3.4: ESTABLISHING REFERENCE VALUES FOR CENTRAL BLOOD PRESSURE IN A GENERAL HEALTHY POPULATION AND ESTABLISHED DISEASE GROUPS

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Methods: From the cohort of EPP3 study, 2211 patients were included in this report (age 59 ± 6 years). The baroreceptor sensitivity (BRS) was defined as the ratio between variations in the carotid distension rate and variations in R-R interval in the low-frequency range (0.04-0.15Hz). The CHD risk was estimated according to the Framingham risk score.

Results: We studied 2088 patients with GFR$>$60ml/min/1.73m^2 and 123 patients with CKD (GFR 45-60ml/min/1.73m^2). The prevalence of 10 years CHD risk$\geq$20% was significantly higher in patients with CKD than in those with normal renal function (30% and 14%, respectively). In fully adjusted model, in the total population, the increase of BSA, IMT and carotid PP, the reduction of carotid strain and BRS, and the presence of CKD were independently associated with 10 years CHD risk$\geq$20% (Table 1).

Conclusions: The spontaneous BRS is a predictor of CHD risk in patients with moderate CKD and in those with normal renal function.

Predictors of 10 years CHD risk ≥ 20%	OR	95%CI	P value
Body surface area, m^2 x 10^{-1}	1.20	1.13-1.27	<0.001
Intima-media thickness, μm x 10^2	1.29	1.16-1.43	<0.001
Carotid pulse pressure, 10 mm Hg	1.62	1.47-1.79	<0.001
Carotid strain, %	0.80	0.74-0.86	<0.001
Baroreflex sensitivity, $Log [(ms/(\mu m/s)^2] x 10^2]$	0.36	0.23-0.59	<0.001
Moderate chronic kidney disease	2.15	1.38-3.37	<0.001

3.3

NORMAL AND REFERENCE VALUES FOR CAROTID INTIMA-MEDIA THICKNESS

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Increased carotid artery intima-media thickness (IMT) has been widely used as a surrogate marker of atherosclerosis and has been shown to predict cardiovascular disease (CVD). However, the interpretation of IMT values, as measured across different age, sex and risk groups, has been hampered by the absence of normal and reference values comparators. The aim of the present study is therefore to establish normal and reference values for IMT based on a wide population.

We combined common carotid IMT data from 25 research centres worldwide as obtained with the use of an echo-tracking system. The total population consisted of 29,975 individuals (54% men), with ages ranging from 15 to 101 years-old, of whom 21% had established CVD, 56% had hypertension, 11% had diabetes, 25% had hypercholesterolemia, 20% was current smoker and 32 and 16% were on blood pressure (BP)- and/or lipid lowering treatment respectively. Sex- and age-specific normal values of IMT were established in the 'normal population', which consisted of 2,762 individuals without overt CVD, *and* who had optimal or normal BP (i.e. <130/85 mm Hg) *and* no acquired cardiovascular risk factors [i.e. diabetes, use of BP- and/or lipid lowering medication, hypercholesterolemia, current smoking] (Fig 1). Multiple linear regression analyses will be used to investigate the influence of, and establish reference IMT values across categories of the cardiovascular risk factors mentioned above.

In conclusion, this unique study enables the definition of normal and reference values for IMT to help interpretation of such measures as obtained in both research and clinical settings.
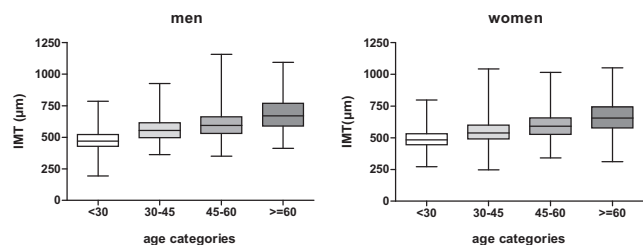

Fig 1   Normal values of IMT for age categories in men and women

3.4

ESTABLISHING REFERENCE VALUES FOR CENTRAL BLOOD PRESSURE IN A GENERAL HEALTHY POPULATION AND ESTABLISHED DISEASE GROUPS

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Background and Objective: Estimated central blood pressure is a non-invasive outcome regarded as a prognostic marker of cardiovascular disease. Reference values have been calculated previously in specific populations, for example, in 5,648 healthy subjects from East Anglia and Cardiff in the ACCT study (*Hypertension* 2008;51;1476-1482). These values are useful not only for assessing flow properties, but for study design in investigating treatments or adverse events longitudinally. This study aimed to establish reference values for a worldwide general population, increasing the flexibility of their use.

Methods: Existing data from individual studies were combined, comprising of central pressure data from clinical trials and population surveys, whether published or not. Main inclusion criteria were that these studies used validated methods of applanation tonometry or distension measurement and could provide a minimum pre-defined set of variables and information on the individual study.

Results: Data of 63,107 subjects were gathered from 52 centres in total and values standardised across different study methods. Of these subjects, 29,882 were declared as healthy and valid for analysis (median (IQR) age = 53 (40.5 to 63) years, 15,290 being female (51%) with median (IQR) SBP = 108 (103 to 115) mmHg. Reference ranges were calculated for these subjects, stratified by age, sex and peripheral pressure. This analysis was repeated for the 18,524 valid non-healthy subjects, by established disease-groups.

Conclusions: Average central pressures per subject-characteristic group were provided, as well as disease-type, across a very broad population with an increased precision.
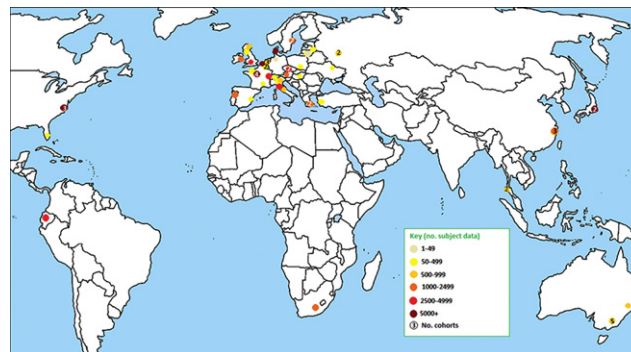

Fig 1   Map of cohorts included in this study.

3.5

DIFFERENTIAL EFFECTS OF BNP AND NO DONORS ON HUMAN FOREARM MUSCULAR CONDUIT ARTERIES

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Nitroglycerin (NTG) selectively vasodilates muscular conduit arteries. Whether other nitric oxide (NO) donors and natriuretic peptides have similar effects is unknown. The aim of this study was to compare effects of NTG, sodium nitroprusside (NP) and brain natriuretic peptide (BNP) on the radial artery (a muscular conduit artery) and forearm resistance vasculature. Phentolamine (PHT), a vasodilator with minimal vasodilator effects on conduit arteries was used as a control. Healthy normotensive men aged 19-45 years were studied. The right brachial artery was cannulated using a 27 gauge needle and an intra-arterial infusion of each vasodilator (PHT, 10, 30 and 100μg/min, n = 9; NTG 0.03, 0.1, 0.3, 1.0, 3.0 μg/min, n = 8. NP, 0.3, 1, 3 μg/min,n = 11; BNP 0.03, 0.1, 0.3, 1, 3 μg/min n = 8) given on separate occasions or after washout. Forearm blood flow (FBF) was measured by venous occlusion plethysmography and change in radial artery diameter by ultrasound. The percentage change in diameter for different drugs was compared at doses producing the same change in FBF (DFBF). The