

Metformin`s Pleiothropic Effect of Improving Endothelial Function in Hypertensive and Prediabetic Subjects

A 3 Months Follow-up Study

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Background: The vascular effect of insulin resistance had been known to cause serious damage on endothelial function, especially nitric oxide (NO) system, that may cause an earlier onset of cardiovascular disease.

Objective: To explore the pleiotropic effect of Metformin on improving endothelial function

Method and Results: A quasi experimental study of 62 hypertensive and pre-diabetic (IGT) patients showed a significant improvement of Flow Mediated Dilatation (FMD) within 3 months in those who received added therapy of Metformin 500 mg twice daily (n=23) on their routine anti-hypertensive drugs (p<0,001). It also showed a moderate correlation between improvements of FMD that reflects the endothelial function with good achievement of targeted blood pressure (R 0,421). Linear regression analysis (adjusted analysis to confounder factors such as age, sex, BMI, history of smoking, aspilet added therapy, anti-hypertensive drugs) showed Metformin as the only factor that influenced the improvement FMD (OR 7,88; p<0,001).

Conclusion: This study showed that Metformin 2x500 mg as an add-on therapy in hypertensive pre-diabetic subject plays a positive role in improving the endothelial function as seen on the FMD measurement

Key words: Impaired Glucose Tolerance, Flow Mediated Dilatation, Metformin

Hypertension and the Subsequent Treatment Options for Patients in the United States

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End Stage Renal Disease is a growing concern in the United States, among other countries, as a result of the aging population, diabetes, and hypertension. Aside from age, diabetes and hypertension are the two driving forces for renal failure. Renal failure is a noted expensive therapy that, at the very least, may be delayed. Hypertension, in addition to the threats of cardiovascular disease, should raise concerns with renal failure. Data in the United States reflects a renal economic cost of billions for the treatment of renal disease not including subsequent hospitalizations for conditions based on side effects, unrelated conditions, and patient specific issues. There are two problems created by the lack of treatment for hypertension and CKD that is predicated on a lack of diagnosis as well as patient non-compliance in some specific cases. First, economic costs associated with the cardiovascular system and more importantly, the expenditures associated with the outlay of end stage renal disease. This paper does not specifically address the hypertensive cause of renal failure, although it is significant, but rather the ramifications of such an advanced disease and the limited treatment modalities available for patients with this previously treatable condition if diagnosed early. Lack of this treatment will result in the escalating expenditures of renal failure patients with a limited supply of organ donation and the preferred treatment of outpatient hemodialysis.

Systolic Blood Pressure, Alkaline Phosphatase and Body Mass Index, Predictors of High hs-CRP in Overweight and Obese Adults

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Objectives: This study was conducted to investigate the association of blood pressure, ALP and BMI with high levels of hs-CRP in healthy adults.

Methods: A cross-sectional study of 232 healthy adults attending for medical check-up in one health clinic in Kota Kinabalu, Sabah comprising of 70 males and 162 females. hs-CRP and ALP were measured. Analysis of hs-CRP association with ALP, BMI, blood pressure, smoking, family history was done.

Results: The median for hs-CRP was 1.2 mg/L. A significant positive correlation between high levels of hs-CRP and ALP, BMI and blood pressure. BMI, systolic blood pressure and ALP were contributing significantly to the model $p < 0.001$, $p < 0.047$, $p < 0.03$ mg/L in females with high BMI was almost 4 times higher as compared with males. Those with ALP level 1 U/L higher had 5% more odds of having high risk hs-CRP compared to those with lower ALP level. Those with 1mmHg higher in systolic pressure had 3 times more odds of having high levels of hs-CRP.

Conclusion: In conclusion, this study showed that BMI, systolic pressure, ALP were independent predictors of higher levels of hs-CRP. High levels of hs-CRP were found significantly in overweight and obese and more significant in females. Further epidemiological studies are suggested

Keywords: hs-CRP, ALP, BMI, MAP, overweight, obese.

Compare Pre-Hypertension and Metabolic Syndrome in the Development of Hypertension: Result from a Five Year Follow Up Study in Macao

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Backgrounds: Both pre-hypertension (pre-HBP) and metabolic syndrome (MS) could be precursors of hypertension. This report is based on the results of a five year follow up study in Macao and compares the difference between pre-HBP and MS in their effects to the five year incidence of hypertension.

Methods: In year 2006, 3119 Macao residents adults were randomly recruited for a survey. Data was collected by health assessment, questionnaires and laboratory tests. In 2011, a phone follow up was conducted and 2395 people answered the questions (76.8% response rate). After excluding those who had hypertension in 2006, a total of 1690 were included in the analysis. Pre-hypertension was defined by SBP between 120 to <140, or DBS between 85 to <90; Metabolic syndrome was defined by IDF criteria. The hypertension incidence was defined by the questions "If a doctor had told you that you had hypertension (or high blood pressure) ?" in 2011 follow up. IBM-SPSS version 20 was used for data analysis.

Results: Prevalence was 35.4% for pre-HBP and 6.8% for MS in 2006. Hypertension incidence was 5.1% for five years. The people with pre-HBP or MS had higher risk for developing hypertension compared to their counterparts (RR=4.77 and 4.36). Because of overlapping between pre-HBP and MS, three dummy variables (v1. pre-HBP only, v2. MS only, and v3. both pre-HBP and MS) were created and put into a logistic regression model with hypertension status as dependent variables. We finally found that odds ratios were 3.27, 3.98, and 5.31 for dummy variables v1 to v3.

Conclusions: In our analysis samples, prevalence was 35.4% for pre-HBP and 6.8% for MS. Five year incidence of hypertension was 5.1%. Pre-HBP and MS had similar effect at the risk of hypertension development. However, the risk will increase much higher if a person has both pre-HBP and MS.

Influence of the Coexistence of Metabolic Syndrome and Antiphospholipid Syndrome on Frequency of Thrombotic Events

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Background & Aim: The antiphospholipid syndrome (APS), primary or associated with certain autoimmune rheumatic diseases, represents prothrombotic state. Coexistence of metabolic syndrome (MetS) and autoimmune rheumatic diseases is already recognized while clinical significance of metabolic syndrome in patients with APS has not been systematically studied. Therefore the aim of this study was to estimate the prevalence of MetS among patients with antiphospholipid syndrome (APS), primary (PAPS) and associated with rheumatic diseases (sAPS), as well as to determine the influence of these coexistencies on frequency of thrombotic events in these patients.

Methods: Study included 68 PAPS patients (59 females, 9 males, mean age 43.51±10.58 years), 69 sAPS patients (61 females, 8 males, mean age 47.83±15.67 years). Presence of metabolic syndrome among studied patients was determined according to the International Diabetes Federation (IDF) clinical definition. For all participants clinical data concerning thrombotic events, their appearance, management and follow-up were obtained from medical charts review. As thrombotic events the following were recorded: superficial and deep venous thrombosis, pulmonary embolism, peripheral arterial occlusion, cerebral vascular accident and myocardial infarction.

Results: Prevalence of MetS was 36.76% in PAPS and 42.03% in sAPS. Compared with patients without MetS, higher frequency of thrombotic events were present among those with MetS and PAPS (44.19% vs 68%, p<0.01) as well as with sAPS (42.5% vs 75.86%, p<0.01).

Conclusions: MetS was present in significant percent of patients with APS. Higher frequency of thrombotic events among those patients with PAPS and sAPS who were MetS positive, has suggested that by identification of MetS in these patients, we could be able to identify those high risk patients in whom strict control of modifiable cardiovascular risk factors is mostly needed.

Gender Aspects of Obesity in Patients with Metabolic Syndrome

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The purpose of this study - to examine gender features of obesity among young patients with metabolic syndrome (MS).

Material and methods: There were examined 189 men and women with MS at the age of 18-44 years for three years, including 107 women and 82 men (mean age $36,2 \pm 0,3$ years). The control group - 65 healthy men and women. We conducted of anthropometric study, the study of lipid metabolism, glucose metabolism, hormonal measurements (levels of estradiol (E2), total testosterone (T) binding globulin sex hormone (SHBG), leptin, insulin, insulin resistance index definition, free androgen index (FAI).

Results: The decreasing of weight among men ($8,19 \pm 0,02$ kg/year) exceeded the a similar indicator among women ($7,7 \pm 0,05$ kg / year). The annual dynamics WC among women was lower than that among men. Hyperleptinemia common among 43.9% women and 25.6% men. Leptin was normalized among 12.7% women and 17.0% men. Leptin resistance among female patients was higher by 36.4% than that of men. The treatment of leptin / BMI decreased in men 2.1 times faster than that of women. The weight loss 1 kg was associated with a reduction FAI on 0.14% and leptin on 1.95 ng/ml. For patients with MS characterized by increased triglycerides on 37.7% and decreased HDL-C on 33.5%. Among men with MS was total cholesterol level higher on 40.0%, LDL cholesterol on 21.1%. Impaired glucose tolerance (IGT) was found among 55% of patients. Weight loss was correlated with HOMA-IR (63% women and 79.2% men) ($r = 0,74$; $r = 0,69$, $p < 0,01$).

Conclusions: Hyperandrogenism, hypoestrogenemy among women and the decrease of testosterone among men are predictors of obesity that determines the gender differences to the management of patients with MS.

Mean Arterial Pressure and Visceral Adiposity Index Amplify the Association of Serum Uric Acid with Albumin/Creatinine Ratio in Pre-Metabolic Syndrome

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Objective: In the present analysis, we evaluated an association between serum uric acid and ACR in early stages of metabolic disturbances, and examined whether any metabolic composite phenotype characterized by visceral adiposity index (VAI), mean arterial pressure (MAP) and fasting plasma glucose explains this association.

Methods: In a cross-sectional survey of a representative Czech population (n=3612) aged 25-64 years, albumin and creatinine excretion were determined in a morning spot urine sample. Metabolic syndrome (MetS) components were defined using the joint statement of the leading societies. Individuals presenting with 1 or 2 components were defined as pre-metabolic, whereas individuals without any MetS component were considered as normo-metabolic. Individuals with diabetes and chronic kidney disease were excluded (in total 2441 remained).

Results: In normo-metabolic individuals (27%), there was no association between uricemia and ln-ACR. In pre-metabolic individuals (48%), fully adjusted linear regression model for uricemia documented an independent correlation with gender (SB 0.482; p<0.001), eGFR (SB -0.424; p<0.001), waist circumference (SB 0.256; p<0.001), age (SB -0.260; p<0.001), ln-triglycerides (SB 0.074; p<0.001), systolic blood pressure (SB 0.068; p=0.044) and ln-ACR (SB 0.045; p=0.032). We observed an independent interaction of ln-ACR with MAP (β 0.313; p=0.008) and with VAI (β 8.48; p=0.0139) and in relation to uricemia. In individuals with MAP \geq the median of 98 mmHg along with VAI \geq the median of 1.35 (n=283), stepwise multivariate adjusted regression for uricemia showed an independent correlation with ln-ACR (SB 0.190; p<0.001). No association between the uricemia and ln-ACR was present in the remaining subgroups.

Conclusion: Uricemia was independently associated with ACR in pre-metabolic individuals. This association was amplified by VAI \geq 1.35 and MAP \geq 98 mmHg. We report no association between uricemia and ACR in normo-metabolic individuals.

Association of Retinol Binding Protein 4 and Triglyceride Level in Rural Thais with Type-2 Diabetes Risk

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Background: Retinol binding protein 4 (RBP4), a protein secreted by the adipocytes, is associated with obesity, the early phases of insulin resistance, and other components of metabolic syndrome, especially Type-2 diabetes mellitus (DM). Diabetes is currently a serious problem in Thailand, even in rural areas.

Objective: To elucidate the relationship between RBP4 and abnormalities among Type-2 diabetes risk in a rural area of Thailand.

Methods: A total 168 volunteers in Sung Noen District, Nakhon Ratchasima Province, Thailand were investigated for serum RBP4, fasting blood glucose, OGTT at the 1st and 2nd hours after glucose loading, serum triglyceride, and serum insulin levels. The Student t-test, Pearson correlation and logistic regression analysis were used to evaluate the relationship between serum RBP4 and Type-2 DM markers.

Results: Serum RBP4 levels were elevated significantly among subjects with high triglyceride levels in a fasting state ($p=0.000$), at the 1st ($p=0.000$) and 2nd ($p=0.003$) hours after glucose loading; corresponding to a homeostasis model assessment for insulin resistance (HOMA-IR), it was statistically higher ($p=0.019$). Serum triglyceride level largely correlated with serum RBP4 at all three blood-draw states ($r=0.34, 0.3, 0.31, p=0.000$). After adjustment for age and gender, the risk of hypertriglyceridemia was 3.6 times (1.36-9.31, $p=0.009$), when compared high with low serum RBP4 groups. However, a statistically significant relationship between serum RBP4 and blood glucose level was not found.

Conclusion: Cytokine RBP4 and its relationship to Type-2 DM markers remains controversial. However, an association between RBP4, serum triglyceride level and insulin resistance was observed in this study. High triglyceride levels are often a sign of other conditions that increase the risk of heart disease and stroke.

Serum Advanced Glycation end Products are Associated with Left Ventricular Dysfunction in Normal Glucose Metabolism but not in Type 2 Diabetes - The Hoorn Study -

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Background: Advanced glycation endproducts (AGEs) may be involved in the pathobiology of heart failure especially in type 2 diabetes (T2DM). Therefore we investigated the association between the serum advanced glycation endproducts (AGEs), N^ε-(carboxymethyl)lysine (CML), pentosidine and N^ε-(carboxyethyl)lysine (CEL), and left ventricular (LV) structure and function, in participants with normal glucose metabolism (NGM), impaired glucose metabolism (IGM) and type 2 diabetes (T2DM).

Methods: Participants from a cross-sectional, population-based, study (280 NGM, 171 IGM, 242 T2DM) underwent echocardiography. Serum protein-bound CML and CEL were measured by UPLC-MSMS, and protein-bound pentosidine by HPLC with fluorescent detection. Linear regression analysis was used, stratified according to glucose metabolism status (GMS).

Results: Higher CML levels were associated with worse diastolic function (i.e. left atrial (LA) volume index and LA volume · LVMI product term) in NGM (regression coefficient (95%CI): (-0.053(-0.095;-0.011) and -0.064(-0.126;-0.002), respectively). Higher pentosidine levels were associated with worse LA volume index and LA volume · LVMI product term in NGM (-0.056(-0.099;-0.013) and -0.084(-0.147;-0.021), respectively), and with worse LA volume · LVMI product term in IGM (-0.080(-0.164;0.003)). AGEs were not associated with diastolic function in T2DM. Higher CML levels were associated with worse ejection fraction in NGM (-1.227(-2.322;-0.131) and better ejection fraction in T2DM (0.950(0.039;1.861)).

Conclusions/ Discussion: In NGM, higher serum CML and pentosidine levels were associated with worse diastolic function and higher CML and CEL levels with worse systolic function. In IGM a similar pattern emerged, though less consistent, whereas in T2DM these associations were non-existent or reversed. This suggests that serum AGEs are associated with impaired LV function in NGM but that with deteriorating GMS serum AGEs may not mirror heart failure risk.

Obesity and Arm Circumference as Predictors of High Blood Pressure in Female Teenagers

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Cardiovascular diseases such as high blood pressure, coronary heart disease, stroke, and heart failure are the leading causes of death worldwide. Within the past decade, the prevalence of overweight and obesity has drastically increased. Recent reports say that obesity leads to high blood pressure in young adults and is one of the strongest predictors of hypertension. Thus, it is critical to examine the health statuses of students who will become the adults of the future.

Data for this study was collected from a local high school in Cleveland, Ohio, USA. Girls between the ages of 14 and 18 were recruited for the experiment. After receiving consent, the girls' weight (kg), height (m), heart rate, blood pressure, skin fold tests (percentage of body weight) and arm, abdomen, and thigh circumferences (cm) were obtained. A survey was also distributed in which participants self-reported their height, weight, and caffeine intake. A total of 223 students participated in the study.

Findings showed that there was a correlation between weight and systolic blood pressure as well as between arm circumference and systolic blood pressure. However, no strong correlations were found between body mass index and blood pressure. Caffeine was shown to increase heart rate, percentage of body fat, and different anthropometrical measurements. The survey showed that female high school students usually underestimate their weight on average by 2 kg. Most importantly, an arm circumference greater than 29 cm was found to predict high systolic blood pressure.

Thus, a simple screening test such as arm circumference measurement can be of value to the nursing staff and allied health care professionals in schools to screen adolescents at risk for the development of cardiovascular disease at an early stage. This is valuable for the prediction of high blood pressure and early intervention.

Predictive Markers for Coronary Heart Disease and Abnormal Blood-Sugar Levels among a Group of Rural Thais

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Background: Diabetes, a chronic disease that usually begins with insulin resistance, is a major cause of mortality and morbidity worldwide. Evidence has suggested a relationship between inflammatory reactions and diabetes, where the development of diabetes might correlate with inflammatory C-reactive protein (CRP) level. However, CRP levels depend on various factors, including lifestyle factors and genetics.

Objective: This cross-sectional study investigated the relationship between predictive factors for coronary heart disease and the incidence of blood-sugar abnormalities.

Methods: One hundred and sixty-eight (168) subjects aged 35-61 years, living in Sung Noen District, Nakhon Ratchasima Province, Thailand, were recruited into the study. Fasting blood glucose (FBG), oral glucose tolerance test (OGTT), HbA1C, CRP, and anthropometric data, were evaluated. Socioeconomic data were collected using a questionnaire. Then, statistical analysis was performed.

Results: Subjects with FBG ≥ 126 mg/dl, impaired glucose tolerance (IGT) ≥ 140 mg/dl, or HbA1c > 6.5 , were recruited into the risk group (n=80); the remainder were recruited into the control group (n=88). When the risk and control groups were compared, significantly elevated CRP levels were found in the risk group (6.05 vs. 2.01; $p < 0.001$). After adjustment for age, gender, and confounding factors using a logistic regression model, CRP was found to associate with abnormal blood sugar (OR: 2.24, 95% CI: 1.04-4.84). Anthropometric parameters were also significantly higher in the risk group--body mass index (26.92 vs. 24.13; $p < 0.001$), waist circumference (86.07 vs. 80.53; $p < 0.001$), body fat (32.53 vs. 27.95; $p < 0.001$), and visceral fat (10.68 vs. 8.05; $p = 0.001$).

Conclusion: The risk group in this study was found more likely to develop coronary heart disease in the near future if they did not maintain their health through appropriate behaviors. Weight reduction and diet modifications were recommended.

Oxidative Stress Biomarkers, Skin Alterations and Cardiovascular Risk Factors in Metabolic Syndrome (MetS) Patients

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Background: Oxidative stress (OS) associated with Metabolic syndrome (MetS) is one of the major focuses of recent research related to pre-diabetes, diabetes and cardiovascular diseases (CVD) prevention. Lipid peroxidation may be one mechanism through which several risk factors may promote cardiovascular disease (Willeit P et al, 2014). OS biomarkers predict 15-year CVD and stroke outcomes (Tsimikas S et al, 2012). OS supports a chronic inflammatory reaction in the skin. Associations among OS biomarkers, malondialdehyde (MDA) and superoxide dismutase (SOD) levels, as well as skin alterations were assessed.

Methods: The prospective study of random, age- and sex-stratified population sample was conducted during 2014-2015 at the Department of Internal Medicine, Riga Stradiņš university, Latvia. Detailed examination of the skin for the presence of acanthosis nigricans, Lentigines, Seborrheic keratosis, Actinic keratosis, Aging wrinkles, Gravity wrinkles, Teleangiectasias was performed. Serum MDA and SOD were determined using method of RANSOD, Randox laboratories.

Results: Statistical analysis (SPSS 20.0 for Windows) showed a direct linear relationship (Positive Pearson correlation, Chi-square test, $p < 0.05$) between skin alterations and intensity of MDA and SOD. Increased MDA ($p < 0.05$) was associated with Lentigines, Seborrheic keratosis, Actinic keratosis, Aging wrinkles, Gravity wrinkles. Increased SOD was associated with Lentigines and Seborrheic keratosis.

Conclusions: Skin alterations being associated with elevated MDA/SOD level might be helpful indicators in actual cardiovascular risk evaluation. Studying associations between biomarkers of oxidative stress, skin alterations, and cardiovascular risk score in Metabolic syndrome (MetS) patients with and without prevalent cardiovascular disease (CVD) is therefore important. Such approach could identify apparently healthy patients among those who already have clinical damages caused by metabolic disorders, to carry out preventive and curative measures early, whilst prevention is still effective.

Phenotype of Metabolically Healthy Centrally Obese non-diabetic Slovak Adolescents and Adults

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Background: Metabolically healthy obese (MHO) subjects not manifesting typical risk factors (dyslipidemia, hypertension, and insulin resistance) are still on higher risk to develop cardiovascular (CV) afflictions. Low concentrations of soluble receptor for advanced glycation end products (sRAGE) in non-diabetic adults with normal renal function are considered as risk factors for development of CV disease. We aimed to estimate the prevalence of central obesity (CO) in adolescents and adults, and compare the standard and non-standard CV risk factors among metabolically healthy lean (MHL) and MHCO subjects.

Methods: Subjects were recruited from general population. CO was classified as waist/height ratio ≥ 0.5 . CV risk factors were considered as SBP ≥ 130 mm Hg and/or DBP ≥ 85 mm Hg; enhanced atherogenic risk: AIP=(logTAG/HDL-Ch) ≥ 0.11 ; insulin resistance: QUICKI ≤ 25 . percentile. CO subjects not presenting additional risk factor were classified as MHCO; MHL did not manifest any risk factor.

Results: From among 1 952 adolescents aged 16-19 years 88% were lean; wherefrom 73% were risk factors-free. 5% adolescents were MHCO, representing 37% out of CO adolescents. In comparison with MHL, COMH adolescents presented significantly higher BP, FPI, QUICKI, total and LDL-cholesterol, hs-CRP and leptin levels, and lower HDL-cholesterol, AIP, Hcy, and sRAGE. From among 729 adults aged 20-81 years 46% were lean, from these 62% were MHL. 8% were COMH, accounting for 14% of CO adults. MHCO adults presented significantly higher BP, FPG, total and LDL-cholesterol, TAG, uric acid, hs-CRP, AIP, and lower leptin, adiponectin and sRAGE.

Conclusion: MHCO subjects present already in adolescence higher values of CV risk markers, although within the reference ranges of each studied marker. Consistent finding of decreased sRAGE levels in MHCO adolescents and adults suggest that existence of metabolically healthy phenotype is questionable.

Risk Evaluation and Management of 100 Consecutive Rheumatic Patients Undergoing Mitral Surgery in Rural China

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Background: Rheumatic heart disease seems to have been eradicated in western countries. Our patient population represents a rare group of rural patients, if compared to western countries, since they had no preoperative medical diagnosis or any sort of treatment - except traditional Chinese medicines. We felt intrigued to study and analyze this patient population, assess their risk profile and compare to average profile data of European patients.

Methods: Between January and June 2015, 100 consecutive rheumatic patients who underwent mitral valve surgery were included into this retrospective analysis. Preoperative and early postoperative data were assessed.

Results: The mean age was 54.3 ± 8 , but 65 ± 14 years for European heart valve patients. The mean body mass index of Chinese patients was 21.6 ± 3.2 , compared to 26.3 ± 3.9 for cardiac surgery patients in Europe.

On admission day the mean blood pressure was $122 \pm 19 / 78 \pm 12$ mmHg. And 73% of all patients were in atrial fibrillation, but only 15 had left atrial thrombi and 6 of them had a history of stroke. No one had any preoperative anticoagulation treatment. Preoperative mean triglycerides were 0.48 ± 0.35 mmol/l, HDL cholesterol 1.2 ± 0.2 mmol/l and fasting plasma glucose 5.1 ± 1.3 mmol/l.

Preoperative laboratory showed significantly elevated lactate dehydrogenase of 263 ± 24 U/l, total and indirect bilirubin of $29.1 \pm 9.4 \mu\text{mol/l}$ and $19.4 \pm 6.4 \mu\text{mol/l}$ as well as uric acid $430 \pm 138 \mu\text{mol/l}$. Preoperative fibrinogen was significantly low $2.2 \pm 0.4 \text{g/l}$.

76% of our Patients had multiple-valve surgery, 15% of them a triple valve intervention, but only 16.8% of European valve patients had multi valve surgery. Operative (30 day) mortality for all our 100 rheumatic patients was 1.0%, but 6.5% for European multi-valve patients. There was one postoperative neurological event. Patients have been discharged home 8.6 ± 3 days postoperatively.

Conclusions: This group of patients was surprisingly `healthy` if compared to European standards, and the prevalence of metabolic syndrome low.

Role of Ketohexokinase (KHK) in Fructose-Induced Insulin Resistance

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Introduction: Fructose is a monosaccharide abundant in fruits and used as a sweetening agent in processed foods and soda. Its major industrial sources are sucrose (from sugar cane and beet) and high-fructose corn syrup 55 (55% fructose, 42% glucose) which is used in the manufacture of juices, breakfast cereals, and pre-packaged foods. Excessive fructose consumption in animals and humans results in adverse metabolic effects including insulin resistance, elevated blood pressure, low HDL, fatty liver and cardio-metabolic diseases. We examined the effect of modified diets on the development of insulin resistance through changes in insulin signalling pathway components.

Methodology: C57/BL6 mice were fed with three different modified diets, namely low-fat (LFD), high-fat (HFD) and high-fat supplemented with sucrose (HFSD) for 20 weeks. Glucose tolerance test (GTT) and insulin tolerance test (ITT) were performed at the 5th, 11th and 16th weeks. Insulin signalling proteins such as AKT, eNOS, IR-b and ATP citrate lyase were quantified using western blotting in liver lysates. Ketohexokinase (KHK) protein expression was analysed in liver and skeletal muscle.

Result: Consistent with our previous findings, addition of sucrose to high fat (HFSD) resulted in a significant elevation in body weight compared to LFD or HFD groups. Glucose clearance was reduced in the HFSD mice compared to the LFD control group. Moreover, fasting glucose levels of HFSD mice were increased. Interestingly, the HFSD-fed mice were less insulin sensitive than the LFD- and HFD-fed mice. AKT and eNOS protein expression were considerably decreased in HFSD, while ATP citrate lyase was elevated in HFSD mice, compared to the control groups.

Conclusion: Taken together, our data suggest that the addition of sucrose to high fat diet (HFSD) induces deleterious effects predominantly through elevated levels of KHK in liver, which alters insulin signalling molecules leading to insulin resistance via alterations in the Akt/eNOS pathway.

Prevalence of Metabolic Syndrome in Serbian Cohort of Patients with Antiphospholipid Syndrome

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Objective: To evaluate prevalence of metabolic syndrome (MetS) in patients with antiphospholipid syndrome (APS).

Patients and Methods: Cross sectional study of 41 APS patients from the outpatient clinic has been performed. MetS was based on International Diabetes Federation (IDF). Clinical history and laboratory investigations, including insulin levels, lipid profile, glucose, and CRP, anthropometric and blood pressure measurements, were evaluated.

Results: 41 APS patients 24 with primary APS and 17 with secondary APS, were studied, mean age 49.78 ± 12.12 , 4 men, 37 women. The most frequent cardiovascular risk (CVR) factors were hypertriglyceridemia (34.1%), low HDL cholesterol levels (65.9%), and visceral obesity. (63.4%). Prevalence of MetS was 19.2% and lower than in general population according to IDF definition (19.2% vs. 49.8%).

Conclusions: This study shows a significant prevalence of MetS in APS patients. Identification of MetS is very important to indicate preventive strategies and reduce cardiovascular morbidity and mortality in APS.

A New Wearable Device for Home-Based Exercise Training in Diabetic and Hypertensive Patients

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Background: Exercise training is safe and includes numerous health benefits, however, (1) the number of individuals and patients participating in preventive and rehabilitative exercise training is low, and (2) no accurate and real-time assessment of exercise intensity exist to allow safe and effective training.

Aim: To develop a new, non-invasive, non-laboratory wearable device for safe and effective exercise training for patients with hypertension and diabetes.

Methods: We developed a new wearable stretch sensor that measures the equivalent of pulmonary ventilation (VE) and exercise intensity, based on the detection of the anaerobic threshold (AT) in the pulmonary ventilation curve, a vertical accelerometer and heart rate monitor, all connected to data processing and logging unit. A newly developed algorithm also allowed us to detect the AT during real-time (the gold standard parameter for exercise intensity). Cardiopulmonary exercise testing (CPET) was conducted while simultaneously using the chest strap to compare between the two methods.

Results: Comparative experiments of AT determination with CPET were tested in N=10 normal healthy volunteers showing mean difference of 1.5 [W], using Bland–Altman Analysis. The average deviation of time and load of the AT between the chest strap and the CPET was 0.6% and 1.4% for time and load, respectively. The wearable chest strap showed high performance in running tests and the detection of AT using the newly developed algorithm was <5% error when compared to off-line expert analysis of the AT.

Conclusions: The new wearable chest strap successfully detects pulmonary attributes (BF, relative TV, and equivalent of VE), and accurately detects the AT noninvasively during real time. These data provide the basis for a reliable wearable device that accurately detects exercise intensity and can serve as an alternative device for home-based exercise training in diversity of patient`s population.

Capillary Rarefaction is Associated with (Micro) Albuminuria - The Maastricht Study

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Background: (Micro) albuminuria is hypothesized to be a biomarker of generalized endothelial dysfunction which is present in the micro- and macrocirculation. According to this concept, endothelial dysfunction of the renal microcirculation causes (micro) albuminuria by increasing glomerular capillary wall permeability and by increasing intraglomerular pressure, the latter eventually leading to glomerular capillary drop-out (rarefaction) and further increases in intraglomerular pressure. However, direct evidence for an association between capillary rarefaction and (micro) albuminuria is lacking. Therefore, we examined the cross-sectional association between capillary density in the skin and (micro) albuminuria.

Methods: The recruitment of capillaries after arterial occlusion (peak reactive hyperemia) and after venous occlusion (venous congestion) were assessed by skin capillaroscopy in 741 participants of The Maastricht Study (211 with type 2 diabetes). Urinary albumin excretion was based on two 24h urine collections. (Micro) albuminuria was defined as a urinary albumin excretion ≥ 15 mg/24h. We used logistic regression analyses to evaluate the association between the percentage recruitment during peak reactive hyperemia as well as during venous congestion and (micro) albuminuria. These analyses were adjusted for age, sex, type 2 diabetes and cardiovascular disease risk factors.

Results: 135 participants had (micro) albuminuria (64 without and 71 with type 2 diabetes). A lower recruitment during venous congestion was associated with (micro) albuminuria: after adjustment, the odds ratio (OR) for (micro) albuminuria in the lowest as compared with the highest tertile was 1.75 (95%CI 1.05 to 2.95). Results were similar for the comparison between the lowest and the highest tertile recruitment during peak reactive hyperemia (OR 1.59 (95%CI 0.96 to 2.64)). Results were not modified by the presence of type 2 diabetes ($P_{\text{interaction}}$ 0.10).

Conclusions/Discussion: Lower capillary density of the skin microcirculation was independently associated with (micro) albuminuria. Thereby, this population-based study is the first to provide direct support for a role of capillary rarefaction in the pathogenesis of (micro) albuminuria.

The Influence of Treatment on Asymmetric Dimethylarginine Level, Biochemical Parameters and Blood Pressure in Patient with Non-Diabetic Proteinuria

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Background: Endothelial dysfunction is related to the limited availability of nitric oxide (NO) in the early stages of atherosclerosis. NO is synthesized with the participation of NO synthase activity of which is inhibited by asymmetric dimethyl larginine (ADMA).

The aim of this study was to assess the relationship between the concentration of ADMA in the plasma of patients with non-diabetic proteinuria, and selected biochemical parameters and blood pressure and the impact of treatment on the concentration of ADMA.

Methods: 37 patients (11F, 26M), mean age 38.5 years with non-diabetic proteinuria. The mean serum creatinine at baseline was 1,15mg / dl. The study population was divided into group A and B, depending on the treatment. The former was treated with blockers of renin angiotensin aldosterone system (RAAS), and the latter received additionally immunosuppressive therapy (steroids, cyclophosphamid, cyclosporine).

In each patient three points of observation (0, 6, 12 months) the level of ADMA, the parameters of the protein, lipid, renal parameters and inflammation was evaluated. Additionally, a daily measurement of blood pressure was performed. In the control group ADMA level once was assessed.

Results: At baseline ADMA concentration in the study population was 0.77 μ mol / l, in the control group 0.56 mmol / l. After 12 months the concentration of ADMA decreased to 0.4 mmol / L. At no time point there was no significant difference of ADMA level between group A and B. During the study, it was found statistically significant changes in total cholesterol, triglycerides, albumin, fibrinogen. The relationship between the level of ADMA and CRP, fibrinogen and total cholesterol (P <0.05) was observed. Blood pressure was controlled in the population. Conclusions: The use of drugs blocking the RAAS resulted in a significant decrease of the ADMA during observation period. Immunosuppression in addition to RAAS blockade doesn't change the level of ADMA reduction in our patient

Glomerular Volume in Patients Who Died Due to Intracranial Haemorrhage

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Background: Results of some quantitative histopathological studies suggest that patients with essential hypertension are characterized by lower number and higher mean volume of kidney glomeruli (MGV). Intracranial hemorrhage is one of the common causes of death in the patients with hypertension. The aim of the study was to evaluate MGV in kidney donors died due to intracranial haemorrhage.

Methods: MGV was evaluated in randomized obtained preimplantation kidney biopsies from cadaveric kidney donors. Weibel-Gomez formula was adapted to calculate mean glomerular volume (MGV). Results were presented as means and 95% CI.

Results: Analyzed group consisted of 34 cadaveric kidney donors who died due to intracranial hemorrhage [18 females and 16 males; age 49 years (42-51), kidney weight 191.0g (174.1-208.7) and serum creatinine concentration 104 $\mu\text{mol/l}$ (89-174)]. The control group consist of 20 patients who died due to brain injury [3 females and 17 males, age 41 years (30-44), kidney weight 187.0g (164.2-212.7) and serum creatinine concentration 97 $\mu\text{mol/l}$ (81-236)]. Entire medical history of cadavers (including history of hypertension) were not available for all kidney donors. Kidney donors died due to intracranial hemorrhage characterized by significant higher MGV than donors died due to brain injury [(4.95x10⁶ μm^3 (4.51-5.95) vs 3.50x10⁶ μm^3 (2.91-4.01)]. Significant differences ($p=0.025$) in median MGV between age terciles were also found: [tercile 1 (6 μm^3 (2.90-3.98), tercile 2 (42-49 years) – 4.68x10⁶ μm^3 (4.00-5.38) and tercile 3 (>50 years) – 5.11x10⁶ μm^3 (3.56-7.97)]. Significant ($p=0.024$); positive ($R=0.42$) correlation between median MGV and donors age were found.

Conclusions: 1. Kidney harvested from patients who died due to intracranial hemorrhage (presumably due to the history of arterial hypertension) are characterized by higher MGV. 2. More advanced age seems to be an important risk factor of increased MGV.

Awareness of Risk Factors, Clinical Manifestations, and Treatment Options for Chronic Kidney Disease in the Older Adult Population: An Investigative Study with Foster Grandparents

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Since the first group of Baby Boomers became 65 years of age in 2011, there has been the realization that the older population is growing and will continue to grow in future decades. This increase is a direct result of improvements in medical knowledge and technology. However, health care professionals should be aware that as one ages, there is an increased risk for the development of chronic illnesses such as heart disease, hypertension, diabetes mellitus Type 2, and chronic kidney disease.

There is also the nationwide effort to move from the paradigm of treating illness and shifting to awareness and prevention. This effort has been apparent in the proliferation of education and screening programs that have a specific focus on the child, adolescent, young adult and middle adult. However, the focus is not as great on these types of programs specifically for the older adult.

The presenter/researcher conducted a study to investigate the level of knowledge that the older adult population (specifically, Foster Grandparents) had in regards to their awareness of the definition of chronic kidney disease, risk factors, clinical manifestations, and treatment options. The study was conducted with three separate groups of Foster Grandparents in the state of Mississippi; a state with a high rate of hypertension, diabetes mellitus Type 2, and obesity. The study participants were given a pretest to assess their knowledge of chronic kidney disease. An education session was provided after the pretest. Following the education session, a post test was administered to assess how much content they retained/learned from the information presented from the education session.

The presenter/researcher will share the results of the study with the purpose, objectives, and methodology. This will provide a foundation for attendees to develop community-based education and screening programs with a focus on the older adult population.

Prehypertension and Factors Predicting Kidney Function

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Background: The ideal level of blood pressure in maintaining targeted kidney function among Chronic Kidney Disease (CKD) is inconclusive. Current research findings suggest low diastolic blood pressure related to high mortality rate among CKD patients. Prehypertension condition leads to later deterioration of cardiovascular and kidney functions. We examined factors predicting of kidney function among Thais with prehypertensive condition. **Objective:** To examine the predictability of factors influencing kidney functions included: Systolic blood pressure (SBP), Diastolic blood pressure (DBP), Cholesterol (Chol), blood sugar (HbA1c), Creatinine (Cr) on the Glomerular Filtration Rate (GFR) among persons with prehypertension.

Methods: This is a descriptive with a cross sectional study on community dwellers in Thailand came for health screening under the Sufficiency Health Project. The setting is a Subdistrict Health Service facility (or Health Promoting Hospital) in Central Thailand. Only those with prehypertension or systolic blood pressure between 120-139 mmHg. were included in the study. The total number of subjects is 83 were identified from those 200.

Results: The majority of the subjects are middle age female farmers. The results suggests the positive relationship between GFR and DBP. Stepwise Regression analysis concluded that only Cr and DBP significantly predict 32.2 % of variance of GFR. Those SBP, Chol, and HbA1c can not significantly predict GFR level.

Conclusion and Discussion: The study result suggests a significant role of DBP on kidney functions. As the association of Cr level and GFR is confirmed, it also suggests that those with higher DBP would have better kidney functions (higher GFR). Therefore, even at the early stage of hypertension, DBP should be carefully monitored and maintain its safety level to prevent Chronic Kidney Disease.

The project was supported by The National Council of Research, Thailand.

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Doctor-Patient Communication about Nutrition on Related Secondary Preventive Behaviors, Especially for Hypertension

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Background: Inadequate consumption of fruit and vegetables and salt intake are two major factors that can play a role in increased to secondary prevention behaviours. Doctor-patient relationship intervenes on the adherence of these advices. For hypertension, hypercholesterolemia, diabetes, overweight and obesity, our study's aim was to analyse the associations between the quality of the doctor-patient communication, evaluated in 2013, and patients' adherence to their general practitioner (GP)'s nutritional advices, between 2008 and 2013.

Methods: Performed by the National Institute of Cardiac Surgery and Interventional Cardiology in Luxembourg, 4391 patients were contacted. Five years after a coronary angiography, 1289 completed a self-rating questionnaire assessing the GP'Com-5 items scale (Cronbach 0.87). The variables were analysed with a multiple logistic regression model.

Results: Patients declared that 57.9% reduced or stopped their consumption of salt intake, whereas 65% increased their consumption of fresh fruits and vegetables. Around 37% of the patients reported having made changes following the advice of their doctor. An increased consumption of fresh fruits and vegetables was linked with the quality of doctor-patient communication when patients were hypertension (odd ratio (OR) = 1.084, IC 95%, [1.017-1.157]), overweight (1.081 [1.013-1.155]), obesity (OR = 1.130 [1.056-1.209]), hypercholesterolemia (OR = 1.102 [1.033-1.175]) and diabetes (OR = 1.103 [1.029-1.181]). The decreased of salt intake consumption was associated with the quality of physician-patient communication when the patient was hypertension (OR = 1.102 [1.034 - 1.176]).

Conclusion: Doctor-patient communication is a relevant determinant in obtaining a favourable behavioural outcome, especially on nutrition. The rehabilitation program must promote more exchange and telephone assistance to develop a mutual engagement.

Rate Pressure Product: Both Blood Pressure and Heart Rate Correlate Directly with Morbidity and Mortality

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Background: High blood pressure increases morbidity and mortality. However, the same is true for high heart rate. The beneficial effects of antihypertensive drugs are well known. However, there are no clinical outcome trials with drugs that decrease heart rate. In addition, potential correlations of the Rate Pressure Product (heart rate x systolic blood pressure, RPP) with morbidity and mortality are unknown

Materials and Methods: We compared haemodynamic effects of bisoprolol, carvedilol and doxazosin in 12 healthy males. Subjects received single oral doses of 5mg bisoprolol, 50mg carvedilol and 4mg doxazosin according to a randomised, double-blind, cross-over protocol. Heart rate and blood pressure were measured 4 hours following drug intake

Results: Blood pressure was decreased by all drugs. However, heart rate was decreased by bisoprolol (–12%, p0.05), carvedilol showed no effect (–5%, n.s.), whereas doxazosin increased heart rate (+16%, p0.05). The RPP was decreased by bisoprolol (–18%, p0.05) and carvedilol (–16%, p0.05) but increased by doxazosin (+7%, p0.05)

Conclusions: These data show that different antihypertensive drugs show markedly different effects on heart rate and, herewith, on the RPP. Particularly the increase of heart rate caused by doxazosin was more pronounced than its decrease of blood pressure, thus causing an increase of the RPP. On the other hand, bisoprolol and carvedilol decreased not only blood pressure but also heart rate and, herewith, the RPP. Therefore, we hypothesise that the effects of antihypertensive drugs on the RPP might predict outcome even better than their effects on blood pressure alone. Accordingly, the data of heart rate in (numerously already existing!) clinical outcome trials in arterial hypertension should be analysed, too, in order to find out whether or not the RPP might correlate with morbidity and mortality better than blood pressure or heart rate alone!

Evaluation of the Efficacy and Safety of Novel Angiotensin II Receptor Blocker Fimasartan in Adult Russian Patients with Mild or Moderate Hypertension

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Background: Fimasartan, potent angiotensin II receptor blocker (ARB), has been used successfully in Korea since 2010. In Russia number of hypertensive patients who achieved target blood pressure is still low. New promising ARB can be attractive option for improving antihypertensive therapy. However fimasartan was not studied in population other than Korean and Mexican adequately.

Methods: In multicenter open-label parallel-group non-inferiority trial adult patients with primary hypertension, grade I-II were randomized in 1:1 ratio to receive fimasartan 60 mg per day or losartan 50 mg per day with subsequent optional titration to 120 or 100 mg respectively. Primary end-point was change from baseline in "office" sitting systolic blood pressure (SBP) at week 12. Frequency of treatment emergent adverse events (TEAE) was evaluated to assess safety of the drugs.

Results: A total of 179 patients were randomized to fimasartan [n = 89, 59 (66.3%) males] or losartan [n = 90, 56 (62.2%) males] groups. There were no differences between groups in key parameters. In intention-to-treat analysis average change in SBP from baseline to week 12 was -25.2 ± 8.6 mm Hg in fimasartan group ($p < 0.001$) and -24.3 ± 7.8 mm Hg in losartan group ($p < 0.001$). Difference in average change was -0.18 ± 1.00 , upper limit of 95% CI was 1.47 mm Hg that was lower than prespecified non-inferiority margin (5.5 mm Hg). In per-protocol analysis non-inferiority of fimasartan to losartan was also confirmed. TEAE were observed in 22.5% patients in fimasartan-treated group with one case leading to discontinuation of the drug due to transaminase elevation and in 16.7% patients in losartan-treated group, difference was not statistically significant ($p=0.352$).

Conclusion: In adult Russian hypertensive patients fimasartan had similar efficacy and safety profile in comparison to losartan that consistent with results of previous trials and facilitate widespread implementation of fimasartan into clinical practice.

Is Prehypertension Affecting the Progression of Coronary Artery Calcium? - Results of the Heinz Nixdorf Recall (HNR) Study

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Background: To determine the role of stages of hypertension for coronary artery calcification (CAC) progression in a European urban population.

Method: The population-based Heinz Nixdorf Recall study recruited 4814 subjects from 2000-2003 in a heavily populated region in Germany (baseline examination, BL). Out of three consecutive blood pressure (BP) measurements, mean values of the second and third measurement defined BP. BP stages were classified according to JNCVII guidelines as normotension (NT), prehypertension (PreHT), stage 1 (ST1) and 2 (ST2). CAC was measured using electron-beam computed tomography. Remaining Framingham risk factors and antihypertensive medication (risk factors, RF) were recorded. After 5 years, the second examination (5Y) with identical CAC-measurement protocol as in BL took place. CAC at 5Y was modelled from age- and sex-specific CAC percentiles at BL, exponentially extrapolating along the subject's percentile by the time between measurements. A predefined acceptance band nominally covers 20% of observed values around the individually predicted value at 5Y. CAC progress was classified as within band (expected, EP), above band (rapid, RP), below band (slow, SP).

Results: 3481 subjects (age at BL 45-74 years, 53.1% women) without coronary heart disease until 5Y enter the analysis. Prevalence of BP stages was: NT 25.9%, PreHT 37.8%, ST1 25.9%, ST2 10.4%. Prevalence of CAC progress classes was: RP 19.4%, EP 68.1%, SP 12.5%. The RP proportion increases steadily from 17.2% (NT) to 21.5% (ST2), $p=0.021$. Relative risks (95%CI) of rapid progress with NT as reference were: age- and sex-adjusted, PreHT 1.21 (1.01;1.46), $p=0.043$, ST1 1.35 (1.10;1.65), $p=0.004$, ST2 1.42 (1.11;1.83), $p=0.006$; RF-adjusted: PreHT 1.18 (0.98;1.42), $p=0.084$, ST1 1.28 (1.05;1.57), $p=0.016$, ST2 1.31 (1.01;1.68), $p=0.039$. Excluding 1058 subjects with antihypertensive medication left relative risk estimates unchanged.

Conclusion: The risk of rapid CAC progression increases with BP stages. This already affects prehypertensives, a substantial proportion of our urban population.

Reliability of Spontaneously Hypertensive Rat in Biomedical Research: A Word of Caution

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Man had purely relied on observation to study complex physiologic principles for long with hardly any intervention possible. But ever since scientists started using animal models as human replicas, it has been possible to employ a lot of interventional and experimental strategies. Spontaneously hypertensive rat (SHR) is considered as one of the best and most widely used models of human hypertension. We have shown that acidosis induces a contraction in aortas from SHR and normotensive Wistar-Kyoto (WKY) rats. Since acidosis is not an uncommon condition in the setting of diabetes mellitus and chronic renal failure, which are often comorbid with hypertension, this change in the behavior of arterial contractility was of immense interest. These findings in rodent animal model compelled us to investigate further the underlying mechanisms and the intracellular signaling pathways involved in contraction. However, much to our surprise, when the similar experiments were repeated on human (both normotensive as well as hypertensive) internal mammary artery, acidosis caused relaxation of vessels. Although SHR is a valuable model of hypertension, its findings were not reproducible in humans. Personal experience and review of literature shows lot of discrepancies between the data generated from humans and animals. However, it is a usual practice that the results obtained from animal models are extrapolated on humans. In this presentation, this issue will be focused, that while animal models are essential for the research and development, a critical caution needs to be practiced in interpreting the results. Uncritical reliance on the results of animal experimentation can be dangerously misleading and has resulted in damages to human health in several cases.

Incidence of Hypertension among Industrial Workers in Kerala, India: Results From a Cohort Study

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Background: The Indian state of Kerala state was reported to have one of the highest prevalence of hypertension (HTN) in India. However limited information is available on the incidence of hypertension in the state. The objective of this study was to find the incidence of hypertension among industrial workers in Kerala.

Methods: We measured blood pressure (BP) among 326 workers (mean age 51 years, men 76%) from two major industries in Kerala in the year 2009 and 2011 using standard protocol. Workers with systolic blood pressure (SBP) ≥ 140 mm Hg or diastolic blood pressure (DBP) ≥ 90 mm Hg or on medication for hypertension were considered to be hypertensive, SBP 120–139 or DBP 80–89 as pre-hypertensive and SBP

Results: Among the 326 workers 36.5% (95% CI 31.2-41.7) were hypertensive, 39.3% (CI 34.0-44.6) were pre-hypertensive and the remaining 24.2% were having normal BP at baseline. At the two year follow-up 49.1% were hypertensive, 30.4% were pre-hypertensive and 20.6% had normal BP. At year two, 19.8% of the 207 workers who were either normal or pre-hypertensive at baseline developed hypertension providing an incidence rate of 9.9% per year. Incidence of HTN among men was 10.7% per year compared to 7.6% among women ($p > 0.05$). Incidence of HTN among ≥ 50 years was 11.4% compared to 9.0% among < 50 years ($p > 0.05$). Among the 79 workers with normal BP at baseline 31.6% progressed to pre-hypertension, 13.9% developed hypertension and among the 128 pre-hypertensives, 23.4% developed hypertension at year two. The odds of progressing to hypertension from pre-hypertension was two times higher compared to those from normal BP (OR 1.89; CI 0.88-4.03).

Conclusion: The incidence of hypertension in this population is high. Efforts should be made to prevent or delay the progression to hypertension focusing on pre-hypertensives.

Central Blood Pressure as an Emerging Risk Factor for Mild Cognitive Impairment in Hypertensive Patients

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Background: We tested the hypothesis whether central blood pressure (BP) corresponds to mild cognitive impairment (MCI) in treated hypertensive patients (Pts) better than the brachial BP.

Methods: we studied 70 hypertensive Pts on combination medical therapy. The mean age was 64.97 ± 8.88 years. 18 (25.71%) were males and 52 (74.28%) females. They underwent complete anamnesis and physical examination, registration of home-measured BP, basic laboratory testing, instrumental evaluation: office BP, central BP, ambulatory BP monitoring and echocardiography. The screening for MCI was conducted via Mini Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA). Other tests were used as well: Hachinski ischemic score, Geriatric Depression Scale and the Four Instrumental Activities of Daily Living Score. SPSS 19 was used for the statistical analysis.

Results: The mean central pulse pressure values of patients with cognitive impairment were significantly ($p=0.016$) higher than those of the patients without cognitive impairment. There was a weak negative correlation between central pulse pressure and the results from MoCA and MMSE ($r= - 0,283$, $p=0.017$ and $r= - 0.241$, $p=0.044$ respectively). The correlation between home measured BP and MCI was also negative ($p0.05$) with higher r for the systolic and lower r for the pulse pressure than the corresponding central measurements.

Conclusion: Central blood pressure is an important risk factor for MCI. It can be easily assessed in the everyday practice and used as a screening tool for suboptimal control and target organ damage – MCI.

Inadequate Hypertension Control among Industrial Workers in Kerala, India: Results of a Cross Sectional Study

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Background: The Indian state of Kerala has one of the highest prevalence rates of hypertension. However data on awareness, treatment, control and correlates of hypertension are limited among industrial workers in the state with better access to medical care. We studied the prevalence, awareness, treatment, control and correlates of hypertension among industrial workers in Kerala.

Method: We measured blood pressure (BP) among 2321 industrial workers (mean age 44 years, men 70.3%) from selected industries using standard protocol in 2009. Hypertension was defined as systolic BP ≥ 140 and diastolic BP ≥ 90 and or on medication for hypertension. We analyzed awareness, treatment and control of hypertension (Systolic BP

Result: The prevalence of hypertension was 37.1% (95% CI: 35.1-39.0) (men 40.0%, women 30.3 %). Among hypertensives, 50.5 % were aware (men 54.0%, women 39.4%), 42.9% were treated (men 46.6%, women 31.4%) and 19.2% achieved adequate control of hypertension (men 20.5%, women 15.4%). In age adjusted multiple logistic regression analysis, odds for hypertension was higher for those who had abdominal obesity (OR 1.80, CI: 1.48-2.18), those with family history of hypertension (OR 1.54, CI:1.25-1.89), those who consumed alcohol (OR 1.42, CI:1.14-1.76), men (OR 1.38, CI: 1.08-1.75) and lower for smoker (OR 0.69, CI: 0.53-0.90) compared to their counterparts.

Conclusion: In spite of having access to regular doctor and a clinic in the selected industries the control of hypertension was low which needs to be studied.

Pre-Hypertension and Hypertension in Cancer Patients Receiving Antiangiogenetics: An Emerging Topic

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Introduction: Antiangiogenetics (AAG) inhibit vascular endothelial growth factor cascade and are used to treat various neoplasms. They are well-known to increase blood pressure (BP) and determine Hypertension (HTN) in up to 35% of patients (pts). HTN is considered a class-effect and its management may be crucial for pts prognosis.

Methods: All cancer pts receiving an AAG at Treviglio-Caravaggio Hospital (Italy) between March 2012 and May 2015 were evaluated. Clinical and instrumental evaluation was performed before AAG starting (office, ambulatorial, home BP measurement, cardiovascular (CV) risk factors determination and target organ damage identification). BP was measured for all the duration of AAG treatment until one month after its withdrawal. AAG-related HTN (AAG-HTN) and pre-HTN (=high-normal BP) were defined according to the ESH/ESC guidelines.

Results: 47 consecutive pts (M/F=32/15, median age: 67yrs, range 49-84) were evaluated and a total of 52 AAG treatments performed (5 pts received 2 AAG treatments). The AAG employed were: bevacizumab (N=20), sorafenib (N=13), sunitinib (N=12), axitinib (N=3), pazopanib (N=2), and regorafenib (N=2). BP before starting AAG resulted ≥ 140 and/or 90 mmHg in 13 out of 52 pts (=25%, grade II in 3 pts), 10 of them already receiving antihypertensives because of a history of HTN, and 3 of them with a newly diagnosed HTN. Moreover, basal SBP coherent with pre-HTN was found in 9 (=17%, 6 of them already receiving antihypertensives). After AAG starting, BP ≥ 140 and/or 90 mmHg was observed in 30 (=73%) out of 41 evaluable pts (11 not evaluable). Among them, 15 (50%) had normal BP before AAG starting, 11 (37%) not controlled basal BP, and 4 (13%) had SBP coherent with high-normal BP. When considering CV risk factors, the most represented were diabetes, dyslipidaemia, and obesity (21% each), smoke (12%), coronary (7%) and cerebrovascular disease (6%). AAG-HTN was treated according to the current guidelines and BP control was achieved in up to 74% pts.

Conclusions: while BP control in cancer pts before starting AAG was not different from general population, AAG introduction was associated with a high prevalence of HTN development and in a further significant rate of already hypertensive pts was associated with a failed BP control. The introduction of antihypertensives or adjustment of a pre-existing therapy improved BP control rate and outcome of pts.

Observational Study of the Effect of Substitution of NaCl by NaCl + 3% Chitosan (Symbiosal®) in the Diet of the Elderly on Their Blood Pressure

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Objective: to confirm in daily practice the results of a previous double blind cross over clinical trial which demonstrated that the replacement of NaCl by NaCl + chitosan 3% (according a specific patent process) significantly decreases the hypertensive power of the salt.

Methods: an observational study was conducted in a rehabilitation centre for elderly in which all foods are produced by the local kitchen and all the salt NaCl traditionally used was replaced by the Symbiosal® salt ie a combination of NaCl + 3% chitosan. All patients, hypertensive or not, were followed at inclusion and every month for their hypertension during three months by the medical practitioner in charge of their medical follow up. The cook was asked not to change his cooking habits and especially concerning the salt during all the study period.

Results: The study covers 77 patients, 75.1 ± 8.0 years old, among whom 71.4% were women. In the total population SBP (mmHg) decreases from 130 ± 17 at inclusion to 123 ± 10 at 3 months (-7.8 ± 8.5) ($p < 0.0001$). In the 16 persons whose hypertension was not under control at inclusion it decreases from 156 ± 18 to 136 ± 12 after 3 months (-19.6 ± 7.3) ($p < 0.0001$) and among them 68.5% were controlled. In the subject with limit hypertension (between 130 et 140) it decreases from 135.7 ± 3.1 to 123.2 ± 4.9 (-12.5 ± 4.6) ($p < 0.0001$).

Conclusion: The replacement of the traditional salt NaCl by the NaCl + chitosan 3% appears to reduce significantly the blood pressure and contribute to demonstrate that a decrease of the hypertensive toxicity of the salt may be obtained. This suggest that it could be used either in the field of a low salt diet in hypertensive patient but also in general population in addition to the recommendation of a salt reduction

Influence of Blood Pressure on Retinal Vessel Diameters in Swiss Primary School Children – The Sportcheck Study

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Background: Alterations of retinal vessel diameters have been shown to be predictive of cardiovascular risk in adults and children. The study examined the association of blood pressure with retinal vessel diameters in young children.

Methods: In the cross-sectional study, 391 primary school children (6-8 years) of the Swiss canton Basel Stadt were screened for blood pressure. Blood pressure levels were categorized by age, sex and height into normotension (NT), prehypertension (PHT) and hypertension (HT), according to the reference values of the KiGGS study. The retinal microcirculation was examined using a Static Retinal Vessel Analyzer.

Results: In our cohort of children, the prevalence of PHT and HT was 11.5 % and 14.1%, respectively. Higher systolic and diastolic BP were associated with narrower CRAE (p

Discussion: Blood pressure, even at the level of PHT, seems to be the driving force for microvascular target organ alterations in young school children. Retinal vessel analysis seems to be a valid non-invasive tool to capture early vascular ageing in the young. Childhood health programs may have to focus more on BP lowering interventions to prevent development of cardiovascular disease later in life.

Association between Serum Uric Acid, Metabolic Variables and Arterial Stiffness in Stage I Hypertensives Subjects

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Background: High serum uric acid (SUA) is often associated with the metabolic syndrome and is a risk factor for cardiovascular disease. Whether high SUA is associated with arterial stiffness in the early stage of hypertension is not well known.

Methods: We addressed this issue in 340 non-diabetic subjects from the HARVEST study (73% males, mean age of 31±8 years, mean blood pressure (BP) of 145±11/92±6 mmHg). Patients were divided into SUA tertiles (T1: 1.30-4.47, T2: 4.50-5.50, T3: 5.55-8.60 mg/dl). Arterial stiffness was assessed by pulse wave velocity (PWV), augmentation index (Aix), pulse pressure (PP) amplification and systolic BP (SBP) amplification.

Results: Patients in the highest SUA tertile were heavier (BMI, T3: 25.7±0.3 kg/m², T2: 24.9±0.3 kg/m², T1: 24.4±0.3 kg/m²; p=0.031) and had a worse metabolic profile, with higher age-and-sex-adjusted total cholesterol (TC) (T3: 201.5±3.8 mg/dl, T2:188.8±3.6mg/dl, T1:193.2±3.8 mg/dl; p=0.048), triglycerides (T3: 150.9±7.8 mg/dl, T2: 99.6±7.5 mg/dl, T1: 96.3±7.7 mg/dl; p0.0001) and glucose (T3: 93.0±1.1 g/dl, T2: 92.6±1.1 g/dl, T1: 89.5±1.1 mg/dl; p=0.059), and lower HDL-C (T3: 50.6± 1.6 mg/dl, T2: 54.9±1.6 mg/dl, T1: 56.8±1.7 mg/dl; p=0.033) than subjects in the lower SUA tertiles. No significant difference in peripheral BP and central BP was found according to SUA tertile. Patients in the highest SUA tertile showed lower SBP amplification (p=0.037 adjusted for age, sex, BMI, and metabolic data). This difference remained significant after inclusion in the model of lifestyle habits (p=0.021) and of 24-h BP and heart rate (p=0.034). Patients in the highest SUA tertile also presented a lower PP amplification even though the difference was of borderline significance after adjustments (p=0.08). No significant difference in PWV and Aix was found across SUA tertiles.

Conclusion: These data show that among young to middle-age stage I hypertensives higher SUA is associated with metabolic abnormalities and initial impairment of arterial elasticity.

Hypogonadal Men with Prediabetes do not Develop Type 2 Diabetes (T2DM) During up to 8 Years of Treatment with Testosterone Undecanoate Injections (TU)

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Background: Long-term studies using testosterone therapy (TTh) in hypogonadal men with T2DM have shown beneficial effects. There is no information whether TTh has benefits in hypogonadal men with prediabetes.

Methods: Testosterone was measured in men presenting to urologists and, if found hypogonadal, offered TTh. Those who received at least 1 year of treatment with TU were entered into cumulative registry studies. 109 men with prediabetes, defined as baseline HbA_{1c} 5.7-6.4% were analysed. TU was administered in 3-month intervals for up to 8 years. At each or each other visit, anthropometric and metabolic parameters were measured.

Results: Mean age was 57.37±8.99 years. Mean weight decreased from 96.15±13.05 to 84.14±6.98 kg by -14.58±0.68 kg, percent change from baseline -14±0.65%. Waist circumference decreased from 103.8±6.88 to 94.32±4.53 cm by -9.62±0.44 cm. BMI decreased from 30.55±4.35 to 27.04±2.55 kg/m² by -4.66±0.23 kg/m². Waist-to-height ratio decreased from 0.58±0.04 to 0.53±0.03 (p

Fasting glucose decreased from 5.43±0.68 to 4.63±0.67 mmol/L (p<0.0001) by -0.94±0.11 mmol/L. HbA_{1c} decreased from 5.9±0.21 to 5.38±0.26% (p<0.0001) by -0.59±0.04% with statistical significance compared to the previous year for the first 3 years.

The triglyceride: HDL ratio, considered a surrogate parameter of insulin resistance, declined from 5.62±2.61 to 2.6±0.74 (p<0.0001). The product of fasting glucose and triglycerides (TyG Index), another surrogate for insulin resistance, improved from 4.04±0.17 to 3.81±0.14.

No patient progressed from prediabetes to T2DM. All but 4 patients' last measured HbA_{1c} was <5.7%.

Lipid patterns, blood pressure, liver transaminases and CRP improved significantly.

There were no major adverse cardiovascular events during the full observation time.

Conclusions: Hypogonadal men with prediabetes showed meaningful and sustainable weight loss and improved glycaemic control on long-term TTh. No patient advanced to overt T2DM. TTh effectively prevents progression from prediabetes to T2DM, thereby potentially reducing cardiometabolic risk.

KCNJ5-Mutated Aldosterone-Producing Adenomas Should Be Early Diagnosed and Treated for Preventing from Vascular Complications in Primary Aldosteronism

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Background: Aldosterone-producing adenoma (APA) is a common disease of surgically curable hypertension (HTN), while complete remission (CR) of hypertension is not always achieved after surgery. Our objective is to evaluate whether or not KCNJ5 gene mutations affect an improvement of HTN in the APA-patients after surgical treatment.

Methods: We retrospectively analyzed 90 APA-patients before and 1 year after surgery, and sequenced KCNJ5 cDNA in 90 samples of APA-tissues to compare clinical characteristics between the mutated and the wild-type group.

Results: Somatic KCNJ5 gene mutation was detected in 70 APAs and there was no difference in the prevalence of non-dipper HTN between each group. HTN was post-operatively improved in all patients, although CR was much more achieved in the mutated group (65%) than in the wild-type group (35%). The patients with partial remission (PR) of HTN showed significantly older age, longer duration of HTN, larger number of antihypertensive drugs and severer vascular complications compared to those with CR before surgery. The KCNJ5 mutated APA-patients with PR showed younger age, severe hypokalemia, higher aldosterone production than the wild-type APA-patients with PR, although duration of HTN, vascular complications and the prevalence of non-dipper HTN were not different between two groups. 1 year after surgery, LVH was much more improved in KCNJ5 mutated group than in the wild-type group.

Conclusions: The present study clearly demonstrated that early surgical treatment is quite effective for achieving CR, especially in KCNJ5 mutated APA-patients, since CR was more frequently observed in the KCNJ5 mutated group than in the wild-type group regardless of similar incidences of non-dipper HTN in both groups. Moreover, unilateral adrenalectomy in KCNJ5 mutated APA-patients could make much more beneficial effect on improving LVH than in wild-type APA-patients. Thus, we should precisely diagnose younger APA-patients with KCNJ5 gene mutations for improving blood pressure and vascular complications.

High Prevalence of Primary Aldosteronism among Cases with Adrenal Subclinical Cushing's Syndrome

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Introduction: Cases with subclinical Cushing's syndrome (SCS) often demonstrate hypertension. However it is obscure whether or not mild excess of cortisol involves pathogenesis of hypertension, because the cure rate of hypertension has been reported 14.4~27.8% after adenomectomy in SCS. SCS had been recently reported to simultaneously complicate primary aldosteronism (PA). Thus, we prospectively studied the prevalence of PA and hypertension among SCS.

Methods: 60 cases with adrenal SCS diagnosed by overnight dexamethasone suppression test were enrolled into this study from 2009 to 2014. PA was suspected when maximal aldosterone concentration was >20ng/dl after 250µg of ACTH stimulation. Hyperaldosteronism was diagnosed when concentration of aldosterone was >1400ng/dl in effluent sampled at various intra-adrenal tributary veins by ACTH-stimulated segmental adrenal tributary sampling (SS-ATS). We evaluated remission of hypertension one year after unilateral adenomectomy for cortisol-producing adenoma (CPA) or aldosterone-producing adenoma (APA).

Results: S-ATS revealed that 51 cases (85%) complicated PA among 60 cases with SCS. Moreover, the results of S-ATS could make differential diagnosis of various subtypes of PA, such as 15 cortisol plus aldosterone-producing adenoma (CAPA), 18 SCS simultaneously showing APA, and 18 SCS associated with bilateral hyperaldosteronism (IHA). 94% of cases with SCS complicating PA were hypertensive, while 56% of cases with SCS not complicating PA were normotensive. 11 of 12 cases with CAPA become normotensive after removing CPAP. 3 cases among 4 SCS complicating APA became normotensive after removing APA, however 5 cases among 6 SCS complicating APA and 3 cases among 4 SCS associated with IHA still persisted hypertension even though hypercortisolemia was cured one year after removing CPA.

Conclusion: The present data demonstrated that PA is frequently complicated with SCS, and that hyperaldosteronism seems to induce hypertension among SCS-cases. We should, consider the possibility of association of PA when the SCS-patients are suffered from hypertension.

The Role of Inflammatory Signal and Aortic Smooth Muscle Cells in Developing Aortic Aneurysm

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Inflammation and dyslipidemia have been known to be major risk factors in developing arterial disorders, such as aortic aneurysm (AA). It is well known that prostaglandin-mediated inflammatory signal, via blood cells, such as macrophages, increases protease and inflammatory cytokine expression, leading to development of AA. However, the role of arterial smooth muscle cells (ASMCs) in this pathologic process remains poorly understood. In a mouse model of dyslipidemia, i.e., ApoE-knockout mice (ApoEKO), infusion of angiotensin II (AngII) for 4 weeks induced AA. Administration of an antagonist for a prostaglandin receptor subtype, i.e., EP4 antagonist, however, significantly attenuated AAA. Similarly, AAA was significantly reduced in EP4^{-/-}/ApoEKO mice compared to EP4^{+/+}/ApoEKO mice (76% reduction, *P*0.01). Thus, both pharmacological inhibition and genetic disruption of EP4 signal attenuated AngII-induced AAA in dyslipidemic mice. To examine the role of EP4 in ASMCs, we measured EP4 expression in human ASMCs. PGE2 stimulation increased EP4 expression in hASMCs. Similarly, EP4 expression was significantly greater by 3.5±0.8-fold in ASMCs of human AA tissues than those of normal aorta, suggesting EP4 was increased in hASMCs of AA. Stimulation of hASMCs with EP4 agonist increased MMP-2 activity and IL-6 (1.4±0.08- and 1.4±0.08-fold, *P*0.05), suggesting that EP4 in ASMCs plays an important role in developing AAA. Accordingly, we overexpressed EP4 selectively in ASMCs in mice using the Cre-loxP system (EP4TG). AngII infusion did not induce AA in control mice (n=6) because they were not ApoEKO. However, AngII infusion developed AAA and caused death in 7 out of 8 mice in EP4TG, which were not dyslipidemic. Macrophage infiltration and enhanced expression of IL-6 were significant in EP4TG. Our findings suggest that EP4 signal in ASMC may trigger blood cell recruitment, and thus protease and cytokine expression, leading to the development of AA. Inhibition of EP4 signal may effectively prevent this pathological process.

Development of Sustained Release “NanoFDC (Fixed Dose Combination)” for Hypertension – An Experimental Study

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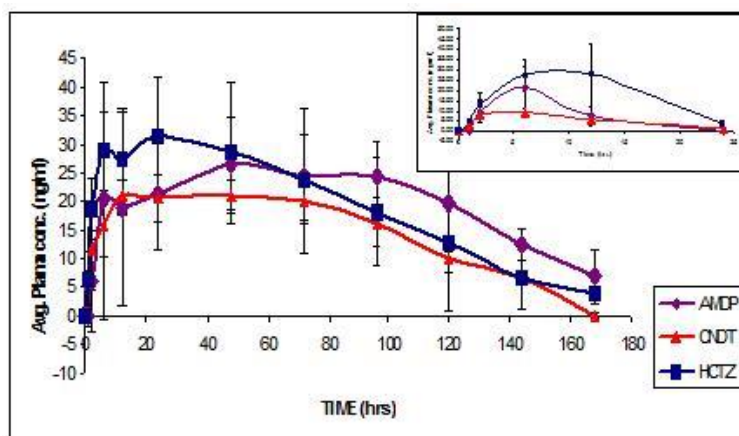
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Objectives: The present study was planned to formulate, characterize and evaluate the pharmacokinetics of a novel “NanoFDC” comprising three commonly prescribed anti-hypertensive drugs, hydrochlorothiazide (a diuretic), candesartan (ARB) and amlodipine (a calcium channel blocker).

Basic Methods: The candidate drugs were loaded in Poly (DL-lactide-co-glycolide) (PLGA) by emulsion- diffusion-evaporation method. The formulations were evaluated for their size, morphology, drug loading and in vitro release individually. Single dose pharmacokinetic profiles of the nanoformulations alone and in combination, as a NanoFDC, were evaluated in Wistar rats.

Results: The candidate drugs encapsulated inside PLGA showed entrapment efficiencies ranging from 30%, 33.5% and 32% for hydrochlorothiazide, candesartan and amlodipine respectively. The nanoparticles ranged in size from 110 to 180 nm. In vitro release profile of the nanoformulation showed 100% release by day 6 in the physiological pH 7.4 set up with PBS (phosphate buffer saline) and by day 4-5 in the intestinal pH 1.2 and 8.0 set up SGF (simulated gastric fluid) and SIF (simulated intestinal fluid) respectively. In pharmacokinetic analysis a sustained-release for 6 days and significant increase in the mean residence time (MRT), as compared to the respective free drugs was noted [MRT of amlodipine, hydrochlorothiazide and candesartan changed from 8.9 to 80.59 hours, 11 to 69.20 hours and 9 to 101.49 hours respectively].

Conclusion: We have shown for the first time that encapsulating amlodipine, hydrochlorothiazide and candesartan into a single nanoformulation, to get the “NanoFDC (Fixed Dose Combination)” is a feasible strategy which aims to decrease pill burden.



Assessment of the Microcirculation – Methods to Analyse the Endothelial Glycocalyx in Patients with Hypertension and Diabetes

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One of the early events of vascular disease and end-organ damage in patients with cardiovascular risk factors is a dysfunctional endothelium. Endothelial dysfunction is associated with an increased morbidity and mortality. The mechanisms responsible for endothelial dysfunction are multifactorial and include the presence of hyperglycemia, toxins such as ADMA, low-grade inflammation and high blood pressure. One of the earliest changes has been postulated to be compositional and dimensional alterations of the endothelial surface layer (ESL) or the glycocalyx.

The ESL is a gel-like structure consisting of different proteoglycans, glycoproteins, and plasma molecules. In recent years, the ESL has gained a lot of attention as a protective layer with regulatory functions in the communication between blood constituents and endothelial cells. Alterations in the composition and/or degradation, therefore, are thought to predispose to the development of vascular disease. Because the ESL is being produced and shed continuously, analysis of the ESL is still a challenge. Most methods that aim to detect alterations in the ESL are based on measurement of shed ESL components in serum, such as proteoglycans, hyaluronan, and heparan sulfates. Recently, a non-invasive tool for ESL analysis was developed using sidestream darkfield microscopy of the sublingual capillary network. We use these approaches to investigate whether perturbations of ESL dimension assessed by intravital microscopy and the presence of shed ESL components are markers of endothelial cell function and are influenced in the early stages of vascular disease.

Persistence of Social Gradient in Knowledge of Hypertension, 5 Years after Coronary Angiography

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Background: High blood pressure is a “killer, global public health crisis” (WHO, 2013). The objective of this study is to measure socioeconomic inequalities in knowledge of hypertension among patients with cardiovascular disease in a context of secondary prevention

Methods: Admitted in the National Institute of Cardiac Surgery and Interventional Cardiology (INCCI) of Luxembourg in 2008-2009, 4391 patients were contacted after a coronary angiography (August 2013-April 2014) by mail. A total of 1289 self-administered questionnaires were completed. Sex, age, education level and hypertension were analysed with multiple logistic regression.

Results: Five years late, the knowledge of hypertension as cardiovascular risk factor was characterized by the existence of social gradient, based on level of education, both in men and women. For all patients, the probability for quote hypertension as a risk factor was higher among those who had completed higher education (OR = 1.91, 95% CI 1.29 - 2.82 in 2014 and OR = 5.64, 95% CI: 2.75 -11.56 in 2008/09) or a secondary education (OR = 1.60, 95% CI 1.20 -2.14 in 2013/14, and OR = 2.50, 95% CI 1.35-4.61 in 2008/09) compared with people who had completed primary education.

Discussion: The knowledge of arterial hypertension reveals the persistence of a social gradient. Patients more concerned by the hypertension have more knowledge aligned to the medical norms of secondary prevention. Patients with low socio-economic status were probably more likely to perform beneficial behaviours, if more targeted interventions would be needed to improve their health and reduce health inequalities.

Novel very Rapid Measurement of Active Renin and Aldosterone Concentrations Might be Beneficial for Selecting Antihypertensive Agents at First Visit of Patients

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Background: The measurement of plasma aldosterone concentration (PAC) and renin activity (PRA) or active renin concentration (ARC) is clinically important not only for detection of primary aldosteronism but also for the selection of antihypertensive agents to treat patients successfully. However, it takes 5-7 days for clinicians to get the results.

Methods: We recently developed the novel rapid non-RIA assays of PAC and ARC, which are simultaneously measurable in 10 minutes by chemiluminescent enzyme immunoassay (CLEIA) system machine with their specific monoclonal antibodies and the immobilized magnetic particles. We retrospectively compared RIA-assayed PAC, PRA and ARC with CLEIA-measured PAC and ARC in 243 patients with aldosteronoma (n=86), idiopathic hyperaldosteronism (n=78) and essential hypertension (n=79), and investigated whether the calculation of aldosterone /renin ratio (ARR) with CLEIA-measured PAC and ARC (ARR-C, ng/dL per pg/mL) instead of RIA-assayed PAC and PRA (ARR-A, ng/dL per ng/m/hour) affects the diagnosing of the APA patients, which are potentially surgically curable.

Results: CLEIA-measured PAC were significantly correlated with RIA-assayed PAC ($y=0.9846x + 2.5708$, Spearman's $r = 0.8166$, $P < 0.0001$). Rapid CLEIA-measured ARC with the lower detection limit of 0.25 pg/mL, which is much smaller as compared to that of 2 pg/mL in conventional RIA-assayed ARC, were significantly correlated with RIA-assayed ARC ($y= 0.991x[\text{ARC-RIA}] - 0.799$, Spearman's $r = 0.9077$, $P < 0.0001$), and also significantly correlated with RIA-assayed PRA (Spearman's $r = 0.8884$, $y = 3.992x[\text{PRA}] + 0.650$, $P < 0.0001$). ARR-A and ARR-C of aldosteronoma patients were 129 ± 4.3 and 25.1 ± 2.7 (Mean \pm SEM), respectively. ARR-A and ARR-C of idiopathic hyperaldosteronism patients were 40.4 ± 2.9 and 6.7 ± 9.5 , and those of essential hypertension patients 17.2 ± 2.1 and 3.2 ± 0.4 , respectively.

Conclusions/Discussion: Our novel rapid CLEIA-assay of PAC and especially very sensitive ARC CLEIA-assay can be clinically very useful, not only for detecting primary aldosteronism but also choosing antihypertensive drugs because it takes only ten minutes to measure them simultaneously during patients' waiting for a very short time at their first visits.

Arterial Hypertension - Significant Risk Factor of Vascular Diseases

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High percentage of population is suffering from arterial hypertension, which is one of the most significant risk factors in development of atherosclerosis and cardiovascular and other diseases. Therefore the early diagnosis of arterial hypertension is crucial. Two groups of patients are compared. One group with established diagnosis of arterial hypertension and another one which included patients where the elevated blood pressure (BP) was recorded anew and at random during admission, those who had the so called high normal blood pressure or whose case history contained a record of sporadic BP increase but on further admissions was normal. The following examinations were performed at both groups and then compared: electrocardiography, transthoracic echocardiography, Holter monitoring of blood pressure and ECG, exercise bike stress testing, measurement of carotid myointimal thickness and carotid pulse velocity.

The main goal of the study was to show that both groups are similar in important parameters, which may be of clinical importance in decision-making about early diagnosis and treatment of AH. The second goal was to show that measurement of BP under the so called basal conditions may sometimes be insufficient when deciding if the patient is hypertonic or not.

The stress testing in certain group of patients with AH should become a part of guidelines for arterial hypertension.