

G53

HYPERTENSION AND AGE ARE ASSOCIATED WITH DISORDERED RETINAL ARTERIAL BIFURCATION GEOMETRY. A Hughes, A Stanton, B Wasan, R Marsh, S Ford, P Sever*, S Thom. The Peart-Rose Clinic, St Mary's Hospital & I.C.S.T.M., London, U.K.

The major role of arteries is as a conductive network carrying blood to the tissues. This involves large and small blood vessels arranged in series and connected at bifurcations. Vessel bifurcation angles are easily measured using image analysis techniques and have important implications for efficiency of fluid transport. The purpose of this study was to compare retinal arterial bifurcation geometry in normotensive and hypertensive subjects.

We analyzed fluorescein angiograms of subjects aged 30-80 years, with uni-ocular retinal pathology. Twelve subjects with hypertension (currently untreated or uncontrolled, systolic BP > 160 mm Hg; age = 62 ± 3 years), and 13 normotensive controls (systolic BP < 130 mm Hg; age = 51 ± 3 years) were compared. Quantification of bifurcation angles was performed from digitized retinal angiograms of the uninvolved eye by image analysis using a PC and video image grabber.

Bifurcation angles were greater in normotensives ($84 \pm 3^\circ$; mean \pm s.e.) than hypertensives ($74 \pm 3^\circ$; $p < 0.02$). Bifurcation angles declined with increasing age in both groups ($p < 0.02$), however analysis of covariance indicated that blood pressure was independently related to bifurcation angle ($p < 0.01$).

Hypertension is associated with altered branching geometry in the human retinal vasculature. This altered geometry will have a disadvantageous impact on blood flow and resistance, and could play a causative role in the development of hypertension. These measurements can equally be made from fluorescein, red-free or colour retinal photographs and thus bifurcation geometry quantification offers the prospect of a novel early diagnostic approach to hypertensive vascular disease.

Key Words: hypertension, age, retina, bifurcation geometry

G54

Blood pressure profile analysis by the cubic function model in hypertensives: a significant association with target organ damage.

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We previously proposed the analysis of 24-h non-invasive ambulatory BP profiles by a cubic model. This study aimed at clinically validating such an analysis. We studied 46 hypertensives aged 56 ± 13 yrs (20 women/26 men). ABPM data from each patient were used for the multiple regression analysis in order to estimate function coefficients, quantitative fitting of the cubic function on crude data (R-squared) and the statistical probability of the model fitting. Moreover, we calculated some mathematic parameters on each cubic function. On the other hand, we evaluated the target organ damage only as four heart-damage categories: absence of damage, left ventricular hypertrophy (LVH), LV ischemia (LVI), combined alterations (LVH + LVI). The general factorial analysis of variance was performed. We found a statistically significant association between the angular coefficient at flex point of function and left ventricular alterations (multiple $r=0.75$; R-squared=0.57; $p < 0.001$). We found no association between target organ damage and other conventional or function-derived BP parameters. Moreover, the predictive value of a circadian rhythm abnormality detected by our model was equal to 83% (odds ratio=5.7; 95% confidence limits 4-7.4). In conclusion our model resulted not only useful in defining with completeness and flexibility the circadian BP profiles but in particular showed the capability to predict the presence and the degree of heart damage.

Key Words: hypertension, blood pressure profiles, cubic function model, circadian rhythm

G55

REPRODUCIBILITY OF ECHOCARDIOGRAPHIC PARAMETERS OF CARDIAC AUTOMATICALLY BOUNDARY DETECTION ON HYPERTENSIVE SUBJECTS. F Tremel, M Chevallier, JP Siche, JM Mallion. Médecine Interne et Cardiologie C.H.R. Grenoble. France

Objective: to study the reproducibility of measures of systolic and diastolic function measured by analysis of automated boundary detection (ABD) using newly developed acoustic quantification (AQ) technology, in hypertensive subjects.

Subjects: twenty seven consecutive patients with essential HTA. Sinus rhythm. Mean age: 51 ± 15 years old, 7 women 20 men. Left ventricular mass index (LVMI): 126 ± 39 g/m². Mean end-diastolic diameter: 50.5 ± 5.4 mm.

Materials: Hewlett Packard Sonos 1500 Echocardiograph. 2.5 MHz probe, with AQ option. Apical Recording. Each parameter is measured twice by two trained observers in each patient, within a period of two hours. Statistical Analysis was performed according to the recommendations of Bland and Altman. The following parameters are measured. End-systolic area (ESA), end-diastolic area (EDA), mid-diastolic area (MDA), fractional area change (FAC) %, peak rate of area change during early ventricular filling (PRE), peak rate of area change during atrial ventricular filling (PRA). Values for 3 cardiac cycles are averaged for each measurement.

	Intraobserver reproducibility						Interobserver reproducibility					
	Obs 1			Obs 2			reproducibility					
	m	sd	cv	m	sd	cv	m	sd	cv	m	sd	cv
ESA (cm ²)	1,46	3,36	15	0,01	2,42	13	3,80	4,67	22			
EDA (cm ²)	0,63	3,73	12	0,23	3,55	12	3,73	4,12	14			
MDA (cm ²)	0,46	4,16	16	0,01	2,46	10	3,21	3,16	13			
FAC (%)	0,03	0,05	19	0,01	0,05	14	0,03	0,06	20			
PRE (cm ² /s)	2,57	15,2	25	0,36	10,1	16	5,38	16,2	26			
PRA (cm ² /s)	0,46	11,4	26	2,18	7,96	17	2,21	10,5	23			

Intraobserver reproducibility: 2 measures by the same observer. **Interobserver reproducibility:** 2 measures by 2 different observers. M: mean of the differences between the two measures. SD: standard deviation of the differences between two measures. CV: coefficient of variation.

Conclusion: the surface parameters and measures of systolic function are equally reproducible by ABD as the left ventricular mass (LVMI), in the order of 15% for the measures of ventricular surfaces. The acoustic quantification is of interest only for the measure of surface parameters. Diastolic function parameters are not reproducible.

Key Words: Echocardiography. Left Ventricle. Edge Detection. Reproducibility.

G56

LIFESTYLE MANAGEMENT FOLLOWING DRUG TREATMENT OF BLOOD PRESSURE IN GENERAL PRACTICE.

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The HEART project was conducted in general practice to determine whether lifestyle strategies, aimed at increasing physical activity and weight loss, can be substituted for drug therapy in patients who have been well controlled on anti-hypertensive medication.

Patients (n=45) who had been well controlled for at least the past 6 months (BP < 160/95 mmHg) were randomised to a continued medication (C) group (n=24) or a withdrawal (W) group (n=21). Subjects had received antihypertensive therapy for an average of 7.8 years (range 1-28 years). Drug therapy was recommended if BP exceeded 160/95 mmHg on any visit. Both groups were counselled regarding lifestyle by their GP throughout the study and provided with specifically developed materials. Subjects were reviewed at least monthly over a 9-month period. Following randomisation, there were no significant differences between the 2 groups for BP, heart rate, age, duration of therapy, total cholesterol or body mass index. All but 3 subjects (1 from the W and 2 from the C group) completed 9 months of monitoring and there were no cardiovascular events. 71% of W subjects remained off drug therapy at 9-months (15 of 21) with mean BP of 144/85 mmHg (W) and 139/86 mmHg (C). No significant differences were observed in mean systolic or diastolic BP, heart rate, or body mass index between the W and C groups after 9 months (MANOVA). The group stopping therapy had a 6% reduction in body mass index after 9 months. Successful W group patients had lower diastolic BP at baseline than unsuccessful subjects ($p < 0.05$). On multivariate analysis, physical activity level at 9 months was the best predictor of change in systolic ($r^2=0.20$) and diastolic BP ($r^2=0.12$) over the study period. A proportion of motivated patients willing to trial a lifestyle approach can cease drug therapy and be adequately maintained by lifestyle advice from their physician for at least a 9-month period. Cessation of drug therapy may be an important motivating factor to lifestyle change.

Key Words: drug withdrawal, lifestyle change, exercise