACE was also seen for heart failure, RHR 0.90 (95% CI 0.81, 1.00). As 25% in each group subsequently received treatment with a drug from the other class, differences may have been underestimated. CCB treated patients included more smokers (19% vs 14%) and fewer diabetics (13% vs 16%) but the treatment groups were well balanced for other risk factors. Achieved systolic blood pressure was lower (1.6 mmHg) and diastolic blood pressure higher (4.1 mmHg) in ACEI treated patients. Adjustment for these imbalances did not alter importantly the RHRs.

Conclusions: Compared with CCB, treatment with hypertension with ACEI in primary care is associated with a lower rate of cardiovascular outcomes. The findings are not easily explained by differences in blood pressure control or other risk factors.

1058-125 Is Central Aortic Systolic Pressure Augmentation Solely Due to Pressure Wave Reflection?

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Background: The augmentation of central aortic systolic pressure, associated with increasing age and cardiovascular mortality, is widely believed to result from pressure wave reflection from the distal aorta or its branches. According to this hypothesis the time to the inflection point (TI), marking the putative onset of the influence of a reflected pressure wave, would be expected to decrease, and augmentation index (AI) to increase with augmentation of central systolic pressure (all effects explained by differences in blood pressure control or other risk factors.)

Methods: Aortic pressure waveforms were measured using 2F Millar pressure transducers-tipped catheters in 20 patients (12 male) at 5 pre-determined points within the aortic arch. Waveforms were analyzed for AI and TI. The data were analyzed by repeated measures analysis of variance.

Results: AI decreased progressively between the aortic root and bifurcation (P < 0.001) while TI increased (P < 0.001). Vegetative effects, as expected there was progressive peripheral amplification of systolic and pulse pressures and a fall in the time to peak pressure (all P < 0.001). There was no difference between genders.

Conclusions: These data are in variance with the concept that central systolic pressure augmentation results only from pressure wave reflection. Pressure wave propagation phenomena may be important.

1058-126 Greater Effect in Noninvasive Transfer Function-Derived Central Aortic Systolic Pressure in Type 2 Diabetes Mellitus

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Background: There is theoretical benefit in the assessment of central aortic rather than brachial artery systolic pressure. Optimal blood pressure control in subjects with diabetes mellitus reduces the risk of cardiovascular complications. Thus assessment of central aortic pressure may offer greater benefit, but the method has yet to be evaluated, in diabetes.

Methods: Simultaneous invasive central aortic and non-invasive radial waveforms (application tonometry, Millar’s MillarSP100 tonometer) were acquired in 19 subjects with type II diabetes and applied to a single-input-single-output method for the derivation of a transfer function (TF). Individual TFS were averaged to yield a diabetes-specific TF (DTT). DTT filter were also acquired from 30 age and sex matched nondiabetic subjects. A generalised TF (GTF) was applied to the radial data from all subjects, and the DTT filter to each diabetic subject to yield reconstructed central aortic waveforms. Measured and reconstructed aortic waveforms were analyzed for parameters of potential clinical value, including pressures, augmentation index and systolic and diastolic pressure time integrals.

Results: There was no difference between the groups in systolic, or any other directly measured central aortic pressures. However, the time to inflection was shorter in the diabetics (P = 0.05), with a trend to a higher augmentation index (P = 0.09). There was a significantly greater difference between measured and DTT-derived central systolic pressures in diabetic patients (0.6 ± 1.5 mmHg) (mean ± SD) compared with non-diabetics (0.8 ± 1.6 mmHg) (P = 0.05). The errors in the other waveform parameters were no different. The use of the generalised TF in this patient group was not superior to the use of a diabetes-specific TF. A generalised TF is inappropriate for the derivation of central aortic waveforms in subjects with type II diabetes.

1058-127 Monitoring and Improving Hypertension Using the Veterans Administration Electronic Medical Record: A 48-Month Review

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Background: The Computerised Patient Record System (CPRS) was installed at all 112 Department of Veterans Affairs Medical Centers (VAMCs). At the Washington DC VAMC, database vital signs have been queried to identify patients with hypertension. Methods: The CPRS database was examined for hypertension, defined by at least 1 outpatient encounter in the previous 6 months, and 3 or more elevated Blood Pressures (BP) on 3 different days. Routine reports characterized these patients' most recent BP as normal, mildly elevated (>140/90, <160/100), or severely elevated (>160/100). Reports included names and pending appointments to facilitate interventions. Results: The table shows all hypertensives at the Washington VAMC, tabulated over a 48-month period. Conclusions: A 63% improvement in patients returning to normal (p < 0.0001) and 49% in those tainting below 160/100 (p < 0.0001) occurred with feedback to clinic managers and providers through automated reminders and reports. All patients with hypertension in a medical center can be monitored and improved when vital signs are part of an electronic medical record. Four VAMCs now use this report, allowing analysis between VAMCs. The Inter-VAMC report of May aggregated 33,226 patients with 3+ elevated BPIs of whom 49.1% had returned to normal pressures, and 16.6% remained severely elevated. The ability to apply such analysis hospital-wide via electronic vital signs allows unprecedented feedback to primary care providers for the benefit of all patients.

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1058-128 Evaluation of the Extent and Duration of the ABPM Effect in Patients With Essential Hypertension

Diana E. Ayala, Ramon C. Hernandez, Carlos Calvo, Jose E. Lopez, Jose R. Fernandez, Artemio Mojon, Maria J. Dominguez, Manuel Covelo, University of Vigo, Vigo, Spain, Hospital Clinico Universitario, Santiago de Compostela, Spain

Background: While a "white coat" pressure effect on conventional blood pressure (BP) measurements has been defined and used for the improved evaluation of hypertensive patients, there is limited indication that an ABPM monitoring (ABPM) could also influence BP. In that case, 24-hour ABPM would be insufficient for a proper diagnosis of hypertension and evaluation of a patient's response to treatment. Our objective was to further test and quantify the extent and duration of a possible pressor effect due to ABPM.

Methods: We studied 961 mild-to-moderate hypertensive patients (416 men, 53.6 ± 14.2 years of age) during their daily living environment, performing ABPM in addition to clinic visits. The patients were included in the study if their mean DBP was 90 mmHg, and 49% in those falling below 160/100 (p < 0.0001) occurred with feedback to clinic managers and providers through automated reminders and reports. All patients with hypertension in a medical center can be monitored and improved when vital signs are part of an electronic medical record. Four VAMCs now use this report, allowing analysis between VAMCs. The Inter-VAMC report of May aggregated 33,226 patients with 3+ elevated BPIs of whom 49.1% had returned to normal pressures, and 16.6% remained severely elevated. The ability to apply such analysis hospital-wide via electronic vital signs allows unprecedented feedback to primary care providers for the benefit of all patients.

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Circadian Variation of Blood Pressure in Normotensive and White Coat Hypertensive Subjects

Diana E. Aviles, Maribel C. Hervás, Carlos Calve, Jose E. López, Jose F. Fernández, Antônio Mário, Maria J. Domínguez, Manuel Cova, Univ. Vigo, Vigo, Spain; Hospital Clínico Universitario, Santiago de Compostela, Spain

Background: The prevalence and circadian significance of white coat hypertension (WCH) is still controversial. Although recent longitudinal studies have provided preliminary prognostic data on subjects with WCH as compared to patients with sustained hypertension, the possible relation between WCH and vascular risk is still under debate. Accordingly, we compared the circadian pattern of blood pressure (BP) variability between normotensive subjects and patients with WCH.

Methods: We studied 332 subjects (129 mean), 43.9 ± 4.4 (mean ± SD) years of age, with diurnal BP mean below 135/85 for systolic/diastolic BP. Among those subjects, 171 (74 mean) men had WCH (average of 6 conventional office BP measurements above 140 or 90 mm Hg for systolic or diastolic BP). BP was measured at 20-minute intervals during the day (07:00 to 23:00 hours) and at 30-minute intervals at night for 48 consecutive hours with a SpaceLabs 90202 ambulatory device. Circadian parameters established by population multiple-component analysis (Fernández and Hervás. Chronobiol Int. 1980;10:191-204) were compared between normotensive and WCH subjects by non-parametric testing.

Results: Patients with WCH are characterized by a significant increase in systolic (2.5 mm Hg; P < 0.001) but not in diastolic BP (P = 0.408 for comparison of 24-hour mean) as compared to normotensive subjects. The differences in systolic BP between normotensive and WCH are much more pronounced during the first 6 hours after awakening, and they are most irrelevant during nocturnal resting hours. The largest and highly significant difference between groups was found around the clock in pulse pressure (about 3 mm Hg in 24-hour mean, P < 0.001).

Conclusions: In patients studied by 48-hour ambulatory monitoring, WCH is characterized by a large fall in effective arterial BP and, especially, in pulse pressure as compared to truly normotensive subjects. Indeed pulse pressure is an independent predictor of risk for cardiovascular events, WCH could then be associated to a long-term worst prognosis in comparison to true normotensive, an impact that deserves further investigation.

Blood Pressure Response During ABPM and Exercise and Cardiac Alterations

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Background: Some studies with a small sample size suggested that left ventricular mass index (LVMI) is more closely related to ambulatory blood pressure (ABPM) or exercise BP than to resting/casual BP.

Methods: In 1142 untreated patients (mean age 50 ± 9.2 y., 56% males) an ABPM (SpaceLabs 90207), a bicycle exercise test (50-100 watts, 5 min recovery period) and an echocardiography were performed within a 48 h period and thereafter the patients were divided into 4 groups (G1 = 538, G2 = 627, G3 = 305, G4 = 47) due to their ABPM response.

Results: Despite a nonoptimal daytime BP during ABPM, patients of G4 with an increased ExBP+ (>200>100 mmHg) at 100 watts) revealed significantly (p<0.05; n=101) higher values for LVMI, wall thickness (IVS, PWT) left ventricular enddiastolic mass index (LVMI) is more closely related to ambulatory blood pressure (ABPM) or exercise BP than to resting/casual BP.