2.5: COMPARISON OF NON-INVASIVE AND INVASIVE MEASUREMENTS OF CENTRAL BLOOD PRESSURE IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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2.3 LOCAL STIFFNESS OF THE CAROTID ARTERY IS ASSOCIATED WITH INCIDENT CARDIOVASCULAR EVENTS AND ALL-CAUSE MORTALITY—A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: It has been suggested that local carotid stiffness is independently associated with cardiovascular (CV) events and mortality. However, consistent evidence for such an association is lacking. We therefore performed a systematic review and meta-analysis of longitudinal studies on the association between local carotid stiffness, incident CV events and all-cause mortality.

Methods: Medline and Embase were searched for articles published up to June 1, 2014. All studies were included which evaluated the association between local carotid stiffness (as determined by ultrasound) on the one hand and incident CV events and mortality on the other. We used random-effects models to calculate hazard ratios (HRs) and 95% confidence intervals (95%CIs) for pooled data.

Results: We included 10 studies with data for 19,919 participants and 177,136 person-years of follow-up. The pooled HRs (95%CIs) for one SD higher carotid elastic modulus were: for CV events (fatal and nonfatal combined) 1.19 (1.06-1.33); 10 studies, n=19,496); for CV mortality 1.34 (1.15-1.55); 4 studies, n=3,083) and for all-cause mortality 1.26 (1.14-1.40; 5 studies, n=3,501). All results were adjusted for age, sex, blood pressure (SBP and/or MAP), and CV factors. Results were qualitatively similar when HRs were pooled for lower carotid distensibility and compliance instead of higher elastic modulus.

Conclusion: The present meta-analysis shows a strong association between local carotid stiffness and incident CV events, CV mortality and all-cause mortality. In a next step, we will do an individual participant meta-analysis to evaluate whether the association between local carotid stiffness and CV events and mortality is independent of carotid-femoral pulse wave velocity.

2.4 RELATIONSHIP BETWEEN ADULT TRANSFER FUNCTION DERIVED CENTRAL AORTIC SYSTOLIC PRESSURE AND MEASURED SYSTOLIC PRESSURE IN THE HEALTHY CHILDREN POPULATION

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Background: A non-invasive method, that used a general transfer function (TF), has been shown to accurately predict central aortic pressure from peripheral tonometry measurements in the adult population. However, applying the same TF to estimate central aortic systolic pressure (aSP) in children has not yet been fully evaluated. This study aimed to assess the usage of adult TF to estimate aSP in children (aSPest_ch) by establishing and testing different linear single/multivariate regression models between the adult TF estimated aSP (aSPTF_ad) and the measured aSP (aSPmeas_ch).

Methods: 118 healthy, pre-pubescent children aged 8 years (113 male) had tonometric and carotid and carotid arterial pressure waveform recorded using the SphygmoCor device. Central aSP estimated was calculated from the radial pressure using the TF (SphygmoCor, AtCor Medical), and the carotid systolic pressure taken as a surrogate for central pressure (aSPmax_ch). The study group was divided into two groups: one to estimate the models (n=50, 19 male); another to test the models (n=168, 94 male). Models 1 and 2 were two simple linear regression models, whilst models 3 and 4 were two multivariate regression models.

Results: In the tested group, the aSPest_ch from all models showed high correlations and low average differences with aSPmeas_ch (model 1 R²=0.88, difference=-1.6+2.6 mmHg; model 2 R²=0.88 difference=-1.8+3.4 mmHg; model 3 R²=0.89 difference=-1.6+2.5 mmHg; model 4 R²=0.89 difference=-1.2+2.7 mmHg, all p<0.001).

Conclusion: Central aSP in children can be estimated accurately using the adult TF from the radial pulse by incorporating the now defined linear relationship between aSPTF_ad and aSPmeas_ch.