THEME 5: NON-COMMUNICABLE DISEASES

ABSTRACTS FOR ORAL AND POSTER PRESENTATIONS

ORAL PRESENTATIONS

NCD-O-01

Relationship Between Chromogranin A And Surrogate Indices of Insulin Regulation in Apparently Healthy Women

Philisiwe Ntuli, Marketa Toman, Tracy Snyman:

Department of Chemical Pathology, National Health Laboratory Services, Johannesburg; Department of Chemical Pathology, University of the Witwatersrand, Johannesburg. Department of Chemical Pathology, Pathcare Vermaak, Pretoria.

Abstract: Chromogranin A (CgA) contributes to glucose regulation, including islet beta-cell granulogenesis and sequestration and secretion of hormones. CgA knock-out mice are hypertensive, obese on a normal chow diet and have increased glucose-stimulated insulin secretion. The role of CgA in diabetes pathogenesis has been suggested but is currently not clear. We investigated whether circulatory CgA levels in apparently healthy black and white women are associated with beta-cell function, insulin resistance (IR) and insulin clearance. Sixty-six black and 52 white normoglycaemic, normotensive women below 45 years-of-age underwent an oral glucose tolerance test. Blood samples were analysed for glucose, insulin, C-peptide and CgA using manual and automated-system immunoassays. Surrogate indices for IR (HOMA-IR), insulin secretion (Insulinogenic index; IGI), beta-cell function (Disposition index; DIo) and hepatic insulin clearance (HIC) were calculated. Body mass index (BMI) and waist-to-height ratio (WHtR) were calculated. In black women, CgA levels correlated negatively with BMI ($r=-0.442$; $p<0.001$), WHtR (-0.340; 0.005), and HOMA-IR ($r=-0.404$, $p=0.001$) and positively with HIC ($r=0.366$, $p=0.002$) but not with IGI ($r=-0.203$, $p=0.099$) or DIo ($r=0.070$, $p=0.575$). The association of CgA with HIC and HOMA-IR remained significant after adjustment for BMI and WHtR in regression analysis. No CgA associations were observed for white women. These data suggest that the CgA levels in apparently healthy `black but not white women affect insulin via extra-pancreatic mechanisms involving modulation of HIC and insulin sensitivity independently of BMI. Although this is a novel finding it is based on statistical associations and requires confirmation in more in-depth studies in larger populations.

Keywords: Chromogranin A; Insulin regulation; Surrogate indices

NCD-O-02

Alcohol-induced left ventricular remodeling in preadolescent male Sprague Dawley rats

Xitsakiso Mabasa: Frederic Michel, Siluleko Mkhize, Kennedy Erlwanger and Muzi Maseko

School of Physiology

Abstract: In sub-Saharan Africa, children are increasingly consuming alcohol. However, there is a dearth of information on the cardiovascular consequences of alcohol intake during childhood. We aimed to determine the effects of alcohol intake on cardiac parameters in preadolescent Sprague Dawley rats. Twenty preadolescent male Sprague Dawley rats were randomly assigned to either a control group receiving plain water and 0.06% saccharin sweetened water or the alcohol group receiving plain water and 0.06% saccharin sweetened alcohol (n=10 per group). A two-bottle choice paradigm for voluntary alcohol intake was used. During the 5 week-intervention, the alcohol was offered incrementally from 3% to 20%. Body mass was measured thrice weekly. Blood pressure was measured using the tail-cuff technique. Left ventricular (LV) geometry and function were assessed using echocardiography. At termination, the heart and LV were isolated and weighed. Statistical analyses were done using GraphPad Prism. Following normality tests, all data were expressed as mean ± SEM. An unpaired Student's t-test was used to compare the means with $p < 0.05$ considered significant. Body mass, blood pressure, heart and LV masses as well as systolic and diastolic functions were similar between the groups ($p > 0.05$). However, alcohol-consuming rats had a reduced LV relative wall thickness ($p = 0.0045$) as well as a smaller posterior wall thickness in both systole ($p = 0.0165$) and diastole ($p = 0.0113$) compared to the control group. The findings showed that alcohol intake in preadolescent rats induces LV posterior wall thinning, suggesting an impaired growth of the LV.

Keywords: Preadolescent, alcohol intake, echocardiography, blood pressure

NCD-O-03

The genetic impact on first line treatment in South African black hypertensives

Kudakwashe Nyamupangedengu, Collen Masimirembwa, Andrew May, David Twesigomwe

African Institute of Biomedical Science & Technology; Wilkins Hospital, Harare, Zimbabwe; Sydney Brenner Institute for Molecular Bioscience, Faculty of Health Sciences, University of the Witwatersrand, South Africa

Abstract: Hypertension (HT) is a significant modifiable risk factor for cardiovascular disease and global mortality, with Africa having the highest prevalence (46%) but the lowest control rates for men (12%) and women (22%). Treatment response to HT varies due to genetic differences within and across populations. This study aimed to assess the impact of genetic variation on HT treatment outcomes in South Africa. We analyzed 364 participants newly diagnosed with HT and

receiving treatment. We sequenced 16 candidate genes using the Illumina iSeq100. These genes were selected for their roles in hydrochlorothiazide response or previous clinical variant annotations. Genome Analysis Toolkit was used for variant joint calling, and Ensembl variant effect predictor (VEP) plugins were used for impact prediction. Multivariate logistic regression models assessed the association of variants with HT treatment response. At follow-up, 49% of treated HT individuals did not achieve blood pressure control. Genetic analysis identified 1,258 variants, with no overall association found between these variants and hypertension control. Notably, previously linked missense variants (rs10995311 and rs1799983) showed no association. However, we identified rare potentially high-impact variants, such as frameshift (rs746484082), inframe insertion (rs532691783), and stop-gain (COSV52012081) variants in key pharmacodynamic genes, which regulate blood pressure and fluid balance. Genetic associations with HT treatment response may be population-specific. Differential responses to HT treatment are likely influenced by a combination of environmental, genetic, and physiological factors, rather than genetics alone. Further investigation is needed to elucidate the functional effects of potentially impactful variants identified in important HT control genes.

Keywords: pharmacogenetics, hypertension, treatment response

NCD-O-04

Clinical Characteristics and Outcomes of Adults Patients Hospitalised for Acute Heart Failure Patients Based on Left Ventricular Ejection Fraction Phenotypes in South Africa: A prospective Case-Control Study

Umar Gati Adamu, Muzi Maseko, Nqoba Tsabedze

Department of Internal Medicine, Clinical Medicine

Abstract: This study aimed to describe the clinical characteristics and outcomes of patients with acute heart failure (AHF) in South Africa based on left ventricular ejection fraction (LVEF) phenotypes. The study enrolled 406 patients aged 18 years or older with elevated N-terminal pro-brain natriuretic peptide (NT-proBNP) levels and echocardiographically determined LVH in Johannesburg, South Africa, between February 21 and November 31, 2023. Controls included healthy individuals without LVH. Participants' clinical characteristics and in-hospital mortality were categorized based on LVEF phenotypes. Univariate and multivariate regression analyses were conducted using LVEF and in-hospital mortality as dependent variables and clinical, laboratory, and echocardiographic parameters as independent variables. The average age of the patients was 55.74±15.83 years, with 51% being women. Controls were younger at 39.26±11.40 years ($p<0.001$). Sixty-six per cent of patients were in New York Heart Association Class IV, and the mean overall quality of life score using KCCQ was 15 (13-22). The median LVEF was 32% (heart failure with reduced ejection fraction, HFrEF= 63%, heart failure with mildly reduced ejection fraction, HFmrEF =15%, and heart failure with preserved ejection fraction, HFpEF=21%). HFpEF

patients were older (mean age of 59.52±16.33 years, p=0.007) and had higher median global longitudinal strain (-10, p=0.0054), lower median LVMI (122 g/m2), and lower median NT-proBNP (2117 ng/ml, p=0.0001). The in-hospital mortality rate was 3.5%, which differed significantly among the LVEF phenotypes (p =0.001). The research showed the characteristics and outcomes for adults with AHF categorized by LVEF phenotype. Appropriate therapies should be implemented to reduce the mortality risk.

Keywords: Acute heart failure, acute decompensated heart failure, heart failure subtypes, South Africa

NCD-O-05

Involvement of pentraxin-3 in the development of hypertension but not left ventricular hypertrophy in male spontaneously hypertensive rats

Siluleko Mkhize, Ashmeetha Manilall, Lebogang Mokotedi Sule Gunter,Frederic S Michel

Integrated Molecular Physiology Research Initiative, School of Physiology, Faculty of Health Sciences, University of the Witwatersrand, South Africa; Department of Physiology, School of Medicine, Sefako Makgatho Health Sciences University; Department of Health Sciences and Medicine, Bond University, Australia

Abstract: Hypertension drives the development of concentric left ventricular hypertrophy (LVH). However, the relative contribution of pentraxin-3 (PTX-3), a circulating marker of hypertension, in the hypertrophic response to pressure overload has not been adequately elucidated. We sought to investigate the role of PTX-3 in the development of LVH in spontaneously hypertensive rats (SHR), untreated and treated with either captopril (an ACE inhibitor) or hydralazine (a non-specific vasodilator). Three-month-old SHR received either 20 mg/kg/day hydralazine (SHR+H, n=6), 40 mg/kg/day captopril (SHR+C, n=6), or plain gelatine cubes (untreated SHR, n=7) orally for 4 months. Wistar Kyoto rats (WKY, n=7) were used as the normotensive controls. Blood pressure was measured using the tail-cuff method. At termination, cardiac geometry and function under anaesthesia were determined using M-mode echocardiography. Following termination, the blood, and the left ventricles (LV) were sampled. Circulating levels of inflammatory markers were measured in plasma by ELISA and relative mRNA expression of PTX-3 was determined in the LV by RT-PCR. Untreated SHR exhibited greater systolic BP and relative wall thickness compared to WKY. Captopril and hydralazine normalised BP but only captopril reversed hypertrophic changes in SHR. Circulating PTX-3 levels were elevated in untreated SHR but normalised with captopril and hydralazine. Circulating PTX-3 was positively associated with systolic BP but lacked independent relations with indices of LVH. Additionally, LV relative mRNA expression of PTX-3 was similar between the groups. In conclusion, PTX-3 may not be involved in

the development of LVH in SHR, but plausibly reflects the localised inflammatory milieu associated with hypertension.

Keywords: Cardiac remodelling, hypertension, left ventricular hypertrophy, pentraxin-3

NCD-O-06

Cardiometabolic changes following fasting in Ramadan in Indian South Africans

Ashraf Suliman Wadee: Mohammed Tickly, Ayesha Wadee, Kareema Ismail

Department of Internal Medicine, Faculty of Health Sciences, University of the Witwatersrand

Abstract: Fasting in the month of Ramadan is obligatory on adult Muslims. We investigated changes in cardiometabolic parameters in Indian South Africans known to have a high risk of cardiometabolic disorders. Body mass index (BMI), hip to waist circumference ratio, blood pressure, HOMA index, serum lipids, uric acid and hsCRP were measured pre- and post- Ramadan in 63 (29 females, 34 males) consenting adults with median age of 49yrs. Summary of cardiometabolic data: Variable* Pre-Ramadan Post-Ramadan P value BMI 27.3 (5.6) 26.8 (5.8) <0.0001 Hip-waist ratio 1.0 (0.14) 1.0 (0.15) ns Systolic BP 127 (20.0) 122.00 (28.0) ns Diastolic BP 82 (15) 80 (16) 0.02 HOMA index 1.49 (1.64) 1.90 (1.56) 0.01 Cholesterol: total 5.7 (1.5) 5.5 (1.5) <0.0001 LDL 3.8 (1.2) 3.5 (1.6) ns HDL 1.24 (0.42) 1.20 (0.46) ns Triglycerides 1.2 (1.0) 1.2 (0.78) 0.04 Uric acid 0.4 (0.1) 0.4 (0.1) ns hsCRP 2.1 (3.4) 1.6 (1.9) 0.01 All values expressed a median (interquartile range); ns: non-significant Pre-Ramadan, 40 (63.5%) participants were overweight/obese, median for total cholesterol and LDL were greater than the upper of normal, 25 (39%) had abnormally raised HOMA index of >1.9. Post-fasting parameters that showed significant improvements were BMI, diastolic BP, total cholesterol, triglycerides and hsCRP, whilst HOMA index worsened significantly. This study of Indian South Africans shows significant prevalence of overweight individuals; improvements in some cardiometabolic profiles but worsening of the HOMA in Ramadan, likely due to poorer diet and less physical activity.

Keywords: Cardiometabolic, Fasting, Ramadan, Indian South Africans

NCD-O-07

Sexual dimorphism in cardiac remodeling and function in L-NAME induced hypertensive Sprague- Dawley rats

Kgotso Mosoma, Siluleko Mkhize, Refentshe Nthlane, Frederic Michel

School of Physiology

Hypertension results in left ventricular (LV) dimensions, functions and structural changes. Structural changes, including the development of reactive fibrosis, may precede the altered myocardial function. The sequence of events is still under debate. The use of L-NAME, a nitric oxide synthase inhibitor, to induce hypertension in male rats has shown to mimic human hypertension and its consequences in a relatively rapid fashion. However, the cardiac structural and functional changes induced by L-NAME are uncertain in female rats. This study investigated the effects of L-NAME administration on cardiac dimensions, functions and structure in male and female Sprague-Dawley rats. Forty-three Sprague- Dawley rats were divided into control (male, n=11 and female, n=10; saline) and L-NAME (male, n =12 and female, n=10; L-NAME 40mg/kg/day) groups. LV dimensions and functions were determined using conventional echocardiography techniques. LV structure was assessed using histology (Sirius red) to determine fibrosis. After four weeks, male and female rats receiving L-NAME had significantly higher systolic ($p<0.0001$) and diastolic ($p=0.0001$) blood pressure (BP) compared to controls. Following L-NAME intervention, male rats developed significantly heavier normalized heart ($p=0.045$) with greater LV PWTd ($p<0.001$) and RWT ($p=0.046$). Conversely, female rats developed LV diastolic dysfunction, as indexed by significantly lower e' ($p<0.001$) and a' ($p=0.016$), with similar LV dimensions than control. The collagen fraction area was significantly greater in the L-NAME groups compared to controls. Our data shows sex specific differential response to L-NAME-induced hypertension in terms of cardiac dimensions and functions. However, cardiac fibrosis may remain a crucial step in both phenotypes.

Keywords: L-NAME, Hypertension, Hypertrophy, and Fibrosis

NCD-O-08

Seek and Destroy: Nanoparticles Engineered to Target Prostate Cancer at the Cellular Level

Divesha Essa:

Department of Pharmacy and Pharmacology, School of Therapeutic Sciences; Wits Advanced Drug Delivery Platform (WADDP)

Abstract: Several nanoparticles have been developed for chemotherapeutic drug delivery. However, many of these systems have reduced efficacy due to rapid elimination, poor biocompatibility, and high off-site delivery of the therapeutic agent. This research discusses the development of nanoparticle systems with enhanced targeting abilities with the aid of design and optimization. The goal was to fabricate an optimized system with improved performance as a nanocarrier for drugs to prostate cancer tissue, by targeting PSMA, a cell surface receptor that is overexpressed on prostate cancer cells. Experimental optimization was conducted using design of experiments, and fabrication methods compared traditional and microfluidics approaches. The preparation of uniform nanoparticles using the microfluidics method was confirmed by particle size analysis and scanning electron microscopy. All systems were thermally and physico-

chemically characterized and their in-vitro toxicity was evaluated on PSMA positive (LnCap) and negative (PC-3) cell lines as well as on non-cancerous cell lines. Finally, an in-vitro 3D tumour spheroid model was used to test for anti-cancer efficacy of the nano-systems, and an in-vivo mouse model was used to evaluate biocompatibility. All nano-systems displayed sustained drug release profiles and higher release at the tumour microenvironment-relevant acidic pH of 6. Targeted systems demonstrated higher toxicity and cellular uptake in PSMA positive cells, pointing to a PSMA-specific mechanism of action. The targeted system also showed greater inhibition of tumour cell spheroid growth, while all treatments showed no toxicity on the major organs of nude mice, indicating the potential of the system for targeted delivery in prostate cancer treatment.

Keywords: nanoparticles, targeted therapy, prostate cancer

NCD-O-09

Effect of tannic acid against metabolic disorders caused by sweetened alcohol consumption in Sprague Dawley rats

Toluwase Olanipekun, Kennedy H. Erlwanger, Oladiran Olateju

School of Physiology; School of Anatomical Sciences

Abstract: Excessive sugar or alcohol, consumed individually, is associated with metabolic disorders worldwide. Adolescents are now increasingly consuming sweetened alcoholic beverages. The effect of phytochemicals on the management of metabolic dysfunction linked to combined sugar and alcohol intake is not well known. Thus, this study explored the effects of tannic acid (TA) against metabolic disorders caused by sweetened alcohol consumption (SAC) in young adult rats. Sixty-four female and male Sprague Dawley rats were treated for 10 weeks with SAC (10%w/v ethanol+20%w/v fructose) and/or TA (50mg/kg) or its control (the vehicle, gelatine). Weekly body mass, terminal fasting blood glucose (FBG), visceral fat mass, serum insulin, triglyceride (TG), high-density-lipoprotein-cholesterol (HDL-C), homeostatic-model-assessment of insulin resistance (HOMA-IR) and TG/HDL-C ratio were then determined. In females, FBG was higher in SAC+TA than TA ($P< 0.05$). The relative visceral fat was higher in the females than in the males in all groups ($P<0.05$) except for control. HDL-C was higher in the SAC groups ($P<0.05$) in the males, but body mass, insulin, HOMA-IR, TG or TG/HDL-C ratio were similar across the groups in both sexes ($P>0.05$ ANOVA). The results showed that the body mass, insulin resistance and TG concentration were not negatively impacted by SAC or TA in the treatment paradigm used. However, visceral fat was higher in the females than in the males for the SAC and/or TA groups. HDL-C concentration was high in the SAC groups in the males, but not in the females. This suggests a need for additional studies using a different treatment paradigm.

Keywords: Metabolic disorders, tannic acid, sweetened alcohol, adolescents

NCD-O-10

The effect of circadian misalignment on cardiometabolic parameters in a rat model of estrogen deficiency

Refentshe Amandu's Nthlane, Karine Scheuermaier, Siluleko A. Mkhize, Frédéric Michel

School of Physiology

Postmenopausal shiftworkers are at an increased risk of cardiometabolic disorders due to the dual impact of reduced estrogen concentrations and chronic circadian misalignment. However, the combined effect of shiftwork and menopause on cardiometabolic health is unclear. The present study investigated whether circadian misalignment worsens cardiometabolic parameters in estrogen deficient female Spontaneously Hypertensive Rats (SHR). Female SHR (n=36) underwent either ovariectomy or sham operation and were exposed to either chronic phase shift (CPS) protocol or control light schedule (n=9 per group) for 10 weeks. Body mass, food and water intake, blood pressure and fasting blood glucose concentrations were measured. 3 days before intervention completion, an oral glucose tolerance test was performed. At completion, systolic and diastolic function were assessed by echocardiography. Organ mass was measured, and low-density lipoprotein concentrations was determined with ELISA. Ovariectomized rats were heavier and had greater food intake and organ masses than sham-operated rats. When normalized to body mass, the food intake and organ masses were lower than in sham-operated rats. Ovariectomized rats had greater left ventricular (LV) dimensions and reduced LV contraction than sham-operated rats. The cardiometabolic parameters measured were similar between the CPS and control light rats, except for greater water intake and reduced liver mass in CPS rats. No interaction between ovariectomy and CPS was demonstrated. Our findings indicate that estrogen deficiency impairs systolic function in female SHR, and circadian misalignment does not worsen cardiometabolic parameters in estrogen deficient female SHR. However, circadian misalignment may still influence other physiological pathways in female SHR.

Keywords: Circadian misalignment, estrogen deficiency, hypertension, metabolism

NCD-O-11

The Association Of Glucose-6-Phosphate Dehydrogenase and Type 2 Diabetes Melitus In the African Black Population

Vonakalani Nkuzana

Department of Chemical Pathology

Abstract: Type 2 diabetes mellitus (T2DM) affects approximately 462 million people worldwide. Multiple factors play a role in the development of T2DM and one such factor is glucose-6-

phosphate dehydrogenase (G6PD). G6PD is a highly polymorphic enzyme encoded by a gene on the X-chromosome. The rs1050828 (C>T) G6PD polymorphism results in a valine to methionine amino acid change. The presence of the rs1050828 T allele decreases G6PD activity by 40-90%. Little is known about the association of the rs1050828 polymorphism with T2DM and therefore this study aims to determine the association between the rs1050828 polymorphism and glucose levels and T2DM. Data on 4846 male African participants aged 40-60 years from the AWI-Gen study was available. Participants were recruited from South Africa, Kenya, Ghana, and Burkina Faso. Age, BMI, glucose levels, T2DM status were available for all participants. The rs1050828 polymorphism was genotyped using the Infinium™ H3Africa Consortium GeneArray v2. Multiple regression analysis was performed to determine the relationship of the rs1050828 genotype with glucose levels after adjustment for possible confounding variables. There was no difference in the rs1050828 allelic frequencies between participants with T2DM and control subjects. Participants with the C allele had significantly higher glucose levels than participants with the T allele (4.89 [4.44-5.33] vs. 4.49 [4.06-4.97] mmol/L; $p<0.001$). The association of the rs1050828 C allele with glucose levels remained ($p=0.008$) after adjustment for age and BMI. In conclusion, the G6PD rs1050828 C allele is associated with higher glucose levels in the African population.

Keywords: type 2 diabetes mellitus, glucose 6-phosphate dehydrogenase, rs1050828

NCD-O-12

Physician Perceptions of Challenges and Barriers to Optimal Care of Systemic Lupus Erythematosus in Africa

Mohammed Tikly, Farhanah Paruk, Dzifa Dey, Anisa Mosam, Christina Amira

Division of Internal Medicine, Nelson R Mandela School of Medicine, South Africa; Rheumatology Unit, Department of Medicine and Therapeutics, University of Ghana, Medical School, Ghana; Department of Dermatology, Nelson R Mandela School of Medicine, South Africa; Nephrology Unit, Department of Medicine, College of Medicine, University of Lagos, Nigeria.

Abstract: Systemic lupus erythematosus (SLE) is a systemic autoimmune rheumatic disease which often difficult to diagnose and management. Little is known about factors that influence care delivery and outcomes in SLE patients in Africa. A cross-sectional online questionnaire-based survey was conducted among specialists involved in SLE care, over a 3-month period, to determine the factors that they perceive to contribute to poor outcomes in SLE patients in Africa. 226 responses from 31 countries were received; 87 (38.5%) were dermatologists, 64 (28%) rheumatologists, 52 (23%) nephrologists. Despite most respondents being in university (56.2%)/state (24.8%) practice, patient care was largely funded privately (59%), with state and medical insurance contributing 19.4% and 11.5% respectively. While 40% of respondents indicated that patient support groups were available; 26.4% of respondents indicated they were

unaware of the availability/ existence of such groups. Most commonly cited reasons for late diagnosis were lack of awareness (92.4%), lack of financial resources (80.1%), lack of access to care (61.9%), consulting traditional healers (55.3%), unavailability of diagnostic tests (51.7%), bewitchment (38.9%), and HIV/TB coinfection (23.9%). Reasons cited for poor SLE outcomes were late presentation (95%), lack of resources (diagnostic tests and human) (91%), drug access (82.3%), lack of supportive service e.g., ICU (62%), infections (48%) and intrinsic aggressive disease in African patients (38%). Measures cited to improve care were: increased resources (91%), ongoing medical education (88.9%), specialist training (85.4%), patient education (84.5%) and undergraduate training (70.1%). Several socio-economic and biological factors are perceived to adversely affect SLE outcomes in Africa.

Keywords: Systemic lupus erythematosus, Africa, physician perceptions

NCD-O-13

Association of ager gene Polymorphisms with Albuminuria in South African black individuals with type 2 diabetes

Reatlaretswe Matlhaga, Eleanor Cave

Department of Chemical Pathology, School of Pathology

Abstract: Chronic hyperglycaemia plays a role in the development of diabetic nephropathy (DN), the leading cause of end-stage renal disease in type 2 diabetes (T2D). Hyperglycaemia causes increased formation of advanced glycation end products (AGEs) which bind to the receptor for AGEs (RAGE) and activate signalling cascades that increase transcription of proinflammatory/profibrotic genes leading to kidney damage and ultimately DN. Polymorphisms within the AGER gene that encodes RAGE have been associated with DN. We aimed to determine whether AGER gene polymorphisms (rs3134940, rs1800625, rs184003 and a 63bp insertion/deletion) are associated with albuminuria in black South Africans with T2D. Previously recruited participants (n=238) were classified as having albuminuria based on a urine albumin:creatinine ratio (UACR≥3mg/mmol). Participants were genotyped for the 63bp insertion/deletion by PCR, rs1800625 and rs184003 by PCR-restriction fragment length polymorphism and rs3134940 by TaqMan assay. The prevalence of albuminuria in the cohort was 40.5%. None of the polymorphisms were associated with albuminuria in univariate analysis ($p>0.05$). In multivariate analysis systolic bp and the rs3134940 TT genotype were associated with increased UACR ($p<0.001$ and $p=0.043$, respectively) and BMI was negatively correlated to UACR ($p=0.010$). The association of the rs3134940 T-allele with albuminuria is supported by several studies in different populations. It is hypothesised that the rs3134940 C-allele causes alternative splicing of RAGE mRNA resulting in the increase of the endogenous-secretory RAGE isoform which acts as a decoy receptor for AGEs reducing AGE-RAGE signalling and thus protecting against kidney damage. Therefore, participants with the T allele are more likely to develop DN.

Keywords: Diabetic Nephropathy, RAGE, AGEs

NCD-O-14

Childhood Trauma and Post-traumatic Stress Disorder (PTSD) among Adolescent girls and young women aged between 18-28 years in Mpumalanga, South Africa: A Cross-sectional Study

Siyanda Madala

School of Public Health; Sydney Brenner Institute for Molecular Biosciences (SBIMB)

Abstract: Introduction Background: Post traumatic stress disorder (PTSD), is a mental disorder which has been found to be associated with comorbid mental and physical disorders, as well as reduced quality of life. Children who have experienced traumatic events (TE) before the age of 18 are at risk of physical disorders, mental disorders, and substance abuse later in life but more evidence is needed regarding their risk of PTSD. Main objective: To examine the association between PTSD and childhood TE among adolescent girls and young women (AGYW) aged between 18 and 28 years in Agincourt, South Africa, in 2015-2017 utilising Complete Case Analysis (CCA). We also examined the effect of using Multiple Imputation (MI) or Inverse Probability Weighting (IPW) given the large proportion of missing values, on the estimated measure of association. Methods This study was a secondary analysis of cross-sectional data from a Randomised Controlled Trial (RCT). PTSD and childhood TE data were collected between 2015 and 2017 from AGYW. Participants who had at least one childhood TE were included in the secondary analysis. Univariable and multivariable logistic regression models were used for the analyses. In addition to carrying out a CCA, MI, and IPW were utilised as methods for handling missing data. Results There were 1175 participants who met the inclusion criteria. The mean age of the study participants was 20.1 years with a standard deviation of 1.3 years. In the CCA model, PTSD was found to be associated with childhood TE (OR=1.69, 95% CI 1.01-2.47). This association remained after accounting for missing data in the

Keywords: Childhood Trauma and PTSD

NCD-O-15

LABORATORY SCREENING OF PORPHYRIAS USING HPLC WITH A FLUORESCENCE DETECTOR: A CASE OF ACUTE INTERMITTENT PORPHYRIA IN A 17-YEAR-OLD FEMALE

Zwiitavhathu Magadzu, Ngalula Kone

Department of Chemical Pathology, Faculty of Health Sciences, University of the Witwatersrand; National Health Laboratory Services

Abstract: Porphyrias are a group of inherited disorders of heme biosynthesis. They are caused by a deficiency of specific enzymes in the heme pathway that lead to overproduction of intermediates or precursors (porphyrins, delta-aminolevulinic acid [ALA], porphobilinogen [PBG]), which then accumulate in the body (liver, red blood cells). Porphyrias are classified according to their clinical manifestations as neuro-visceral (acute attacks), cutaneous (photosensitivity) and mixed types. There are various methods for the detection of porphyrins in urine, faeces and blood. Our laboratory uses high-pressure liquid chromatography (HPLC) for detection of porphyrin precursors in urine samples, after a positive PBG screening using the Hoesch test. A 17-year-old female presented at Baragwanath Academic Hospital with seizures, acute severe abdominal pain, nausea, vomiting, tachycardia and increased blood pressure. The urine tested positive for PBG using the Hoesch test and was further analysed by HPLC for fractionated porphyrins using a fluorescence detector. The fractionated HPLC showed a significant increase in uroporphyrins, increased copro-porphyrins and a mild increase in pentacarboxyl porphyrins. These findings, together with the patient's clinical history, were highly suggestive of acute intermittent porphyria (AIP). Fractionated HPLC, using a variety of detectors, is an efficient method for testing of porphyrias. With the use of a fluorescence detector, our laboratory was able to detect the significant increase in uroporphyrin, coproporphyrin and pentaporphyrin fractions, which are strongly suggestive of the diagnosis of AIP. Appropriate treatment of the patient was instituted which resulted in resolution of symptoms. Genetic testing can assist in confirming the diagnosis of AIP.

Keywords: porphyria, HPLC, fluorescence detector

NCD-O-16

The impact of altitude on the prevalence and characteristics of Restless Legs Syndrome

Pariska Munian, Chloe Dafkin, Samantha Kerr, Stella Lacovides

Health Science Physiology, Physiology

Abstract: Restless Legs Syndrome (RLS) is a neurological sensory disorder, characterised by the irresistible urge to move due to unpleasant, deep-seated paresthesias in the legs. The urge to move usually occurs in the evening, when an individual is at rest and the sensations experienced are alleviated with movement. The global prevalence of RLS in a general population ranges from 2.5 to 10%. Low partial pressure of oxygen at high altitude may exacerbate iron dysregulation which may account for the greater prevalence of RLS at high altitude areas. However, the impact of altitude on the prevalence of RLS requires further investigation and is the aim of this study. To investigate the effect of altitude on the prevalence and correlates of RLS, a questionnaire was administered to the general South African population at two altitudes: low altitude and higher altitude. Using an online questionnaire, data were collected on demographic correlates, the Cambridge-Hopkins RLS questionnaire, self-reported iron deficiency and measures of daytime

sleepiness. RLS was significantly more prevalent at the higher altitude compared to low altitude, which may be due to an increase in iron dysregualtion at high altitude. Factors associated with RLS also were exacerbated at higher altitude; these include increased RLS severity, increased daytime sleepiness and decreased iron levels in individuals with RLS at higher altitude. My data therefore support that altitude appears relevant to the pathophysiology of RLS, with high altitude presenting as a risk factor for RLS and exacerbating some correlates of RLS.

Keywords: Altitude, Restless Legs Syndrome

NCD-O-17

Comparison of aortic haemodynamics in community participants and patients with systolic heart failure and the impact of blood pressure control

Ntapo Marcus Lebelo

School of Physiology, Cardiovascular Pathophysiology and Genomics Research Unit

Abstract: In patients with systolic heart failure (HF), both decreases and increases in pulse pressure (PP) are associated with poor prognosis. If aortic PP in systolic HF is decreased due to systolic dysfunction, then improvements in stroke volume (SV) or forward wave pressure (Pf) would be beneficial. Alternatively, if hypertension is the primary cause of systolic HF, aortic PP may be increased as a consequence of high aortic characteristic impedance (Zc) and backward wave pressure (Pb). Accordingly, blood pressure (BP) lowering would be advantageous. I therefore compared aortic haemodynamics (central pressures [SphygmoCor], aortic tract outflow [echocardiography]), and the impact of controlled BP (SBP/DBP<140/90 mm Hg or SBP/DBP<130/80 mm Hg) between stable systolic HF patients (n=42) and age and sex-matched community participants (n=298). Systolic HF patients had lower central PP and Pb ($p<0.005$) and higher HR ($p<0.005$) than community participants. However, no other differences were noted. When assessing the impact of BP control (SBP/DBP<140/90 mm Hg), HF patients with uncontrolled BP had higher Zc ($p<0.005$), Pf ($p<0.05$), and systemic vascular resistance (SVR) ($p<0.05$) than both HF patients and community participants with controlled BP. Moreover, despite similar peripheral and central PP to community participants with uncontrolled BP, Zc ($p<0.005$) and SVR ($p<0.05$) were higher in HF patients with uncontrolled BP. However, when assessing more intense BP control (SBP/DBP<130/80 mm Hg), the differences in Zc, QxZc, and SVR between the systolic HF patients with uncontrolled BP and the community participants with uncontrolled BP were eliminated. In conclusion, a lower aortic PP, which was not due to decreased SV, was observed in stable systolic HF patients. However, in the presence of uncontrolled BP (SBP/DBP≥140/90 mm Hg), but not SBP/DBP≥130/80 mm Hg, Zc, QxZc and SVR were increased in patients with systolic HF. Hence, BP control and its level of control are imperative in patients with systolic HF.

Keywords: Aortic haemodynamics

NCD-O-18

Involvement of microRNAs-146a-5p, -155-5p, and -29b-5p in cardiac remodelling and dysfunction in spontaneously hypertensive rats

Frederic Michel, Siluleko A Mkhize, Ashmeetha Manilall, Sule Gunter, Lebogang Mokotedi, Aletta AM Millen, Refentshe Nthlane

School of Physiology

Abstract: The contribution of microRNAs remain poorly understood in the context of hypertensive cardiac pathology. We investigated the role of miR-146a-5p, -155-5p, and -29b-5p in the development of left ventricular (LV) hypertrophy and dysfunction in male and female spontaneously hypertensive rats (SHR). Seven-month-old SHR (n=7 male, n=10 female), and age- and sex-matched normotensive Wistar Kyoto rats (WKY, n=7 male, n=9 female) were used for the study. LV geometry and function were determined by echocardiography. Plasma levels of inflammatory markers were measured by ELISA. LV collagen fraction area was determined by histology. MicroRNA, and mRNA expression was determined in the LV by RT-qPCR. In SHR, normalised heart and LV masses, LVPWTd, RWT, E, A, E/e', and collagen fraction were significantly greater compared to WKY. MidFS, e', and a' were significantly lower in SHR versus WKY. Female rats exhibited significantly greater LV mRNA expression of Lox1, Col1a/Col3a ratio, and plasma levels of CRP, IL-6, and TNF-α compared to males. MiR-29b-5p showed similar expression levels across experimental groups. MiR-146a-5p was upregulated in SHR and exhibited positive associations with BP, normalised heart and LV masses, RWT, collagen fraction area, and E/e' ratio, but negative associations with e'. Conversely, miR-155-5p was downregulated in females and only positively associated with absolute heart, LV, kidney masses, and stroke volume. Upregulation of miR-146a-5p was associated with indices of LVH, diastolic dysfunction, reactive fibrosis, and may be involved in the hypertensive-induced LV remodelling; whereas, changes in expression of miR-155-5p may be involved with a cardiac phenotype related to sexual dimorphism.

Keywords: MicroRNAs, hypertension, cardiac dysfunction, fibrosis, inflammation

POSTER PRESENTATIONS

NCD-P-01

School Dietary Habits & Oral Health Experience of learners in Johannesburg

Mpho Molete, Octavia Lebele, Peedi Mathobela

Department of Oral Biological Sciences; Oral Health Sciences

Abstract: Dental caries is one of the most predominant chronic childhood disease worldwide and one of the major risk factors being a diet high in sugar. The study examined dietary habits and

oral health experience of public primary school learners in Johannesburg. This was a cross-sectional study where a multistage sampling technique was utilized. One school was on a feeding scheme program and the other school had no feeding scheme. Data was collected by means of a dietary questionnaire, and an oral health assessment. Of the 107 eligible learners, 68% were from a school with a feeding scheme and 31.8% with no feeding scheme. The mean (SD) BMI, dmft, and DMFT were 18.19 (3.59), 3.14 (3.39), and 1.49 (2.10), respectively. The mean age of the learners was 8.69 (SD:0.79). Mean sugar content of meals served in the feeding scheme was 11.65 (SD 9.6) and mean sugar content of food consumed from lunch boxes and food purchased from school tuckshops was 24.53 (24.54).The odds of high gingiva score decreased with increasing BMI (OR: 0.85; 95% CI: 0.74-0.94). Similarly, the odds of high gingiva score decreased with increasing sugar intake (OR: 0.99; 95% CI: 0.95-0.99). The mean sugar content of food consumed from lunch boxes and purchased from school tuckshops was higher than sugar content from the feeding scheme. Although a high BMI and sugar intake reduced the odds of a high gingival score, the effect size was small. Further research with a larger sample needs to be undertaken to assess the real effect difference.

Keywords: school learners, dietary habits, oral health experiences, DMFT

NCD-P-02

Ethnic disparities in the Aetiology of insulin resistance in normoglycaemic and apparently healthy black and white women

Philisiwe Ntuli, Dr Marketa Toman, Tracy Snyman

Department of Chemical Pathology, University of the Witwatersrand; National Health Laboratory Services; Pathcare Vermaak.

Abstract: Ethnic disparities in insulin resistance (IR) are well recognised but their aetiology is not fully understood. Obesity and inflammation are key mediators of IR, which is the primary feature of type 2 diabetes. We investigated the relationship between ethnicity and mediators of IR in apparently healthy black and white South African women. Black (BW; n=46) and white (WW; n=47) normoglycaemic, premenopausal women had blood samples evaluated for glucose, insulin, adipokines (leptin and adiponectin) and inflammatory markers (MCP-1 and IL-6), using immunoassays. The HOMA-IR calculation was used to quantify IR. The waist (WC) and hip (HC) circumferences were measured and body mass index (BMI) calculated. Women were matched for BMI (24.1 (BW) vs. 23.0 kg/m2 (WW); p=0.073), however, BW had significantly higher WC (77.4 vs. 71.0 cm; p=0.003), HC (105 vs. 97 cm; p<0.001), and were younger (25 vs. 30 years; p=0.004) than WW. BW had significantly lower adiponectin (1.7 vs. 9.6 µg/mL; p<0.001) but higher leptin (4.9 vs. 2.8 ng/mL; p=0.002), IL-6 (2.4 vs. 0.7 pg/mL; p<0.001) and MCP-1 (472 vs. 327 pg/mL; p<0.001) levels than WW of comparable HOMA-IR (1.8 vs. 1.7 (WW); p=0.299). The significant leptin difference was lost after adjustment for age and WC. Ethnic differences in

factors associated with IR exist between healthy non-obese black and white women but the level of IR was similar between the groups. This suggests that these factors are not major determinants of IR or that other unmeasured factors are modulating their effect on IR in each of the groups.

Keywords: Insulin resistance; normoglycaemic; Ethnic differences

NCD-P-03

Lifestyle interventions in comorbid mental and physical illness: A systematic review

Sandy Lord, Vaneshveri Naidoo, Karien Mostert

Department of Physiotherapy, School of Therapeutic Sciences; University of Witwatersrand University of Pretoria

Abstracts: Background: Patients with mental health disorders (MHDs) often present with chronic illness and complain of pain and poor physical health. They present with a high burden of disease and poor quality of life. Lifestyle interventions are cost-effective strategies, which seem to be an effective adjunct in managing MHDs and chronic illness. Our study aimed to determine the effectiveness of lifestyle interventions on health-related quality of life, in patients with presenting with both mental and physical health disorders. Method: The systematic review was conducted using the Joanna Briggs Institute (JBI) methodology. MEDLINE (Ovid), CINAHL (EBSCO), LiLACS, Scopus, PEDro and Cochrane Central Register of Controlled Trials were searched to identify published randomised control studies available in English from 2011 to 2022. The inclusion criteria were adults with comorbid physical and MHDs who received lifestyle interventions (including stress management strategies) to improve health-related quality of life. Group interventions were excluded. Conclusion: A total of four studies were included in the review. The main lifestyle intervention described was cognitive behavioural therapy (CBT) with one study including physical activity. While CBT was shown to be effective in managing patients with depression, anxiety, and comorbidities such as obesity, diabetes and heart failure, the benefits were not maintained long term. Clinical implications: Stress management modalities such as CBT may be effective in the shorter term to help manage patients with comorbid physical and MHDs, however these studies were limited to individual therapies. Studies with group activities were excluded, which excluded a large range of other lifestyle interventions.

Keywords: lifestyle interventions, mental health

NCD-P-04

Simple solutions for complex problems: a holistic understanding of adolescent mental health

Sonto Madonsela

Department Clinical Medicine, Developmental Pathways for Health Research Unit

Abstract: In recent years, significant advancements have been made in digital technologies, including smartphones, mobile applications, and social media. These innovations have transformed the healthcare industry and the delivery of healthcare services through mobile health. The use of mobile health to support adolescent mental health has experienced substantial growth. Embracing mobile health for adolescent mental health presents an alternative approach to delivering care, enhancing the quality and availability of services, and potentially closing the gap in mental health support. While this might be useful, it is crucial to shift the focus beyond technology and address the everyday mental health needs of adolescents. This study, conducted using a qualitative method, involved a convenience sample of 37 Soweto adolescents aged 14-18 who participated in 7 draw-and-tell workshops. As part of the draw-and-tell-your-story technique, the participants were asked to draw and write a short narrative of the mental health interventions they thought would be effective for adolescents in their community. Inductive content analysis was used to analyse the data. This process yielded three major themes: basic material needs, relationships with caregivers, and mental health support systems. The findings from this study show that a complex combination of basic material needs, open communication with caregivers and access to safe spaces and peer support are what adolescents in this context need for their everyday mental well-being. While mobile mental health success is promising, there is a need to go back to basic and more practical solutions when considering appropriate mental health solutions for this community.

Keywords: Mental health; Mobile health; Children and adolescent mental health

NCD-P-05

Supplemental Lycopene Promotes Bone and Gastrointestinal Tract Growth, Prevents Bone Loss, in Growing Male Wistar Rats Fed a High-Fructose Diet

Mercy Shafe, Eliton Chivandi, Trevor Nyakudya, Nontobeko Gumede

School of Physiology, Faculty of Health Sciences, University of the Witwatersrand, 7 York Road, Parktown, 2193 Johannesburg, South Africa, Department of Physiology, School of Medicine, Faculty of Health Sciences, University of Pretoria, Private Bag X323, Gezina, 0031 Pretoria, South Africa,

Abstract: Consumption of a high-fructose diet is associated with the development of bone and gastrointestinal disorders. Lycopene, a phytochemical exhibits potent antioxidant activity. We evaluated the prophylactic potential of lycopene against dietary fructose induced metabolic derangements in male Wistar rats in a model mimicking adolescents fed an obesogenic diet. Forty-eight 23-day old weanling male Wistar rats were randomly allocated to six treatment

groups as follows: 1 - received standard rat chow (SRC), plain drinking water (PDW), and plain gelatine cubes (PG), 2 - SRC+PDW+20% fructose solution (FS) as drinking fluid, 3 - SRC+FS+100 mg/kg fenofibrate (FENO)+PG and 4, 5 and 6 received the high fructose diet but with orally administered lycopene at 30, 60 and 100 mg/kg/day, respectively for 12 weeks. Terminally the rats were fasted overnight, weighed, euthanized and the stomach, intestines, and caecum excised and measured for mass and length. Defleshed femora and tibiae were oven-dried to constant mass, their lengths measured and mass: length ratio computed. Lycopene-treated rats showed a significant increase ($P < 0.05$) in tibia length and femora mass compared to the fenofibrate group. Medium and high dose lycopene significantly increased stomach masses compared to control while high dose lycopene increased small intestinal mass compared low dose. In conclusion, although fructose did not alter bone and gastrointestinal tract (GIT) development, supplemental lycopene can enhance bone and improve GIT function and protect against fenofibrate-induced bone loss in male Wistar rats.

Keywords: Lycopene, fructose, bone and viscera

NCD-P-06

The association of HLA-G with type 1 diabetes in the South African black population

Charmaine Dzimbanhete, Eleanor M Cave, Sureka Bhola, Nigel J Crowther, Carolyn J Padoa,

Department of Chemical Pathology, University of the Witwatersrand and National Health Laboratory Service, Johannesburg, South Africa

Abstract: The Human leukocyte antigen (HLA)-G, a non-classical HLA gene, was identified as a susceptibility locus for type 1 diabetes (T1D). HLA-G is constitutively expressed in the pancreas and has immune-suppressive properties. Polymorphisms in the HLA-G gene have been associated with T1D and a younger age at diagnosis. Therefore, the aim of this study was to determine whether HLA-G gene polymorphisms (14bp indel, rs9380142, rs1063320 and rs1710) are associated with age at diagnosis, serum HLA-G concentrations and T1D in the South African black population. Participants with T1D (cases; n=263) and controls (n=202) were previously recruited. Participants were genotyped for the HLA-G 14bp indel by PCR, a TaqMan assay for rs9380142 and PCR-RFLP for rs1063320 and rs1710. Serum HLA-G concentrations were measured by ELISA. HLA-G polymorphisms were not associated with T1D or HLA-G concentrations ($p>0.05$). HLA-G concentrations were significantly higher in cases than controls (52.0[32.0; 89.7] vs. 33.1[22.0; 52.0]; $p<0.001$). The 14bp insertion/insertion genotype was associated with an earlier age at diagnosis ($p=0.042$). Our findings contradict the literature where the 14bp deletion and lower HLA-G concentrations were associated with a younger age at diagnosis and T1D, respectively. The 14bp insertion has been associated with lower HLA-G levels which are unable to inhibit apoptosis of cytotoxic T-cells, resulting in rapid autoimmune destruction of β cells and earlier age

at diagnosis. Therefore, lower HLA-G concentrations in cases are expected, however this is not seen in our study. The differences observed in our study may be due to ethnic differences in the immuno-aetiology of T1D.

Keywords: HLA-G, type 1 diabetes, 14bp insertion/deletion polymorphism

NCD-P-07

Marked Increases in Proximal Aortic Characteristic Impedance and hence Forward Wave Pressures Beyond Brachial Blood Pressure in Patients with Angiographic Proven Coronary Artery Disease

Danelle Els

School of Physiology, Cardiovascular Pathophysiology and Genomics Research Unit

Abstract: Although indexes of aortic stiffness increase the risk for coronary artery disease (CAD), the extent to which increases in proximal aortic stiffness enhance central arterial forward wave pressures beyond changes in peripheral pressures, is uncertain. We aimed to determine whether increases in proximal aortic stiffness, as indexed by aortic characteristic impedance (Zc) translate into an enhanced central arterial pressure. We determined Zc and arterial pressure wave morphology in 71 patients with angiographic proven CAD. We compared central arterial function in these patients with 230 age and sex-matched controls from a community study and in patients diagnosed with stroke and CLI (n=287). With adjustments for confounders, both Zc and the pressures generated by the product of peak aortic flow (Q) and Zc (PQxZc) were markedly increased in patients with CAD ($p<0.0001$) and those with stroke or CLI ($p<0.005$). Moreover, as compared to patients with stroke and CLI, those with CAD also had marked increases in both Zc and PQxZc ($p<0.0001$). As a consequence, the pressures generated by forward wave pressures (Pf) were markedly increased in patients with CAD ($p<0.0001$). Importantly, after further adjustments for brachial PP or SBP, the higher Pf values in patients with CAD were retained ($p<0.005$ to <0.0001). In contrast, aortic PP did not differ between groups. Independent of confounders and aortic root diameter, a marked increase in proximal aortic Zc occurs in patients with CAD as compared to controls and patients with arterial disease. This translates into a strikingly greater central arterial pulsatile load determined by forward

Keywords: CAD, aortic stiffness, characteristic impedance,

NCD-P-08

Relationship between functional disability and disease activity in two distinct populations with rheumatoid arthritis

Nimmisha Govind, Lai Ling Winchow, Mohammed Tikly

Division of Rheumatology, Chris Hani Baragwanath Academic Hospital, University of the Witwatersrand, Faculty of Heath Sciences; School of Clinical Medicine

Abstract: Socio-economic status and access to health care are important contributors to disease activity, pain and functional disability in rheumatoid arthritis (RA). We compared differences in disease activity, assessed using the 28 joint with ESR (DAS28-ESR) score and functional disability, assessed by the health assessment questionnaire disability Index (HAQ-DI in RA patients from a high income country, the Netherlands (NL) and low-middle country, South Africa (SA). Data were extracted from the international Measurement of Efficacy of Treatment in the Era of Outcome in Rheumatology (METEOR) RA database. Patients included were adults, ≥ 18 years at diagnosis, fulfilling 2010 ACR/EULAR classification criteria for RA, and symptom duration <2years, the two groups were matched for disease duration and gender. Disease activity was ESR) and functional disability with). Overall, 235 patients from NL and SA each, had median age of 51years (IQR) (43;59) and most were females (80.6%). There were significantly more smokers in NL cohort than in SA cohort (61.0 vs 33.1%, p=<0. 005). More of the SA cohort was seropositive for rheumatoid factor/anti-cyclic citrullinated peptide antibodies (100% vs 96% and 95.7% vs 77.6, respectively, p<0.005 for both), had a longer symptom duration (9.3 vs 5.5 months, p<0.005), higher visual analogue pain scores (range:0-10), (75.0 vs 53.0, p<0.005), worse DAS28-ESR scores (37.0(20.0;57.0) vs 24 (11.0;41.0) p<0.005) and HAQ-DI (range:0-3), (1.63 vs 0.88, p<0.005). These findings show both disease severity and functional disability to be worse at initial diagnosis in patients with relatively early RA from SA compared to those from NL.

Keywords: Rheumatoid, function, disability, sio-economic

NCD-P-09

Isolated diastolic hypertension and target organ damage in a community of African descent

Wantonda Mukhovha, Muzi Maseko, Edgar Phukubje

School of Physiology

Abstract: Cardiovascular diseases (CVD) are the world's number one leading cause of death, they are responsible for about 31% of all deaths globally and 17% of all deaths in South Africa. Hypertension has been identified as the major risk factor for CVDs. Extensive research has been conducted on hypertension and its effects on target organ changes. However, little is known about the prevalence and effects of isolated diastolic hypertension (IDH) on target in a population of black African descent. Therefore, the aim of this study was to determine the prevalence of IDH and its effect on target organ changes in a population of black African descent. The study consisted of 796 participants who were divided into four blood pressure groups based on their conventional blood pressure: normotension (n=511), IDH (n=87), Hypertension (n=138),

and Isolated systolic hypertension (n=60). In this study we used Pulse wave velocity (PWV) to determine the participants arterial stiffness, echocardiography to determine the participant's left ventricular mass index (LVMI), and serum CRP concentrations to determine systemic inflammation. Compared to the normotensives the three hypertension groups had significantly higher serum CRP concentrations ($p<0.0001$), LVMI ($p<0.0001$), and PWV ($p<0.0001$). Isolated diastolic hypertension causes target organ damage in this population which increases their risk of cardiovascular mortality and morbidity. Furthermore, based on our findings it is possible that IDH may predate the other hypertension subtypes in this population.

Keywords: Hypertension, Target Organ Damage

NCD-P-10

Design of integrin-functionalised neuromimetic biomembranes to promote peripheral nerve regeneration across peripheral nerve injury (PNI) GAPS

Sameera Khatib, Poornima Ramburrun, Yahya E. Choonara

Department of Pharmacy and Pharmacology; School of Therapeutic Sciences; Wits Advanced Drug Delivery Platform (WADDP)

Abstract: Peripheral nerve injuries (PNIs) cause lifelong paralysis, disability, and chronic pain, leaving patients with psychological stress, and at a higher risk of unemployment. The gold standard of treatment for PNI is autografting, or nerve transplants, but this poses problems such as low availability and donor site morbidity. The alternative, artificial nerve conduits are tubes that act as a bridge between severed nerves. However, commercial conduits currently lack biomimetic properties and perform at a subpar level. This study proposes a new category of PNI conduits that resemble biological structures in native nerves. Using solvent-casted biocompatible polymers that mimic the extracellular matrix, a photocurable, magnesium-crosslinked hydrogel-conduit was produced. This conduit is lined with artificial cellular membranes, with embedded integral proteins to promote nerve regeneration and mimic biological nerve architecture. Physico-mechanical studies show properties comparable to that of porcine sciatic nerves (7.236 MPa), with the conduit able to withstand forces up to 9.206 MPa. The conduit displays minimal swelling of 4.34% under in-vitro physiological conditions (37°C at pH 7.4). Microscopy imaging of the artificial cell membranes show lipid rafts of cholesterol/sphingomyelin/DOPC (like native membranes) - suitable as points of attachment for regenerating neuronal axons to promote the growth of damaged peripheral nerves. FTIR analysis of the final conduit show no remnants of un-crosslinked polymers. The chemical composition, swelling and mechanical strength show suitability of the conduits for progression to PC-12 neuronal cell studies for biocompatibility and proliferation. This biomimetic conduit may provide better nerve functionality with fewer adverse consequences.

Keywords: peripheral nerve injury, hydrogel, biomimetic, artificial cellular membranes

NCD-P-11

Thixotropic Biomimetic Hydrogels: A Novel Approach to Rheumatoid Arthritis Treatment

Simran Mitha, Lisa C. du Toit, Yahya E. Choonara

Department of Pharmacy and Pharmacology, School of Therapeutic Sciences; Wits Advanced Drug Delivery Platform (WADDP)

Abstract: Rheumatoid arthritis (RA) is an autoimmune disease, classified by the inflammation of synovial joints. When the synovial membrane becomes inflamed it may cause destruction of cartilage and bone, attributed to pro-inflammatory cytokines. Current treatment includes non-steroidal inflammatory drugs (NSAIDs), and disease-modifying anti-rheumatic drugs (DMARDs), both which have systemic side effects. Treatments are aimed at reducing symptoms, as opposed to halting the degeneration of tissue. Due to the poor tissue regenerative ability of classical hydrogels, ''bio-inspired'' hydrogels (which mimic synovial fluid) can be formulated to enhanced performance. Aim: To design and investigate an injectable thixotropic bioresponsive hydrogel, which responds to inflammatory biomarkers to release bioactives for inflammation. Methods: An inflammation-responsive hydrogel was synthesised employing hyaluronic acid and alginate which can reduce inflammation. Thixotropic agents were incorporated to promote tissue regeneration and deliver bioactives site-specifically to treat joint injury. Characterisation of the hydrogel was undertaken by evaluating the swelling and degradation, chemical transitions (via Fourier Transform Infrared Spectroscopy, FTIR), rheological properties, and textural attributes. Evaluation of both in vitro bioactive and drug release from the hydrogel was undertaken under normal and stimulated inflammatory conditions. Rheological data indicates the presence of thixotropy with the thixotropic area (Ar%) ranging from 7.71% to 39.38%. Frequency sweep shows that storage modulus (G')>loss modulus (G'') indicating strong gel networks. Hydrogels have a maximum swelling capacity of 70.73% (normal conditions) and 56.25% (inflammatory condition). Degradation occurs faster in inflammatory conditions (pH= 4.4) as opposed to normal conditions (pH=7.4). The proposed system offers RA patients with localized anti-inflammatory therapy.

Keywords: Rheumatoid Arthritis, Hydrogel, Thixotropy, Biomimetic

NCD-P-12

Challenges in diagnosis and management of systemic lupus erythematosus in Africa: an online survey

Mohammed Tikly, Farhanah Paruk, Dzifa Dey, Anisa Mosam, Christina Amira

Division of Internal Medicine, Nelson R Mandela School of Medicine, South Africa. Rheumatology Unit, Department of Medicine and Therapeutics, University of Ghana, Medical School, Ghana. Department of Dermatology, Nelson R Mandela School of Medicine, South Africa. Nephrology Unit, Department of Medicine, College of Medicine, University of Lagos, Nigeria.

Abstract: We surveyed African physicians about challenges in diagnosis and management of SLE. A cross-sectional, online questionnaire-based survey of African specialist physicians on availability of laboratory tests for diagnosis of SLE, and drugs and specialized services for the management of SLE. 226 respondents from 31 countries were dermatologists (38%), rheumatologists (28%) and nephrologists (23%), majority practising at university/state-funded hospitals (80.8%), but most patients (59.6%) being self-funded for laboratory tests and drugs. Antinuclear (ANA), antiphospholipid antibody and complement tests were available to 79.4%, 67.6% and 62.3% of respondents, respectively, less in East and West African regions. Median turnaround time for the ANA test was within 2 weeks, but >4 weeks for 5.6% of respondents, and especially longer in West Africa compared to other regions (p=0.0002). Availability of urine protein:creatinine test, skin and renal histopathology was 82%, 82.5% and 76.2%, respectively. Median turnaround times were within 1-2 weeks, but >4weeks for 13.8% for skin histology results; and within four weeks, but >4weeks for 24.5% of respondents. Corticosteroids and antimalarials were readily available across all regions, variable availability to immunosuppressants from 93.7% for methotrexate to 65% for calcineurin inhibitors and only 58.4% for the biologic, rituximab. ICU/high care facilities, haemodialysis, and renal transplantation were available to 69.8%, 91.9%, and 56.5% of respondents, respectively. Variable availability of laboratory tests, drugs and supportive services coupled with cost constraints are major impediments to early diagnosis and optimal management of SLE and are likely factors contributing to under-reporting and poor prognosis of SLE in Africa.

Keywords: Systemic lupus erythematosus, Africa, diagnosis, management

NCD-P-13

Comparison of the Roche and Siemens TSH immunoassays at Charlotte Maxeke Johannesburg Academic Hospital - are they well harmonised?

Bongiwe Damane

Chemical Pathology

Abstract: Thyroid stimulating hormone (TSH) measurement is recommended as the initial biomarker to assess the presence of thyroid disease. Harmonisation of TSH assays is necessary to minimise the differences among assays and reduce inconsistent clinical interpretation of abnormal results. The aim of the study was to assess comparability of the Roche and Siemens TSH immunoassays using patient samples. A method comparison study was conducted using 46

residual patient samples, which were analysed on the Siemens Atellica CI900 and Roche Cobas602 analysers. Passing Bablok regression analysis and Bland Altman plots were performed to determine method agreement and bias (observed differences) between the two assays. Analytical performance was assessed using the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) biological variation specifications. The assays' reference intervals were used to assess clinical interpretation discordance. Siemens and Roche TSH assays had good correlation ($r = 0.990$, $p < 0.0001$). Regression analysis revealed no significant systematic or constant difference with an equation for the line of $y = -0.0114 + 0.986x$. Bland-Altman plot showed good agreement with an average bias of 1.96% which is within the EFLM allowable optimum bias of ±5%. Using assays reference intervals, 91.3% patient results showed consistent clinical interpretation. The Roche and Siemens TSH immunoassays results are comparable despite being traceable to different World Health Organisation standards and having assay specific reference intervals. This demonstrates that the assays are well harmonised.

Keywords: Keywords: TSH, Assays, Harmonised, Comparable

NCD-P-14

LPS-induced inflammation worsens cardiac dysfunction in a hypertensive model

Kealeboga Fako, Tiiso Maluleke, Leandrie Pienaar

School of Physiology

Abstract: Hypertension causes structural remodelling of the myocardium, which often results in cardiac dysfunction. Chronic inflammation contributes to left ventricular (LV) systolic and diastolic dysfunction. The compounding effect of inflammation in hypertension-induced cardiac dysfunction is uncertain. This study investigated the short- and long-term effects of an acute exposure to lipopolysaccharide (LPS) on cardiac structure and function in a hypertensive model. Wistar-Kyoto (WKY) rats and spontaneously hypertensive rats (SHR) were divided into control and LPS groups, receiving saline or 1 mg/kg LPS, respectively. Cardiovascular function was determined using echocardiography. Serum interleukin-1β levels were determined using an ELISA and LV collagen content was determined with histology. In the short-term, LPS increased serum interleukin-1β concentration and impaired LV systolic and diastolic function in SHR and WKY rats compared to the rats in their respective control groups. In the short-term, LPS administration worsened LV systolic and diastolic dysfunction in SHR compared to the WKY rats. In the long-term, there were no significant LPS-induced effects on any LV function markers. However, hypertension resulted in increased heart weight and impaired LV systolic function in SHR compared to WKY rats. In the presence of hypertension, LPS exposure increased collagen volume and worsened LV systolic dysfunction. In conclusion, acute LPS exposure induced short- and long-term cardiac structural changes and LV systolic and diastolic dysfunction, which were compounded by hypertension. **Keywords: Hypertertension, Inflammation, Cardiac**

NCD-P-15

Perceptions, attitudes and experiences of mental health and mental health services among adolescents in a Johannesburg high school

Nkhluleko Ndlangamandla, Abigail Dreyer

School of Public Health

Abstract: Introduction: Adolescence is a critical stage of human development where there is a susceptibility to developing mental health disorders that last into adulthood. Socioeconomic factors such as poverty, lack of adequate resources for adolescent mental health, and poor mental health literacy hinder their overall health. Objectives: The study aimed to investigate adolescents' understanding of mental health, by assessing their perceptions of mental health and mental health services, the mental health challenges they experienced, and their awareness of mental health care services. Methods: This study used an exploratory qualitative research method, using an in-depth interview guide to explore the perceptions, attitudes and experiences of mental health and mental health services in a Johannesburg high school. The participants engaged in a collage/activity after which, the interview guide was implemented. Purposive and convenience sampling methods were used for participant recruitment. Results: The adolescents viewed mental health as a lived experience that they should manage on their own. Most adolescents had a negative association with mental health and experienced a myriad of risk factors including, but not limited to rape, bullying, grief, loneliness, and academic stress. The use of stigmatising and dehumanising language indicated misinformation and a negative association with mental illness and mental health care services. Conclusion: Knowledge of mental health and mental health care services is limited and varied, which hinders access to mental health care. Further research investigating the perceptions of mental health is necessary to inform policy and intervention programs that are culturally and socially relevant.

Keywords: Adolescents; Perceptions; Mental Health; Mental Health Care Services