Diabetes, obesity, metabolic syndrome

P0769

COMPARISON OF POINT-OF-CARE AND LABORATORY GLYCATED HEMOGLOBIN A1C AND ITS RELATIONSHIP TO TIME-IN-RANGE AND GLUCOSE VARIABILITY

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BACKGROUND-AIM

The main objective of the current study was to perform a comparison of point-of-care testing for hemoglobin A1c (POCT-HbA1c) versus standard laboratory method (Lab HbA1c) and their relationship to time-in-range (TIR) and glucose variability (GV) among patients with diabetes mellitus (DM) presented to the outpatient diabetes clinics.

METHODS

This single-center cross-sectional study was carried out on diabetic patients (aged ≥14 years of both genders) who undergo routine follow-up at our institution and whose physicians ordered HbA1c analysis for routine care. The included patients were using the isCGM Abbott's FreeStyle Libre system for at least three months and regular CGM users with at least 70% use.

RESULTS

We included 97 diabetic patients (41 female and 56 male), with a mean age of 29.75±13.55 years and a mean DM duration of 10.33±5.48 years. The mean values of Lab-HbA1c and POCT HbA1c were 8.82%±0.85% and 8.53%±0.89%. The TIR, time below range, and time above range were 33.47±14.38 minutes (47.78%±14.32%), 5.44±2.58 minutes (8.41%±4.42%), and 28.8±8.27 minutes (43.81%±13.22%). According to the Bland-Altman plot analysis, the POCT-HbA1c values are consistent with the standard Lab-HbA1c values (SD of bias= 0.55, and 95% CI= -0.78 to 1.4). Using the univariate linear regression analysis showed a statistically significant relationship between laboratory HbA1c and POCT HbA1c (R2= 0.637, p <0.001), TIR (R2= 0.406, p <0.001), and GV (R2= 0.048, p= 0.032). After adjusting for age, gender, disease duration, diabetes type, and percentage of sensor data in a multivariable linear regression model, the linear associations remained significant (all $p < 0.05$).

CONCLUSIONS

TIR and GV have promise as preferred measures for identifying clinical trial endpoints, estimating the likelihood of DM-related complications, and gauging a patient's glycemic condition.

Diabetes, obesity, metabolic syndrome

P0770

THE POTENTIAL ROLE OF VITAMIN D SUPPLEMENTATION AS A GUT MICROBIOTA MODIFIER IN HEALTHY INDIVIDUALS

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BACKGROUND-AIM

Vitamin D deficiency affects approximately 80% of individuals in some countries and has been linked with gut dysbiosis and inflammation. While the benefits of vitamin D supplementation on the gut microbiota have been studied in patients with chronic diseases, its effects on the microbiota of otherwise healthy individuals is unclear. Moreover, whether effects on the microbiota can explain some of the marked inter-individual variation in responsiveness to vitamin D supplementation is unknown.

METHODS

Here, we administered vitamin D to 80 otherwise healthy vitamin D-deficient women, measuring serum 25(OH) D levels in blood and characterizing their gut microbiota pre- and post- supplementation using 16S rRNA gene sequencing.

RESULTS

Vitamin D supplementation significantly increased gut microbial diversity. Specifically, the Bacteroidetes to Firmicutes ratio increased, along with the abundance of the health-promoting probiotic taxa Akkermansia and Bifidobacterium. Significant variations in the two-dominant genera, Bacteroides and Prevotella, indicated a variation in enterotypes following supplementation. Comparing supplementation responders and non-responders we found more pronounced changes in abundance of major phyla in responders, and a significant decrease in Bacteroides acidifaciens in non-responders

CONCLUSIONS

Altogether, our study highlights the positive impact of vitamin D supplementation on the gut microbiota and the potential for the microbial gut signature to affect vitamin D response.

Diabetes, obesity, metabolic syndrome

P0771

TLR4 RECEPTOR D299G/T399I HAPLOTYPE POLYMORPHISM IS ASSOCIATED WITH INSULIN RESISTANCE IN OBESE FEMALE SUBJECTS

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BACKGROUND-AIM

Activation of Toll-like-receptor 4 (TLR4) causes chronic inflammation that can result in obesity and metabolic syndrome (MeS). Aim: This study aimed to investigate the role of TLR4 polymorphisms of TLR4D299G/T399I, and its impact on protein expression of TLR4 in obese female subjects.

METHODS

A prospective cross-sectional association study was performed on Arab female subjects from Qatar University. The subjects were categorized according to BMI classifications into two groups: “obese; n = 69” and “non-obese; n = 136”. Anthropometric measurements, weight (kg), height (m) and waist circumference (WC) were evaluated, and the body mass index (BMI) was calculated. Fasting blood samples were collected, and assessment of glucose, lipid profile, C-reactive protein (CRP), leptin, IL-6 and insulin was performed. Insulin resistance was computed using HOMA-IR. Genotyping of the TLR4 polymorphisms of TLR4D299G (rs4986790) and TLR4T399I (rs4986791) was performed by the 5# nuclease assay by TaqMan MGB probe. Flow cytometry was used to evaluate the monocyte cell surface expression of TLR4.

RESULTS

The frequency distribution of the genotype revealed that homozygous AA is the most frequent among obese subjects (86.4%) for (TLR4D299G, A > G) and the homozygous CC genotype is the most frequent (92.4%) for (TLR4T399I, C > T). Haplotype analysis of TLR4 D299G/T399I showed that GT carriers had a significant association with increased probability of insulin resistance (odds ratio = 4.73; 95% CI 1.19–18.90; p-value = 0.016). The monocyte cell surface of TLR4 was significantly higher by 1.3 folds in obese compared to non-obese subjects.

CONCLUSIONS

TLR4 D299G/T399I haplotype polymorphism is associated with an increased risk of insulin resistance with the upregulation of TLR4 protein expression in obese subjects.

Diabetes, obesity, metabolic syndrome

P0772

DETECTION OF FALSELY LOW HBA1C VALUE IN BIO-RAD D-10 HBA1C PROGRAMME DUE TO PRESENCE OF A RARE HEMOGLOBIN VARIANT

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BACKGROUND-AIM

HbA1c, one of the most important monitoring markers for diabetes mellitus complications. HbA1c is measured by HPLC, Immunoassay etc and can be affected by the presence of hemoglobinopathies. We present a case where falsely low HbA1c lead to the detection of a rare Hemoglobin variant.

METHODS

1. HbA1c: Biorad D-10 HPLC HbA1c variant programme
2. Fasting Blood Glucose: Beckman coulter 680
3. Formula for HbA1c conversion to Glucose level and vice versa: ADA eAG/A1C Conversion Calculator
4. Complete Blood Count (CBC) was performed on sysmex cell (XN series) counting system
5. Hbf and HbA2 levels- Biorad D-10 Thalassemia variant programme
6. Hb variant analysis- Biorad Hb Varient II system- Hemoglobin variant analysis programme

RESULTS

46 year old female submitted her plasma sample for HbA1C analysis in view of her raised fasting blood glucose levels (180 mg/dl) however her HbA1c levels were very low i.e. 3.0%. Similar findings were seen even with a fresh repeat sample. HPLC HbA1c graph was analysed, unknown peaks were found alongside other parameters with a raised total area (Normal area=9 lakhs to 15 lakhs) of 1881681. Both thalassemia variant analysis and Hemoglobin variant analysis was performed, where it was found patient had a rare Hb varient- J meerut. Similar finding was seen in her daughter's sample as well. In HPLC Chromatogram, peaks of unknown Hb alongside the peaks of HbA1c and A0 were present, indicating the presence of a hemoglobin variant. Both mother and daughter had similar presence of unknown peak with 49.9% area and retention time around 1.23 min.

CONCLUSIONS

Knowledge of presence of Hemoglobin variants is very important for estimation of HbA1c to prevent mismanagement. Our patient had conflicting HbA1c values where her fasting blood glucose levels did not match her HbA1c level. Hemoglobin J is a heterogenous Hb which usually result from substitution of negatively charged amino acid residue in either α, β, or γ chain. Due to its interference with A1c levels, it is advised to pursue alternate methods of glucose monitoring like fructosamine or HbA1c methods such as borate affinity method which have shown acceptable values in presence of hemoglobinopathies

Diabetes, obesity, metabolic syndrome

P0773

ASSOCIATED NON-INVASIVE BIOMARKERS FOR RISK OF LIVER DISEASE IN TYPE 2 DIABETES MELLITUS PATIENTS

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BACKGROUND-AIM

Non-invasive assessment for analysis of risk of liver disease are based on clinical parameters such as age, sex, BMI, lipid profile test, liver function test, and platelet count. Risk of liver disease increases in Type 2 diabetes mellitus (T2DM) patients. This study aimed to find the association of liver biomarker with diabetes population.

METHODS

This cross-sectional study was carried out among 297 attended at Nepal Lab House, Kathmandu, Nepal. Fasting plasma glucose, HbA1c, lipid profile, liver function test, and platelet count was measure in diabetes population participating in the study. Aspartate to platelet ratio index (APRI), gamma-glutamyl transpeptidase to platelet ratio (GPR), fibrosis-4 index (FIB-4), and triglyceride and glucose index (TyG) were assess for non-invasive biomarkers as risk liver disease. Correlation with HbA1c and different biomarkers was performed by spearman's correlaton. Different liver marker index were subjected to multiple linear regression analysis to estimate the association with glycemic control in diabetes population.

RESULTS

The prevalence of abnormality liver function test in diabetic population is 46.8%. Patient with poor glycemic control had a significantly higher level of AST (p=0.012), ALT (p=0.048), GGT (p = 0.034) and ALP (p = 0.006) whereas lower level of albumin (p=0.044). Higher HbA1c showed significantly positive correlation with APRI (r=0.185, p=0.001), GPR (r=0.193, p=0.001), FIB4 (r=0.198, p=0.001), and TyG (r=0.575, p<0.001) in diabetic population. Glycemic control was inversely associated with APRI (β = -0.222, p = 0.025), while positively associated with FIB-4 (β = 0.234, p = 0.007) and TyG (β = 0.591, p <0.001).

CONCLUSIONS

APRI, GPR, FIB4 and TyG can be associated biomarker to define the risk of liver disease in T2DM. Routinely screening for markers may prevent progression of liver disease in T2DM patients.

Diabetes, obesity, metabolic syndrome

P0774

CAN LEPTIN/GHRELIN RATIO AND RETINOL-BINDING PROTEIN 4 PREDICT IMPROVED INSULIN RESISTANCE IN PATIENTS WITH OBESITY UNDERGOING SLEEVE GASTRECTOMY?

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BACKGROUND-AIM

Obesity is associated with metabolic syndrome (MBS), a cluster of components including central obesity, insulin resistance (IR), dyslipidemia, and hypertension. IR is the major risk factor in the development and progression of type 2 diabetes mellitus in obesity and MBS. Predicting preoperatively whether a patient with obesity would have improved or non-improved IR after bariatric surgery would improve treatment decisions.

METHODS

A prospective cohort study was conducted between August 2019 and September 2021. We identified pre- and postoperative metabolic biomarkers in patients who underwent laparoscopic sleeve gastrectomy. Patients were divided into two groups: group A (IR < 2.5), with improved IR, and group B (IR ≥ 2.5), with non-improved IR. A prediction model and receiver operating characteristics (ROC) were used to determine the effect of metabolic biomarkers on IR.

RESULTS

Seventy patients with obesity and MBS were enrolled. At 12-month postoperative a significant improvement in lipid profile, fasting blood glucose, and hormonal biomarkers and a significant reduction in the BMI in all patients (p = 0.008) were visible. HOMA-IR significantly decreased in 57.14% of the patients postoperatively. Significant effects on the change in HOMA-IR ≥ 2.5 were the variables; preoperative BMI, leptin, ghrelin, leptin/ghrelin ratio (LGr), insulin, and triglyceride with an OR of 1.6,1.82, 1.33, 1.69, 1.77, and 1.82, respectively (p = 0.009 towards p = 0.041). Leptin had the best predictive cutoff value on ROC (86% sensitivity and 92% specificity), whereas ghrelin had the lowest (70% sensitivity and 73% specificity).

CONCLUSIONS

Preoperative BMI, leptin, ghrelin, LGr, and increased triglycerides have a predictive value on higher postoperative, non-improved patients with HOMA-IR (≥ 2.5). Therefore, assessing metabolic biomarkers can help decide on treatment/ extra therapy and outcome before surgery.

Diabetes, obesity, metabolic syndrome

P0775

CORRELATION OF TOLL LIKE RECEPTORS 2 AND 4 WITH THEIR ADAPTOR PROTEINS IN TYPE 2 DIABETES MELLITUS

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BACKGROUND-AIM

Toll-like receptors (TLRs) are central to innate immunity. The Toll-like receptors 2 and 4 plays a crucial role in the pathogenesis and progression of type 2 diabetes and its related complications. The increased activity of TLRs in diabetes could be the result of both endogenous and exogenous ligands. TLRs could be beneficial in predicting diabetic complications given the pivotal role of inflammation in both micro vascular and macro vascular complications.
AIM and OBJECTIVE
To study the correlation of expression of Toll like receptors 2 and 4 with adaptor proteins in type 2 Diabetes Mellitus.

METHODS

The case control study conducted on diagnosed cases of Type 2 Diabetes mellitus. RNA was extracted to synthesize Cdna. template DNA in the gradient PCRs for standardization of primers for gene expression studies.

RESULTS

Data were presented as mean ± standard deviation, unless otherwise indicated. Correlation and linear regression were used to see the association between different variables. For all analysis, P value < 0.05 was considered significant.
TLR2 showed the highest expression, followed by TLR4 in type 2 DM subjects and there was significant difference from healthy subjects ($P < 0.05$).
Expression levels of TLRs increased significantly with increasing type 2 DM (TLR2: $r = 0.91$; TLR4: $r = 0.88$, $P < 0.0001$).
The expression of TLRs' adaptor proteins MyD88 and IRAK1 were significantly increased in PBMCs from type 2 DM subjects ($P < 0.05$).

CONCLUSIONS

1) Down regulation of TLR2 can be considered as a novel approach for the treatment of these conditions.
2) There are no approved therapeutic agents targeting TLR2/TLR4 that have been shown to play a pivotal role in initiating and propagating persistent inflammation in diabetes.
3) The systemic inflammatory profile with activation of PBMC could be an important factor in the accelerated atherosclerosis observed in type 2 diabetes mellitus.
4) The potential of targeting mediators of inflammation like toll-like receptors (TLRs) are part of current investigation by the scientific community. Hence, the aim of the present review is to discuss the role of TLRs as a potential drug target for diabetes and diabetes associated complications.

Diabetes, obesity, metabolic syndrome

P0776

C-MICRORNAS ASSOCIATED WITH HIGH HBA1C, PLATELET AGGREGATION, AND VITAMIN D DEFICIENCY IN TYPE 2 DIABETES PATIENTS

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BACKGROUND-AIM

Based on recent studies, certain microRNAs are involved in the pathogenesis of Type 2 diabetes (T2D). Previous studies at our lab showed that glycemic control (HbA1c) of patients with or without diabetes is inversely associated with high platelet aggregation and low vitamin D levels. Following these findings, we aim to identify circulating miRNAs variations in diabetic versus non-diabetic patients in correlation with glycemic control, vitamin D deficiency and platelet activation.

METHODS

Plasma samples were collected from eight non-diabetic (control) and diabetic (DM) patients classified based on their HbA1c, vitamin D and platelet aggregation levels; Control:DM - HbA1c <5.7%: >6.4%, vitamin D>76nmol/L: <76nmol/L, %max platelet aggregation<50: >50. We performed screening of 179 miRNAs in plasma samples using the miRCURY LNA miRNA Serum/Plasma Focus PCR Panel (Qiagen). The relative expression of circulating miRNAs in the plasma was calculated using geNorm algorithm of the GeneGlobe data analysis center (Qiagen).

RESULTS

Data analysis revealed miRNAs expression variations between diabetic to non-diabetic samples, 24 miRNAs were up-regulated (three sig.: miR 17-5p/miR92b-3p/miR629-5p) and 27 down-regulated (two sig.: miR-497-5p/miR-200c-3p). miR-17-5p negatively correlates, and miR-497-5p positively correlates with vitamin D levels, while miR-92B-3p and miR-629-5p positively correlates with HbA1c, and miR-200c-5p negatively correlates with platelet aggregation, in contrast to miR-629-5p and miR-17-5p.

CONCLUSIONS

Our findings support the important role of C-microRNAs in the regulation of glucose homeostasis, vitamin D levels, platelet activation, and pathogenesis of DM. Further investigation of candidate miRNAs could reveal a new biomarker for the early diagnosis and prevention of DM complications.

Diabetes, obesity, metabolic syndrome

P0777

ASSOCIATION OF TOLL LIKE RECEPTORS 2 AND 4 WITH THEIR ADAPTOR PROTEINS IN TYPE 2 DIABETES MELLITUS

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BACKGROUND-AIM

Type 2 diabetes is associated with a low-grade systemic persistent inflammation. Structurally TLRs are characterized by an extracellular leucine rich repeat domain, This domain activates MyD88, IRAKs and TRAF6 are called adaptor protein. Activation of these adaptor protein stimulates multiple cascades and activation of NF-kB result up regulation of inflammatory mediators which together lead to promote inflammation. Therefore this study has been designed to find the changes in expression of TLRs with adaptor proteins of type 2 diabetes Mellitus in Indian population.
AIM
To study the correlation of expression of Toll like receptors 2 and 4 with adaptor proteins MyD88, IRAKs and TRAF6 in type 2 Diabetes Mellitus.

METHODS

The case control study conducted on diagnosed cases of Type 2 DM in the dept of Biochemistry &Medicine in Safdarjung Hospital. Total 226 samples (113 cases and 113 controls) were collected. RNA was extracted to synthesize cDNA and used as template DNA for gene expression studies peripheral blood.

RESULTS

TLR2 mRNA showed the increased expression, followed by TLR4 in type 2 DM and there was significant difference from healthy subjects (P <0.05). On comparison of mRNA Expression in Controls and cases for TLR 2 and 4 with adaptor protein we have found an increase in expression in cases as compared to controls.
In control The correlation of TLR 2 with MYD 88 2^delta Ct (r=0.74, p <0.001,), IRAK 12^delta Ct (r=0.72, p<0.001,) and TRAF 6 2^delta Ct (r=0.78, p<0.001,) respectively. In Cases The correlation TLR 2 with MYD 88 2^delta Ct (r=0.55, p<0.001), IRAK 1 2^delta Ct (r=0.57, p<0.001)& TRAF 6 2^delta Ct (r=0.78, p<0.001) TLR 4 was also positively correlated with r value 0.625, 0.623, 0.856 respectively for the adaptor proteins. This correlation was statistically significant (p<0.0001).

CONCLUSIONS

These results suggest that the overexpression of TLR2 and TLR4 in PBMCs enhanced production of proinflammatory cytokines may pave way for the development of insulin resistance in obese individuals, leading to type 2 diabetes. Down regulation of TLR2 can be considered as a novel approach for the treatment of these conditions.

Diabetes, obesity, metabolic syndrome

P0778

AN EXTREME IATROGENIC HYPERGLYCEMIA DUE TO AN INTENTIONAL OVERDOSE OF THE GROWTH HORMONE

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BACKGROUND-AIM

Metabolic acidosis may be a severe and acute complication of diabetes. It includes both ketoacidosis or lactic acidosis. Here we present an unusual case of metabolic acidosis associated with extreme hyperglycemia in patient with no previous history of diabetes mellitus.

METHODS

A 59-years-old man was admitted to the hospital emergency department due to disturbances of consciousness. Acid base balance analysis showed deep acidosis with pH of 6.891 with increased pCO2 of 63.5 mmHg and low HCO3- of 11.5 mmol/L. He presented low sodium (124 mmol/l) and potassium concentration (2.5 mmol/l) with significantly increased anion gap (24.0 mmol/l) and lactates (6.4 mmol/l). Glucose concentration could not been measured with glucometer during POC testing – an analyzer repeatedly showed an error.

RESULTS

Tests performed at central laboratory showed extreme hyperglycemia of 2081 mg/dl, increased urea (64 mg/dl), creatinine (2.69 mg/dl) and serum osmolality of 393 mOsm/kg H2O.
Family members reported, that the patient for the last 6 weeks has been administering Genotropin (growth hormone) in a dose of 12 mg every two days for weight reduction, and was drinking 6-10 liters of cola daily.
Patient's condition was still worsening, ketoacidosis was still persisting, multiorgan failure was developed with increasing urea, creatinine, lactates, lipase, amylase, troponin I and d-dimers. Despite introduced treatment patients had still low sodium and deepening hypokalemia (up to 1.6 mmol/l). He died 36 hours after hospital admission due to multiorgan disfunction and metabolic acidosis.

CONCLUSIONS

Growth hormone administration is routinely used for patients with growth deficiency, either in childhood and adulthood. Its anabolic and lipolytic action, however, is thought by some people as a good medicament for weight loss and muscles developing. Nevertheless, it has to be underlined, that metabolic action of growth hormone is multidirectional and affects several pathways, that may lead to serious homeostasis disorders.

Diabetes, obesity, metabolic syndrome

P0779

URINE PROTEOMICS ANALYSIS OF TYPE 2 DIABETES MELITUS PATIENTS: A NOVEL APPROACH TO PREDICT THE RISK OF DIABETES NEPHROPATHY

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BACKGROUND-AIM

The prevalence of Diabetes Melitus Type 2 (T2DM) keep increasing worldwide. The glycated end products, oxidative stress, low grade chronic inflammation, and neovascularization in T2DM result in long-term vascular alterations and organ damage. Diabetes Nephropathy (DN) is one of the most common T2DM consequences, yet microalbuminuria remains the main standard for early detection of DN which is not accurate enough and often shows false positive results in patients with uncontrolled hyperglycaemia, hypertension, urinary tract infections, stress, and cardiovascular decompensation.
In this study, we aimed for a novel and simple approach to detect DN earlier, with better specificity and sensitivity for appropriate and targeted diagnostic therapy.

METHODS

The urine proteomic profiling of T2DM patients (n=94) and control group (n=32) were compared using liquid chromatography-tandem mass spectrometry, and the untargeted low molecular weight (LMW) protein profiles were analysed with Progenesis Q1 For Proteomics v4.2

RESULTS

A total of 32 differentially abundance expressed proteins ($P<0.05$) were identified and quantified. This protein seems to have a variety of roles, including the ß-cell pathway signalling, extracellular components, and antioxidant activity. Further analysis with heat maps identified two potential proteins with highest folding alterations in urine: V-type proton ATPase subunit C1 (V-ATPase subunit C1) and Inhibitor of Nuclear Factor Kappa-B Kinase Interacting Protein (IKBKB-IP). V-ATPase subunit C1 abundance was significantly inversely correlated with microalbumin and significantly decreased in urine, whereas increased IKBKB-IP was positively correlated with microalbumin.

CONCLUSIONS

The findings of our study indicates that the decreasing V-ATPase subunit C1 together with increasing IKBKB-IP in urine might predict T2DM patients to develop DN.

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P0780

DOES INTERMITTENT FASTING CONTROL THE DIABESITY EPIDEMIC?

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BACKGROUND-AIM

Intermittent Fasting (IF) is a fasting strategy that cycles between fasting and eating over a period of time. IF prevents the development of insulin resistance by creating extended periods of low Insulin that maintain the body's sensitivity to insulin. It also helps autophagy, cellular repair, microbiome and inflammation levels. The main objective is to determine the effect of IF on glycemic control in subject with pre-diabetes and diabetes.

METHODS

Newly diagnosed prediabetes subjects (n=20) and diabetes subjects (n=13) were recruited as per ADA 2017 criteria from endocrinology clinics, Department of Medicine, BPKIHS. After taking signed consent, subjects counseled about the implementation of IF in their daily life event. Subjects were advised to provide blood samples for biochemistry analysis and Urine for Exosome isolation for proteomics. After three months, subjects were contacted to give post blood and urine samples to see the effect of IF in their body.

RESULTS

Out of 33 subjects, 10 subjects (pre diabetes (n=7) and diabetes (n =3) had come to give blood samples and urine after three months. 56.4% compliance towards IF strategy were observed. Pearson correlation between Pre and Post IF management strategy HbA1c and fasting blood glucose significantly lowered in the post sample by 0.54% and 23.71 mg/dl respectively. Lipid profile in the post samples were also seen marked improvement.

CONCLUSIONS

No doubt, IF is the most powerful natural therapy available for Type 2 diabetes and diabesity. However, keeping the mind of poor compliance (56.49%±13.18%) and high dropout rate (69.7%), there is a need to focus on planned with determination in this research.

Diabetes, obesity, metabolic syndrome

P0781

SERUM LEPTIN, SOME LIPID FRACTIONS AND FASTING BLOOD GLUCOSE(FBS) LEVEL(S) IN OVERWEIGHT, AND OBESE SUBJECTS IN A RURAL TOWN (NNEWI) SOUTH EAST NIGERIA.

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BACKGROUND-AIM

Obesity emanates from an imbalance between food intake and energy expenditure, which results to excessive accumulation of fat in adipose tissue, liver, muscle, and other organs involved in metabolism. Leptin is an adipokine that acts, at the level of the brain, and reflects the degree of adiposity of an organism. Obesity is associated with hyperlipidemia (mixed) and these medical problems are substantially greater among obese individuals. We looked at the association of leptin, lipid profile and FBS with BMI in normal weight, overweight and obese participants in Nnewi south east Nigeria.

METHODS

This is a cross- sectional study. A total of 90 apparently healthy obese, overweight and normal weight participants who met the inclusion criteria were randomly enrolled into the study. They were grouped using their body mass index. The measured parameters were analyzed using standard methods.

RESULTS

There was increased difference in the mean level of Leptin (ug/l) of the obese and overweight participants when compared to normal weight participants. Significant positive correlation was observed between leptin and BMI of obese subjects.

CONCLUSIONS

The level of leptin was increased in the overweight and obese groups when compared to the control groups and correlates positively with BMI of obese participants.

Diabetes, obesity, metabolic syndrome

P0782

IMPROVE THE UTILIZATION OF THE IMMEDIATE HBA1C TESTING IN MANAGING DM

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BACKGROUND-AIM

Diabetes mellitus (DM) is a common chronic metabolic disorder. In 2011 the WHO advocated using HbA1c for the type 2 DM diagnosis. HbA1c is also an important indicator of long-term glycemic control with the ability to reflect the cumulative glycemic history of the preceding 8 to 12 weeks. However, in most hospital settings, the process to assess patients with suspected DM or monitor the treatment typically involves at least two appointments with a physician; blood samples are taken during the first visit, and HbA1c results are discussed with the patient after laboratory analysis 1-2 weeks later, adding the length of time taken to reach a diagnosis or monitoring. Why are HbA1c results not available during their first outpatient visits? This study aimed to assess the performance of an immediate HbA1c testing workflow and endorse the new approaches in our 554-bed regional hospital in Taiwan.

METHODS

We relocated the HbA1c measurement system from the serology department to the hematology workstation near the phlebotomy station and transformed to an immediate testing workflow in January 2011, intending to report HbA1c within 30 minutes will contribute to therapeutic decisions to be made at the earliest possible opportunity, and then implemented an auto-verification middleware for automating selection and reporting results in June 2015. More recently, our laboratory was equipped with two ARKRAY HA-8180v HbA1c instruments that replaced an obsolete Tosoh G8 analyzer to perform about 150 outpatient samples every morning in March 2019, with an objective of turnaround time (TAT) within 20 minutes since June 2019.

RESULTS

We evaluated the outpatient's HbA1c testing TAT as a monthly quality indicator from 2011 to 2022. The rates of overdue TAT per month were found to range from 0.24% to 7.65%, and the overall mean was 2.23%. This study has shown that 96.78% of HbA1c tests took less than 20 minutes to complete from July 2019 to December 2022. Namely, the rate of overdue TAT for HbA1c patient samples over nearly four years was 3.22%.

CONCLUSIONS

This study has shown and verified the performance of our new continuously improved workflow in the hospital setting to get HbA1c results in 20 minutes. We suggest changes in the traditional practice and recommend offering clinical clinicians and patients immediate HbA1c results.

Diabetes, obesity, metabolic syndrome

P0783

LEPTIN INCREASES THE EXPRESSION OF AQP-9 AND CHOLESTEROL TRANSPORTERS (ABX-A1 AND ABC-G1) IN HUMAN TROPHOBLASTIC CELLS

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BACKGROUND-AIM

Gestational diabetes is the most frequent pathology of pregnancy, and it increases the incidence of complications both in the mother and fetus. The macrosomía that occurs in these fetus may be related with some changes in the mechanisms of transport in placenta. Leptin is a placental hormone that regulates growth and proliferation in trophoblast in an autocrine and paracrine manner. Placenta has the important function of providing nutrients and oxygen to the fetus. In this sense, leptin seems to play a role in the feto-maternal dialogue. Since placental leptin expression and circulating levels are increased in gestational diabetes, our aim was to determine the effect of leptin in the expresión of the nutrient transporter AQP-9 (water and glycerol) and ABC-A1 and ABC-G1 (cholesterol transporters) in human trophoblast cells.

METHODS

Human trophoblastic cells (BeWo cell line) were used in culture. Cells were incubated in the presence of increasing concentrations of leptin for 48 h. The expresión of transporters in response to leptin was carried out by quantitative PCR. Statistical differences were analysed by ANOVA followed by Bonferroni post-test.

RESULTS

After 48 h incubation, leptin increases the expresión of AQP-9, ABC-A1 and ABC-G1 in human tophoblastic cells (BeWo) in a dose-depencent manner. Maximal effect was achieved at 10 nM leptin.

CONCLUSIONS

Leptin seems to positively regulate the expression of nutrients from the mother to the fetus, since leptin increases the expresión of glycerol and cholesterol transporters in human trophoblastic cells.

Diabetes, obesity, metabolic syndrome

P0784

ZONULIN FAMILY PEPTIDES AND OBESITY PHENOTYPES

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BACKGROUND-AIM

Zonulin family peptides (ZFPs), the regulators for intestinal tight junctions, were considered as markers of intestinal wall permeability. Recent studies also found an association between ZEP levels and cardiometabolic features like obesity, insulin resistance, dyslipidemia or liver dysfunction. Due to the fact that body weight assessed with the use of BMI does not always reflect the patient's metabolic state, definitions of four obesity phenotypes have been proposed: metabolically obese normal-weight (MONW), normal-weight obese (NWO), metabolically healthy obese (MHO) and metabolically unhealthy obese (MUO). We aimed to evaluate serum ZEP levels in middle-aged women representing four obesity phenotypes, and in the control group.

METHODS

Two-hundred women (40-60 years), classified into five groups: control n= 36, women with normal BMI and total body fat (TBF) below 30% without metabolic syndrome (MetS); NWO n=39, women with normal BMI and TBF above 30% without MetS; MONW n=41, women with normal BMI and TBF above 30% with MetS; MHO n=40, obese women according to BMI without MetS and MUO n=44, obese women according to BMI with MetS. The amount of adipose tissue was assessed by whole-body densitometry. ZEPs were determined using enzyme-linked immunosorbent assay (Immundiagnostik AG). Biochemical and anthropometric measurements as well as blood pressure were performed.

RESULTS

ZFP levels were significantly higher ($p<0.05$) in groups with MetS (MONW and MUO) when compared to the control group and NWO. ZFPs showed the positive weak correlations with anthropometric measurements, glucose, HOMA-IR, alanine aminotransferase, fatty liver index, uric acid and the number of the MetS components. While the positive moderate correlations were shown between ZFPs and glycated hemoglobin, aspartate aminotransferase and gamma glutamyltransferase. In logistic regression analysis ZFPs were significantly associated with MONW and MUO phenotype [OR 1.09 (1.01-1.18) p=0.037 and OR 1.07 (1.0-1.14) p=0.04]. We also observed that ZFPs were predictors for MetS occurrence [1.07 (1.02-1.12) p=0.003] and this association was independent of BMI.

CONCLUSIONS

ZFP levels are associated with metabolic risk factors and obesity phenotypes with MetS.

Diabetes, obesity, metabolic syndrome

P0785

LIPID PROFILE IN DIABETES AND PREDIABETES

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BACKGROUND-AIM

Prevalence of type-2 diabetes mellitus and prediabetes [impaired glucose tolerance (IGT) and impaired fasting glucose (IFG)] are rapidly rising due to sedentary life style. It is well established that type 2 diabetes is the secondary cause of dyslipidemia and associated with higher cardiovascular risk. There are conflicting reports from various studies whether cardiovascular risk is more associated with isolated IGT, IFG or having both IGT and IFG. Therefore we have evaluated the lipid parameters for assessing the cardiovascular risk in type-2 diabetes mellitus and prediabetes subjects.

METHODS

This is a hospital based cross-sectional study conducted at BPKIHS, Dharan. 34 normal, 104 type-2 diabetes mellitus and 110 prediabetes subjects were recruited using purposive sampling. Their fasting, postprandial blood sugar, HbA1c and lipid profiles were measured by cobas c 311, Roche autoanalyser. The ADA criteria and NCETP ATP III guidelines were applied for diagnosis of diabetes, prediabetes and dyslipidemia. Chi-Square test, one way ANOVA and Kruskal-Wallis test were applied to test the significance considering p value $\leq$0.05 as statistically significant.

RESULTS

Participants age varies from 15 to 89 years with 1:1 male and female ratio. Lipid profile parameters including TC/HDL and TG/HDL ratio are not statistically different among the groups. Dyslipidemia (65.2% male vs 82.7% female) was found significantly higher in female ($p<0.001$). Total Cholesterol (193.32± 44.51 mg/dL vs 156.86± 37.02 mg/dL; $p=0.001$) and LDL cholesterol (114.96±34.56 mg/dL vs 90.00±31.78 mg/dL; $p=0.004$) levels are significantly higher among subjects with IFG as compared to subjects with IGT.

CONCLUSIONS

IFG group have high LDL and total cholesterol level as compared to IGT group among Prediabetes. Dyslipidemia is found higher in female.

Diabetes, obesity, metabolic syndrome

P0786

UTILITY OF GROWTH DIFFERENTIATION FACTOR 15 (GDF-15) IN THE ASSESSMENT OF LIVER DISEASE NON-ALCOHOLIC FATTY ACID (NAFLD) IN OBESE PATIENTS

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BACKGROUND-AIM

Nonalcoholic fatty liver disease (NAFLD) progresses from simple steatosis to nonalcoholic steatohepatitis (NASH), fibrosis, cirrhosis and hepatocellular carcinoma. NAFLD is considered the most prevalent chronic liver disease in western countries, with special incidence in obese patients.
Liver biopsy is the gold standard for the diagnosis of NAFLD but it is a very invasive technique, therefore it is urgent to develop noninvasive diagnostic biomarkers.
Growth differentiation factor 15 (GDF15), a stress-induced cytokine belonging to the transforming growth factor beta superfamily, key role as an anti-inflammatory molecule and has been associated with many conditions. Recent studies have shown that GDF15 is associated with NAFLD.
Our objective was to evaluate GDF15 in a population of obese patients with NAFLD and to study its relationship with the different stages of the disease.

METHODS

We selected morbidly obesity patients who were to undergo bariatric surgery and were classed according to their hepatic biopsy findings. Group A: normal liver; Group B: NAFLD and Group C: NASH. The previous day of surgery, blood samples were collected for laboratory evaluation of GDF15 (Cobas 8000, Roche Diagnostics).

RESULTS

The study population consisted of 107 patients; group A: n=32 (34.24%), group B: n=52 (55.64%) and group C: n=23 (10.12%).
74,3% of subjects were female and the mean age in the study was 49 years. The mean BMI was 43,22 Kg/m2 and an 45,9% of subjects had evidence of diabetes, 87,2% of dislipemia 42,2% of hypertension and 71,6% of metabolic syndrome (MS).
GDF15 values in serum (mean [p25-p75]) were: group A=757.9[561.5-979.45], group B 837.15[595.9-1164] and group C=933.2[708.75-1579]. Significant differences were found between groups (p=0,037).
We found significantly higher GDF15 values in patients with MS (p=0.008).

CONCLUSIONS

A proper hepatic assessment enabling NAFLD to be differentiated from NASH would be fundamental for establishing a risk population. Our data suggest that that GDF15 is a useful diagnostic tool for differentiating this in morbidly obesity patients.
GDF15 is postulated as a suitable biomarker in NAFLD context, that allows a complete assessment of liver damage and its relationship with metabolic syndrome.

Diabetes, obesity, metabolic syndrome

P0787

GLYCATED ALBUMIN LEVELS PREDICT THE TYPE OF KIDNEY DAMAGE IN DIABETIC PATIENTS

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BACKGROUND-AIM

Diabetes mellitus is the most frequent cause of end stage renal disease. Glycemic control by Glycated albumin (GA) is not influenced by anemia and associated treatments; however, K-DIGO Guidelines still recommend HbA1c in the diabetic patients with chronic kidney disease. Renal damage in diabetes can range from real diabetic nephropathy (DN) to non-diabetic renal disease (NDRD), thus influencing prognosis and treatment. The aim of the study was to evaluate the clinical utility of the GA dosage, for the prediction of the type of kidney damage in the diabetic patient.

METHODS

We enrolled 108 diabetic patients, 90 with a biopsy proven diagnosis of kidney disease and 18 with no kidney dysfunction. 51 patients had real DN or mixed forms (DN + NDRD) and 39 had NDRD. GA dosage was obtained by QuantILab® Glycated Albumin assay. qPCR was used to evaluate urinary levels of miR27b-3p, a biomarker that predict the kind of renal damage in diabetic patients.

RESULTS

GA values were differently distributed among patients ($p=0.003$) and correlated with Hb1Ac levels, in the whole cohort ($p<0.001$) as well as in the different groups of patients (DN: $p<0.001$; NDRD: $p=0,01$). GA also correlated with glycaemia (Whole cohort: $p<0.07$; DN: $p=0.01$; NDRD: n.s.) and diabetes duration (Whole cohort: $p=0.001$; DN: $p=0.008$; NDRD: n.s.) in particular in patients with real DN. GA also correlated with: sCr and eGFR ($p=0.001$); resistive index evaluated by ultrasound ($p<0.001$); histological features: glomerular fibrosis ($p=0.04$) and % of sclerotic glomeruli in the kidney biopsy ($p=0.02$). We confirmed a different distribution of miR-27b-3p among the patient's populations ($p<0.01$). Interestingly, only GA levels, but not Hb1Ac levels, were significantly and inversely correlated with miR-27b-3p (All cohort: $p=0.011$; DN: $p=0.049$; NDRD: $p=0.01$). Finally, in a multivariate logistic regression model corrected for sex, age and serum creatinine, we demonstrated that GA is the only significant predictor of real DN vs NDRD ($p=.019$; OR=0.780-0.978; 95% CI).

CONCLUSIONS

Our study described for the first time the role played by GA as a diagnostic marker in the identification of the different kind of renal damage in diabetic patients, thus supporting the need to introduce GA as an index of glycaemic control in diabetic patients with renal damage.

Diabetes, obesity, metabolic syndrome

P0788

CORRELATION BETWEEN MAGNESIUM AND HBA1C IN TYPE 2 DIABETES MELLITUS

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BACKGROUND-AIM

Magnesium (Mg) is most abundant electrolyte with unlimited physiologic importance in the body, playing a vital role in many fundamental processes. Cellular magnesium is an essential cofactor for various enzymes involved in glucose transport, insulin release and glucose oxidation. Mg has potential role in improving insulin sensitivity and preventing diabetes and its complications. Hypomagnesemia promotes to the initiation and progression of DM and its macrovascular and microvascular complications. The aim of this study was to evaluate the correlation of magnesium with HbA1C in T2DM.

METHODS

This cross sectional study conducted at Tribhuvan University Teaching Hospital, included 85 diagnosed with type 2 diabetes Mellitus visiting Medicine OPD and 85 apparently healthy controls. Clinical and anthropometric characteristics were documented using clinical proforma. The fasting blood samples were collected for estimating serum glucose, HbA1C and magnesium

RESULTS

The mean values of BMI, FBG, HbA1C were found to be significantly elevated in T2DM, but that of Mg were higher in healthy controls ($p<0.05$). The prevalence of hypomagnesemia in T2DM was found to be 32.94%. The Serum magnesium levels were moderate negatively correlated ($r = -0.544$, $P<0.001$) with HbA1C.

CONCLUSIONS

Patient with Type 2 Diabetes Mellitus showed significantly low magnesium levels compared to heathy controls as well as uncontrolled HbA1C levels also showed significantly low magnesium level than controlled HbA1C level. There was significant inverse correlation between serum Mg level and HbA1C level in patients with T2DM. So if serum magnesium values are made to rise, HbA1C values will fall.

Diabetes, obesity, metabolic syndrome

P0789

DIAGNOSTIC ACCURACY EVALUATION OF GLYCATED ALBUMIN IN HAEMODIALYZED PATIENTS TREATED WITH ERYTHROPOIETIN

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BACKGROUND-AIM

Glycated albumin (GA) has been proposed as a short- and medium- term indicator of glycaemic homeostasis. The association between GA and glycaemic status has been investigated in patients with advanced chronic kidney disease, but not fully described in haemodialyzed patients. The aim of our study was to evaluate GA diagnostic accuracy in detecting glycaemic homeostasis alterations in haemodialyzed patients treated with erythropoietin (HPE).

METHODS

This prospective study was conducted on 142 HPE: 78 (of which only 43 with a diagnosis of diabetes) with impaired fasting glucose (IFG) detected by 2 consecutive findings of fasting plasma glucose (FPG) ≥ 5.6 mmol/L and 64 (of which 8 with compensated diabetes) with no FPG alterations. GA was measured on patients' plasma samples using an enzymatic method (quantILab Glycated Albumin, IL Werfen, Germany) on Roche Cobas C 702 module. The upper reference limit (URL) was calculated using the non-parametric percentile method on patients with no FPG alterations. GA diagnostic accuracy was evaluated using URL as cut-off and was compared with that of HbA1c. Statistical analyses were performed using SPSS software, version 27.0. The study was approved by the Local Ethics Committee and all patients provided their informed consent.

RESULTS

Patients with IFG (median age 72 years, Interquartile Range - IR 65-77) presented GA levels (median 16.8%, IR 13.0-20.0) significantly higher than patients with no IFG (68 years, IR 54-75) (12.6%, IR 11.7-14.2) ($p < 0.001$). At calculated cut-offs (95^{th} percentile) of 16.8% and 40 mmol/mol, GA and HbA1c showed sensitivities of 48.7% and 37.2%, specificities 95.3% and 96.9%, positive predictive values 92.7% and 93.5%, negative predictive values 60.4% and 55.9%, positive likelihood ratios 10.393 and 11.897, negative likelihood ratios 0.538 and 0.648, diagnostic odds ratio 19.3 and 18.4, with overall diagnostic accuracies of 69.7% and 64.1%, respectively.

CONCLUSIONS

In our study, at proposed cut-offs, GA would seem to be a more reliable marker of IFG status than HbA1c, presenting better diagnostic performances. Therefore, it could be proposed as an indicator of IFG in HPE, particularly in monitoring and dealing with IFG long-term complications. Its role as early marker in HPE diabetes diagnosis should be more investigated.

Diabetes, obesity, metabolic syndrome

P0790

ASSESSMENT OF RISK OF DEVELOPING DIABETIC HEPATOPATHY IN NEPALESE SUBJECTS WITH TYPE 2 DIABETES MELLITUS

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BACKGROUND-AIM

Diabetes Mellitus causes or worsens liver diseases known as diabetic hepatopathy. Type 2 Diabetes Mellitus (T2DM), the most common form of diabetes mellitus, occurs when the body becomes insulin resistant or is unable to produce enough insulin. Even though type 2 diabetes mellitus is a significant public health problem in Nepal, accurate and comprehensive data on the disease prevalence are lacking. There exist the association between diabetes and hepatic changes. Although some diabetic patients experience liver dysfunction, the exact pathophysiological mechanism of diabetes mellitus to induce the haptopathy is still unclear. Diabetes awareness as a major risk factor for liver injury may help with early detection and subsequent interventions.

METHODS

A cross sectional observational study was conducted in Tribhuvan University Teaching Hospital (TUTH), Kathmandu, Nepal. Patients diagnosed with type 2 diabetes mellitus visiting Medicine OPD of TUTH were included in the study. Control group consists of individuals with normal test parameters visiting for General Health Checkup (GHC). The study was conducted from September 2021 to September 2022.
Liver Function Tests, lipid profile tests, blood sugar fasting and post prandial were analyzed by using BT 1500, BT 3500 and vitros 3600 chemistry analyzer. Quality control was maintained through run of controls each day prior to each test. Collected data were analyzed using Statistical Package for Social Sciences (SPSS) Version 21.

RESULTS

The prevalence of abnormal level of Liver function tests in T2DM was higher (33.85%) than a control group (7.08%). The mean values of the liver enzymes and Total bilirubin in patients with T2DM were significantly higher than that of a control group ($p \leq 0.001$). In addition, T2DM patients had lower level of TP ($p \leq 0.01$) and albumin ($p=0.006$) in comparison to the control group. The most frequent abnormal LFT was ALT (27.55%) which was followed by AST (15.74%), ALP (11.81%), TBIL (2.36%) and Alb (1.57%) in T2DM patients.

CONCLUSIONS

In comparison to the non-diabetic control group, Type 2 diabetes Mellitus patients reported a greater prevalence of abnormal Liver Function Tests. Therefore, our study recommends liver function tests to monitor the liver conditions in Type 2 diabetes Mellitus patients.

Diabetes, obesity, metabolic syndrome

P0791

PERCENTILE EQUIVALENTS FOR ENZYMATIC FRUCTOSAMINE AND GLYCATED ALBUMIN IN A POPULATION WITHOUT DIAGNOSED DIABETES

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BACKGROUND-AIM

Fructosamine and glycated albumin (GA) are extracellular markers of the presence of chronic hyperglycemia and are independent of changes in erythrocytes or hemoglobin. Previous studies have examined that the clinical potential of the cutpoints is small, since the population studied is not representative and the determinations use colorimetric methods.
The aim of this study is to obtain cutpoints for enzymatic fructosamine (EFA) and GA equivalent to those for HbA1c and fasting glucose (FG) for diabetes in a well-characterized, community-based white population in Spain.

METHODS

EFA was determined by the diazyme serum glycated protein enzymatic method (Diazyme, UK), FG by the glucose hexokinase method and total albumin by the bromocresol green method (Siemens Diagnostics, Spain) and HbA1c by the Arkray Adams HA-8180T analyzer from Menarini Diagnostics.
To derive cutpoints for EFA and GA that are equivalent to the cutpoints for HbA1c and FG we used the AEGIS study population of 1335 participants with no history of diagnosed diabetes including 12 participants with unknown diabetes (0.9%) and 387 with prediabetes (29%).

RESULTS

The EFA concentrations that correspond to the clinical cutpoints for prediabetes and diabetes of 5.7% and 6.5% for HbA1c based on percentiles are 246 µmol/L (81st percentile) and 328 (99.2nd percentile), respectively. The corresponding values for GA are 13.7% and 17.1%.
While the corresponding EFA concentrations for the FG prediabetes and diabetes cutpoints (100 mg/dL and 126 mg/dL, respectively) are 225 µmol/L (86.5 percentile) and 322 (98.9 percentile). The corresponding values of GA are 14.1% and 16.9%.

CONCLUSIONS

The equivalent "diagnostic" cutpoints may be useful in studies that do not have fasting samples for glucose measurement or whole blood samples for HbA1c measurement.

Diabetes, obesity, metabolic syndrome

P0792

COMPARISON OF SERUM LEVELS OF SOME TRACE ELEMENTS AND MARKERS OF GLYCEMIC CONTROL BETWEEN TYPE 2 DIABETICS AND NON-DIABETIC NIGERIANS

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BACKGROUND-AIM

Trace metals such as magnesium (Mg), zinc (Zn), and manganese (Mn) have been shown to adversely affect pancreatic islets and cause the development of diabetes or worsened its progression. Serum levels of these antioxidant trace elements may reflect their metabolic abnormalities and contribute to disease severity. This study measured serum mean values of these elements and markers of glycaemic control among type 2 diabetics and compared results with those of non-diabetic controls.

METHODS

A total of 300 participants, 150 type 2 diabetics and 150 age and sex-matched nondiabetics as controls were recruited for this study. The trace metals (Mg, Zn, and Mn) were analyzed using the atomic absorption spectrophotometry method. Glycated Albumin (GA) was measured using two steps: the ELISA method for determining glycated serum albumin (GSA) and the colorimetric method for serum albumin. The HbA1c was assayed using the immuno-nephelometry method and fasting plasma glucose (FPG) was measured using the glucose oxidase method.

RESULTS

The mean value of HbA1c among the diabetics (7.51 ± 2.50%) was significantly higher when compared to that of non-diabetic controls (5.40 ± 0.51%) (p = <0.001). The mean FPG in diabetics (8.53 ± 3.11mmol/L) was significantly higher when compared to that of the controls (5.35 ± 0.39mmol/L) with p= <0.001. The mean value of GA in diabetics (23.48 ± 6.58%) was significantly higher when compared to controls (12.49 ± 1.98%) (p< 0.001). The mean value of serum Mg among diabetics (0.69 ± 0.09mmol/l) was significantly lower when compared with that of nondiabetic controls (0.86 ± 0.12mmol/l) (p= <0.001). The mean serum Zn in diabetics (14.49 ±.2.10µmol/l) was significantly lower when compared with the nondiabetic controls (16.21 ± 2.23 µmol/l) and p= <0.001. The mean serum Mn among diabetics (21.04 ± 1.56nmol/l) was slightly higher than in the nondiabetic control (20.54 ± 0.99nmol/l) however, the difference was not statistically significant with p= 0.237.

CONCLUSIONS

This study demonstrates significant changes in the serum levels of Mg and Zn between diabetic patients and the controls. This result indicates the important role these trace metals (Mg and Zn) may be contributing in the maintenance of optimal plasma glucose among diabetic patients.

Diabetes, obesity, metabolic syndrome

P0793

DETERMINATION OF SERUM COPPER STATUS IN TYPE 2 DIABETIC PATIENTS TREATED WITH METFORMIN

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BACKGROUND-AIM

An alteration of the metabolism of certain trace elements in type 2 diabetics is described by certain studies. This alteration could play a role in pathogenesis and the progression of the disease. The objective of this study is to determine the status of an oligoelement Copper (Cu) among Algerians with type 2 diabetes and treated exclusively by metformin.

METHODS

160 type 2 diabetic subjects treated with metformin have been selected. The average age is estimated at 49.57 ± 6.70 years. A biochemical assessment was carried out on the serums of each subject : a dosage of blood sugar, a complete lipid assessment and the measurement of certainoplasmine levels on the Cobas 501 of Roche Diagnostic. A dosage of the HBA1C on Integrat 400 of Roche Diagnostic. A dosage of insulin on Cobas E411 of Roche Diagnostic. The measurement of serum Copper levels was done on the ICE3300 atomic absorption spectrometer of Thermo Fisher.

RESULTS

Significant difference ($p < 0.001$) between copper rates in diabetic subjects which are higher than in witnesses. Significant difference ($p < 0.001$) between ceruloplasmine levels in diabetic subjects which are higher than in witnesses. Significant positive correlation of copper with fasting blood sugar and HBA1C($p < 0.05$).

CONCLUSIONS

In this study , high copper levels were observed in diabetics under Metformin, proving the involvement of this element in the pathogenesis of type 2 diabetes. Other studies must be envisaged in order to define the role of copper in the development of complications of type 2 diabetes, as well as to determine whether copper chélators could represent a future therapeutic strategy in this disease.

Diabetes, obesity, metabolic syndrome

P0794

ASSOCIATION OF THE SERUM MAGNESIUM AND THE C REACTIVE PROTEIN IN ALGERIAN SUBJECTS WITH INSULIN RESISTANCE

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BACKGROUND-AIM

Magnesium (MG) is the cofactor of several enzyme involved in particular in carbohydrate metabolism, several mechanisms are envisaged to explain insulin resistance in particular, the lack of magnesium which would prevent insulin receptors, located on the periphery of the cells, from functioning properly. This MG deficit which would also play a role in modulating the processes of inflammation. Our aim is to assess the link between serum magnesium and C-Reactive protein (CRPUS) levels in subjects with insulin resistance .

METHODS

The study focused on a total of 90 subjects with insulin resistance Homa-IR index (> 3) .The average age is estimated at 57.94 ± 7.68 years. On the serum of each subject, a dosage of blood sugar, a complete lipid assessment, a dosage of the serum Mg and the measurement of CRPUS levels were carried out on the Cobas 501 of Roche Diagnostic. The dosage of the serum insulin necessary for the calculation of the Homa-IR index was carried out on the Cobas E411 of Roche Diagnostic.

RESULTS

In this study, there is a reverse correlation between the levels of serum Mg and CRPUS (R = -0.478), a negative correlation was also found between the serum Mg and the Homa-IR index (R = -0.331).

CONCLUSIONS

Insulin resistance is significantly associated with low levels in serum magnesium and inflammation by raising CRPUS levels. Supplementation should be considered in this category of subjects to improve insulinosensitivity and to combat inflammation by decreasing CRPUS levels.

Diabetes, obesity, metabolic syndrome

P0795

REAL-TIME CONTINUOUS CONTINUOUS GLUCOSE MONITORING AFTER LIVER TRANSPLANTATION

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BACKGROUND-AIM

Glucose homeostatic mechanisms are influenced in post-transplant period with different stressors in liver, kidney, pancreas or Langerhans islets transplantation (Tx). The aim was to compare results of continuous glucose monitoring (CGM) in the setting of early post-transplant and postoperative period.

METHODS

In a pilot study, a total of 61 patients after liver (N=41), Langerhans islets (Li, 9), kidney+pancreas (5) transplantation (Tx) and total pancreatectomy (TP, 6) was evaluated within 10 days after Tx. CGM was monitored by Dexcom G6 (Dexcon, Inc., San Diego, USA), glucose was measured by ABL800 Radiometer, Copenhagen, Denmark and StatStrip, NOVA Biomedical Corp., USA.

RESULTS

Median number of days with CGM was 9.0 days (IQR 7.0-9.3) with median number of calibrations per days 0.7 (0.5-1.2). Medians of mean glucose during monitoring and glucose variation coefficients were 8.4 mmol/L (7.5-9.7) and 28.0% (20.2-33.8), respectively. Median of percentage of time with glucose above 10 mmol/L was 23.0% (6.0-38.0), there were 22.8% of glucose concentrations above 10.0 mmol/L (6.4-38.2). Percentage of time above 10 mmol/L was significantly different among 4 respective groups (Kruskal-Wallis, $p<0.0001$). Highest percentage was in LTx (median 28.0%, IQR 15.0-39.5) and TP (22.0%, IQR 3.0-45.0), both significantly higher than KPTx and LiTx ($p<0.05$). Similarly, mean glucose concentration was different among groups ($p<0.01$), with highest glucose concentration in LTx (median 9.0 mmol/L, IQR 8.0-9.7) and TP (8.9 mmol/L, IQR 7.2-10.2), both significantly higher than KPTx ($p<0.05$). Highest variability of glucose, assessed as coefficient of variation, was different among groups ($p<0.0001$), with highest variability in TP (median 28.8%) and LTx (36.3), both significantly higher than LiTx (14.7%) and KPTx (7.8%) ($p<0.05$).

CONCLUSIONS

Preliminary data revealed, that liver Tx and total pancreatectomy were associated with worse glucose homeostatic parameters in comparison with kidney and pancreas Tx or Tx of Langerhans islets. Liver Tx and pancreatectomy require more attention and a higher level of monitoring can be obtained with CGM to provide reliable information on glucose homeostasis in terms of hypo- and hyperglycemia.

Supported by Cooperatio, Charles University, Prague.

Diabetes, obesity, metabolic syndrome

P0796

HEALTH EFFECTS OF CLINOPTILOLITE ZEOLITE SUPPLEMENTATION, AN IN VIVO APPROACH

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BACKGROUND-AIM

Zeolites are microporous aluminosilicate minerals. Zeolite Clinoptilolite (ZC) is of great interest for its use in supplementation, since due to its novel physical and chemical properties it could confer benefits to human health. Scientific evidence has shown beneficial effects of ZC, such as hypoglycemic and lipid-lowering capacity, and anti-oxidative stress. However, these studies are not conclusive and further analysis is required to assess the potential benefit and/or possible adverse effects that ZC supplementation may confer. The objective of this work is to evaluate the effects that 2% ZC supplementation can confer on health, through the evaluation of body weight and food consumption and the measurement of biochemical, hematological, hepatic and renal biomarkers, in biomodels with a normal diet and a high-fat diet.

METHODS

The study was experimental, cross-sectional and prospective. Twenty-four male Wistar rats were used, divided into 4 groups (n=6 per group). Group 1 consumed a standar diet (AIN93), group 2 a normal diet with 2% ZC (AIN93-ZC), group 3 a high-fat diet (DHF) and group 4 a high-fat diet with 2% ZC (DHF- ZC), all for 28 days. The measured parameters were analyzed using ANOVA and Tukey's Post hoc test.

RESULTS

It was found that the biomodels of the AIN93-ZC group consumed a greater amount of food without this increase in food intake being reflected in a significant increase in weight, or changes in biochemical parameters. On the other hand, it was found that the biomodels of the HDF-ZC group present lower levels of glycosylated hemoglobin than those who consumed a normal diet (p=0.003). Finally, no differences were found between the rest of biochemical, hepatic, renal and hematological biomarkers.

CONCLUSIONS

This study establishes evidence on the physiological effects that ZC might confer to supplementation, such as increasing food intake without compromising intermediate metabolism or glycemic control in subjects on a high-fat diet. Finally, in this study we did not find signs of alterations in biomarkers in the liver or kidneys that could be conferred by the consumption of this supplement. The beneficial effects and mechanisms that ZC can generate in the body remain to be elucidated in detail.

Diabetes, obesity, metabolic syndrome

P0797

INSULIN RESISTANCE IN PATIENTS WITH DEPRESSION BEFORE AND AFTER TREATMENT

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BACKGROUND-AIM

A high proportion of patients with depression develop glucose intolerance accompanied by hyperinsulinemia, suggestive of reduced insulin sensitivity (insulin resistance).
The aim of this study was to evaluate insulin sensitivity in patients with depression and its changes during the clinical course and treatment of depression.
Study group consisted of 43 nondiabetic patients with depression (23 males and 20 females aged 40 ± 10 years), body mass index BMI was 23.2 ± 2.8 kg/m2 and an age, sex, and BMI-matched control group (n = 40).

METHODS

We examined oral glucose tolerance test (OGTT) before and after psychopharmacological treatment of depression in duration of 6-8 weeks. Metabolic indices measuring glucose effectiveness at basal insulin and insulin sensitivity were derived from minimal model analysis. Each patient was treated with antidepressant and diet with 2,000 kcal/day food intake and underwent no exercise therapy.

RESULTS

Insulin sensitivity was significantly lower in patients before treatment versus control subjects (6.0 ± 2.5 mmol/l 13,8 ± 8,6mmol/l $P < 0.01$). After treatment of depression, a significant increase in insulin sensitivity in treated patient (10.7 ± 7.5 mmol/l $P<0.01$) followed by clinical improvement with reduction of depressive symptoms was observed without changes in the BMI, fasting blood glucose and basal insulin. This was associated with a decrease in the insulin response during the OGTT.

CONCLUSIONS

We can conclude that patients with depression have impaired insulin sensitivity and resultant hyperinsulinemia and that these abnormalities can be resolved after recovery from depression

Diabetes, obesity, metabolic syndrome

P0798

ASSOCIATION OF ACE GENE POLYMORPHISM AND DIABETIC NEPHROPATHY

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BACKGROUND-AIM

Diabetic nephropathy is the main cause of chronic kidney disease and is the most common and serious complication of diabetes. Its exact pathogenesis is complex and not completely understood. Several factors and mechanisms contribute to the development and outcome of this pathology.
The objectives of our work are to determine the frequency of the polymorphism Insertion(I)/Deletion (D) of the ACE (angiotensin-converting enzyme) gene in diabetic patients with and without nephropathy and to establish the relationship between this polymorphism and diabetic nephropathy in a population of Eastern Algeria.

METHODS

For this purpose, we recruited twenty-nine diabetic subjects with nephropathy and thirty diabetic controls without nephropathy.
DNA extraction was performed on fresh blood by the NaCl method and the polymorphism I/D polymorphism of the ACE gene was determined by PCR (polymerase chain reaction).
Informed consent was obtained from all participants.

RESULTS

The average duration of diabetes with nephropathy in our cases was 19.21 ± 9.31 years; that of the controls without nephropathy was 10.67 ± 7.66 years. Type 1 diabetes is more frequent in nephropaths (72.41%), in controls without nephropathy, the frequency of type 2 diabetes is more important (73.33%). Macro angiopathic complications are more prevalent in nephropaths. Moreover, the association of two or more complications is frequently found. The frequencies of the I and D alleles are respectively 13.79% and 86.21% in the controls without nephropathy subjects, whereas the allele frequencies in subjects with nephropathy are respectively 19.64% and 80.36%.

CONCLUSIONS

No significant association between this polymorphism and diabetic nephropathy has been demonstrated.

Diabetes, obesity, metabolic syndrome

P0799

ANALYTICAL AND STABILITY PERFORMANCE OF THE ALINITY C HBA1C ASSAY

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BACKGROUND-AIM

Haemoglobin A1c (HbA1c) is a fully standardized analyte that has been widely used in the diagnosis of Diabetes Mellitus and monitoring of long-term blood glucose control. The Abbott enzymatic HbA1c test automatically lyses red blood cells and utilizes an enzymatic method that specifically measures N-terminal fructosyl dipeptides of the beta-chain of HbA1c. The clinical value of an HbA1c assay is dependent on the assay being standardized, precise and accurate. This is the first study to assess the effect of increasing heamatocrit concentration on sample stability and carryover on the HbA1c assay on the Alinity c system.

METHODS

A comprehensive evaluation of the Abbott Enzymatic HbA1c method was undertaken using Clinical and Laboratory Standards Institute-based protocols. For stability testing, native and heamatocrit (0.2 – 0.8 L/L) samples (red blood cells added to plasma) were tested. Fifty whole blood EDTA samples, with HbA1c ranging from about 20-120 mmol/mol, were measured on both the Abbott Alinity c Analyzer and the A.Menarini Diagnostics Premier Hb9210 analyser (boronate affinity high performance liquid chromatography). To assess imprecision, three patient pools (low, medium, and high) were run in duplicate twice per day for 20 non-consecutive days. To evaluate linearity, two patient samples (one low and one high HbA1c level) were mixed together incrementally to produce a set of panels at five distinct levels. Carryover was assessed with whole blood HbA1c samples (n=5) followed by saline.

RESULTS

The Abbott Enzymatic HbA1c method correlated well with the A.Menarini Hb9210 analyser with a regression slope of 1.00 and a correlation of 0.99. Total imprecision for each patient pool was <1% at 32.2, 58.9 and 102.8 mmol/mol. The results obtained for linearity showed acceptable linear performance. No carryover was observed from whole blood samples into whole blood samples or saline (0 ppm). Whole blood samples (n=20) were stable with or without mixing, </= 3% difference after 72 h at RT and 2-8C. Haematocrit concentrations from 0.2 -0.8 L/L were stable </= 3% after 8 h at RT.

CONCLUSIONS

The Alinity c Haemoglobin A1c assay is a precise and accurate method independent of the haematocrit value and with no whole blood carryover for measuring HbA1c.

Diabetes, obesity, metabolic syndrome

P0800

EVALUATION OF ANTHROPOMETRIC, CLINICAL AND BIOCHEMICAL BIOMARKERS THROUGH A DIETARY INTERVENTION IN MEXICAN ADULTS WITH RISK FACTORS FOR METABOLIC SYNDROME

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BACKGROUND-AIM

Metabolic syndrome (MetS) increases the risk of developing diseases such as diabetes mellitus and cardiovascular disease. Since the prevalence of these diseases is increasing in Mexico and the world, some of the prevention strategies include dietary modification; however, not all diets achieve the same results in subjects, so in this study we evaluated whether a two-month dietary intervention following the recommendations of the Adult Treatment Panel III (ATP-III) of the National Cholesterol Education Program (NCEP) improves anthropometric, clinical and biochemical biomarkers in Mexican subjects with risk factors for MetS.

METHODS

A prospective, longitudinal intervention study was conducted. Mexican subjects between 18 and 60 years of age were recruited. The subjects selected had one or more of the MetS criteria according to the NCEP-ATP-III, in addition to a body mass index (BMI) ≥30 kg/m2 and/or total cholesterol ≥200 mg/dL. The dietary intervention was established following the NCEP-ATP-III recommendations and consisted of 50-55% carbohydrate, 15-25% protein, 25-35% fat and 20-30 g/day fiber. A reduction of 500 kcal was established. The results were analyzed using Student's t statistic or wilcoxon.

RESULTS

A total of 98 subjects were analyzed, 63 (64.3%) women and 35 (35.5%) men, of whom 65 completed the two-month intervention. The main baseline characteristics were abdominal obesity and hypertriglyceridemia. Two months after the dietary intervention, changes were observed mainly in weight ($p<0.001$), BMI ($p<0.001$), waist circumference ($p<0.001$), glucose ($p<0.01$), total cholesterol ($p=0.013$) and LDL cholesterol ($p=0.006$) in both sexes. In women there was only a decrease in weight ($p<0.001$) and BMI ($p<0.001$) and an increase in glucose ($p<0.001$), while in men the decrease was in weight ($p<0.001$), BMI ($p=0.001$) and waist circumference ($p=0.001$).

CONCLUSIONS

The dietary intervention for two months showed a decrease mainly in anthropometric and lipid biomarkers. There is controversy about the optimal diet for MetS patients, however our results indicate that this dietary intervention could be a good option as a primary prevention strategy in subjects with MetS risk factors, since in a short time there was an improvement in some components of MetS.

Diabetes, obesity, metabolic syndrome

P0801

SOCIODEMOGRAPHIC, LIFESTYLE AND CARDIOMETABOLIC DETERMINANTS PREDICT INCREASED GLUCOSE LEVELS IN MEXICAN CHILDREN AND ADOLESCENTS

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BACKGROUND-AIM

Currently, hyperglycemia, defined as levels greater than 100 mg/dL, is a problem in Mexico and the world, which if not prevented can lead to the development of type 2 diabetes mellitus and its cormorbidities, even in the pediatric population. Risk factors include environmental, lifestyle and biological factors. However, it is necessary to deepen the knowledge of which are the risk factors that most influence the development of hyperglycemia in order to generate prevention strategies in the young population. Therefore, the aim of this study was to evaluate the association of different sociodemographic, lifestyle and cardiometabolic determinants with glycemia in Mexican children and adolescents.

METHODS

The study was cross-sectional, recruiting schoolchildren from different municipalities in the state of San Luis Potosí, Mexico. The variables were analyzed with spearman's correlation coefficient, multiple linear regression and bivariate logistic regression in SPSS statistics® 20 software.

RESULTS

A total of 642 schoolchildren aged 6 to 19 years were included, 395 (61.5%) females and 247 (38.5%) males. Systolic and diastolic blood pressure presented the highest positive correlation with glucose levels ($r=0.305$, $p<0.01$ and $r=0.253$, $p<0.01$ respectively). For both sexes, the predictors of glycemia that explained up to 15.6% ($p<0.05$) of the variability of glucose concentrations were: time in front of video games, body mass index, elevated total cholesterol, diastolic blood pressure, inadequate diet, high socioeconomic level and male sex. When subdivided by sex, glycemia was explained by up to 17.3% ($p<0.05$) in men and up to 9.4% ($p<0.05$) in women; the determinants were the same for men, except total cholesterol and inadequate diet, whereas in women the determinants were cholesterol levels, diastolic blood pressure and high socioeconomic level.

CONCLUSIONS

In this study, lifestyle, sociodemographic, and cardiometabolic determinants predict glycemia by up to 17% in men and up to 15% in both sexes. Most of these determinants are modifiable risk factors when detected early, so it is important to generate preventive strategies and corrective measures to reduce the high prevalence of type 2 diabetes mellitus and metabolic syndrome from an early age.

Diabetes, obesity, metabolic syndrome

P0802

SOLUBLE PROGRAMMED CELL DEATH LIGAND 1 (SPD-L1) IN OBESE SUBJECTS ASSOCIATION WITH CHRONIC INFLAMMATION AND DEVELOPMENT OF DIABETES

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BACKGROUND-AIM

To analyze the level of sPD-L1 in obese subjects compared with healthy controls and to explore the association of sPD-L1 in the development of obesity with chronic inflammation and diabetes status

METHODS

The levels of sPD-L1 were measured using a flow cytometer and assessed using a bead-based immunoassay method. The hs-CRP levels were measured using the chemiluminescent method to determine the level of inflammation. The HbA1c levels were used to distinguish between obese subjects with and without diabetes. The NGSP-certified High Performance Liquid Chromatography (HPLC) method was used to determine the levels of HbA1c. Materials included human serum, which was used both as a screening test and to measure levels of sPD-L1, hs-CRP, and HbA1c.

RESULTS

In 33 obese subjects without type 2 diabetes mellitus (T2DM), 31 obese subjects with T2DM, and 17 healthy subjects, the levels of sPD-L1 were significantly higher in obese subjects with and without T2DM than in healthy subjects. Although the levels of hs-CRP in obese subjects were significantly higher than in healthy subjects, the levels were maintained below the acute infection cutoff. In both groups of obese subjects, there was a significant positive correlation between the production of sPD-L1 and the elevated hs-CRP and HbA1c levels

CONCLUSIONS

The severity of chronic inflammation and the onset of diabetes disease were associated to the elevated sPD-L1 levels in obese subjects.

Diabetes, obesity, metabolic syndrome

P0803

SALMONELLA INFECTION AMONG THE SUSPECTED ENTERIC FEVER PATIENTS

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BACKGROUND-AIM

Enteric fever is one of the common public health problems in Nepal. The progressive increase in antibiotic resistance among pathogens in developing countries is becoming a critical area of concern globally.

METHODS

. The present study was carried out at Everest Hospital, Kathmandu, Nepal, with an objective to determine the prevalence of enteric fever and to analyze the status of antimicrobial resistance pattern of Salmonella enterica serovar Typhi and Paratyphi isolated from blood specimens. Identification of the isolates was done by standard microbiological techniques and antibiotic susceptibility testing was done by modified Kirby Bauer disc diffusion method following clinical and laboratory standard guidelines (CLSI).

RESULTS

A total of 692 blood samples were collected during April, 2019 to September, 2020..Among them 40(5.8%) samples were found to be culture positive whereas 652 (94.2%) cases were culture negative. Out of 40 isolates, 22 (55%) were S. Typhi and 18 (45%) were S. Paratyphi A and the prevalence was higher in male and in the age group of 11-20 years.. Most effective antibiotics were chloramphenicol and cotrimoxazole.

CONCLUSIONS

Among the 22 S. Typhi isolates, 21 (95.5%) were nalidixic acid resistant (NAR). Out of 18 S. Paratyphi A isolates, 16 (88.9%) were nalidixic acid resistant. Among 21 nalidixic acid resistant (NAR) S. Typhi, only 2 isolates were found to be resistant to ofloxacin and only 11 isolates were found to be sensitive to ciprofloxacin. Similarly, out of 16 isolates of S. Paratyphi A resistant to nalidixic acid, only one of the isolate was found to be resistant for both ofloxacin and ciprofloxacin. It was concluded that higher rate of nalidixic acid resistance as well as emerging resistant pattern to other fluroquinolone antibiotics suggests us to follow correct treatment regimens and good infection control practices.

Diabetes, obesity, metabolic syndrome

P0804

CORRELATION OF SERUM UREA, CREATININE AND URINARY MICROALBUMIN IN TYPE 2 DIABETIC PATIENTS IN WESTERN, NEPAL

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BACKGROUND-AIM

Diabetic Mellitus (DM) is a group of metabolic disorders in which glucose is underused, producing hyperglycemia. Abnormal renal function is represented by an abnormality in serum creatinine, urea, and urinary microalbumin. In diabetic nephropathy, serum urea and creatinine, and urine microalbumins known to be raised with hyperglycemia and usually correlate with severity of kidney damage.
Objective: The objectives of this study are to compare the level and direction of urea, microalbumin, and other study parameters such as creatinine, serum glucose among diabetic and non-diabetics in Butwal, Nepal.

METHODS

This study was a cross-sectional comparative study conducted among the type-2 diabetic and non-diabetic subjects who visited National Path Lab, Butwal, Rupandehi for their routine blood examinations. A total of 100 samples were collected randomly and study parameters were determined by using standard laboratory protocols.

RESULTS

In this study, 40 were diabetic and 60 were non-diabetic. The Mean±SD of serum urea, creatinine and urine microalbumin in this study was 53.50 ± 7.68, 1.71±0.23, and 33.0±8.25 respectively for diabetic patients and 20.60±5.12, 0.73±0.19, and 11.73±4.517 for non-diabetic. There were correlations between serum urea, creatinine and urinary microalbumin between diabetic. (r-value of urea, creatinine and microalbumin were 0.703,0.572 and 0.674 respectively). It is also statistically significant in diabetic and non-diabetic i.e. (p-value<0.001) with serum urea, creatinine, and urinary microalbumin.

CONCLUSIONS

The present study suggests that there were correlations between serum urea, creatinine and microalbumin in diabetic patient and statically insignificant relationship of the degree of albuminuria and creatinine with age.

Diabetes, obesity, metabolic syndrome

P0805

GLYCATED ALBUMIN FOR GLYCEMIC CONTROL IN INDIVIDUALS WITH DIABETES: AN ITALIAN MULTI-DIMENSIONAL ANALYSIS

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BACKGROUND-AIM

Glycated haemoglobin (HbA1c) is traditionally used to monitor the glycemic control in type 2 diabetes mellitus (T2DM). Glycated albumin (GA) has emerged as an innovative glycaemic marker, differing from HbA1c because its values are not affected by changes in erythrocyte lifespan nor influenced by interfering conditions.
This research activity aims at defining the impacts of GA introduction, as an add-on marker to the traditional glycaemic monitoring systems, within insulin naïve T2DM individuals, treated with oral therapies, and T2DM patients with chronic kidney disease (CKD).

METHODS

A Health Technology Assessment was conducted in the two different settings, assuming the Italian NHS perspective. The EUnetHTA Core Model dimensions were explored using: 1) literature evidence, to define efficacy and safety indicators; 2) health economic tools, to study GA economic sustainability; 3) healthcare professionals' perceptions, examining the equity, social and organizational impacts.

RESULTS

Focusing on insulin naïve T2DM individuals, treated with oral therapies, GA introduction could lead to a greater therapeutic success (97% vs 72%), measured as patients not experiencing any therapeutical switch. Within T2DM individuals with concomitant CKD, GA could better identify a worst glycemic control than HbA1c alone (52% vs 19.2%). From an economic perspective, GA would lead to an overall saving in both settings (1% within the insulin naïve T2DM population and 2% within the T2DM individuals with concomitant CKD), being the solution presenting a better trade-off between costs sustained and efficacy achieved.
According to experts' opinions (based on an evaluation scale ranging from -3 to +3), lower perceptions on GA emerged on equity aspects ($p>0.05$), whereas it would improve both individuals and caregivers' quality of life ($p=0.000$). From an organizational perspective, despite marginal investments are required for training courses and equipment updates, GA would lead to an overall improvement in the patients' care ($p>0.05$).

CONCLUSIONS

In conclusions, results demonstrated the strategic relevance of adding GA to traditional glycemic control instruments, in the optimization of T2DM patients glycaemic monitoring, leading to clinical, economic, and organizational advantages.

Diabetes, obesity, metabolic syndrome

P0806

UNC - AN EARLY MARKER FOR KIDNEY INJURY IN PATIENTS WITH TYPE II DIABETES MELLITUS

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BACKGROUND-AIM

Neutrophil gelatinase-associated lipocalin (NGAL) is one of the most promising tubular biomarkers in the diagnosis of kidney diseases. The data in the literature determine NGAL as a marker with a good diagnostic profile in the diagnosis of diabetic kidney disease (DKD). NGAL values correlate with progression of albumin excretion and with the severity of renal impairment.
The aim of the study to determine the diagnostic reliability of urine NGAL/Creatinine ratio (UNC) as a marker for DKD in patients with diabetes mellitus II (DM II).

METHODS

The study included 92 patients with DM II, who were divided according to urine Albumin/Creatinine ratio (ACR) in three subgroups - A1 - 46% (ACR <3 g/mol), A2 - 31% (ACR – 3-30 g/mol) and A3 - 23% (ACR >30 g/mol). NGAL was measured in a first morning urine using particle-enhanced turbidimetric immunoassay (BioPorto).

RESULTS

The study group consisted of 92 patients with DM II (51 women and 41 men), the middle age was 58.28±14.69 years. The median and interquartile range of UNC in the three subgroups of patients were: A1–2.52 (1.83-4.32), A2–7.86 (4.11-16.46) and A3–10.94 (7.63-33.26) μg/mmol. A statistically significant difference in UNC concentration was found between all subgroups of patients ($p<0.05$). In each subgroup, UNC values were higher in females compared to males, but the difference was significant only in subgroup A1 ($p<0.001$). The ROC analysis demonstrated good diagnostic effectiveness of UNC in differentiating patients with DKD (A1 vs A2/A3) with AUC-ROC in females – 0.845 and in males – 0.904. The sex-differentiated cut-off values for UNC in women was 6.87 (sensitivity and specificity – 75% and 86%) and in men was 3.72 μg/mmol (sensitivity and specificity - 88% and 95%). A positive correlation was found between UNC and ACR ($p<0.001$).

CONCLUSIONS

The UNC may be used as an early marker for the kidney damage in DM II. More studies are needed to confirm our results and to detect the underlying mechanism of the tubular injury in diabetic patients.

Diabetes, obesity, metabolic syndrome

P0807

LIRAGLUTIDE IMPROVES CARDIOMETABOLIC PARAMETERS IN OBESE PATIENTS WITH TYPE 2 DIABETES: A REAL-WORLD 18-MONTH PROSPECTIVE STUDY.

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BACKGROUND-AIM

The glucagon-like peptide-1 agonist (GLP1-RA) liraglutide is currently approved for the treatment of both obesity and type 2 diabetes (T2DM). We investigated whether the effect of this agent on cardiometabolic parameters in patients with T2DM varied in relation to the concomitant presence of obesity.

METHODS

One hundred thirty-five subjects (78 men and 57 women; age: 62 ± 10 years) naïve to incretin-based therapies were treated with low-dose liraglutide (1.2 mg/day) as an add-on to metformin for 18 months. Patients were divided into two subgroups based on their body-mass index (BMI): (a) obese (BMI $\geq$ 30) and (b) non-obese (BMI < 30). Clinical and laboratory analyses were assessed at baseline and every 6 months.

RESULTS

During follow-up, significant improvements were detected in both groups in fasting glycemia, glycated hemoglobin, waist circumference, and carotid intima-media thickness (cIMT), while body weight, BMI, total cholesterol, and low-density lipoprotein cholesterol decreased significantly in obese subjects only. Correlation analysis revealed that changes in subclinical atherosclerosis (assessed by cIMT) were associated with changes in triglycerides ($r = 0.488$, $p < 0.0001$) in the obese group only.

CONCLUSIONS

Liraglutide had beneficial effects on glycemic parameters and cardiometabolic risk factors in both non-obese and obese patients with T2DM, with a greater efficacy in the latter. These findings reinforce the benefits of liraglutide for the cardiometabolic outcomes of obese patients with T2DM in the real-world setting. This is of critical importance during the current pandemic, since patients with diabetes and obesity are exposed globally to the most severe forms of COVID-19, related complications, and death.

Diabetes, obesity, metabolic syndrome

P0808

SERUM VITAMIN D STATUS IS ASSOCIATED WITH INSULIN RESISTANCE AND DYSLIPIDEMIA IN GESTATIONAL DIABETES MELLITUS

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BACKGROUND-AIM

Gestational diabetes mellitus (GDM), a pregnancy complication, is any degree of glucose intolerance with onset or first recognition during pregnancy. Vitamin D deficiency and insufficiency has recently been recognized as a contributing factor to the pathogenesis of GDM, this link might be associated with hyperglycemia, insulin resistance, and dyslipedemia, which are implicated in GDM. Objectives: This study aim at investigating the relationship between vitamin D, fasting plasma glucose (FPG), insulin,ferritin and serum lipids (total cholesterol, TC; triglycerides, TG; low density lipoprotein cholesterol, LDL-C and high density lipoprotein cholesterol, HDL-C) in GDM

METHODS

A case-control study in which 120 women attending the antenatal clinic of University College Hospital (UCH), Ibadan, Nigeria, were recruited; the women were grouped into controls (60 nondiabetic pregnant women) and cases (60 pregnant women with GDM). Blood samples were taken at the second trimester, and metabolites were quantified by standard laboratory methods. Student's t test and Pearson correlation were used to compare and determine the relationship between variables respectively.

RESULTS

Serum levels of vitamin D and HDL were significantly lower ($p < 0.05$) in GDM group when compared to the control group (26.6±8.7 Vs 35.3±9.5ng/ml, 36.90±4.4 vs 61.34±2.9 mg/dl). There was a significant increase in the serum levels of FPG, insulin and ferritin (152.15±28.6 Vs 93.2±15.4 mg/dl, 30.41±13.8 Vs 16.39±7.7pmol/l, 40.57±14.4 Vs 26.62±8.5ng/ml respectively) in GDM group when compared to control. Also, TG, TC and LDL levels were significantly increased ($p <0.05$) in the GDM group compared to the control group.(230.3±11.43 Vs 77.81±8.3, 386.29±18.5 vs 156.36±5.3, 244.69±17.7 vs 59.64±3.85 mg/dl respectively).Vitamin D was inversely correlated with FPG, serum insulin, ferritin and LDL ($r = -0.33, -0.41, -0.20, -0.55$ respectively, $p < 0.05$),while there was no significant relationship ($p > 0.05$) between vitamin D, HDL, TG and TC in the GDM group.

CONCLUSIONS

This study suggests that low levels of serum Vitamin D might be associated with glucose intolerance, insulin insensitivity, and dyslipidemia, which are factors implicated in the development of GDM.

Diabetes, obesity, metabolic syndrome

P0809

RELATIONSHIP BETWEEN SELECTED IRON STATUS INDICES, BILIRUBIN AND BODY COMPOSITION IN NORMAL WEIGHT AND OVERWEIGHT SUBJECTS – A PRELIMINARY STUDY

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BACKGROUND-AIM

Recent studies indicate the association of endocrine activity of adipose tissue with iron metabolism disorders and decreased levels of bilirubin. The aim of this study was to evaluate the relationship between iron status indices (iron, ferritin, transferrin and hepcidin), total bilirubin and body composition in normoglycemic normal wieght and overweight individuals.

METHODS

The study included 70 healthy subjects (35 women, 35men) aged 25-40, with normal fasting glucose. Subjects were divided by body mass index (BMI) values: normal weight BMI 18.5-24.9 kg/m^2 and overweight 25.0-29.9 kg/m^2. In all subjects serum iron, ferritin, hepcidin, transferrin, total bilirubin concentrations, BMI and waist-to-hip ratio(WHR) were measured. Percentage of water, muscle and fat tissue content was evaluated using bioelectrical impedance analysis (BIA).

RESULTS

Significantly lower concentrations of ferritin, hepcidin, total bilirubin and lower values of WHR and muscle content were observed in women, compared to men. Overweight subjects had significantly lower concentrations of iron ($p=0.02$), total bilirubin ($p<0.001$), lower water and muscle content ($p=0.02$), compared to normal weight group. A moderate negative correlation was noted between BMI and bilirubin concentration, water and muscle content. Significant strong correlation was observed between hepcidin and ferritin concentrations ($R=0.85$; $p<0.001$) in overweight subjects, as well as moderate negative correlation of hepcidin and transferrin. In subsequent tertiles of total bilirubin concentrations a significantly lower transferrin, fat tissue and higher muscle content were found in the whole group. Abdominal obesity and high percentage of fat tissue were more frequent in subjects with lower iron concentration (<84 mg/dL). A significant increase in WHR and ferritin concentration was observed with increasing hepcidin concentration. In women abdominal obesity was 2-times more frequent in the third (>28.8 ng/mL) compared with the first (<13.1 ng/mL) hepcidin tertile.

CONCLUSIONS

Concentrations of iron, transferrin and total bilirubin are significantly lower in overweight subjects, while ferritin and hepcidin are significantly higher. This indicates the potential prooxidative activity associated with excessive adipose tissue.

Diabetes, obesity, metabolic syndrome

P0810

CORRELATION OF HEMOGLOBIN A1C AND PARAMETERS OF LIPID STATUS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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BACKGROUND-AIM

Diabetes mellitus type 2 is one of the leading non-communicable diseases worldwide. Patients with type 2 diabetes (T2DM) have an increased prevalence of dyslipidemia, which contributes to their high risk of cardiovascular diseases (CVDs).
The aim of this work was to determine the relationship between hemoglobin A1c (HbA1c), fasting glucose levels (FBG) and serum lipid parameters and to evaluate the importance of HbA1c as an indicator of dyslipidemia in patients with T2DM

METHODS

A total of 337 patients with T2DM (men 157; women 180) were included in this study. The whole blood and sera were analyzed for fasting blood sugar (FBG), HbA1c, total cholesterol (TC), triglycerides (TGs), high-density lipoprotein cholesterol (HDL-C) and low-density lipoprotein cholesterol (LDL-C) in the period from January to July 2022. Dyslipidemia was defined according to the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) guidelines. Diabetes was defined as per International Diabetes Federation (IDF) criteria. The correlation of HbA1c, FBG with lipid parameters were analyzed. The statistical analysis was done by SPSS statistical package version 24.0.

RESULTS

The mean age ± standard deviation of male and female patients were 64.56 ± 9.22 and 67.66 ± 8.89 years respectively. The results of this work show that the values of HbA1c, TC, TG and HDL-C were higher in women, while the values of FBG and LDL-C were higher in men. Lipid status parameters in relation to glycemic status show a significant statistical difference in hypercholesterolemia ($p=0.004$) and elevated LDL values ($p=0.002$). The correlation between HbA1c, FBG, TC and LDL-C was statistically significant (FBG $r=0.721$; TC $r=0.379$ and LDL-C $r=0.378$, $p< 0.05$), while the correlation between HbA1c and HDL-C was negative but statistically significant (HDL-$r= -0.662$, $p<0.05$). The TG correlation was moderately positive but also statistically significant (LD-C $r=0.224$, $p<0.05$).

CONCLUSIONS

There is a significant correlation between HbA1c and lipid status parameters, especially with TC and LDL-C. Based on results, we concluded that HbA1c can also be used as a predictor of dyslipidemia.
Key words: correlation, type 2 diabetes mellitus, HbA1c, lipid status parameters, dyslipidemia.

Diabetes, obesity, metabolic syndrome

P0811

EVALUATION AND COMPARISON OF HBA1C DETERMINATION METHODS

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BACKGROUND-AIM

Glycosylated haemoglobin (HbA1c) assesses the mean serum glucose concentration over the last 3 months. Its quantification is key in the diagnosis and follow-up of patients with type-II diabetes mellitus and/or pre-diabetes.
There are numerous methods based on different principles for the quantification of
HbA1c. The reference method for its determination is high performance liquid chromatography (HPLC), which allows the separation, detection and quantification of the different haemoglobin fractions.
The aim of this study is to evaluate the concordance of HbA1c measurement obtained on Hb9210 (Menarini) and Tosoh G11 (Horiba) analysers.

METHODS

100 samples of whole blood-EDTA-K3 were analysed in a range of values between 4.9% and 11.6%. The samples were processed in parallel and to minimise pre-analytical error, the analysis was performed on the two machines in a sequential order: first on the Hb-9210 analyser (reference analyser) and then on the Tosoh G8 analyser (analyser under evaluation).
Statistical analysis for method comparison was performed by Passing-Bablok Regression and Bland-Altman difference analysis with the statistical programme MedCalc®. The cut-off point analysis was performed using ROC curves with the SPSS 25.0 statistical software.

RESULTS

Results of the equation of the regression line (Passing-Bablok):
- Slope=0.76 (0.26-0.98).
- Ordinate at the origin= 231.11 (CI95% 52.48- 536.05).
Mean difference results (Bland-Altman): -295.40 (CI95% -356.46- -234.34); p-value 0.0001
Spearman Rank correlation coefficcient 0.395 (CI95% 0.215-0.549).
From the Bland-Altman comparison we observe that both measurements are far away from the 0 value and it is even observed that the results with horiba are much higher than those of Menarini.
As for the Passing-Bablock, the slope and the and the ordinate at the origin show that both methods are not concordant and present both constant and proportional differences.
In addition, the Spearman coefficient was 0.395, far from 1.

CONCLUSIONS

We conclude that the results by the two methods are completely different, so it is not possible to ensure the transferability of the results between the two instruments.

Diabetes, obesity, metabolic syndrome

P0812

ADIPOCYTE FATTY ACID-BINDING PROTEIN AND ADIPONECTIN LEVELS IN WOMAN WITH EARLY DIAGNOSED GESTATIONAL DIABETES (GDM)

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BACKGROUND-AIM

Adipocyte fatty acid-binding protein (A-FABP) and Adiponectin are adipocytokines (adipose tissue hormones) with important metabolic effects. A-FABP increases lipolysis and insulin resistance, reduces contractility of cardiomyocytes, supports chronic inflammation and formation of atherosclerotic plaques. Adiponectin improves insulin resistance, his levels are decreased in obesity, type 2 diabetes, and patients with coronary artery disease.
It is suspected that disruption of the endocrine function of adipose tissue and the associated change in the expression of these adipokines may lead to the development of hyperglycemia in woman with GDM.
Early detection of GDM allows timely intervention, improve adverse metabolic profiles and prevent adverse pregnancy outcomes.

METHODS

23 pregnant women with early diagnosed GDM, 29 pregnant women without GDM, and 25 non-pregnant healthy controls. Early GDM was diagnosed based on repeated fasting plasma glucose levels ≥ 5,1 mmol/l and < 7 mmol/l during the first trimester of pregnancy and exclusion 1 or 2 type diabetes. Adiponectin was determinated with immunochemistry kit Human Adiponectin ELISA (BioVendor, Czech Republic). Levels of A-FABP were assessed using Human Adipocyte AFABP4 ELISA kit (BioVendor, Czech Republic). Early therapeutic intervention was introduced for women with GDM already during their first visit (in the first trimester).

RESULTS

Levels of adiponectin were significantly descreased and levels of A-FABP were significantly elevated in woman with GDM compared to both pregnant woman without GDM and non-pregnant healthy controls. Both adipokines were associated with markers of visceral adiposity and glucose control. The introduction of early therapeutic intervention was associated with the shifting of circulating concentrations of these adipokines to levels comparable with those in healthy pregnant woman.

CONCLUSIONS

Women with GDM showed altered adipokine production already in the first trimester of pregnancy. These findings support the importance of GDM screening in the early stages of pregnancy and the possible role of endocrine dysfunction of adipose tissue in the development of gestational diabetes.
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Diabetes, obesity, metabolic syndrome

P0813

GLYCATED HAEMOGLOBIN A1C FOR GESTATIONAL DIABETES MELLITUS SCREENING DURING THE CORONAVIRUS PANDEMIC

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BACKGROUND-AIM

During the coronavirus (COVID-19) pandemic it was necessary to implement alternative protocols for the screening of gestational diabetes mellitus (GDM).
Some medical societies proposed guidance where they recommended the measurement of glycated haemoglobin (HbA1c) during the first trimester for the screening of GDM.
The aim of the study is to evaluate the utility of HbA1c for GDM screening and compare it with the current protocol.

METHODS

Pregnant women who had results of HbA1c in the first trimester of pregnancy between 2020 and 2021 were retrospectively included in the study. Data from the current screening algorithm for the second trimester were also collected: non-fasting 50 g glucose challenge test (GCT); if the test was abnormal (≥7.8mmol/L), a subsequent 3 hours 100 g oral glucose tolerance test (OGTT) was performed. The diagnostic criteria for diagnosing GDM were according to the Carpenter-Coustan which was considered the gold standard.
Mean and SD were calculated for HbA1c. The diagnostic accuracy of cut off proposed by the scientific societies (HbA1c≥5.9%) was calculated. A receiver operating characteristic (ROC) curve was plotted to evaluate the utility of HbA1c test in the diagnosis of GDM: Area Under Curve (AUC), and diagnostically specificity (Sp) and sensibility (Se). Cut-off points were calculated to screen GDM.
Glucose concentration was measured on plasma (NaF) using Cobas8000 c702 analyser (Roche-Diagnostics®). HbA1c levels were measured in blood (EDTAK3) through HPLC-ADAMS® HA-8180v (Menarini®).

RESULTS

A total of 747 pregnant women were recruited with HbA1c result. Out of these, 125 were also screened following the gold standard protocol and 13 pregnant women (10.4%) had GDM. The mean HbA1c level was 5.33±0.46%. There were no higher results than the cut-off value (HbA1c≥5.9%) therefore Se=0% and Sp=100%).
The AUC was 0.6683 (0.4837-0.8529). A new HbA1c cut-off value was calculated, and ≥4.8% was the optimal threshold for the screening of GDM (Se:100%; Sp:3.57%).

CONCLUSIONS

Following medical societies cut off value, there were 13 pregnant women (10.4%) with GDM underdiagnosed by HbA1c. We propose a screening of GDM with HbA1c<4.8% (Se:100%). OGTT should be performed on those patients who present an HbA1c≥4.8%.

Diabetes, obesity, metabolic syndrome

P0814

AMINO ACIDS PROFILE IN RELATION TO BIOCHEMISTRY INDICATORS IN OBESE PREPUBERTAL CHILDREN

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BACKGROUND-AIM

Branched chain amino acids (BCAAs) and aromatic amino acids (AAAs) are accepted as closely related to metabolic risk. On the other hand, in arterial hypertension, metabolic syndrome, endothelial dysfunction, inflammation and non-alcoholic fatty liver disease (NAFLD), conditions frequently seen in obese patients, many biochemical indicators are increased. However, it is not known if changes of amino acids profile parallel with chemerin, hCRP, interleukin-6 (IL-6), as well as simple biochemistry measurement in obese prepubertal children.

METHODS

The study included 20 obese children (M/F 12/8; mean age 7.7±2.3 years; BMI 26.8±5.0 kg/m^2) and 12 non-obese children (control group) (M/F 4/8; mean age 6.5±2.2 years; BMI 14.8±1.5 kg/m^2). Free plasma amino acids (AAs) were measured by the LC-MS/MS (Agilent Technologies, Jasem). The following plasma AAs were measured: aspartic acid, glutamic acid, serine, asparagine, glycine, glutamine, taurine, histidine, citrulline, threonine, alanine, arginine, proline, tyrosine, methionine, valine, isoleucine, leucine, phenylalanine, tryptophan, ornithine and lysine. Chemerin, hsCRP, IL-6 and basic biochemistry were measured.

RESULTS

The mean plasma levels of leucine, isoleucine, valine, phenylalanine, tyrosine, glutamic acid, alanine were significantly higher in obese children than in the control group ($p<0.03$ – $p<0.0004$). Conversely, the mean values of serine, asparagine, glutamine, citrulline were significantly lower in obese children than in the controls ($p<0.03$–$p<0.0007$). Isoleucine, leucine, valine (BCAAs) and tyrosine, phenylalanine (AAAs) levels showed a positive correlation with uric acid, ALT, hsCRP, and chemerin ($r=0.80$ – 0.36; $p<0.05$ - $p<0.00001$), but not with IL-6. The mean value of glucose, IL-6, hsCRP, chemerin, uric acid, ALT were significantly higher in obese children than in the control group ($p<0.03$ – $p<0.00002$), whereas lipids profile did not differ between groups.

CONCLUSIONS

Differences in amino acids profile in obese children together with high ALT activity and increased uric acid level might indicate disturbances of metabolic syndrome as well as NAFLD, even before pubertal onset.

Diabetes, obesity, metabolic syndrome

P0815

INVERSE CORRELATION BETWEEN FECAL PROPIONATE AND SERUM ADMA IN TYPE 2 DIABETIC PATIENTS

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BACKGROUND-AIM

Type 2 diabetes mellitus (T2DM) is a worldwide issue with an increasing prevalence. Human metabolism is influenced by the gut microbiota. Asymmetric dimethylarginine (ADMA) is a competitive inhibitor of nitric oxide synthase, and elevated ADMA levels are associated with vascular disease in people with diabetes. Short-chain fatty acids (SCFAs) has been reported to protect endothelial function and thus exert anti-atherosclerotic action, however, the correlation of SCFAs and ADMA in diabetic patients is unknown yet. The study aimed to determine the correlation SCFAs and ADMA.

METHODS

The study design was an observational study with cross sectional approach. Subjects were 115 men (25 control and 90 T2DM patients), aged 30-50 years old, and fulfilled inclusion criteria. Serum ADMA was quantified by Liquid Chromatography–mass spectrometry (LCMS/MS). Fecal SCFAs were quantified by Gas Chromatography-MS (GCMS/MS).

RESULTS

Lower concentration of fecal SCFAs was found in subject with T2DM compared to control (Acetate 7.99±2.91 vs 9.35±2,45; p= 0.019; butyrate 2.82±1.95 vs 3.34±0.94, p=0.028; propionate 3.51±1.92 vs 4.71±1.68, p= 0.001; total SCFAs 15.87±6.04 vs 18.31±4.15, p=0.029). The serum ADMA concentration was higher in T2DM patients compared to control (71.27 ± 10.75 ng/ml; 67.48 ± 7.71; p=<0.05). Fecal SCFAs inversely correlate with HbA1C (acetate r=-0.234, p=0.012; butyrate r=-0.226, p=0.015; propionate r=-0.267, p=0.004; total SCFAs r= -0.207, p=0.027). Further analysis with SCFAs data showed only propionate inversely correlated with ADMA (r=-0.502 and p=0.000) while other SCFAs were not correlated with serum ADMA (acetate r=-0.125, p=0.184; butirate r=-0.128, p=0.173; valerate r=0.036, p=0.704).

CONCLUSIONS

Fecal Propionate is inversely correlated with serum HbA1C and Serum ADMA in Type 2 Diabetic Patient

Diabetes, obesity, metabolic syndrome

P0816

A FULLY AUTOMATED HBA1C ASSAY ON THE DXC 500 AU CLINICAL CHEMISTRY ANALYSER

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BACKGROUND-AIM

HbA1c is the major species of glycohemoglobin in human blood. HbA1c formation occurs through a non-enzymatic reaction, called glycation, which occurs between glucose and the n-terminal valine of the hemoglobin β-chain of HbA. A Schiff base intermediate product is formed, which rearranges to form a stable ketoamine in an irreversible reaction. The rate of glycation is proportional to the glucose concentration in the bloodstream and is an accurate reflection of average blood glucose over a period of eight to twelve weeks. HbA1c testing is recommended for the diagnosis of diabetes by the International Expert Committee (IEC), the American Diabetes Association (ADA), and the WHO, who recommended a diagnostic threshold of ≥6.5% (≥48 mmoL/moL) HbA1c and a range for pre-diabetes of 5.7%-6.4% (39–46 mmoL/moL) HbA1c.

METHODS

The HbA1c Advanced assay on the DxC 500 AU* utilizes automatic sample pre-treatment, has batch and random access capability. No manual pre-treatment of the whole blood sample or additional washing steps are required. Firstly the red blood cells are hemolyzed automatically, total hemoglobin and glycated hemoglobin are then measured colorimetrically and immunoturbidimetrically respectively.

RESULTS

Precision studies were conducted according to CLSI EP15-A3. Commercial controls and four native K2 EDTA whole blood samples ranging from 5.1% to 12.0% HbA1c, were run twice daily, over twenty days using three lots of reagent on three DxC500AU Clinical Chemistry analyzers at a single site. Repeatability ranged from 0.86 to 1.44% CV and Total Precision ranged from 1.55 to 2.43% CV. Method comparison and bias estimation was evaluated using CLSI EP09-A3. Patient samples (n=150) across the analytical range were run versus a Secondary Reference method and yielded a slope of 1.031, intercept -0.147% HbA1c, correlation coefficient R=0.997 for Weighted Deming regression.

CONCLUSIONS

The HbA1c Advanced assay on the DxC 500 AU is a precise and accurate assay, requiring no manual pretreatment and can be used for monitoring and diagnosing diabetes.

Diabetes, obesity, metabolic syndrome

P0817

DETERMINATION OF URINARY MAGNESIUM IN TYPE 2 DIABETICS

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BACKGROUND-AIM

Magnesium (Mg)' deficiency is generally associated with endocrine and metabolic disorders, especially with type 2 diabetes. There is a close correlation between metabolic control of diabetes and Mg homeostasis. The objective of our work was to assess Mg status in type 2 diabetics.

METHODS

This is a descriptive prospective study involving 40 patients with type 2 diabetes whose Mg status was assessed by measuring 24-hour magnesemia and magnesuria. The determination of blood and urinary magnesium was done by a colorimetric technique by the Cobas 6000 automaton (Roche®).

RESULTS

Our study included 25 women (62%) and 15 men (37%) with a sex ratio of 0.6. 59.1 ± 8.32 years with extremes of [42-76]. The average duration of diabetes progression was 12.5 ± 11 years with extremes ranging from 5 months to 35 years. The average HbA1c was 10.15%. The mean magnesemia was 0.77 mmol/L and the mean 24-hour magnesuria was 3.7 ± 2.6 mmol/24 h. Blood Mg deficiency was present in 66.6% of cases while urinary Mg deficiency was present in 72%. Mg deficiency was correlated with poor glycemic control (p = 0.019).

CONCLUSIONS

Hypomagnesemia was linked to poor metabolic control of type 2 diabetes resulting mainly from increased urinary loss stimulated by high blood sugar levels.

Diabetes, obesity, metabolic syndrome

P0818

HYPONATREMIA CAUSED BY TREATMENT OF DIABETES INSIPIDUS. ABOUT A CASE

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BACKGROUND-AIM

Diabetes insipidus (DI) is a disease caused by a deficiency of Antidiuretic Hormone (ADH)/Vasopressin (Central DI) or by resistance to its action (Nephrogenic DI). ADH is synthesized in the supraoptic and paraventricular nuclei of the hypothalamus and stored in the form of secretory granules in the pituitary gland.
ADH secretion is pulsatile and follows a circadian rhythm, the fundamental regulation of which is mediated by the increase in osmolality and the decrease in plasma volumen. It main function is due to V2 receptors located in the collecting duct of the nephron, increasing the reabsorption of water, obtaining a more concentrated urine with less volume.
In both Central DI and Nephrogenic DI, ADH malfunction will lead to the appearance of prominent polyuria and polydipsia.

METHODS

Monitoring a 72-year-old patient with multiple pathologies diagnosed with diabetes insipidus and myelodysplastic syndrome recently, following a treatment with azaticidine. He was transferred to the ER because of deterioration, instability, sweating and low blood pressure.

RESULTS

The pacient is undergone to laboratory tests with a complete blood count and biochemical parameters, whose values are inside of reference margin, with the exception of the remarkable pancytopenia and level of sodium of 115 mEq/L, being notified to the requesting service as a critical value.
Treatment with desmopressin for diabetes insipidus was withdrawn, furosemide was administered, and sodium concentration was corrected to stabilize the patient.
The evolution of his biochemical parameters is successful, showed level of sodium around 119 mEq/L, 124 mEq/L and 134 mEq/L consecutively.

CONCLUSIONS

Given the complexity of polypathological patients with various pharmacological treatments, it is essential to carry out exhaustive follow-up to avoid adverse reactions to the different drugs and subsequent complications. For this reason, it is necessary to make the analytical determinations according to the pathology and the treatment administered. In this case, determinations of electrolytes provided information about the patient's clinical status and made it possible to contact those responsible for the patient, so he could be stabilized.

Diabetes, obesity, metabolic syndrome

P0819

GLYCATED ALBUMIN AND GLYCATED HEMOGLOBIN ASSAY IN THE DIABETIC POPULATION AND PREGNANT WOMEN OF SALENTO IN ITALY: CORRELATIONS, ACCURACY AND REFERENCE VALUES.

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BACKGROUND-AIM

According to the American Diabetes Association (ADA) guidelines (2021), diabetes may be diagnosed basing on plasma glucose criteria (Fasting Plasma Glucose [FPG] and 2h-plasma glucose during Oral Glucose Tolerance Test [OGTT]) or glycated haemoglobin (HbA1c) criteria. HbA1c represents an average of blood sugar levels over the last 8-12 weeks so it can be considered as a long-term glycemic indicator. The method used to assess this value is accurate, easy, and reproducible but sometimes it has not a good sensitivity. Furthermore, several biological/environmental factors and interferents could affect results. Glycated albumin (GA) measurement reflects the mean blood glucose levels over the past 2-3 weeks. Therefore, it could be considered as a medium-term glycemic indicator, allowing to verify patient's glycemic compensation in the initial phases of diabetes and in all those situations that require short-term monitoring of changes in glycaemia.

METHODS

In this study, we verified the analytical performances of sensitivity and specificity of the GA test on healthy and diabetic subjects, divided according to the clinical history and the results obtained from the HbA1c test. We compared the results of GA with those of HbA1c in different groups of patients: diabetic subjects, subjects with impaired fasting glucose and pregnant women during OGTT. A correlation study between the levels of GA and HbA1c in each cohort was performed using the Pearson’s correlation coefficient. Finally, using a receiver operating characteristic curve (ROC curve), we established the ideal cut-off value associated with the best sensitivity (76%) and specificity (73.7%) for the tested population.

RESULTS

Comparative studies show a strong correlation between GA and HbA1c both in diabetic and at risk subjects. In these same groups there is a moderate correlation when we compare GA and HbA1c with glycaemia. There is a weak correlation of GA in healthy subjects with impaired fasting glucose. In pregnant women during the OGTT, GA has an 80% sensitivity for women with baseline blood glucose values > 93 g/L, while there is poor specificity with blood glucose measured after 120 minutes.

CONCLUSIONS

These results suggest that the reference values for the diagnosis of gestational diabetes should be re-evaluated with new studies.

Diabetes, obesity, metabolic syndrome

P0820

IMPLEMENTATION OF A TWO-STEP CIRCUIT FOR THE DETERMINATION OF GLYCOSYLATED HEMOGLOBIN IN THE PRESENCE OF UNCOMMON VARIANTS.

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BACKGROUND-AIM

It is important to know the presence of hemoglobinopathies in the determination of glycosylated hemoglobin (HbA1c) since they can influence the results with clinical consequences. Various groups of experts affirm that it is advisable for us to report HbA1c values in diabetics with rare hemoglobin variants, proposing fructosamine determination as an alternative, taking into account the drawbacks that this presents. The aim was the Implementation of a two-step circuit for the determination of HbA1c by different methodologies in diabetic patients with infrequent clinically silent hemoglobinopathies.

METHODS

The study is carried out with samples from patients whose HbA1c is routinely determined by ion exchange chromatography (HPLC) G8 (Horiba) who present an unknown peak indicative of a rare hemoglobin variant. They are processed in parallel by the immunochemistry Cobasb101 (Roche) and by the affinity chromatography Premier Hb9210 (Menarini), using the latter as a reference in order to investigate the interchangeability of the results. MedCal is used to perform a Passing-Bablock regression line and the correlation coefficient.

RESULTS

In the Passing Bablok analysis, the regression lines are obtained y=-0.133 + 1.0833x; y=-2.7813+1.3750x, in the concordance analysis, the Correlation coefficient was obtained r= 0.9703 and r= 0.4663 for Cobas b101 vs Premier Hb9120 and HPLC G8 vs Premier Hb9210 respectively.
The HbA1c results obtained by the Point of Care device are interchangeable with affinity chromatography.

CONCLUSIONS

A two-step circuit is proposed in laboratories where the number of rare hemoglobin variants is a factor to consider. The first step is to process the samples by the HPLC healthcare method, which has the great advantage of detecting these rare variants, not going unnoticed and reporting the presence of clinically silent hemoglobinopathy, but of methodological importance. In a second step, processing the samples by the Point of Care team previously evaluated by each laboratory, and issue the HbA1c results, being results of analytical quality to be able to carry out any medical action.

Diabetes, obesity, metabolic syndrome

P0821

AN EXPLORATORY STUDY TO ASSESS THE RELATIONSHIP BETWEEN MARKERS OF IRON METABOLISM AND HYPERGLYCAEMIA AMONGST WOMEN IN CAPE TOWN, SOUTH AFRICA

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BACKGROUND-AIM

In 2021, it was estimated that 573 million people globally were diagnosed with diabetes mellitus (DM). Amongst predictors of DM, the micronutrient, iron, is closely associated with the development of type 2 DM. However, limited evidence has been presented on various markers of iron metabolism(MIM) besides ferritin (FER), which is regulated differently and may function via separate mechanisms. This study aims to explore the relationship between MIM and hyperglycaemia amongst mixed-ancestry women in Cape Town, South Africa.

METHODS

A total of 264 women were selected as part of this study. Trained research staff collected clinical and biochemical measurements for various test including a 75g oral glucose tolerance test, anthropometric measurements and MIM.

RESULTS

Of the women, 100 were pre-menopausal and 164 were menopausal. Hyperglycaemia was higher amongst menopausal women compared to pre-menopausal women ($p<0.001$). Waist circumference, body mass index, FER, RDW, MCV, HbA1c, and creatinine levels were significantly higher in menopausal women ($p\leq0.011$). However, pre-menopausal women displayed higher levels of transferrin, total iron binding capacity and platelet count, respectively (all $p\leq0.031$). Serum iron (Fe) and transferrin saturation were the only two iron parameters significantly correlated to HbA1c in menopausal women ($p=0.004$). Furthermore, logistic regression analysis amongst menopausal women demonstrated that Fe was the sole variable significantly associated with hyperglycaemia ($p=0.028$), while premenopausal females had no significant association with MIM (all $p\geq0.220$).

CONCLUSIONS

Menopausal women displayed higher levels of FER, but lower levels of Fe, which may indicate iron overload. As such, this study requires further investigation to understand the link between MIM and hyperglycaemia, and the possible role it plays in the development of DM. To our knowledge, this study is the first to be conducted in a mixed-ancestry population and may serve as a foundation for future studies in South Africa.

Diabetes, obesity, metabolic syndrome

P0822

INDIRECT PANCREATIC FUNCTION TEST- UTILITY OF FECAL PANCREATIC ELASTASE FOR DIAGNOSIS OF EXOCRINE PANCREATIC INSUFFICIENCY IN CHILDREN.

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BACKGROUND-AIM

Testing of pancreatic function is a valuable tool in the assessment, diagnosis, overall management, and prognosis of pancreatic disease. The “gold standard,” the direct pancreatic stimulation test is not widely used in clinical practice because of its complexity, cost, and invasiveness particularly in Paediatric population. Human pancreatic elastase 1 (FPE) has been suggested as an alternative fecal test of exocrine pancreatic insufficiency (EPI). This study was done to evaluate the frequency of EPI in Pakistani children based on FPE values at a clinical laboratory in Pakistan.

METHODS

This cross-sectional study was performed at the section of Chemical Pathology, Aga Khan University Karachi from 2018 to 2021. A data mining of FPE results of age birth to 16 years was done from the laboratory information system. Duplicates were removed and only the first sample per patient was included, comprising of both inpatient and outpatients. FPE was analyzed using an enzyme-linked immunosorbent assay (Immundiagnostik AG, Germany). Levels > 200 μg/ml are considered normal value, 100 - 200 μg/ml as slight to moderate EPI and < 100 μg/ml suggestive of severe EPI respectively. Data was analyzed using SPSS version 19.

RESULTS

A total of 3324 FPE results were performed during the study period. After application of exclusion criteria, a total of 551 were included in the final analysis. There were 334 (60.6 %) males and 217 (39.4%) females. The median age was 206 (IQR0-730) days. The mean FPE levels were 167 (IQR 120-249) ug/ml. Slight to moderate and severe EPI was found in 85 (15.4%%) and 276 (50.1%) respectively.

CONCLUSIONS

A high frequency of EPI in children from a single center is alarming. There is need to advocate the utility of indirect pancreatic function tests for optimal screening and better health outcomes.

Diabetes, obesity, metabolic syndrome

P0823

THE RELATIONSHIP OF NOCTURNAL MELATONIN WITH IMPAIRED FASTING GLUCOSE

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BACKGROUND-AIM

According to modern understanding, disorders of the hypothalamic-pituitary axis are important for the development of metabolic syndrome (MS). The study aimed to examine and compare serum concentrations of melatonin, cortisol, and growth hormone (GH) in women with and without impaired fasting glucose (IFG).

METHODS

The study included 30 women with IFG and 30 women without IFG. For melatonin and GH determinations, blood samples were taken at 03:00 AM and 08:00 AM, and for cortisol at 08:00 AM and 11:00 PM. Serum melatonin (Elabscience Biotechnology Inc, China) and GH levels (IBL-Hamburg, Germany) were analyzed using Sirio S microplate reader (SEAC, Italy). Cortisol levels were analyzed with Access, Beckman Coulter, USA. Concentrations of glucose, total cholesterol, triglycerides, HDL-cholesterol (Olympys AU 480, Beckman Coulter, USA), and insulin levels (Access, Beckman Coulter, USA) were analyzed from venous blood taken at 08:00 AM. Anthropometric measurements included body mass index (BMI), waist circumference, and HOMA index. The independent sample t-test and Mann-Whitney test were used ($P<0.05$).

RESULTS

There was no significant difference in the mean age of the women with and without IFG (34.63±2.39 years' vs 28.62±2.46 years, $P>0.05$). Patients with IFG had a significantly higher waist than those without IFG (101.00±3.00 cm vs. 77.73±4.64 cm, $P=0.007$) and a higher BMI (31.82±1.59 kg/m2 vs. 24.49±1.90 kg/m2, $P=0.004$). Total cholesterol, triglycerides, and LDL-cholesterol were significantly higher in women with IFG ($P<0.01$).
The mean melatonin was lower in women with IFG compared to women without IFG at 03:00 AM (132.74±10.01 pg/ml vs. 210.85±41.81pg/ml, $P=0.013$). Serum melatonin levels did not differ significantly between the two groups at 08:00 AM (178.57±21.48 pg/ml vs. 169.04±35.83 pg/ml, $P=0.915$). Serum cortisol at 08:00 AM and 11:00 PM and GH at 03:00 AM and 08:00 AM don't differentiate between the two studied groups ($P=0.547$ and $P=0.782$; $P=0.308$, $P=0.810$ respectively).

CONCLUSIONS

Women with elevated fasting glycemia have decreased nocturnal melatonin levels. Further research is imperative to establish the role of impaired nocturnal melatonin secretion in elevated morning glycemia.
The work was financially supported by MU Plovdiv; project NO-10/2018

Diabetes, obesity, metabolic syndrome

P0824

MELATONIN, LEPTIN AND GHRELIN VALUES DEPEND ON BMI IN WOMEN WITH METABOLIC SYNDROME

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BACKGROUND-AIM

The aim of the study was to analyze and compare the serum concentration of melatonin, leptin, and ghrelin in women with BMI ≥ 26 kg/m2 and BMI ≤ 26 kg/m2.

METHODS

Women with metabolic syndrome were divided into two groups according to their BMI: with BMI ≥ 26 kg/m2 (n=26) and with BMI ≤ 26 kg/m2 (n=18). Venous blood for determinations of melatonin, leptin, and ghrelin was taken at 03:00 AM and 08:00 AM. These parameters were analyzed using ELISA methods and concentrations were measured with a Sirio S microplate reader (SEAC, Italy). Body Mass Index (BMI) and Homeostatic Model Assessment for Insulin Resistance (HOMA-IR) was calculated. The comparative analysis was performed with an independent sample t-test and Mann-Whitney test. P-value < 0.05 was considered statistically significant.

RESULTS

There was no significant difference in the mean age of the women with BMI ≥ 26 kg/m2 and BMI ≤ 26 kg/m2 (34.31 ± 2.39 years vs. 33.61 ± 3.13 years, P= 0.857). Patients with BMI ≥ 26 kg/m2 had a significantly higher waist circumference than those with BMI ≤ 26 kg/m2 (105.73±3.26 cm vs 79.94±2.78 cm, P=0.0001). In the group of women with BMI ≥ 26 kg/m2, mean serum glucose and HOMA-IR were significantly higher than in the group with BMI ≤ 26 kg/m2 (P<0.05). The other metabolic parameters do not differ significantly between the studied groups (P=0.05). Leptin is statistically significantly higher in women with a BMI ≥ 26.6 kg/m2 at 03:00 AM (17.74± 1.82 vs 5.86 ±1.79 ng/ml, P=0.001) and 08:00 AM (23.92± 4.34 vs 6.82± 1.78, P=0.0001) than those with BMI ≤ 26 kg/m2. Serum melatonin concentration did not differ between the two groups at 03:00 AM (134.63 ± 11.53 pg/ml vs. 180.71 ± 29.35 pg/ml, P = 0.114) and 08:00 AM (169.68 ± 23.32 pg/ml vs. 184.62±125.70 pg/ml, P=0.543). Ghrelin had no statistically significant difference between the two studied groups either at 03:00 AM (0.96± 1.08 ng/ml vs 1.25 ±1.99ng/ml, P=0.233) or at 08:00 AM (1.35± 0.21ng/ml vs 1.56± 0.27ng/ml, P=0.451).

CONCLUSIONS

Women with higher BMI have higher day and night leptin than those with normal BMI. The two groups did not differ in melatonin and ghrelin levels.
The work was financially supported by MU Plovdiv; project NO-10/2018

Diabetes, obesity, metabolic syndrome

P0825

PRECISION STUDY OF QASSAY A NEW MEDICAL DEVICE FOR QUANTITATIVE IN-VITRO ANALYSIS OF HBA1C

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BACKGROUND-AIM

Since glycosylated hemoglobin (HbA1c) was introduced into clinical practice in the 1980s, it has become a vital parameter in analysis and control of diabetes mellitus (DM). Regular monitoring of glycosylated hemoglobin levels in diabetic patients under treatment helps to reduce glucose levels and complications associated with this disease.
Point-of-care (POC) analyzers provide results in just few minutes, thus allowing medical decisions to be made almost immediately. The objective of this study is to assess the precision of QASSAY (P4Q®) device for measuring HbA1c in blood samples.

METHODS

To calculate the precision, two different samples were used, one with normal HbA1c concentration (5.2%) and another with pathological concentration (10.9%). Each sample was measured twice a day for 5 consecutive days with 3 different instruments and by 2 different operators. An ANOVA analysis of variance components for random models (ANOVA VCA) was performed using the software R_Core_Team (4.1.2). For this study we used inmunochromatography stripes of SCREEN IFA ANALYZER SMART (SCREEN) from BIOPANDA®.

RESULTS

A coefficient of variation (CV) of 5.2% was obtained for the normal sample and 2.9% for the pathological sample. Inter-day variability was the greatest imprecision factor being 4.7% and 2.7% respectively, while between instrument imprecision was 1.9% and 0.8%, and residual error was 1.3% and 0.7%. Between operator imprecision was minimal, being <0.01% for both samples.

CONCLUSIONS

These results are similar to those of other POC analyzers that are currently on the market. For example, the A1cNow+ analyzer has a CV <3%; the A1c EZ 2.0 CV= 3.2%; the Afinion AS100 CV <2%, and finally, in2it from Bio-Rad reports a CV of 3.7%. However, the CV described in the SCREEN insert is ≤ 15%, much higher than those obtained in the present study with the QASSAY reader, which happens to be much more accurate than the SCREEN reader.
Furthermore, QASSAY reader results to be a cost-effective option, compared with other POC HbA1c available readers.

Diabetes, obesity, metabolic syndrome

P0826

PERFORMANCE COMPARISON OF DIFFERENT BLOOD COLLECTION TUBES FOR ACCURATE BLOOD GLUCOSE CONCENTRATION MEASUREMENT, AN ONGOING STUDY

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BACKGROUND-AIM

Blood glucose level is a frequently requested parameter. According to American Diabetes Association, the glucose value of a patient after 8 hours of fasting should be more than 126 mg/dL for diagnosis of diabetes. People with values more than the upper range limit but below cut-off for diabetes fall into a zone called prediabetes. For these patients, it is crucial to give correct results. The mechanism that causes most erroneous glucose results is in-vitro glycolysis. Greiner Bio-One claims that its VACUETTE FC Mix Tube can stop glycolysis rapidly, and reliable glucose results are possible even if a tube is waited for 24 hours at room temperature(RT). We aim to compare the performance of the tubes used in our hospital (Vacusera, Disera Inc., Izmir/Türkiye) and VACUETTE FC Mix Tube (Greiner Bio-One GmbH, Austria).

METHODS

We decided to enroll people with prediabetes. In our laboratory, glucose can be measured in tubes with no additives or sodium fluoride. We took 6 extra tubes from each patient (3 with sodium fluoride, 2 FC Mix Tube, 1 without additive) along tubes requested. To compare them, two tubes (one with sodium fluoride and FC Mix Tube) are centrifuged no more than 30 minutes after phlebotomy (as “baseline measurement”), one with sodium fluoride is centrifuged after 8 hours, and the others after 24 hours in RT. Glucose is measured on Siemens Atellica Solution via hexokinase method. All patients filled out consent forms, and study was approved by ethics committee.

RESULTS

Here we are presenting our initial results. We found out significant decrease in the tube without any additive after 24 hours. Tubes with sodium fluoride also showed a decrease after 8 hours (6.50 mg/dL, $p<0.01$) and 24 hours (6.50 mg/dL, $p<0.01$). FC Mix Tube’s performance was the best, 2.14 mg/dL difference ($p=0.002$) on 24 hours. These preliminary results show that FC Mix Tube results are reliable even if the tube stays at RT for a long time.

CONCLUSIONS

Getting the correct glucose results is important for clinicians especially follow up on people with prediabetes. The laboratory director is responsible for minimizing the errors, but they can happen even with our best intentions. The preliminary results of our study show that FC Mix Tube performs better than the tubes we use to measure glucose in our laboratory.

Diabetes, obesity, metabolic syndrome

P0827

ROLE OF INTERLEUKIN - 1α, INTERLEUKIN-6 AND TNF-α IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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BACKGROUND-AIM

Type 2 diabetes mellitus (T2DM) represents a significant global health problem. Inflammation is considered to be a key regulator of the pathogenesis of T2DM, but what triggers this inflammation still unknown. Cytokines act as pleiotropic polypeptides regulating inflammatory and immune responses through actions on pancreatic cells. The classic proinflammatory cytokines like tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6), and IL-1 α, may be a causative factor in the development of diabetes but some studies refute their association.

METHODS

A case - control study was conducted in Department of Biochemistry, VMMC and Safdarjung Hospital, New Delhi. We included 100 patients diagnosed with Type 2 Diabetes Mellitus using ADA (American Diabetes Association) criteria. Their results were compared with a group of 100 age and sex matched healthy controls.
Serum IL-1 α,, IL-6 and TNF-α levels were estimated using ELISA kits.

RESULTS

We found a significant increase in serum IL-1 α levels (p<0.001) in patients with DM (mean±S.D = 10.09.2±3.4 pg/mL) as compared to healthy controls (mean±S.D = 3.2±0.9 pg/mL). Serum IL-6 were significantly increased in patients with DM (p<0.005) (mean±S.D = 27.12±7.4 pg/mL) as compared to healthy controls (mean±S.D = 17.2±5.9 pg/mL). Serum TNF-α levels were significantly increased in patients with DM (p<0.001) (mean±S.D = 49.0±12.5 pg/mL) as compared to healthy controls (mean±S.D = 17.2±5.5 pg/mL).

CONCLUSIONS

We found significantly increased serum IL-1 α, IL-6 and TNF-α levels in patients with DM as compared to controls. Raised IL-1 α leads to extensive β-cell destruction and is an indicator of continuing autoimmune aggression against β cells. Inflammatory cytokines secreted by adipose tissue, such as IL-6 and TNF-α may exert an endocrine effect to promote insulin resistance by interfering with the insulin signalling pathway, leading to the clinical manifestation of T2DM. So we conclude that estimation of IL-1 α, IL-6 and TNF-α can be used as possible marker for early prediction of T2DM in patients with family history.

Diabetes, obesity, metabolic syndrome

P0828

AN ASSESSMENT OF THE CIRCULATING PRO- AND ANTI-ANGIOGENIC MARKERS AS INDICATORS OF ADIPOSE TISSUE DYSFUNCTIONS IN MORBIDLY OBESE INDIVIDUALS UNDERGOING BARIATRIC SURGERY

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BACKGROUND-AIM

Dynamic expansion or reduction of adipose tissue (AT) requires constant remodeling of angiogenesis which is orchestrated by various vascular remodelers, VEGF-A being most potent. Paradoxical high levels of total VEGF-A in obesity has been found to coexist with undermined angiogenesis causing inflammation and metabolic dysfunctions. We aimed at studying a discord in balance of serum total VEGF-A and Adiponectin as pro- and soluble Vascular Endothelial Growth Factor Receptor 1 (sVEGFR1) and Thrombospondin 1 (TSP1) as anti-angiogenic factors in obese, and non-obese individuals and correlated with glycemic and adipokine profiles. Their levels were followed after surgically induced weight loss in morbidly obese individuals.

METHODS

Morbidly obese individuals (BMI ≥ 40 kg/m2; n=30) aged 18-60 years undergoing bariatric surgery and their age matched controls (non-obese; BMI < 25 kg/m2; n=30) were included. Serum VEGF-A, sVEGFR1 and TSP1 in both groups were estimated using ELISA based kit assays while human serum Adiponectin was measured using ProcartaPlexTM Immunoassay. Obese subjects (n=17) were followed up at 6 months post bariatric surgery for these assays at the time of their significant weight loss. Results were analyzed statistically by Student's t-test, and were also correlated with glycemic parameters, HOMA-IR and anthropometric characteristics.

RESULTS

A significant increase in the level of total VEGF-A (p value = 0.004) and soluble anti angiogenic factors, sVEGFR1 and TSP1 (p = 0.0341) were found in obese group as compared to non-obese. Mean Adiponectin level was higher in non-obese(10.17ug/ml) as compared to obese(7.31ug/ml). Post-surgical follow up of obese individuals, showed a gravitation towards decline in these levels. Pre-operative data, shows significant correlation between increased blood glucose levels, HOMA-IR and a higher level of sVEGFR1.

CONCLUSIONS

Our findings provide an insight into the role of balanced angiogenesis and any perturbations in levels of VEGF-A, SVEGFR1, TSP1 and Adiponectin may provide a putative evidence towards unhealthy vascular expansion, thereby explaining much of the adipose tissue dysfunctions and co-morbidities of obesity.

Diabetes, obesity, metabolic syndrome

P0829

COMPARABILITY ASSESSMENT OF TWO METHODS FOR HBA1C MEASUREMENT IN WHOLE BLOOD

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BACKGROUND-AIM

Hemoglobin A1c (HbA1c), a major portion of the glycated hemoglobins, is widely used in the management of diabetes to monitor long-term glycemic control and to assess the risk of developing complications. In the last several years, the American Diabetes Association (ADA) and other major organizations have approved the use of HbA1c determination for diabetes screening and have suggested the value of 6.5% (48 mmol/mol) as a diagnostic cut-off. The aim of this study was to compare the two analytical techniques for determination of Glycated hemoglobin (HbA1c), consisting latex agglutination inhibition assay on DxC 700 AU (Beckman Coulter, USA) and capillary electrophoresis on Minicp Flex-Piercing (SEBIA, UK).

METHODS

Comparability was tested on 100 blood samples in measurement range 4.5 % to 12.5 % on DxC 700 AU (Beckman Coulter,USA) and Minicap Flex-Piercing (SEBIA, UK). We compared 100 patients admitted to the Department for Medical Bochemistry in a four week period in 2022. Whole blood was collected from all patients in EDTA vials. Passing Bablok regression analysis and Bland Altman plot were used to compare results in 100 samples. Statistical analysis was performed using MedCalc for Windows, version 12.4.0.0 (MedCalc Software, Mariakerke, Belgium).

RESULTS

Passing-Bablok regression analysis revealed no significant difference; y=-0.10000(-0.10-0.18) + 1.0000(0.96-1.00). There is no significant deviation from linearity (P=0.25). Bland Altman plot indicates significant constant (mean:–0.07300, 95%CI: -0.1095 to -0.03646) and proportional bias (mean:-1.0350, 95%CI:-1.6018 to -0.4683) but according to the American Diabetes Association (ADA) recommendation (CV<2%) this is not clinically significant.

CONCLUSIONS

HbA1c latex agglutination inhibition assay on DxC 700 AU (Beckman Coulter, USA) and capillary electrophoresis on Minicp Flex Piercing (SEBIA, UK) are comparable. There is no significant difference between them and they can be used interchangebly.

Diabetes, obesity, metabolic syndrome

P0830

CORRELATION BETWEEN BIOCHEMICAL PARAMETERS AND DIABETIC KETOACIDOSIS SEVERITY IN PATIENTS WITH TYPE 1 AND TYPE 2 DIABETES

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BACKGROUND-AIM

Ketoacidosis is a frequent and life-threatening complication of diabetes mellitus, with a mortality rate of approximative 1%. An important risk factor associated with the mortality of diabetic ketoacidosis patients is the decrease in kidney function, or acute kidney injury. Diabetic ketoacidosis (DKA) is characterized by a hyperglycemic state and features acidosis, electrolyte imbalance and volume depletion, the latter being the cause of the decrease in kidney function. This study aims to determine the differences in laboratory findings between type 1 and 2 diabetes, and correlations between initial laboratory findings and severity of ketoacidosis, as well as the decrease in kidney function for DKA patients.

METHODS

This is a retrospective study of type 1 and type 2 diabetes mellitus patients diagnosed with DKA between 01 January 2019 and 31 December 2021 at the County Clinical Emergency Hospital of Oradea, Romania. The severity of ketoacidosis was determined using the classification of the American Diabetic Association. Acidosis markers were measured using an ABL 800 BASIC blood gas analyser, and the biochemical parameters using an Architect c4000 and an Allinity AC03837 chemical analyser. IBM SPSS was used for statistical analyses.

RESULTS

A total of 114 patients who were diagnosed with DKA (mean age 44.87, 46% female, 50% type 1 diabetes) were included in the study. There was no significant difference in the initial laboratory evaluation between type 1 and type 2 diabetes patients. Potassium (K) levels were significantly correlated with the severity of ketoacidosis (p=0.044). K levels were also correlated with serum glucose (r=0.271), pH (r=-0.251), serum bicarbonate (r=-0.19), blood urea (r=0.277), creatinine (r=0.239) and glomerular filtration rate (GFR) (r=-0.279). Chloride (Cl) levels were not correlated with the severity of DKA but showed correlations with pH (r=-0.255), serum bicarbonate (r=-0.287), blood urea (r=-0.273), creatinine (r=-0.425) and GFR (r=0.381). Serum lactate levels were correlated with GFR (r=-0.333) and creatinine (r=0.382) levels.

CONCLUSIONS

The findings suggest that patients should be treated similarly for DKA regardless of the underlying type of diabetes, and that electrolyte imbalances should be considered in the assessment of severity and kidney function of DKA patients.

Diabetes, obesity, metabolic syndrome

P0831

DIAGNOSTIC SIGNIFICANCE OF HEMOSTATIC MARKERS IN PEDIATRIC PATIENTS DIAGNOSED WITH TYPE 1 DIABETES MELLITUS

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BACKGROUND-AIM

Diabetes is considered a prothrombotic condition where hemostatic markers play an active role. Numerous studies point out the importance of these biomarkers in adult population with diabetes, while research data in children with type 1 diabetes are still lacking, undermining their high risk for developing microvascular and macrovascular complications. Our aim was to analyse commonly used hemostatic biomarkers in diabetic children and compare them with healthy controls, as well to analyze the relationship of hemostasis biomarkers with glycemic control.

METHODS

The study included 100 healthy and 100 Bosnian children with type 1 diabetes mellitus, aged 2-18 years. Platelet count, INR, aPTT, fibrinogen, hemoglobin A1c and glucose were tested in all children following standard laboratory procedures. Data analysis was performed with IBM SPSS Statistics, version 23.

RESULTS

Our results point out statistically significant differences in the values of glycemic parameters, glucose and HbA1c, between children with type 1 diabetes mellitus and their healthy peers, at the level of $p < 0.05$, as expected. Statistically significant differences were found in platelet count and hemostasis parameters, INR, and aPTT, at the level of $p < 0.05$. Children with type 1 diabetes have significantly lower values of aPTT and platelets, while significantly higher values of HbA1c, glucose and INR, at the level of $p < 0.05$ when compared to healthy controls. Values of fibrinogen did not show significant difference between the groups, $p=0.139$. The degree of disease regulation according to HbA1c has a significant influence on the values of INR, aPTT, fibrinogen, and the number of platelets. In children with T1DM, HbA1c shows significant positive correlations with fibrinogen, and platelet counts, and significant negative correlations with INR and aPTT.

CONCLUSIONS

Examining pro and inhibitory indicators of coagulation, we observed significant differences between healthy children and children with T1DM. We conclude that hemostasis indices represent affordable, simple and inexpensive laboratory parameters that are very useful in monitoring T1DM in children. Some of these tests can, in addition to HbA1c, serve as a diagnostic and prognostic tool for determining the risk of diabetic microvascular and macrovascular complications.

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METABOLIC SYNDROME AND LITHOGENESIS

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BACKGROUND-AIM

The association between lithogenesis and metabolic syndrome is ever increasing. The objective of our study was to investigate the composition of urinary stones and to analyze the biological promoters and inhibitors of urinary crystallization in patients with metabolic syndrome.

METHODS

Prospective study of 50 lithiasis patients divided into two groups: 25 with metabolic syndrome (G1) and 25 without metabolic syndrome. A morpho-constitutional analysis of the urinary stones was performed as well as the determination of crystallization promoters (blood-urine calcium, phosphorus and uric acid and urinary oxalate) and inhibitors (blood-urine magnesium and urinary citrate).

RESULTS

Analysis of renal stones in G1 showed a predominance of uricodependent stones (40%) followed by oxalodependent (28%) and oxalocalcic stones (16%) in contrast to G2 where oxalocalcic stones were dominant (40%) followed by oxalodependent (24%) and uricodependent stones (8%). A statistically significant difference was present for uricodependent stones in G1 and oxalocalcic stones predominating in G2 ($p = 0.059$). Uric acid was the cause of nucleation in 40.90% of the stones in G1. Regarding the promoters of oxalocalcic and phosphocalcic crystallization, although the means of the different promoters were in the normal range, those of urinary calcium and oxalate, expressed in concentration and flow rate, were found to be higher in the G1. Calciuria interpreted with respect to the crystallization threshold of 3.8 mmol/L was higher in 36% of the G1 and 28% of the G2. As for oxaluria, it was higher than the threshold in 44% in G1 vs.12% in G2. Taking into account urine pH and pH-dependent uric acid crystallization thresholds, the proportion of uricuria above the crystallization threshold was higher in the G1 (32% vs. 12%; $p = 0.088$). For crystallization inhibitors, the means were within the usual ranges with a higher urinary citrate value in the G1 (1.24+-0.84mmmol/L).

CONCLUSIONS

The increase in the promoters of oxalocalcic and uric crystallization observed in patients with metabolic syndrome is secondary to insulin resistance, which increases the fraction of tubular excretion for calcium and leads to a defect in renal ammoniogenesis explaining the lowering of urinary pH and the decrease in the solubility of uric acid.

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OBESITY AND VITAMIN D DEFICIENCY

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BACKGROUND-AIM

The lack of vitamin D is a risk factor for the development of metabolic disorders and cardiovascular diseases. It is thought to be associated with obesity.
The aim was to evaluate the association of vitamin D and anthropometric parameters in overweight and obese subjects.

METHODS

The study included 90 subjects, tested for body weight (BW), body height, waist circumference (WC), hip circumference (HC), body mass index (BMI) and waist to hip ratio (WHR). The subjects were divided into 3 groups: 30 overweight (group I), 30 obese (group II) and 30 healthy age and gender matched subjects with normal body weight (control group). 25(OH)D was measured by chemiluminescent method (CMIA) on automated immunochemistry analyzer, Alinity i, Abbott Dg.

RESULTS

Concentrations of 25(OH)D were statistically significantly lower in groups I and II compared to the controls (39.21±12.51vs.24.0±8.07vs.65.40±15.51;p<0.001;all). There are statistically significant lower values of 25(OH)D in group II than in group I (24,00±8,07 vs. 39,21±12,51;p<0.001). The strong negative association between 25(OH)D and BMI (group I: r =-0.467; p <0.01; group II: r = -0.446; p <0.05) as well as with WC (group I : r =-0.425; p <0.05; group II : r =-0.380; p <0.05) were observed in all study groups.

CONCLUSIONS

The statistically significant negative association between serum 25(OH)D and anthropometric parametes, indicators of obesity could indicate the possible role of obesity in the development of vitamin D deficiency.

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ERYTHROCYTE MEMBRANE LIPIDOME DETERMINANTS AND VISCERAL ADIPOSITY INDEX (VAI) IN CARDIOMETABOLIC RISK ASSESSMENT OF TESTICULAR GERM-CELL TUMOR SURVIVORS

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BACKGROUND-AIM

Testicular cancer is the most common solid malignancy among men aged 15-40 years. Remarkably favorable prognosis coupled with the relatively young age at diagnosis underscores the importance of clinical efforts and research agenda addressing the optimization of survivorship care in this patient population. Exposure to platinum-based chemotherapeutic regimens and potential hypogonadism may be associated with long-term cardiovascular toxicities and an increased risk of metabolic disturbances. This cross-sectional study was conducted with an aim to explore the association between the erythrocyte membrane lipidome determinants and Visceral Adiposity Index (VAI) among testicular germ-cell tumor survivors (TGCTS).

METHODS

Erythrocyte membrane fatty acid (FA) cluster, reflecting the intricate interplay between genetic factors, metabolic homeostasis, and the dietary pattern was determined with gas-liquid chromatography. Surrogate indices of desaturase activities were computed as product-to-precursor FA ratios. VAI was calculated with sex-specific formula integrating anthropometric measures and atherogenic lipoprotein phenotype indices: VAI=(waist circumference (WC)/(39.68+1.88×body mass index (BMI))) × (triglycerides (TG)/1.03) × (1.31/high-density lipoprotein cholesterol (HDL)).

RESULTS

Among study participants (n=92, age x#=35.89±8.67 years), 60.87% were overweight or obese (BMI≥25.0kg/m2) and two-thirds displayed dyslipidemia. VAI correlated directly with stearoyl–CoA desaturase-18 activity, linoleic acid (18:2n-6) and n-6/n-3 ratio (r =0.344, 0.289 and 0.381, all p<0.01). Conversely, an inverse association was found between VAI and delta-5-desaturase activity and total polyunsaturated FA abundance (r=-0.294, -0.317, both p<0.05). Based on Omega-3 index (O3I, % sum of docosahexaenoic acid and eicosapentaenoic acids), VAI was significantly higher in patients allocated in the high cardiovascular risk category, i.e. O3I<4% (p<0.001).

CONCLUSIONS

This is the first study to report on relationship between the red blood cell FA profile and VAI among TGCTS. Although additional research is warranted to elucidate the underlying mechanisms, results suggest that these indices may contribute to enhanced cardiometabolic risk-assessment in this vulnerable group.

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ROLE OF MATRIX-METALLOPROTEINASES AND COL4A IN TYPE 2 DIABETES MELLITUS AND DIABETIC NEPHROPATHY PROGRESSION

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BACKGROUND-AIM

The pathogenesis of Diabetic kidney disease (DKD) involves increased extracellular matrix (ECM) accumulation causing thickening of the glomerular and tubular basement membranes, mesangial expansion, sclerosis, and tubulointerstitial fibrosis. Collagens regulate immune cell activity in pathological conditions by altering the extracellular milieu. The matrix metalloproteases (MMPs) are expressed in the kidney, nephron compartments, vasculature, connective tissue and peripheral blood mononuclear cells. We wanted to investigate the relationship between circulating MMPs (MMP2, MMP7, MMP9) and Collagen in the T2DM without complications, DN and healthy controls.

METHODS

Anthropometric measurements and biochemical tests were carried out from Healthy Control (N=36), T2DM (N=38) and DN (N=35). Fasting venous blood samples were collected for blood glucose, HBA1c estimation. Total RNA was extracted from freshly collected blood samples. RNA was reverse transcribed, and gene expression of MMP2, MMP7, MMP9 and COL4A1 was carried out using GAPDH as an internal control. Bioinformatics analyses was done including protein-protein interaction, gene ontology and co-expression networks of the target genes.

RESULTS

The expression of MMP2, MMP7, MMP9 and COL4A in T2DM, DN and Healthy Controls showed downregulation of MMP2 (HC: 1.00, T2DM: 0.84, DN: 0.71; ($p<0.001$)), MMP7 (T2DM: HC: 1.00, 0.49, DN: 0.53; ($p<0.001$)), MMP9 (HC: 1.00, T2DM: 0.29, DN: 0.62; ($p<0.001$), while COL4A showed significant upregulation (HC: 1.00, T2DM: 1.44, DN: 2.21; ($p<0.001$). Fold Change expression of MMP7 and MMP9 was negatively correlated with HbA1c values. Interactomics analysis revealed that MMP2, MMP7, MMP9 and COL4A were involved in AGE-RAGE signaling pathway in diabetic complications, Leukocyte transendothelial migration, and ECM-receptor interaction.

CONCLUSIONS

The study results show that circulating MMP2, MMP7 and MMP9 are significantly downregulated in T2DM and DN, with greater decrease in DN as compared to T2DM and COL4A was significantly upregulated. A significant negative association of MMPs with HbA1c suggests a progressive decline with loss of glycemic control. And interatomic analysis revealed mechanism involved in development of DN via MMPs, COL4A, which need further in-vivo validation.

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PERFORMANCE OF SEQUENTIAL FIBROSIS-4 INDEX AND ENHANCED LIVER FIBROSIS SCORE TO ESTIMATE ADVANCED LIVER FIBROSIS RELATED TO METABOLIC-ASSOCIATED FATTY LIVER DISEASE COMPARED TO LIVER STIFFNESS MEASUREMENT BY TRANSIENT ELASTOGRAPHY IN TYPE 2 DIABETES

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BACKGROUND-AIM

Prevalence of Metabolic-Associated Fatty Liver Disease (MAFLD) is higher among type-2 diabetic patients (T2D) (55%) and about 20% may develop advanced liver fibrosis (ALF). Current guidelines recommend the use of non-invasive tests for screening in a multistep sequential algorithm before referring patients to a hepatologist.
We aimed to evaluate the diagnostic accuracy of the enhanced liver fibrosis score (ELF) to estimate ALF in T2D patients previously recruited with fibrosis-4 (FIB4) index compared to transient elastography (TE) in a tertiary care hospital.

METHODS

FIB4 was evaluated for T2D patients <80 years attending endocrinology clinic for 8 months (n=1976). 491(25%) were positive (cutoff ≥1.3/≥2,</>65 years respectively). 113 have been studied so far. ELF (Atellica Solution, Siemens) and liver stiffness measurement (LSM) (Fibroscan) were measured. Ultrasound was performed on 109 patients to seek liver nodularity. Area under the receiver operating characteristic (AUC) and diagnosis performance for ELF manufacturer's cutoff of 9.8 and an optimized cutoff with Youden's index were assessed. ALF was considered as LSM≥12kPa (F≥3).

RESULTS

Median age (interquartile range) was 66(13), and body mass index 28.3(6.8). ALF prevalence was 19% based on LSM and liver nodularity was observed in 26.6% of patients. AUC for ELF was 0.86(95% confidence interval 0.8-0.9). For ELF cutoff of 9.8, 46 patients (40.7%) with LSM<12kPa would have been referred to hepatologist and only one was undiagnosed; sensibility, specificity, positive and negative predictive value was 95.2%, 50%, 30%, 98% respectively. At Youden's cutoff of 10.53 only 15 patients with LMS<12kPa would have been referred but 6 undiagnosed;71.4%, 84%, 50% and 93%. Mean ELF(SD) was different between patients <12kPa, 9.86(0.8), and ≥12 kPa, 11.01(0.82) as well as FIB4 median, 2.18(1.37) and 3.3(1.75) respectively (p<0.05). Median LSM and mean ELF among patients with/without nodularity was 15.1(12.4)/5.6(2.2)kPa and 10.8(0.89)/9.86(0.78) respectively (p<0.05).

CONCLUSIONS

Sequential algorithm based on FIB4 and ELF showed an accurate diagnosis performance to estimate ALF in T2D patients with MAFLD compared to LSM. Adjusted cutoffs must be well selected based on the prevalence to balance costs for unnecessary referrals and benefits of early diagnosis.

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COMPARISON OF BIOCHEMICAL PARAMETERS OF CARDIOVASCULAR AND DIABETES RISK IN A CHILDREN COHORT FROM ELOIN (ESTUDIO LONGITUDINAL DE OBESIDAD INFANTIL) AT 9 AND 14 YEARS OLD

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BACKGROUND-AIM

ELOIN is a prospective study promoted by the Epidemiology Service of "Consejería de Sanidad de la Comunidad de Madrid" to evaluate obesity and cardiovascular risk factors in childhood. It includes a cohort of children who are followed from 4 to 14 years of age. Besides periodical measurements of blood pressure and anthropometric data, questionnaires of diet, physical activity, and social environmental data are conducted. Biochemical analyses are performed at 9 and 14 years old.
The aim is to compare the results of a series of biochemical analytes of cardiovascular risk and diabetes in a cohort of children belonging to ELOIN at 9 and 14 years of age.

METHODS

To date, biochemical data have been collected at 14 years of age from 379 children who had previous analysis at 9 years of age, from the total of 2004 children participating in the study. The parameters compared were cholesterol, HDL-cholesterol, triglycerides, HbA1c, and insulin. The children selected were those who at 9 years of age had any of the following results: cholesterol > 200 mg/dL, HDL-cholesterol < 40 mg/dL, triglycerides > 150 mg/dL, HbA1c > 5.6 % (prediabetes status) and insulin > 15 µU/mL.

RESULTS

From the 35 children who had cholesterol > 200 mg/dL at 9 years of age, only 8 maintained figures above 200 at 14 years of age, a reduction of 77%. From the 13 with cholesterol-HDL < 40 mg/dL at age 9, only 8 maintained those figures at age 14 (38% reduction). Only 2 children had triglycerides > 150 mg/dL at 9 years, but none maintained hypertriglyceridemia at 14 years. 25 children had HbA1c > 5.6 % at 9 years, but only 4 at 14 years (84 % reduction). 27 children had insulin > 15 µU/mL at 9 years, which only 11 maintained (59 % reduction).

CONCLUSIONS

The results obtained to date indicate a clear improvement in the biochemical parameters related to cardiovascular risk and diabetes in children aged 14 years compared to those presented by the same children at 9 years of age. Apart from other factors that may be related to pubertal changes, it seems evident that early intervention campaigns (physical exercise, changes in diet, and lifestyle) are effective in preventing the aforementioned risk factors from passing into adulthood.

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EVALUATION OF PANCREATIC ISLETS AUTOANTIBODIES IN PATIENTS WITH DIABETES MELLITUS: THIS IS OUR REALITY.

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BACKGROUND-AIM

Pancreatic islets autoantibodies (iAb) are the keystone of autoimmunity in Type 1 Diabetes Mellitus (T1DM), an autoimmune disorder caused by pancreatic β-cell destruction, which results in complete insulin deficiency. T1DM iAbs recognize five specific types: Glutamic Acid Decarboxylase (GAD), Insulinoma-Associated-2/Tyrosine Phosphatase (IA2), Insulin (IAA), Islet Cell Cytoplasmic (ICA) and Zinc Transporter-8 Autoantibodies (ZnT8A). They are also today the only biomarkers that can distinguish Latent Autoimmune Diabetes in Adults (LADA) from phenotypically Type 2 Diabetes. The purpose of this study is to highlights the prevalence of T1DM iAbs in the patient population attending our center from July 2021 to nowadays.

METHODS

2223 serum specimens from 1901 unique patients were collected and analyzed for routine testing at the Department of Laboratory Medicine, AOU delle Marche. 709 samples were from 542 pediatric patients (< 20 years old). Sera were processed on the automated MAGLUMI™ 2000 Plus CLIA platform with the GAD65, IAA, ICA, IA2 assays (Snibe). Data were statistically analyzed to calculate the prevalence and the 95% CI of each iAb in specific subgroups of patients.

RESULTS

1123 samples were tested for one iAb, 310 for two, 141 for three and 649 samples, 537 from pediatric patients, for the entire panel of four iAbs. GAD was dosed in 2071 samples. In adults GAD was the most prevalent iAb 0.10 (0.084-0.117), IAA and ICA had similar prevalence of 0.102 (0.068-0.146) and 0.108 (0.076-0.147), and IA2 was the less represented 0.038 (0.020-0.065). GAD was the most prevalent iAb also in pediatric patients 0.276 (0.242-0.311) followed by ICA 0.230 (0.198-0.265), iAA 0.226 (0.194-0.261) and IA2 0.202 (0.170-0.236). In new-onset T1DM patients GAD showed again the highest prevalence of 0.268 (0.230-0.309) respect to the other iAbs (p= 0.038).

CONCLUSIONS

Our data show the differences for iAbs testing in adult and pediatric patients in our setting. The majority of pediatric patients (98%) were tested for the entire panel. GAD was the most frequently tested and even prevalent iAb in all patients. As expected, all the iAbs had a higher rate of positivity in pediatric patients. In the next future we are completing the panel with Zn-T8.

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THE EFFECT OF MELATONIN SUPPLEMENTATION ON SERUM TNF-α AND OXIDATIVE STRESS PARAMETERS IN THE MODEL OF TYPE 2 DIABETES MELLITUS

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BACKGROUND-AIM

Hyperglycemia-induced oxidative stress is a major contributor to the development of diabetic complications. Excessive formation of reactive oxygen species (ROS) has been linked to endothelial dysfunction and inflammation in obesity and diabetes. ROS can directly modify macromolecules and impair their function. Moreover, ROS can stimulate the production of proinflammatory cytokines, such as tumor necrosis factor-alpha (TNF-α). Endothelial dysfunction in diabetes is, at least in part caused by an increase in serum concentration of TNF-α due to the effect on the vascular permeability and vascular tonus. Melatonin is an indole-derived hormone produced and secreted by the pineal gland in vertebrates and is involved in circadian rhythm regulation. Additionally, melatonin modulates several physiological functions, such as glycemia control, inflammation, and anti-oxidative status. The study aimed to evaluate the effect of melatonin on the serum concentration of TNF-α and oxidative stress biomarkers in a rat model of type 2 diabetes mellitus.

METHODS

Diabetes mellitus was induced using streptozotocin (45 mg/kg, i.p.) and nicotinamide (110 mg/kg, i.p.). Melatonin was administered orally in drinking water (2 μg/ml; 0.2 mg/kg) for two weeks.

RESULTS

Melatonin supplementation led to a reduction in the serum concentration of TNF-alpha ($p<0.01$). In addition, melatonin treatment led to the lowering of oxidative stress biomarkers, thiobarbituric acid reactive substances, TBARS ($p<0.01$), and advanced oxidation protein products, AOPP ($p<0.01$). Furthermore, there was a positive correlation between fasting glycemia and TNF-alpha, TBARS, and AOPP.

CONCLUSIONS

Melatonin reduces circulating TNF-α and oxidative stress parameters and might be beneficial in the prevention of endothelial dysfunction in type 2 diabetes mellitus.

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CORRELATION BETWEEN DIABETES AND RISK OF DEVELOPING CIRRHOSIS. DOES THE FIB-4 RISE IN DIABETIC PATIENTS?

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BACKGROUND-AIM

Hepatic steatosis, obesity and insulin resistance act as cofactors to cause liver damage. Liver cirrhosis is largely associated with diabetes mellitus (DM), their coexistence is related to a worse prognosis and greater complications of both entities. Non-invasive serum indices are currently available for fibrosis risk stratification, such as the FIB-4 index (FIB-4=Age(years)×AST(U/L)/[PLT(10^9/L)×$ALT^{1/2}$ (U/L)]).
Assessment of the association between diabetes and risk of developing cirrhosis by measuring hemoglobin glycosylated (HbA1c) and the calculation of the FIB-4 test.

METHODS

Retrospective study from September to December 2022, which enrolled 5023 primary care samples, which included results of AST, ALT, platelets and HbA1c. AST and ALT determinations were performed by cobas c702 (Roche Diagnostic), platelets by flow cytometry (XN-10 Sysmex); and the HbA1c by High Performance Liquid Chromatography (HPLC). (D-100 BioRad). Classification as diabetics with HbA1c >6.5 and non-diabetics <6.5, according to the ADA (American Diabetes Association) criteria. We used the Mann-Whitney U test for statistical analysis (spss).

RESULTS

39.26% were diabetics (males 53%; females 47%). Age Median(p25-p75) diabetic patients: 68 years (59-76). FIB-4 median (p25-p75) were for diabetics (1,39 [0,88-2,62]) and not diabetic (1,16 [0,58-2-12]). Using U de Mann-Whitney analyzes was observed statistically significantly different median FIB-4 score between categories ($p<0.0001$).

CONCLUSIONS

Spite of, FIB-4 score has Worse negative predictive value in diabetic population (between 11% to 20% of diabetic people with advanced fibrosis showed FIB4 < 1.30), our study shows Diabetic patients are at higher risk of developing fibrosis (FIB-4 1,39 vs 1,16)
It would be interesting to expand the necessary tests for the calculation of FIB-4 index in those patients who have high values of glycosylated hemoglobin in order to detect possible cirrhosis early.

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THE EFFECTS OF SHORT-TERM HIGH-FAT AND HIGH-FAT/HIGH-SUGAR DIETS ON METABOLIC AND SPERM PARAMETERS OF SEXUALLY MATURE RATS

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BACKGROUND-AIM

A body of evidence suggests that male obesity adversely impacts sperm quality. Diet-induced obesity in animal models is a valuable tool for studying the conflicting data about the effects of excess adiposity on male fertility. The aim of this study was to evaluate the influence of short-term high-fat (HF) and high-fat/high-sugar (HFHS) diets on the morphometric, metabolic, and sperm parameters in male rats.

METHODS

A total of 30 sexually mature white wild-type male rats weighing 250-300g were randomized into 3 groups (n=10 in each): control group (CG) with a standard diet, HF diet group, and HFHS group. The feeding duration was 7 weeks. Based on morphometric body measurements, the Lee index, testicular and visceral fat coefficients were calculated. Blood was collected before the start of the experiment from the tail vessels, and at day 50 (after euthanasia). The plasma leptin concentration was assessed by ELISA; the lipid panel by spectrophotometry. Sperm suspension was prepared from cauda epididymis. Sperm count and motility were rated with a hemocytometer, vitality was assessed with propidium iodide staining using a fluorescent microscope Olympus IX73.

RESULTS

The HFHS feeding during 7 weeks caused an increase of the visceral fat index – by 40% ($p<0.05$). No changes in Lee index and gonadosomatic index were found in groups ($p>0.05$). Total cholesterol in the HF group increased by 24.5% ($p=0.035$), in the HFHS group – by 29.8% ($p=0.035$); the atherogenic coefficient was higher by 1.8–2.1 times ($p<0.05$); and the low-density lipoprotein fraction increased by 2.1 times ($p=0.025$). The mean leptin concentration before diets did not differ between the groups and amounted 0.4–0.44 ng/ml ($p=0.05$); a slight increase of leptin levels was observed after 7 weeks of feeding: in the HFD by 9.0%, in the HFHS – by 14% from the initial data ($p<0.05$). The sperm motility worsened: by 13% lowered in the HF group, by 18% – in the HFHS group vs CG ($p<0.05$). There were no changes in total sperm number and viability ($p>0.05$).

CONCLUSIONS

The study results showed that only HFHS diet after 7 weeks caused a significant increase in body visceral fat. In the HFHS group, dyslipidemia and worsened sperm motility were more substantial than in HF group, confirming the more effective application of HFHS diet for modeling adiposity in rats.

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VITROS® A1C SLIDES ENZYMATIC METHOD ON DRY MICROSLIDE FORMAT TO DETERMINE DIRECT HEMOGLOBIN A1C CONCENTRATION WITHOUT TOTAL HEMOGLOBIN MEASUREMENT

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BACKGROUND-AIM

Since the Diabetes Control and Complications Trial in 1993, hemoglobin A1c (A1c) measurement has long been a calculation of separate glycated hemoglobin (gHb) and total hemoglobin (tHb) components after the reaction has fully completed. Thus, this method is dependent on the amount of tHb. A simplified direct measurement using a single channel is desired. The Vitros Chemistry Products A1c Slides* now applies a direct A1c measurement method to a dry MicroSlide that does not require the measurement of tHb.

METHODS

Undiluted whole blood is lysed and denatured in the proprietary spreading layer. A protease cleaves the Hb to form the substrate. It is then reacted with a specific oxidase to produce H_2O_2 that oxidizes a leuco dye and results in a colorimetric signal. This unique MicroSlide structure follows the Michaelis-Menten enzyme kinetics model where only a fraction of the gHb is measured causing a pseudo first order reaction dependent on protease and not tHb concentration. To evaluate independence of A1c measurement, multiple reagent lots were formulated with high and low TX-100 surfactant and protease concentrations and were tested with a series of Hb and patient samples.

RESULTS

To demonstrate tHb independence, Hb levels were altered by adding or removing plasma to 12 individual patient samples. Patient bias with the Hb series ranging from 10.8 – 20.7 g/dL showed no substantial interference from the Hb concentration as expected. The regression for bias to unaltered patient versus hemoglobin concentration yielded a slope = 0.001 and an intercept = -0.0125.
To demonstrate protease dependence, the Vitros A1c Slides 2x2 factorial (TX-100 and protease) resulted in the reaction rate independent of the TX-100 concentration but increased with higher protease concentration. When a patient hemolysate series from ~ 7-23 g/dL hemoglobin was assessed with increased protease concentrations, the reaction rate increased by the same amount for the entire hemoglobin series.

CONCLUSIONS

A1c can be measured directly without a separate tHb measurement because the unique structure of Vitros A1c Slides controls the reaction kinetics.
*Product availability subject to regulatory approval.

Diabetes, obesity, metabolic syndrome

P0843

ASSOCIATION BETWEEN RS11605924, RS11708067, RS340874 AND RS560887 SINGLE NUCLEOTIDE POLYMORPHISMS AND CARDIOMETABOLIC DISEASES IN A MIXED ANCESTRY SOUTH AFRICAN POPULATION

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BACKGROUND-AIM

The prevalence of cardiometabolic diseases (CMDs) is increasing at an alarming rate in Africa. However, while single nucleotide polymorphisms (SNPs) have been extensively investigated and found to be associated with CMDs, such an association has yet to be demonstrated in the African population. Therefore, we investigated the association between SNPs of cryptochrome 2 (rs11605924), Adenylate cyclase 5 (rs11708067), PROX1 (rs340874), and glucose-6-phosphatase catalytic subunit 2 (rs560887) and CMDs in a south African people.

METHODS

This cross-sectional study included 1969 men and women recruited amongst the mixed ancestry population of Bellville South in South Africa. SNP genotyping was performed by real time polymerase chain reaction and Hardy Weinberg equilibrium (HWE) was performed on the SNPs investigated. CMDs were compared across the genotypes of the SNP in HWE. Linear and logistic regressions adjusting for age, gender and body mass index were used to assess the risk of CMDs across the genotypes.

RESULTS

All SNPs investigated were in HWE (rs11605924, p = 0.80; rs11708067, p = 0.21; rs340874, p = 0.18 and rs560887, p = 0.79). The recessive CC genotype of rs11605924 was negatively associated with HOMA-IR (p = 0.028) and positively associated with triglyceride (TG) > 1.5 mmol/L (p = 0.046) while the recessive CC genotype of rs340874 SNP was positively associated with LDL cholesterol (p = 0.025) and total cholesterol (TC) > 5.0mmol/L (p = 0.012). Moreover, rs11605924 was able to predict triglycerides in linear (β = -0.204, p = 0.029) and logistic regression (OR = 0.63, p = 0.017) while rs340874 SNP was able to predict TC (β = -0.315, p = 0.006) and LDL cholesterol (β = -0.346, p < 0.001) in linear regression and TC in logistic regression (OR = 0.54, p = 0.007).

CONCLUSIONS

In this population, the SNPs investigated constitute poor markers for CMDs risk assessment given their moderate association with HOMA-IR and TG for rs11605924, LDL cholesterol and total cholesterol for rs340874 and no associations for rs11708067 and rs560887.

Diabetes, obesity, metabolic syndrome

P0844

EFFECT OF DIET SUPPLEMENTED WITH OMEGA 3 ON BODY COMPOSITION, BIOCHEMICAL AND IMMUNOLOGICAL PARAMETERS IN ADULTS WITH OBESITY

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BACKGROUND-AIM

Obesity is a multifactorial disease that affects 36% of Mexican adults, it is characterized by excessive accumulation of adipose tissue in the body, mainly in the abdominal region, caused primarily by energy imbalance when energy consumption is greater than needed. Moreover, obesity triggers metabolic alterations related to the development of non-communicable chronic diseases. Objective: To evaluate the effect of a diet supplemented with omega 3 on body composition, biochemical and immunological parameters in adults with obesity.

METHODS

Randomized double-blind clinical trial for 8 weeks with a hypocaloric plan plus daily supplementation with 1.8 g of omega 3 vs 1.6 g of alpha-linolenic acid. Biochemical parameters were determined by dry chemistry (Vitros 350), body composition by electrical bioimpedance (InBody 570), the IL-6 determination was performed by ProQuantum assay, RvD1 a by ELISA assay (Cayman Chemical). The ANOVA comparative analysis of repeated measures, Wilcoxon and Mann–Whitney U tests were done in SPSS software v25.

RESULTS

Thirty nine subjects with a mean age of 39.5±9.8 years were included, 20 with omega 3 and 19 with placebo intervention. Statistically significant intra-group changes were found throughout the intervention for the omega 3 group: weight -3.9% (p=0.001), body fat -7% (p=0.003), BMI -3.85% (p= 0.001), waist circumference -4.89% (p=0.001), triglycerides -21.32% (p=0.003) and for placebo group: weight -2.14% (p=0.038), body fat -7.31% (p=0.030), BMI -1.39 % (p=0.049), waist circumference -3.31% (p= 0.001), and triglycerides -10.9% (p=0.019). However, when comparing the two intervention groups, there were no differences. Regarding immunological variables; IL-6 was 57.4% (p=0.044) lower in the omega 3 group vs placebo and RvD1 was 39.4% (p=0.048) higher in the omega 3 group vs placebo at the end of the intervention.

CONCLUSIONS

The hypocaloric diet was related with lower body fat, weight, BMI, waist circumference and serum triglycerides, while omega 3 supplementation had a greater effect than placebo with respect to immunological variables decreasing systemic concentrations of IL-6 and increasing RvD1 inter and intra groups.

Diabetes, obesity, metabolic syndrome

P0845

THE IMPACT OF THE TRACEABILITY CHANGE WITH NEW STANDARDIZATION OF C-PEPTIDE ON HOMA INDEX PARAMETERS – β-CELL FUNCTION AND INSULIN RESISTANCE IN TYPE 2 DIABETIC PATIENTS

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BACKGROUND-AIM

Siemens Atellica C-peptide assay has recently undergone a change in traceability against the WHO International Standard (IS 13/146). This assay modification led to a significant positive shift in C-peptide concentration by 29%.
The aim of this study was to evaluate the impact of the traceability change on the homeostatic model assessment (HOMA) estimates of β-cell function (% B) and insulin resistance index (IRI) derived from C-peptide in type 2 diabetic patients.

METHODS

A total of 126 serum samples was collected from fasting patients with type 2 diabetes for glucose (hexokinase, Beckman Coulter, USA) and C-peptide (chemiluminescence, Atellica IM 1600, Siemens Healthineers, USA) determination. To provide C-peptide results traceable to the new and previous standards, a regression equation derived from an initial verification and comparison study carried out in our laboratory was used. Using the HOMA2 calculator (https://www.dtu.ox.ac.uk/homacalculator/), %B and IRI were determined for each glucose and C-peptide pair. Bland-Altman analysis was used to assess %B and IRI difference depending on the C-peptide concentration, and kappa and chi-square test for testing differences in categorizing insulin-sensitive from insulin-resistant cases.

RESULTS

In comparison to previous standardization, C-peptide traceable to the WHO IS 13/146 yielded a significantly higher %B (23,5%) and IRI (31,4%), respectively. Kappa analysis of IRI at an arbitrary cut-off of 1,4 showed a moderate agreement (0,59) between the two C-peptide-traceability-dependent IRI estimates. The chi-squared test revealed a significantly higher frequency of insulin-resistant cases with new C-peptide-traceability IRI estimates when compared to previous standardization ($P < 0,0001$; 68% vs. 48%, respectively).

CONCLUSIONS

While the traceability change caused a linear shift in serum C-peptide concentration, the new standardization of the assay also resulted in significant and more complex changes of C-peptide-derived HOMA estimates which need to be recognized in patient management.

Diabetes, obesity, metabolic syndrome

P0846

PROTHYMOSIN-ALPHA, A POTENTIAL NEW INFLAMMATORY BIOMARKER ASSOCIATED WITH OBESITY

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BACKGROUND-AIM

Obesity is a global health problem that increases the risk for metabolic and cardiovascular diseases. Adipose tissue hypoxia in obesity is a trigger for fat cell dysfunction, which can lead to changes in the release of cytokines and adipokines. Recently, we have reported that one of the proteins that is upregulated in the secretome of hypoxic vs normoxic 3T3-L1 adipocytes is prothymosin-alpha (PTMA), a protein initially isolated in the thymus, which has multifaceted functions, including the immunomodulatory effects. In the present study, we aimed to assess serum PTMA levels in obese vs lean patients and attempted to establish a correlation with inflammatory and metabolic parameters.

METHODS

Obese patients (BMI > 30 kg/m^2) and lean controls (BMI < 25 kg/m^2), aged 18-55 y, were recruited at the Endocrinology Unit, University of Catanzaro, Italy. Exclusion criteria were: inflammatory states, erythrocyte sedimentation rate (ESR) > 30 mm/h, leukocytosis, metabolic syndrome or type 2 diabetes, hepatic or renal failure, cancer, drug treatments, smoking and alcohol. Besides routine analysis, patients' sera were stored at –80 °C for subsequent determination of PTMA (MyBioSource), and the multiparametric panel "Cytokine array I" (Randox Labs). Statistical comparisons and correlation analysis were performed using SPSS 20.0 (IBM Statistics).

RESULTS

In age-matched obese patients (30 females and 10 males) and lean controls (4 females and 6 males), no statistically significant differences were shown in relation to fasting glucose, insulin, total cholesterol, HDL-cholesterol, triglycerides, liver enzymes, as well as circulating interleukins (IL)-1α, -1ß, -2, -4, -6, -8, -10, TNFα, MCP-1, EGF and VEGF. Instead, significant higher mean levels were observed in obese patients vs controls for HbA1c ($p = 0.012$), ESR ($p = 0.05$) and PTMA (769.19 ± 364.59 vs 419.94 ± 199.17 pg/mL, $p < 0.0001$). PTMA was found to be significantly and positively correlated with fasting insulin ($p = 0.037$, $r = 0.302$), ESR ($p = 0.039$, $r = 0.355$), as well as with IL-6 ($p < 0.0001$, $r = 0.649$), IL-8 ($p = 0.011$, $r = 0.465$), TNFα ($p = 0.007$, $r = 0.489$, VEGF ($p = 0.041$, $r = 0.382$) and EGF ($p = 0.015$, $r = 0.446$) (Spearman's analysis).

CONCLUSIONS

These findings indicate PTMA as a potential new biomarker of inflammation in obesity.

Diabetes, obesity, metabolic syndrome

P0847

PERFORMANCE EVALUATION OF THE NEW CHEMILUMINESCENCE ASSAY FOR GLUCOSE HOMEOSTASIS AND PANCREATIC FUNCTION

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BACKGROUND-AIM

Diabetes is a chronic disease spread to over 442 million people worldwide and has been steadily increasing in recent years. It is defined by a hyperglycemic status and is clinically divided into type 1 diabetes (T1D) and type 2 diabetes (T2D). However, the division between T1D and T2D is not so sharply defined; thus, laboratory tests play a crucial role in the diagnosis. Snibe (Snibe Diagnostics, China) suggests new tests for the evaluation of glucose homeostasis biomarkers and diabetes diagnosis: Insulin, Insulinoma-associated antibodies (IA2), C-peptide, Anti-GAD-65 antibodies. The aim of the study is to evaluate the performance of the new chemiluminescence (CLIA) tests for insulin, C peptide, IA-2, and AntiGAD-65 in comparison with the routine tests present in the laboratory, Abbott Alinity Ci-series (CLIA), and Dynex snx Medizym (ELISA).

METHODS

Leftover samples from the clinical routine were collected and analyzed by Maglumi 600 (Snibe Diagnostics, China). 50 sera were collected for insulin assay; 33 sera for C-peptide assay; 30 sera for IA-2 assay and 30 sera for anti-GAD-65 30 assay. Statistical analyses were processed.

RESULTS

The comparison analysis performed has reported a good agreement for the new tests, showing great Spearman rank correlation coefficients: insulin R2: 0,8445, IA-2 R2: 0,6987, C-Peptide R2: 0,8862, Anti GAD-65 R2: 0,635. The Bland-Altman analysis showed a mean bias of 2,26 (upper limit of 7,83; lower limit of -3,30) for Insulin; the mean bias of -0,05 (upper limit of 3,39: lower limit of -3,50) for C-peptide, the mean bias of -1,61 (upper limit of 1,30: lower limit of -4,52) for IA-2; the mean bias of -3,5 (upper limit of -0,08; lower limit of -6,91) for anti-GAD-65. Receiver operating characteristic (ROC) curves were also examined to evaluate the sensitivity and specificity.

CONCLUSIONS

The new tests revealed an optimal correlation for insulin and C-Peptide with routine laboratory tests, while IA-2 and anti-GAD-65 achieved just a good correlation rate, due to the comparison of different methods (CLIA vs ELISA). Overall, the SNIBE tests have shown good performance, being easy to use, low cost, and fast processing times, merging the need for clinicians to increase the biomarkers that would lead to a correct diagnosis of diabetes types.

Diabetes, obesity, metabolic syndrome

P0848

GLUCOSE-6-PHOSPHATE DEHYDROGENASE (G6PD) STATUS IN TYPE 2 DIABETES MELLITUS

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BACKGROUND-AIM

Type 2 diabetes (T2D) is a chronic metabolic disorder characterized by a persistent hyperglycemia. One of the most feared complications of diabetes is oxidative stress. In this context, several studies have reported the association of T2D with glucose-6-phosphate dehydrogenase (G6PD) deficiency.
This enzymatic disease is characterized by its clinical heterogeneity ranging from being asymptomatic to presenting severe hemolytic crisis when triggered by oxidative stress.
This study was conducted to determine the prevalence of G6PD deficiency in a T2D population and to evaluate the interest of the Fasting Glycemia/HbA1c ratio to suspect a possible G6PD deficiency in TD2 patients.

METHODS

A total of 60 patients with T2D and 53 healthy subjects were included in this study. Laboratory evaluations included fasting glucose (FG) levels, HbA1c levels, complete blood count, and erythrocyte G6PD activity. The G6PD activity was determined using a quantitative assay. The common G6PD mutations were determined using the amplification refractory mutation system method. Statistics were carried out using the R software.

RESULTS

The prevalence of G6PD deficiency in the study population was 28.33% and 4% for the diabetics and non-diabetics respectively. The results showed that the G6PD deficiency was significantly associated with T2D as compared to the non-diabetics ($p<0.005$).
A negative association was found between G6PD activity and the FG/HbA1c ratio in DT2 patients. In addition, DT2 patients with G6PD deficiency had higher FG/HbA1c ratios compared to those without G6PD deficiency (21,9±2 vs 20,7 ± 4; $p > 0.05$). G6PD deficiency was confirmed by genetic analysis that revealed the predominance of the African allele Gd A^- in 21% of the deficient patients.
Our study showed that the hyperglycemia observed in T2D causes the G6PD activity to decrease. FG/HbA1c ratio served as a good indicator and can be used in T2D to suspect possible G6PD deficiency.

CONCLUSIONS

It came to light that T2D and G6PD deficiency are presumably linked, encouraging routine screening for this enzyme pathology in the DT2 population to refine the quality of care for this group and improve their quality of life by delaying or even alleviating diabetes complications.

Diabetes, obesity, metabolic syndrome

P0849

ASSOCIATION BETWEEN GLYOXALASE I GENE POLYMORPHISM AND SEVERITY OF NEPHROPATHY RISK IN TYPE 2 DIABETES AMONG INDIANS

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BACKGROUND-AIM

Glyoxalase I (GLO1) is an enzyme which detoxify methylglyoxal (MGO) which is the precursor of advanced glycation end product (AGEs) and play an important role in the development micro-vascular complications in Diabetes Mellitus. To investigate whether the rs1049346 (c.-7C>T, 5-UTR). and rs2736654 (c. A419C) polymorphisms in GLO1 gene influence GLO-1 activity, MGO levels and association with severity of nephropathy in Type 2 diabetic patients among north Indian Population.

METHODS

The study included 96 type 2 Diabetic patients with nephropathy and 100 healthy controls. Ninety-six diabetic nephropathy patients were divided into two groups with urinary albumin creatinine level <300mg/g (n=65) and >300mg/g (n=31). The TaqMan SNP genotyping assays were performed to assess the genotype frequencies using Real Time PCR. The circulating levels of GLO-1 and MGO were estimated using ELISA.

RESULTS

The GLO-1 C-7Tgenotype ($p<0.02$) and its allelic frequency of rs1049346 (($p<0.003$) SNP were significantly associated with nephropathy risk in diabetes. The mutant allele (CC) in the dominant model was significantly associated with macro-albuminuria in type 2 diabetes (OR: 2.77, CI:0.97-7.87, $p<0.001$). Further haplotype analysis also showed the association of locus with nephropathy risk (Global halotype association $p=<0.001$) in diabetic patients. There was no significant association between genotype and allelic frequency of GLO-1 A419C in Diabetic nephropathy. The GLO-1 activity is significantly decreased in diabetic patients with macroalbuminuria and compared to patients with microalbuminuria and healthy controls. Similarly, the patients with macro-albuminuria showed higher MGO levels when compared to healthy controls and micro-albuminuria.

CONCLUSIONS

The GLO1 C-7T polymorphism is significantly associated with the severity of nephropathy in type 2 diabetic patients. The presence of the mutant allele confers susceptibility to nephropathy risk among type 2 diabetic patients.

Diabetes, obesity, metabolic syndrome

P0850

CORRELATION BETWEEN SHBG SERUM LEVELS AND NON-ALCOHOLIC FATTY LIVER DISEASE

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BACKGROUND-AIM

Non-alcoholic fatty liver disease (NAFLD) is one of the most common causes of chronic hepatic disease which is caused by the fat accumulation in the liver. That represents an important risk factor of cirrhosis and liver transplant, whit extra hepatic manifestations, as renal and cardiovascular problems.
The main form to detect NAFLD is hepatic biopsy, which is an expensive and invasive test. For these reasons, serum markers to make the diagnosis have a rising interest.
Sex hormone-binding globulin (SHBG) is a 45.5 kDa glycoprotein that binds androgens and estrogens. It is synthesized by hepatocytes and released to bloodstream. It has been correlated to insulin resistance and hepatic lipid metabolism. For that reason, it is suggested to be associated with NAFLD.
The aim of this paper is to evaluate the correlation between the serum levels of the SHBG parameter and the presence of NAFLD in morbidly obese patients.

METHODS

The study population consisted of 92 morbidly obese women who was suspected NAFLD and underwent bariatric surgery.
The diagnosis of the disease was carried out by a biopsy during the intervention.
SHBG values were determined with a Cobas e801 analyzer through an electrochemiluminescence immunoassay.
Clinical data and blood samples were collected the day before of the surgical operation.

RESULTS

There were 92 patients: 35 control patients [age 45 ± 12 years] and 57 NAFLD patients [age 47 ± 11 years].
SHBG results: 51.5 ± 31.9 nmol/L for control group and 38.4 ± 29.5 nmol/L for NAFLD group.
SHBG values between control and NAFLD group had a statistically significant difference (Mann-Whitney test p=0.02).
Statistical calculation performed by SPSS 17.0.2 program.

CONCLUSIONS

Attending to data obtained, this study confirms the correlation between low serum SHBG levels and the presence of NAFLD in women population.

Diabetes, obesity, metabolic syndrome

P0851

CARNITINE DEFICIENCY IN CHILDREN WITH TYPE 1 DIABETES: A PILOT STUDY

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BACKGROUND-AIM

The importance of carnitine for the lipid and carbohydrate metabolism is well know but studies investigating the carnitine status in type 1 diabetes (T1D) are rare. The development of complications is uncommon during childhood, however, the principles of proper metabolic control must be imparted from the onset. Recognition of carnitine deficiency in these patients may thus have therapeutic implications. In this study, we piloted acylcarnitine profile (ACP) in children with T1D.

METHODS

A study was performed on patients with T1D (n = 30, age range 4 - 17, median = 6,5) randomly chosen from patients hospitalized in our hospital and healthy volunteers (n=11, age range 5 - 17, median = 11). ACP was analyzed using LC-MS in positive mode. Statistical analysis was performed using R version 4.1.0 and heatmap figure using pheatmap package (version 1.0.12).

RESULTS

24 types of acetylcarnitines (of the 40 tested) were identified in the T1D serum samples. 9 of them (free carnitine - C0, acetylcarnitine - C2, hydroxybutyrylcarnitine - C4.OH, tiglyl 3-methylcrotonylcarnitine -C5.1, decenoylcarnitine - C10.1, dodecenoylcarnitine - C12.1, tetradecenoylcarnitine - C14.1, hexadecenoylcarnitine C16.1, octadecenoylcarnitine – C18:1) showed statistically significant differences (p-val<0.05) but only four of them: C0, C2, C4.OH, C18:1) - statistically significant with q-val<0.05, between the study group and healthy voulonteers. Free carnitine (q-val 0,033, FC 1,42) was the only that was lower in T1D patients compered healthy samples. Acetylcarnitine (q-val 0,034, FC 0,70) , hydroxybutyrylcarnitine (q-val 0,041, FC 0,65) and octadecenoylcarnitine (q-val 0,0045778, FC 0,61), were higher in T1D samples.

CONCLUSIONS

Our preliminary data confirms the deficiency of free -carnitine and high levels of circulating acyl-carnitines in children with T1D. Larger studies are needed to draw firm conclusions, as well as the possible role of carnitine supplementation in preventing diabetic complications.

Diabetes, obesity, metabolic syndrome

P0852

PLACENTAL NUTRIENT TRANSPORT IN GESTATIONAL DIABETES

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BACKGROUND-AIM

Gestational diabetes mellitus is characterized by a state of hyperglycaemia first diagnosed in pregnant women. It is considered one of the most common conditions in pregnant women, affecting 3-8% of all pregnancies. It causes an increase in maternal-fetal morbidity and mortality, mainly due to fetal macrosomia, which requires an increase in the supply of nutrients by the placenta. Our aim is to determine whether trophoblast placentas from women with gestational diabetes express more nutrient transporters that allow placental and fetal overgrowth, compared to control placentas.

METHODS

The study is performed with two groups: gestational diabetes mellitus (n=7) and healthy pregnant women (n=14). Placentas are collected for comparative transporter expression studies. Total RNA will be extracted from placental explants using the Tripure kit (Roche Applied Science. USA) and retrotranscription will be performed with QuantiTect Rev Transcription kit (QIAGEN). For quantitative PCR, QuantiTect SYBR Green PCR Kit (QIAGEN) will be used using a Miniopticon (Biorad, CA. USA) and according to the $2^{-\Delta\Delta CT}$ comparative method described by Livak and Schmittgen (2001), using cyclophilin for normalization. The proteins studied were ABCA1, ABCG1 and LXR-alpha.

RESULTS

The results obtained were: ABCA1/cyclophilin expression (arbitrary units) = 1.49±1.9; ABCG1/ cyclophilin expression (arbitrary units) = 0.48± 0.59; LXR-alpha/cyclophilin expression (arbitrary units) = 1.75±1.07 in pathological placentas VS. ABCA1/cyclophilin expression (arbitrary units) = 0.35±0.28; ABCG1/ cyclophilin expression (arbitrary units) = 0.10± 0.07; LXR-alpha/cyclophilin expression (arbitrary units) = 0.34 ±0.17 in normal placentas.

CONCLUSIONS

A higher expression of the nutrient transporters studied was observed in placentas from women with gestational diabetes mellitus compared to placentas from healthy women. This seems to explain the fetal macrosomia that occurs in pregnancies of women with gestational diabetes mellitus. It is necessary to increase the number of placentas studied to confirm these results.

Diabetes, obesity, metabolic syndrome

P0853

A COMPARATIVE ANALYSIS OF THE GENE EXPRESSION PROFILE OF CD31, CD34, VWF ALONG WITH VEGF-A AS VASCULOGENIC MARKERS IN VISCERAL ADIPOSE TISSUE OF MORBIDLY OBESE AND NON-OBESE INDIVIDUALS

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BACKGROUND-AIM

Unrestrained expansion of adipose tissue in obesity is associated with an inadequate vascularization rendering the tissue hypoxic and dysfunction-prone. The existing literature documents that impaired angiogenesis in obese state exists along with paradoxically high vascular endothelial growth factor-A (VEGF-A), the chief vascular mitogen. This study aims at profiling and comparing the same along-with markers of endothelization von Willebrand Factor (vWF), CD31 and CD34, in adipose tissue of both morbidly obese and non-obese individuals, and correlating those with various patient characteristics.

METHODS

Obese subjects aged 18-60 years undergoing bariatric surgery (BMI $\geq$ 35; n=30) and their age matched controls (BMI < 25; n=30) were included. Expression analysis for VEGF-A, CD31, CD34 and vWF was done in visceral adipose tissue, using qPCR. Results were analyzed statistically by Student's t-test, and correlation analysis with anthropometric as well as glycemic parameters, namely fasting blood glucose, fasting serum insulin, HbA1c, HOMA-IR, HOMA-β and QUICKI, was performed.

RESULTS

Inter-group comparison revealed significantly higher expression of VEGF-A ($p<0.001$***) and vWF ($p<0.05$*) in individuals with obesity, significantly lower expression of CD31($p<0.05$*) and CD34 ($p<0.05$*). Significant correlations were found between VEGF-A and insulin sensitivity ($p<0.05$*), and CD31 and CD34 ($p<0.05$*).

CONCLUSIONS

Dysregulated expression of the studied endothelial markers in VAT from obese individuals points towards a state of compromised angiogenesis which is simultaneously the cause and effect in context of metabolic impairment associated with morbid obesity.

Diabetes, obesity, metabolic syndrome

P0854

IMPORTANCE OF ALTERNATIVE MARKERS FOR GLYCAEMIC CONTROL

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BACKGROUND-AIM

The global prevalence of Diabetes mellitus has increased in recent years. Glycated haemoglobin (HbA1c) has become the gold standard for long-term glucose monitoring in patients with diabetes. In 2010 the American Diabetes Association (ADA) added HbA1c ≥6.5 % as a diagnostic criterion for diabetes, allowing the test to be used for both management and diagnosis.
Many common biological and patient-specific factors can cause misleading HbA1c results. It is important to recognize clinical scenarios that affect interpretation of HbA1c (changes in red blood cells half-life, haemoglobinopathies...) and make even impossible to report accurate results in some cases (haemoglobin variants in which haemoglobin A is not present, high amount of fetal haemoglobin (HbF) in adults, presence of haemoglobin E (HbE)).
The aim of this study is to describe the prevalence of haemoglobin variants in HbA1c tests performed in our centre.

METHODS

Data of HbA1c tests performed in our centre between 2017 and 2022 using high-performance liquid chromatography were reviewed using BIWER Analytics software (Werfen S.A.).

RESULTS

In the aforementioned period 455.000 determinations of HbA1c belonging to 159.216 patients were performed. 433 patients showed some haemoglobin variant, being the most frequent heterozygous haemoglobin S (HbS).
Additionaly, 82 patients had interferences where the HbA1c value could not be provided. They presented the next haemoglobin variants: homozygous HbS, homozygous haemoglobin C (HbC), compound heterozygous HbS and HbC, presence of HbE and high values of HbF.
Regarding the inability to report HbA1c values in these patients, the laboratory expanded the services portfolio with fructosamine, whose level refers to a measurement of the total stable irreversible glycated serum proteins. Although fructosamine reflects a much shorter period of glycemic control compared to HbA1c it could be an alternative for these patients and other situations like pregnancy.

CONCLUSIONS

In situations where HbA1c may not accurately reflect glycemic control, using an alternative index like fructosamine or glycated albumin is desirable. Many promising alternative glycemic markers exist. The main limitation for all of them is that there are still no guidelines or consensus of the international societies on its clinical use.

Diabetes, obesity, metabolic syndrome

P0855

EVALUATION OF THE TRINITY PREMIER HB9210

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BACKGROUND-AIM

Prior to the regional roll out of the Trinity Premier Hb9210 boronate affinity HPLC analyser in provincial laboratories in KwaZulu Natal, South Africa, evaluation of the analyser was required. The aim of the study was to evaluate the Trinity Premier Hb9210 and compare to current method in use before placement in regional laboratories.

METHODS

Evaluation consisted of - precision assessed via the CLSI EP 15 protocol ;CLSI EP 9 protocol for method comparison was performed against the current in use Tosoh G8 ion exchange HPLC. Linearity and reportable range assessed using the CLSI EP6 protocol with sequential mixing of different patient pools across Hba1c concentrations. Carryover studies were performed by analyzing known high and low pooled samples in a specific sequence. Interferences studies were performed using spiked samples for interference by fetal and carbamylated hemoglobin.

RESULTS

The precision evaluation showed repeatability and reproducibility of 0.3% for both levels of IQC material tested.57 patient samples were analysed on Tosoh G8 290 and then on the Trinity Premier Hb9210TM within 2 hours. The alternate method comparison showed a correlation coefficient (R value) of 0.9957; a negative bias of 0.22% HbA1C (%bias of -2.38 %).The performance at medical decision levels for the Trinity Premier based on the regression analysis were within the 95% confidence intervals of the Tosoh G8 values. Interference studies: sodium cyanide level of up to 65mg/dl did not show any clinically significant effect on results. The presence of HbF at both 10% and 50% did not show significant interference in HbA1c measurement (percentage difference from expected result was <5%).The linearity was shown to within the quoted range of the analyser (3.8 to 18.5%) with a slope of 1.00. Initial carryover studies using IQC material showed no significant carryover. When this was repeated at the end of the evaluation period using patient pooled samples noticeable carryover was identified. The supplier was required to evaluate sample syringe wash settings. Following correction by supplier carryover studies were repeated with both patient pools and IQC material and were acceptable.

CONCLUSIONS

Evaluation and not merely simple verification of new methodologies are required when being introduced into a new environment.

Diabetes, obesity, metabolic syndrome

P0856

HEPATIC STEATOSIS AND TRIGLYCERIDE-GLUCOSE INDEX PERFORMANCE TO ESTIMATE LIVER STEATOSIS IN TYPE 2 DIABETES PATIENTS VERSUS CONTROLLED ATTENUATION PARAMETER EVALUATED WITH TRANSIENT ELASTOGRAPHY.

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BACKGROUND-AIM

The frequency of type 2 diabetes (T2D) is continuously increasing and the prevalence of Metabolic-Associated Fatty Liver Disease (MAFLD) among these patients is significantly high (55%). Despite liver fibrosis being the major prognosis factor in MAFLD evolution, guidelines recommend assessing liver steatosis in T2D by non-invasive scores as a first step. Hepatic steatosis index (HIS) and triglyceride-glucose index (TyG) are scores based on serum biomarkers. Controlled attenuation parameter (CAP) (Fibroscan) enables quantification of fatty liver infiltration. This study aimed to evaluate the diagnostic accuracy of HIS and TyG to estimate steatosis compared to CAP in T2D patients with a positive fibrosis-4 (FIB-4) score.

METHODS

From a cohort of 110 patients with T2D and positive FIB-4 (cutoff ≥1.3/≥2,</>65 years respectively), we estimated hepatic steatosis with HIS, TyG and CAP. We considered a cutoff of 302 dB/m for steatosis (S≥S1). Laboratory parameters were compared between patients with and without steatosis. Diagnostic accuracy of HIS and TyG was estimated using the area under the receiver operating characteristic (AUC) and Youden-optimized cutoffs were obtained.

RESULTS

The prevalence of steatosis among T2D patients based on 302 dB/m cutoff was 38.2% in our cohort. Significantly higher values (median(interquartile range)) for HIS and TyG ($p<0.05$) were observed in patients with steatosis (HIS 42(38-47) vs 38(35-42) and TyG 9.2(8.9-9.7) vs 9.0 (8.6-9.3) respectively). Higher BMI, triglycerides and HDL cholesterol were also associated with steatosis S≥S1 ($p<0.05$).
AUC for HIS and TyG was 0.67 (95%CI 0.57-0.67) and 0.70 (0.6-0.8) respectively. Youden cutoff for HIS was 36.5 and showed a sensibility, specificity, positive and negative predictive value of 88%, 43%, 49%, and 85%, and for TyG a cutoff of 8.64 showed 98%, 34%, 48% and 96% respectively.

CONCLUSIONS

Non-invasive steatosis scores such as HIS and TyG has a correct performance to estimate liver steatosis compared to more accurate methods such as CAP. Establishing a MAFLD screening strategy for detecting liver steatosis as well as fibrosis among T2D patients based on routinely low-price laboratory parameters is crucial since disease reversion is possible when intervention is performed in early stages, avoiding progression to advanced liver disease.

Diabetes, obesity, metabolic syndrome

P0857

CHARACTERIZATION OF THE GUT MICROBIOTA IN DIABETES MELLITUS TYPE 2 PATIENTS BY THE NEXT GENERATION SEQUENCING TECHNIQUE

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BACKGROUND-AIM

The human microbiome plays a very important role in the normal functioning of both metabolic and immune systems. Healthy people have different microbiome that leads to achieve more short chain fatty acids and make up more branched amino acids, while the gut microbiota of type 2 Diabetes Mellitus (T2DM) patients is more likely to produce compounds that affects glucose metabolism. The objective of this study was to characterize the composition of the gut microbiota in T2DM patients in comparison to healthy subjects.

METHODS

Totally, 17 patients with T2DM and 16 healthy individuals were enrolled in the study. The complex gut microbiome was analyzed by the NGS (Ganzimmun Diagnostics AG, Mainz, Germany). The study of the microbiome included: assessment of bacterial dysbiosis, analysis of the species composition of the intestinal microflora, determination of the enterotype and distribution of bacterial strains, incl. assessment of the mucosa-protective microflora. Determination was made for: enterotype (predominance of type/genus Bacteroides, Prevotella or Firmicutes), distribution of the most important bacterial strains, Firmicutes/Bacteroidetes ratio and muco-protective microflora.

RESULTS

We found significant decrease in butyrate-producing bacteria Eubacterium spp. and increase in lipopolysaccharide (LPS) - positive bacteria in T2DM patients compared to controls- T2DM patients had approximately 4 times more bacteria from the species Enterobacter spp., Escherichia spp. and Pseudomonas spp. There was an increased amount of Bilophila wadsworthia in T2DM patients as well. Analysis of biodiversity and other bioindicators (pH-value of faeces, Firmicutes/Bacteroidetes ratio, Prevotella/Bacteroidetes ratio) in T2DM patients and controls did not show a significant deviation from the reference values and did not differ statistically between patients and healthy subjects.

CONCLUSIONS

The influence of gut microbiome on the inflammatory processes and glucose homeostasis is evident and its modulation could be a novel approach to prevent and treat T2DM.

Diabetes, obesity, metabolic syndrome

P0858

EVALUATION OF C-REACTIVE PROTEIN AND LIPID STATUS IN WOMEN WITH POLYCYSTIC OVARIES

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BACKGROUND-AIM

Polycystic ovary syndrome (PCOS) is a heterogeneous clinical syndrome characterized by hyperandrogenism and ovulatory dysfunction. A large number of studies have shown that hsCRP is a superior predictor of coronary events than LDL-cholesterol. Determination of CRP and lipid status as well as insulin resistance in women with PCOS allows timely and energetic prevention of the risk of cardiovascular diseases. Research objective: Evaluation of C-reactive protein and lipid status in women with polycystic ovaries.

METHODS

In accordance with the set goals, the research was conducted by cross-sectional study type. The survey included 94 female respondents, aged 20 to 40. Body mass (kg), body height (cm), waist circumference (cm), hip circumference (cm) were measured for each subject, and the body mass index (BMI, kg/m²) was calculated based on the obtained results. The laboratory examination included: measurement of the concentration of hsCRP mg/ml, total cholesterol (mmol/L), cholesterol in HDL (mmol/L), LDL (mmol/L) and VLDL (mmol/L) lipoproteins, triacylglycerol (mmol/L) . Measurement of the concentration of LH (mIU/ml), FSH (mIU/ml), testosterone (ng/ml), DHEA-S (μg/dl) and insulin (μIU/ml) in the serum. The subjects were divided into three groups: obese subjects with PCOS (N32), normal weight subjects with PCOS (N 30) and a control group (N30) of healthy women without PCOS.

RESULTS

72% of obese patients with PCOS have hsCRP >3mg/ml (high risk for atherosclerosis), 28% hsCRP 1-3 mg/ml (medium risk for atherosclerosis). In the PCOS group of normal body weight, 20% of subjects have hsCRP >3 mg/ml (high risk), 70% have hsCRP between 1-3mg/ml (intermediate risk) and 10% have hsCRP < 1 mg/ml (low risk). The values of hsCRP, total cholesterol, LDL cholesterol and triglycerides were the highest in the group of obese subjects with PCOS ($p<0.01$), while there were no significant differences between the group of PCOS subjects of normal body weight and the control group ($p<0.05$).

CONCLUSIONS

In women with polycystic ovaries, there is a statistically significant correlation of C-reactive protein and lipids with obesity and insulin resistance. Early recognition and treatment of obese women with PCOS and taking preventive measures are of key importance in reducing the risk of cardiovascular diseases.

Diabetes, obesity, metabolic syndrome

P0859

MIRS AND PROTEINS LEVELS IN ADIPOSE-DERIVED EXOSOMES (ADES), ADDRESSED IN THE CONTEXT OF METABOLIC BIOMARKERS IN SUBJECTS WITH OBESITY

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BACKGROUND-AIM

The epidemiological evidence highlights that adiposity status is a significant risk factor for developing chronic metabolic diseases in the worldwide adult population, by the body white adipose tissue (WAT) accumulation, such as in the obesity. Adipose tissue (AT) is the major producer of exosomes called adipose-derived exosomes (ADEs), and in obesity its production is exacerbated.
microRNAs (miRs) and proteins transported by the ADEs provides information, for instance of the immunometabolic alterations, so they have been proposed as new biomarkers, and as alternative therapy in different pathologies; so, the aim of this study was to establish the qualitative difference of ADEs between males and females, healthy and with obesity, and the quantitative difference of miRs and proteins levels addressed in the context of metabolic biomarkers.

METHODS

In this cross-sectional study, 81 males and females aged 20 to 59 were included, and split up into three groups, G1 healthy, G2 overweight/unhealthy, and G3, overweight/healthy, based on body mass index. Further analysis was carried out by sex.
From blood plasm samples we isolated exosomes and compared them by transmission electron microscopy (TEM). In parallel, we lysed exosomes and extracted total miRs and proteins by Invitrogen kits, then levels of both were measured by the Nanodrop Onec and Qubit procedures.

RESULTS

We noted an increased qualitative difference in exosome quantity in G2 and G3 compared with G1, without an appreciable difference between males and females in each group. We observed an increase in lipid profile levels, the magnitude of metabolic biomarkers, and insulin-resistant status in G2 and G3 compared with G1, with no difference between males and females within each group. Similar differences were observed in total miRs and protein levels.

CONCLUSIONS

Our results showed that in obesity there is an increased production of ADEs. In this sense, we ought to suggest that exist an alternative molecular mechanism that develops a pathogenic process related to unbalanced WAT accumulation, which turns dysfunctional. At the same time, the loss of the connection in regulating metabolism with the WAT function represents a triggering factor for obesity comorbidities.

Diabetes, obesity, metabolic syndrome

P0860

HHEX AND MTR1B GENE POLYMORPHISMS ASSOCIATED WITH THE RISK OF TYPE 2 DIABETES MELLITUS IN A MIXED ANCESTRY SOUTH AFRICAN URBAN POPULATION

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BACKGROUND-AIM

The HHEX and MTNR1B genes have been well studied across diverse ethnic populations, and variations in these genes, manifesting as single nucleotide polymorphisms (SNPs), have been reported to play significant roles in the pathophysiology of type 2 diabetes mellitus (T2DM). As such, we carried out this study to determine if individuals carrying a specific genotype were at greater risk of developing T2DM when compared to those without the genotype, especially in a South African population where we previously reported a high incidence of T2DM.

METHODS

This cross-sectional study was conducted in a total sample of 1969 male and female mixed ancestry participants with T2DM (n=312) and without T2DM (n=1657). Two SNPs (rs10830963 of the MTR1B gene and rs1111875 of the HHEX gene) were genotyped using quantitative real time polymerase chain reaction, after which Hardy-Weinberg Equilibrium (HWE) was performed on the SNPs. Metabolic diseases and traits were compared across the genotypes of SNPs in HWE. Moreover, linear and logistic regressions, adjusted for age, gender and body mass index (BMI), were used to assess the risk of T2DM, its traits and associated diseases.

RESULTS

Both SNPs, rs10830963 (p=0.158) and rs1111875 (p=0.465) were in HWE. Whilst the two SNPs showed no association with T2DM, they were associated with traits of T2DM. The rs10830963 recessive genotype was able to predict fasting plasma glucose (FPG), insulin and HOMA-IR, whilst the rs1111875 recessive genotype was able to predict total cholesterol, triglyceride, low density lipoprotein (LDL) cholesterol and fasting plasma glucose levels.

CONCLUSIONS

The two recessive SNP genotypes (rs1111875 of the HHEX gene and rs10830963 of the MTR1B gene) may increase the risk of developing T2DM. As such, they may be used as screening targets to identify individuals in whom interventions (lifestyle modifications) may be useful to reduce the development of T2DM. Furthermore, these SNPs may be alternative therapeutic targets once their role in the pathophysiology of T2DM is fully elucidated.

Diabetes, obesity, metabolic syndrome

P0861

GUT MICROBIOTA PROFILES IN TYPE 2 DIABETES PATIENTS: A PILOT STUDY CONDUCTED IN SOUTH AFRICA

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BACKGROUND-AIM

Type 2 diabetes mellitus (T2DM) is one of the leading causes of morbidity and mortality worldwide, and is becoming an even bigger threat to developing countries such as South Africa. This condition is a complex metabolic disorder that stems from multiple pathogenic contributions, among which include the gut microbiota, particularly, gut dysbiosis. Little is known about microbial variability and its implications for T2DM in Africa. Moreover, we have not identified such studies in South African populations. The aim of this study is to profile gut microbiota profiles in South African T2DM patients.

METHODS

Fecal samples were used to analyze the composition of the gut microbiota in 50 South African T2DM patients. The PacBio 16s analysis was done using DADA 2 (https://benjjneb.github.io/dada2/index.html) and QIIME 2 (https://docs.qiime2.org/2021.11/). To describe the composition of the microbiome, data analysis of operational taxonomic units (OTU) were also done. Frequency statistics were conducted using Microsoft Excel.

RESULTS

The average read count of the study participants is 22669.75 with a range of 4425-56375. The average Firmicutes/Bacteroidetes (F/B) ratio is 1.78, ranging from 0.05-11.46. Sixty-two and a half percent of the participants have an F/B ratio of above 1 and only 7.5% of them have an F/B ratio of 1. The top 3 phyla includes Bacteroidetes, Firmicutes and Proteobacteria. The top 3 species are mostly the ones identified as unknown, followed by Bacteroides vulgatus and Bacteriodes dorei. The average number of species identified is 69.03, ranging from 13-127 species.

CONCLUSIONS

The range for both the read count and number of species is wide, therefore showing how variable the gut microbiota is among the participants. These results also demonstrate that patients with T2DM in South Africa mostly present with gut dysbiosis, as demonstrated by the Increased/ decreased F/B ratios. This indicates that there might be some form of association between T2DM and gut dysbiosis. More studies are required to help understand the role gut microbiota/gut dysbiosis plays in T2DM, especially in African countries were such information is limited.

Diabetes, obesity, metabolic syndrome

P0862

CLINICAL AND BIOLOGICAL CHARACTERISTICS OF HYPERTENSIVE TYPE 2 DIABETIC PATIENTS AND CARDIOVASCULAR RISK.

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BACKGROUND-AIM

Cardiovascular disease is one of the main causes of death in type 2 diabetics. The aim of this study is to describe the clinial and biological characteristics of type 2 diabetic patients who developed high blood pressure then to study the relationship between high blood pressure and the occurrence of macro vascular complications.

METHODS

It is about a descriptive retrospective study of type 2 diabetic patients (T2D) who developed high blood pressure. The clinical and biological informations were compiled on an information sheet. Statistical analysis were performed using SPSS software.

RESULTS

they were included in this study the study 341 T2D patients with a mean age of 60.1 ± 11.71 years. The sex ratio w/m was 1.04 (174 women and 167 men). Dyslipidemia was recorded in 205 T2D patients (60%). The average rate of HbA1c is estimated at 9.31 ± 2.43% [5.2-16%]. 17.5% of patients had a good control of diabetes (HbA1c ≤ 7%); 27.62% of them were moderately controled (HbA1c >7 and 1g/L with an average rate of 1.22 ± 0.52 g/. 65% of patients presented a high blood pressure. Macrovascular complications were present in 72 patients (30.9%) These are mainly cerebrovascular accident (CVA) in 14% of cases, obliterating arteritis of the lower limbs (AOMI) in 8% of cases and ischemic heart disease (IC) in 15% of cases.
High blood pressure was more prevalent; in women compared to men (70 vs 61%, p = 0.08), in patients aged 60 years old and over (74 vs 55%, p < 10-3), in those with diabetes older then (+ 10 years) (74 vs 57%, p= 0.001), and in those with desequilibrate diabetes (HbA1c > 7%) (68 vs 44%, p= 0.001). Macrovascular complications were more frequent in patients with high blood pressure: CVA (24 vs 6%, p= 0.006), PAD (14 vs 1.17%, p= 0.002) and CI (26 vs 6%, p= 0.002).

CONCLUSIONS

Hypertension is common in type 2 diabetic patients, it has a correlation with cardiovascular risk. Adequate glycemic control, as well as appropriate therapy, are the priorities for the adequate management of T2D patients, and for a better control of cardiovascular complications.

Diabetes, obesity, metabolic syndrome

P0863

EXERCISE-METFORMIN INTERACTION ON GLUCOSE METABOLISM AND β-CELLULAR FUNCTION: PRELIMINARY RESULTS FROM A TRIPLE-BLIND CLINICAL TRIAL.

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BACKGROUND-AIM

The purpose of this study was to explore the interaction between metformin and exercise on glycemic control, pancreatic #-cell function and insulin sensitivity.

METHODS

12 subjects were randomized to undergo a 5-week period of exercise training either with (metformin-exercise group) or without (exercise-placebo group) metformin (500 mg twice daily). The training was designed to expend 500 Kcal at 60% of pic oxygen consumption. Before and after intervention a 75g 2-hour OGTT was conducted after an overnight fast, and plasma glucose, insulin, and C-peptide were determined for calculations of skeletal muscle, hepatic (HOMA-IR) insulin sensitivity. β-cell function was defined from glucose-stimulated insulin secretion (GSIS) prehepatic insulin secretion (deconvolution modelling).

RESULTS

Exercise-metformin combination resulted in 19.95% decrease in postprandial glycemia ($p<0.001$). In contrast, for the group placebo-exercise group, blood glucose levels increased significantly (+14.44%; $p=0.002$). However, we did not detect significant differences either between groups or within groups for insulin and c-peptide ($p>0.05$ for both parameters). Pre-hepatic insulin secretion decreased in the exercise-metformin group (-20.4% $p=0.064$) and increased in the placebo group (+21.07%; $p=0.054$). Independent of the intervention, we found an increase in first phase glucose-stimulated insulin secretion index ($p<0.001$). We also found the same when this index was calculated using C-peptide concentrations where a main effect of time was noted indicating an overall improvement in first phase glucose-stimulated insulin secretion ($p<0.001$). No significant differences were found in muscle and liver insulin sensitivity ($p>0.05$ for both).

CONCLUSIONS

Metformin-exercise combination improved glucose tolerance compared to the exercise intervention alone. Second, although exercise improved body composition, respiratory and functional capacity, it worsened glycemic control without significant effects on insulin sensitivity when assessed alone. Third, both interventions improved the first phase of insulin secretion and only the exercise-metformin combination improved the second phase of insulin secretion calculated using C-peptide concentrations.

Diabetes, obesity, metabolic syndrome

P0864

A PARTICIPATION IN THE ESTABLISHMENT OF A NORMAL VALUE OF GLYCATED HEMOGLOBIN HBA1C IN A NON-DIABETIC FEMALE MOROCCAN POPULATION

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BACKGROUND-AIM

HbA1c is frequently used to monitor the glycemia of diabetic patients to assess the efficacy of treatments and anticipate diabetic complications.Due to the importance of this parameter and its intra individual variability, our work consisted to participate in the establishment of a normal value of the HbA1c for a specific Groupe of people which was a non-diabetic feminine Moroccan population.

METHODS

Our work is based on data from a private Medical Analytical Laboratory, we examined the results of 934 non-diabetic women, , and we used the SPSS 2.0 version software with a 5% of risk for the statistic studies of data . the results are expressed as a percentage according to the NGSP.

RESULTS

The mean age of the subjects was 53 years with extremes ranging from 16 to 100 years. The mean value of HbA1c for the whole population was 5,44 ± 0,012 % (p value <0.001) with extremes ranging from 4 % to 6 % , to be more specific we have divided our population of study to four groups based on their age , the first one from 16 to 31 years , the second one 32-50 years , the third one 51-71 years , the fourth one 72-100 years .The results are respectively as follows: 5,25 ± 0,026 ; 5,43 ±0,017 ; 5,57 ± 0,020 ; 5,55 ± 0,033 .It was found that the average HbA1c value of the female population increased with age, an increase of 0.18 between the first andsecond groups, with a percentage of 3.30% of the mean values , and an increase of 0.14 was also observed between the second and third groups, equivalent to 2.5% of the mean. The mean value of HbA1c dropped to 0.02 between the third group and the fourth group, which represents a 0.4% decrease in the mean value of the third group.

CONCLUSIONS

Although we have established a normal value of glycated hemoglobin for a Moroccan female population and the existence of an increase in the average value of Hba1c with age, these results do not justify
may not memorize or use thresholds in routine clinical practice.

Diabetes, obesity, metabolic syndrome

P0865

A FRESH LOOK AT SELECTED WELL-KNOWN SEROLOGICAL MARKERS IN MONITORING THE CLINICAL COURSE OF TYPE 1 DIABETES IN PEDIATRIC PATIENTS.

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BACKGROUND-AIM

Biochemical abnormalities in the course of type 1 diabetes (T1D) may cause the produc-tion/activation of various proteins and peptides influencing the treatment and the formation of complications, which are thought to be dependent on blood glucose levels. The aim of this study was to asses concentrations of selected serological markers involved in the pathogenesis and course of T1D, and to correlate their concentrations to patients' age, duration of T1D and glycemic status. To the best of our knowledge, no one has analyzed changes in amylin (IAPP), proamylin (proIAPP), catestatin (CST), chromogranin A (ChgA), nerve growth factor (NGF), platelet activating factor (PAF), and uromodulin (UMOD) concentrations in the context of glucose/HbA1c levels so far. However, in a number of studies, these analytes were indicated as contributing to the etiology (IAPP, proIAPP), course (CST, ChgA) or the development of various complications (neuropathy - NGF, cardiovascular complications - PAF, cardiovascular complcations and nephropatia - UMOD).

METHODS

The study included patients with T1D (n=156) in age 6 - 18 years and age matched healthy controls (n=30). Concentrations of amylin (IAPP), proamylin (proIAPP), catestatin (CST), chromogranin A (ChgA), nerve growth factor (NFG), platelet activating factor (PAF), and uro-modulin (UMOD) were measured in sera using immunoenzymatic tests.

RESULTS

There were significant differences in concentrations of NGF (12.7, range 3.34-17.9 vs 4.69, range 0.52-804 pg/ml), ChgA (74.5, range 40.5-98.5 vs 52.5, range 15.5-104 ng/ml), and PAF (0.20, range 0.11-0.43 vs 0.25, range 0.12-5.18 ng/ml) between patients with newly diagnosed T1D and those treated over 3 years, respectively. IAPP, proIAPP, and NGF were significantly affected by the patients' age. However, the markers were not influenced by glucose level determined by glycated hemoglobin.

CONCLUSIONS

Concluding, the results show that study markers may reflect pathological processes continued even when the blood glucose levels are normal.

Diabetes, obesity, metabolic syndrome

P0866

ADIPONECTIN/LEPTIN RATIO (A/L) AMONG INSULIN RESISTANCE AND SENSITIVE INDIVIDUALS TO ASSESS THE FUTURE RISK FOR CARDIOVASCULAR DISEASES

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BACKGROUND-AIM

Obesity is the leading cause of cardiovascular disease (CVD) and metabolic syndrome (MS) and is characterized by increased leptin and decreased adiponectin levels. We aimed to correlate the adiponectin/leptin ratio (A/L) among insulin-resistance (IR) and insulin-sensitive (IS) individuals with their body mass index (BMI) and assess the future risk for CVD.

METHODS

A total of 84 individuals aged 18 to 60 years without any comorbidities were enrolled in the study. The anthropometric measurements were noted. The biochemical parameters like fasting glucose, insulin, leptin, and adiponectin were estimated. The homeostatic model assessment of insulin resistance (HOMA-IR) was calculated. The total subjects were divided into IR and IS based on HOMA-IR. The data were analyzed on Microsoft Excel 2010 lnk sheet. A P-value of <0.05 was considered statistically significant,

RESULTS

BMI (29.85 kg/m2± 5.92 and 24.92 kg/m2±5.04), fasting insulin (24.27 Mu/L±17.36 and 8.23 Mu/L±2.76), and leptin (28.14ng/ml±28.64 and 14.66ng/ml±21.76) was significantly higher in IR than IS with P-value of <0.05. Whereas A/L was significantly lower in IR (0.8) than IS (1.9). BMI showed a significant positive correlation with A/L (0.284, p=0.008), whereas HOMA-IR did not show a significant correlation with A/L.

CONCLUSIONS

The A/L may be useful in identifying the risk of CVD and MS in obese individuals.

Diabetes, obesity, metabolic syndrome

P0867

VON GIERKE'S DISEASE: ABOUT A CASE

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BACKGROUND-AIM

Von Gierke's disease or glycogenosis type Ia (GSDIa), is a rare inherited metabolic disease, including within the inborn errors of metabolism, caused by deposition or accumulation of glycogen.
This disease was initially described by Simon Van Creveld and by Edgar Von Gierke at
early 1930s and appears with a frequency of 1/100,000. Mortality, common in other times, it has now become rare if the metabolic control is adequate, being the main causes of death hypoglycemic seizures and/or severe acidosis.
The aim of this study is to present a case of this rare disease.

METHODS

Presentation of the case: 4-year-old girl referred to Pediatric outpatient clinics due to lack of growth, abdominal distension, and a history of frequent episodes of weakness and paleness that disappear eating.

RESULTS

In the laboratory tests, the following stand out: hypoglycemia, hyperlipidemia, hyperuricemia and increased lactate, pyruvate and free fatty acids in serum.
Analysis of the G6PC and SLC37A4 genes by complete PCR amplification of their exons and subsequent sequencing allowed us to identify the presence, in homozygosis, of the P178S mutation.
This mutation is produced by a substitution of the Cytosine nucleotide for Thymine at position 649 of Exon 6 of the G6PC gene, which causes a change of an amino acid from Proline to Serine and is described associated with GSDIa.
This mutation inhibits the efficient breakdown of glucose 6-phosphate by a deficit in the activity of the enzyme G-6-phosphatase. Glucose 6-phosphate that is not broken down to glucose is converted to glycogen and fat and can be stored inside cells. This buildup is toxic and causes damage to organs and tissues throughout the body, especially the liver and kidneys, leading to the signs and symptoms of GSDIa.
The study of the parents revealed that they were healthy carriers of the same mutation.
After making the diagnosis of GSDIa, treatment with nutritional regimens was established to reduce minimize organic acidosis and maintain blood glucose levels above 70 mg/dl.

CONCLUSIONS

Von Gierke's disease is a rare hereditary disease that, not treated, can have serious consequences. However, early diagnosis and treatment improves the prognosis and quality of life of affected children, so the role of the Clinical Laboratory is crucial.

Diabetes, obesity, metabolic syndrome

P0868

EXAMINATION OF PANCREATIC BETA CELL RESERVE AND INSULIN RESISTANCE WITH FAM19A5, FGF-21, GDF-15, MOTS-C BIOMARKERS IN PATIENTS CLASSIFIED BY K-MEANS CLUSTERING METHOD

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BACKGROUND-AIM

Obesity can cause insulin resistance and pancreatic beta cell insufficiency. The aim of the present is to classify the obese cases into the groups according to insulin resistance and insulin secretion indexes using K-means clustering method and to investigate the relationship of K-means clustering method with insulin resistance and insulin secretion indices. The secondary aim is to evaluate adipokine (Family with Sequence Similarity 19 Member-A5 (FAM19A5)) and mitokine (Fibroblast Growth Factor-21 (FGF-21), Growth Dıfferentiation Factor-15 (GDF-15), Mitochondrial Open Reading Frame of 12S rRNA-c (MOTS-c)) levels in K-means clustering group and World Health Organization (WHO) classification groups.

METHODS

Thirty healthy cases who applied to the Endocrinology outpatient clinic of our hospital and 130 obese or overweight cases with suspected type 2 diabetes (T2DM) were included in the study. The cases were classified into 4 cluster groups according to their insulin resistance and insulin release indices by the K-means clustering method. In addition, the cases were divided into 3 groups as T2DM, prediabetes and normal glucose tolerance (NGT) according to the WHO diabetes mellitus classification criteria. FAM19A5, FGF-21, GDF-15 and MOTS-c levels were analyzed in all cases and relationships were evaluated both in between cluster groups and WHO groups.

RESULTS

There was no significant difference between the FAM19A5, FGF-21, GDF-15 and MOTS-c levels in K-means cluster groups. Serum MOTS-c was decreased in obese group compared to controls ($p<0.05$); FGF-21 was increased in obese with T2DM than in obese with NGT ($p<0.05$), and increased in obese with NGT than in healthy controls ($p<0.05$); GDF-15 was found to be increased in T2DM compared to the healthy group ($p<0.05$). There was no significant difference in FAM19A5 between healthy controls and obese groups.

CONCLUSIONS

We believe that K-means clustering method is superior to WHO diabetes classification because it gives detailed metabolic data such as insulin resistance and pancreatic beta cell reserve in clarifying the pathogenesis of obesity to T2DM. K-means clustering method enables the creation of personalized treatment protocols by elucidating the individual metabolism data via the insulin resistance and insulin secretion levels of the individuals.

Diabetes, obesity, metabolic syndrome

P0869

HBA1C FOR THE DIAGNOSIS OF TYPE DIABETES: AN UPDATE.

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BACKGROUND-AIM

Diabetes is a serious pathology which deteriorates the quality of life of its patients. Different learned societies have collaborated to come out with recommendations. The main objective of our study was to evaluate the place of HbA1c in the screening and diagnosis of diabetes.

METHODS

This study represents a bibliographic synthesis. An in-depth study of 30 reference publications dealing with the subject was carried out, for that we undertook a systematic search of electronic databases Pub Med, Google scholar, science direct and the information of these references was compiled and summarized in guidelines.

RESULTS

hba1c is a marker used by clinicians to adjust or modify treatment, to assess the quality of care and therapeutic compliance and to quantify the risk of developing degenerative complications of diabetes. The UKPDS study and its main objective was to test whether better control of diabetes prevents diabetes complications. The results of this study showed that a 1% reduction in HbA1c was associated with a 30% reduction in the relative risk of developing microvascular complications, an 18% reduction in the risk of heart attack and a 25% reduction in the risk of diabetes-related mortality. From these studies, it appears that HbA1c allows the monitoring of type 2 diabetes and that the higher the HbA1c, the higher the risk of developing complications.. Diabetes is considered well controlled when HbA1c is less than 6.5%.Diabetes is moderately controlled if HbA1c is between 6.5% and 7.5%.It is poorly controlled if HbA1c is above 8%. The ultimate goal of the IFCC is the global standardization of all routine methods and the concentration of this HbA1c of patients should be reported in the International system. Unfortunately, universal reporting will be unlikely to be achieved: there has been, and still is, resistance to a change in units.

CONCLUSIONS

In the end, we note that the latest recommendations are not applied in Algeria, while the HbA1c has multiple advantages that overcome those of the fasting blood glucose, at the same time this test needs to be studied. at large scale studies to establish a threshold of better sensitivity and specificity.

Diabetes, obesity, metabolic syndrome

P0870

DIABETIC KIDNEY DISEASE, ABOUT ITS ONSET AND PROGRESSION FACTORS STUDY

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BACKGROUND-AIM

Chronic kidney disease in diabetics is one of the major causes of morbidity and mortality,
Its physiopathology of installation and progression is multifactorial and complex and requires
to be studied deeply to explore its increasing incidence
we aimed to determine the frequency of nephropathy in the type 2 diabetic population of our study and look for its onset and progression clinical-biological risk factors

METHODS

We conducted a cross-sectional study, on 96 patients type 2 diabetics, the diagnosis of nephropathy was based on an increase in the rate albumin excretion (ACR > 30 mg/g creatinine) and/or an alteration in the glomerular filtration rate (GFR < 60 ml/min/1.73m2).an information sheet has been duly completed, in addition, several parameters were evaluated in these patients, in particular: fasting glycaemia, HbA1c, microalbuminuria, blood urea and creatinine, as well as lipid profile
The two groups of patients with and without nephropathy were compared and the data were analyzed using SPSS software (Statistical Package for the Social Sciences) version 25.

RESULTS

among 96 diabetic subjects, 33 (34%) had nephropathy, subjects with kidney disease had more advanced age (p=0.03) as well as older diabetes (p=0.049). Arterial hypertension p=0.038), cardiovascular diseases (p=0.018) as well as a high level of glycated hemoglobin (p=0.048) were associated with an increased risk of development of nephropathy. While elevated fasting blood glucose and glycated hemoglobin levels were identified as progression factors of kidney disease when comparing the three stages of kidney disease

CONCLUSIONS

Early diagnosis and control of risk factors such as hypertension arterial blood pressure as well as monitoring of HbA1c and blood sugar levels are the best ways to prevent this complication

Diabetes, obesity, metabolic syndrome

P0871

A STEP TOWARDS PRECISION MEDICINE: REMOTE PATIENT MONITORING OF TYPE II DIABETES

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BACKGROUND-AIM

Remote diagnosis and digital management of diabetes is a reality and the use of real-world data (RWD) will considerably improve health via preventive, personalized, and precision medicine. In Belgium, health data exchange is performed via a hub-metahub system, i.e., via four health networks. In Belgium, 7% of the population suffers from type II diabetes but RWD from glucometers are not integrated into clinician's workflow with currently no possibility for a specialist or a general practitioner (GP) to access glucometers data when connecting to the one of the four Belgian hubs. To improve patient's care, it is of prime importance to make these data available via the hubs. The team's solution aims to improve monitoring of type II diabetes using the glucometer "GlucoMen Areo" from Menarini by storing data into the Brussels Health Network (BHN).

METHODS

First, the patient authenticates to the BHN via a mobile application. Row measurements are then transmitted from the device to the application via near-field communication. After, data is mapped using the Belgian FHIR standard to achieve interoperability, which is key to allow integration and data exchange between healthcare services. Finally, a FHIR dashboard is implemented to display measurements from the BHN. The dashboard must be integrated into electronic health records (EHRs), allowing GPs and specialists to easily access, visualize and interpret the data, and therefore optimize their patient's treatments.

RESULTS

A prototype was implemented by the team, which captures blood glucose measurements from Menarini's glucometer to a mobile application, maps them to FHIR standard and stores them into the BHN. A dashboard, currently not integrated within EHRs, is accessible for clinicians, and presents the evolution of the measurements as a function of time.
An extension is to integrate other point of care testing's devices into EHRs.

CONCLUSIONS

Type II diabetes affects around 900k persons in Belgium and our solution allows remote monitoring of patients thanks to the integration of blood glucose level measurements via the hub-metahub system. In doing so, data is accessible by GPs and specialists, leading to improved patient care.

Diabetes, obesity, metabolic syndrome

P0872

CORRELATION BETWEEN HBA1C AND FRUCTOSAMINE AND THE GLYCOSYLATION GAP EVIDENCE

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BACKGROUND-AIM

The discordance between glycated hemoglobin (HbA1C) and fructosamine (FA) estimations in the assessment of glycemia is often encountered. The purpose of this study is to point out the correlation between HbA1c and Fructosamine levels and to evaluate the GG (Glycation gap) which is defined as the difference between the measured HbA1C and the estimated one. GG has improved the quality of the monitoring of glycemic control, especially for those patients whose HbA1C levels do not truly reflect the mean blood glucose levels.

METHODS

The study population consisted of 100 diabetics with a sex ratio of 1:1. Blood samples were collected for the estimation of the levels of HbA1c (on D-10 bio-rad) and fructosamine (on Architect ci8200). The results were compared by correlation analysis and the glycation gap (GG) was calculated based on the HbA1c-FA regression equation.The statistical analyses were performed with the IBM SPSS statistics 20.

RESULTS

The mean value of measured HbA1c is 7,2% ± 3%. Thus, the mean value of Fructosamine is 210 ± 100 µmol/l. The study has shown a good correlation between Fructosamine levels and HbA1c ($r=0.61$, $p<0.05$). GG had a broad distribution (range from -0,6% to 5.5%).

CONCLUSIONS

Fructosamine can be used in the evaluation of glycemic status in a short period of time. The glycosylation gap may be a useful tool for estimating the physiologic and pathologic sources of variation in diabetic complications beyond glycemic control.

Diabetes, obesity, metabolic syndrome

P0873

ASSOCIATION OF PCSK9 AND LOW-GRADE INFLAMMATION IN CHILDREN AND ADOLESCENTS WITH TYPE 1 DIABETES MELLITUS

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BACKGROUND-AIM

Proprotein convertase subtilisin/kexin type 9 (PCSK9), beside pivotal role in low-density lipoprotein (LDL) homeostasis, could be involved in the inflammatory pathway of atherosclerosis. Type 1 diabetes mellitus (T1DM) is well established risk factor for atherosclerotic cardiovascular disease (ASCVD). The aim of this study was to evaluate the link between PCSK9 and low-grade inflammation in children and adolescents with T1DM.

METHODS

Blood samples were obtained from 151 T1DM patients, without any micro- or macrovascular complications. All patients were treated with intensive insulin therapy. Standard lipid profile, glycohemoglobin and high-sensitivity CRP (hsCRP) were determined by routine laboratory methods, while PCSK9 was measured by ELISA.

RESULTS

The patients in the highest tertile of PCSK9 concentrations (>253.86 ng/mL) had significantly higher (P<0.05) levels of hsCRP (median: 1.20 mg/L; 25th-75th percentile: 0.60-2.50 mg/L) than the patients in first (median: 0.60 mg/L; 25th-75th percentile: 0.20-1.40 mg/L) and second tertile (median: 0.5 mg/L; 25th-75th percentile: 0.30-1,30 mg/L). These patients also had significantly higher levels of total cholesterol (P<0.001), triglycerides (P<0.001), LDL-cholesterol (P<0.01) and glycohemoglobin (P<0.001), as compared to patients in lower tertiles. Increased concentrations of PCSK9 were associated with approximately 2 times higher risk for low-grade inflammation (OR: 2.14; 95% CI: 1.07-4.25; P<0.05). This association remained significant after adjustment for age, gender, body mass index, diabetes duration, insulin dose and concentrations of triglycerides and LDL-cholesterol.

CONCLUSIONS

Our results suggest a proinflammatory effect of PCSK9 in children and adolescents with T1DM. However, contribution of PCSK9-related inflammation to ASCVD risk, beyond PCSK9 involvement in LDL-cholesterol metabolism, should be further investigated.

Diabetes, obesity, metabolic syndrome

P0874

GLUCOSE HOMEOSTASIS IN THE FIRST AND THIRD TRIMESTERS OF HEALTHY PREGNANCIES

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BACKGROUND-AIM

Pregnancy can be associated with many metabolic, biochemical, physiological, hematological and immunological changes. The aim of our study was to compare the values of hemoglobin (Hgb), fasting serum glucose (GLUC), insulin, c-peptide, insulin resistance (HOMA-IR) and hemoglobin A1c (HbA1c) in the first and third trimester of pregnancy of 37 healthy pregnant women.

METHODS

Healthy pregnant women (ages 20 to 40) had their blood sampled in the first and third trimesters of pregnancy, and a complete blood count (Advia, Siemens Healthineers), GLUC, insulin, c-peptide and HbA1c (cobaspro, Roche) were determined. HOMA-IR was calculated from GLUC and insulin values. The comparison of the obtained values in the first and third trimester was done with the Wilcoxon test in the MedCalc 12.4.0.0 program (MedCalc, Mariakerke, Belgium) and the Spearman correlation coefficient between changes in HbA1c and Hgb values, and changes in HbA1c and HOMA-IR, was determined in the same program.

RESULTS

There was no statistically significant difference between the glucose values in the first and third trimesters ($p=0,17$), while for insulin ($p=0,003$), c-peptide ($p<0,001$), HOMA-IR ($p=0,02$) and HbA1c ($p=0,001$) there were statistically significant differences between the two trimesters of pregnancy. The correlation coefficient between changes in HbA1c and Hgb values was 0,0366, and the correlation coefficient between changes in HbA1c and HOMA-IR was 0,2056 which indicates that there is no connection between changes in HbA1c and Hgb or HOMA-IR.

CONCLUSIONS

Pregnancy of healthy women can be associated with resistance to the action of insulin on glucose uptake and utilization. Maternal insulin resistance leads to more use of fats than carbohydrates for energy by mother and spares carbohydrates for fetus, and because of this, there is a difference in the values of insulin, c-peptide and HOMA-IR between the first and third trimester. HbA1c levels fall in most women in early pregnancy, which is related to increased red cell production and a decrease in fasting blood glucose levels. Iron deficiency may prolong red cell survival and increase HbA1c levels. Nevertheless, we did not find connection between the change in HbA1c and the change in Hgb or HOMA-IR, which proves the complexity of metabolism in pregnancy.

Diabetes, obesity, metabolic syndrome

P0875

EFFECTS OF A LOW-CARBOHYDRATE DIET ACCORDING TO THE INTERMITTENT FASTING REGIMEN IN OBESE PATIENTS WITH TYPE 2 DIABETES

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BACKGROUND-AIM

Treatment of DM2(diabetes mellitus type2) through Nutritional Intervention (NI) is main pillars for an alternative approach to standard drugs treatment. If obesity is a strong antecedent factor in DM2, then natural approach would be weight loss by NI. Modification of risk factors such as visceral obesity, reduction of insulin resistance, and alleviation of metabolic syndrome are among the key factors for the control or remission of DM2. Based on this, an observational perspective study was carried out on subjects with DM2. The NI applied was according to the Intermittent fasting low carbihidrate diet, with 6 hours feeding window of 24 hours (IF 6/24-LCD).

METHODS

NI applied to 20 patients with DM2 non-insulin-dependent, BMI > 25 kg/m2, DM2 morbidity < 6 years, without other secondary diseases.
Three check points were applied: phase T0-before NI, phase T1- four weeks after NI, and phase T2-8 weeks after NI.

RESULTS

Anthropometric and metabolic parameters applied generally resulted in a fairly high statistical significance ($p > 0.05$). In T0 , BMI=32.66± 4.83,W/H ratio(Waist/Hip)0.98± 0.04, Glycemia 9.02± 1.78, HbA1c 8.19± 1.21, Homa-IR 6.99± 3.07, and TG/ HDL ratio 3.23 ± 1.19, shows of visceral obesity with high metabolic/atherogjenic risk and poorly controlled of the disease.
In T2, weight loss resulted by decreased BMI to 29.60±3.8 ($p > 0.032$) or-9.4 ∆% compared to T0. W/H-ratio from 0.98±0.04 to 0.957±0.02 ($p > 0.005$). Tg/HDL-ratio from 3.23±1.19 to 1.20±0.36 ($p > 0.001$). HbA1c from 8.19± 1.21 to 6.99± 1.23 (P#0,036).
In the T0 phase, ketonuria 0,195± 0.028 mmol/L while in both control phases T1 and T2, increased to1.84± 0.8 mmol/L and 1.75± 0.7 respectively.

CONCLUSIONS

Application of IF6/24-LCD results in weight loss and decrease of insulin resistance,expressed by positive correlation of BMI / Homa-IR- ratio.
Metabolic shift throughout lipolysis and nutritional ketosis, at the expense of fat mass, is expressed by negative correlation between BMI/ketones.
Improved atherogenic patterns (decreased TG/HDL-ratio) is closely related with an improvement of body shape (decreased W/H-ratio) which is expressed by positive correlation of TG/HDL-ratio:W/H-ratio.

Diabetes, obesity, metabolic syndrome

P0876

CORRELATES OF HIGH BLOOD PRESSURE AMONG ADULTS PRESENTING AT A LARGE REFERRAL HOSPITAL IN ZAMBIA

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BACKGROUND-AIM

Hypertension is a silent epidemic and a major source of increasing health costs, morbidity and mortality and is associated with increased risk of type 2 diabetes mellitus, dyslipidaemia, and cardiovascular diseases. Hypertension itself is a condition that can be controlled, and early detection can prevent its complications. Our study has been designed to determine the prevalence and correlates of blood pressure in adults who present to the adult outpatient clinic at the University Teaching Hospital which is the largest referral hospital in Zambia.

METHODS

This was a cross-sectional study among adult's clients attending Outpatient Clinic (OC) at the Lusaka Adult Hospital of the University Teaching Hospitals between January to June 2017. We collected socio-demographic, anthropometric, blood pressure (BP), lifestyle and fasting lipid profile data. All participants were in an 8-12 hour overnight fasting state.

RESULTS

The overall prevalence of hypertension was 51% among the study participants. At multivariate analysis, age (aOR: 1.064, 95% CI 1.018-1.112; p=0.006) was associated with increased risk of hypertension while aspirin use (aOR: 0.025, 95% CI 0.002-0.322; p=0.005, having a secondary education (aOR: 0.211 95% CI-0.049-0.909; p=0.037) and tertiary education (aOR: 0.251 95% CI 0.063-1; p=0.05) were associated with reduced odds of developing blood pressure.

CONCLUSIONS

The study revealed a higher prevalence of hypertension among clients attending outpatient clinic in Lusaka and it was significantly associated with age, education level and use of aspirin. These evidences may suggest the need for mandatory screening of blood pressure among and urgent interventions.

Diabetes, obesity, metabolic syndrome

P0877

CORRELATION OF ADIPOSE TISSUE CYTOKINES WITH ATHEROGENIC MARKERS IN ADOLESCENT WOMEN WITH POLYCYSTIC OVARY SYNDROME

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BACKGROUND-AIM

To evaluate levels of adipose tissue cytokines such as adiponectin and resistin and and to investigate their relationship with various biochemical and metabolic and atherogenic parameters markers, as well as its contribution in pathogenesis of insulin resistance in women with PCOS with and without insulin resistance.

METHODS

This study was designed as a cross-sectional and involves 80 premenopausal women. Of these patients, 63 females have met the criteria for PCOS (59 insulin resistant, 28 non-insulin resistant). We assessed anthropometric indices of obesity: waist and hip circumference, waist to hip ratio, serum glucose, insulin, total cholesterol, HDL-cholesterol, triglycerides, FSH, LH, E2, testosterone, adiponectin and resistin. Body mass index, waist to hip ratio, HOMA-IR, LDL-cholesterol, and adiponectin to resistin ratio were calculated.

RESULTS

Insulin resistant PCOS woman had significantly lower levels of adiponectin compared to non-insulin resistant PCOS women, and controls. Resistin levels were higher in IR-PCOS, but without statistical significance. Adiponectin showed significant positive correlation with LH, HDL-C, and negative correlation with BMI, insulin, HOMA-IR and triglycerides. Resistin correlated positively with BMI and WC. A/R was significantly higher in insulin resistant PCOS women compared to non-insulin resistant and control women.

CONCLUSIONS

Results from this study suggest that PCOS women were at higher metabolic and atherogenic risk as compared to the healthy women, and this was more pronounced in the insulin-resistant group. Correlations between adipose tissue cytokines with the degree of insulin resistance suggest their involvement in modulation of insulin action in PCOS women.

Diabetes, obesity, metabolic syndrome

P0878

LIMITATION OF HAEMOGLOBIN A1C UTILITY IN DIAGNOSIS AND MONITORING OF PATIENTS WITH DIABETES MELLITUS

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BACKGROUND-AIM

Glycated haemoglobin (HbA1c) is used as a useful tool in the diagnosis and monitoring of patients with diabetes mellitus. The latest ADA recommendations had included HbA1c ≥ 6.5% as diagnostic criterio.
However, there are patients that HbA1c determination is not useful.

METHODS

A 78-years-old man was diagnosed with diabetes mellitus in 2004. Henceforth, HbA1c test was carried out and it was reported with estimated average of glucose levels (mg/dL) over a period of 2 to 3 months based on HbA1c (%) results. In addition, fasting plasma glucose (mg/dL) and total haemoglobin (g/dL) are also requested at same analysis.

RESULTS

The following analysis results were obtained:
22/09/2020
- Fasting plasma glucose: 195
- HbA1c: 5.6
- Estimated average of glucose: 114
- Total haemoglobin: 13.5.

11/03/2021
- Fasting plasma glucose: 196
- HbA1c: 5.6
- Estimated average of glucose: 114
- Total haemoglobin: 13.6

20/07/2021
- Fasting plasma glucose: 155
- HbA1c: 5.1
- Estimated average of glucose: 100
- Total haemoglobin: 11.9

05/04/2022
- Fasting plasma glucose: 151
- HbA1c: 5.3
- Estimated average of glucose: 105
- Total haemoglobin: 13.6

08/11/2022
- Fasting plasma glucose: 188
- HbA1c: 4.7
- Estimated average of glucose: 88
- Total haemoglobin: 12

The results showed much lower HbA1c values than expected. Anemia could justify its reduction occasionally, but it was observed constantly.
Sample from 08/11/2022 was decided to process using boronate affinity. It was obtained a very similar result (4.9%), ruling out methodological interference.
In addition, the haemoglobinopathies study obtained normal results, thence no abnormal structural variants were observed that HbA1c determination could be modified.
Also other factors were considered, including chronic liver disease, antiretroviral therapy, iron deficiency or B12 deficiency.
The complete study showed this patient could present a low glycator metabolism of haemoglobin.

CONCLUSIONS

The HbA1c determination is useful for the diagnosis and monitoring of patients with diabetes mellitus. However, it could not be used in all of them, particularly those considered as low glycators.

Diabetes, obesity, metabolic syndrome

P0879

NON-ALCOHOLIC FATTY LIVER DISEASE AND CARDIOVASCULAR RISK IN TYPE 2 DIABETES MELLITUS: ANALYSIS OF CASE SERIES FROM AN ACADEMIC CENTER.

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BACKGROUND-AIM

Non-alcoholic fatty liver disease (NAFLD) is a spectrum of pathologies ranging from fatty liver to NASH to cirrhosis. Long-term follow-up studies demonstrate cardiovascular mortality to be the most important cause of death in NAFLD patients; the mechanisms by which NAFLD causally contributes to cardiovascular risk (CVR) are not fully elucidated. AIM To evaluate cardiovascular risk in type 2 diabetic (MDT2) patients with NAFLD.

METHODS

Retrospective study including 20 diabetics subjects with NAFLD hospitalized in Endocrinology-Diabetology-Department-CHU-Constantine from January 2021 to December 2022. The diagnosis of NAFLD is retained on the data of the hepatic ultrasonography with absence of serology viral positive and alcoholism. We followed the European society of cardiology (ESC) 2021 guidelines to stratify the CVR. We studied for each patient the presence of target organ damage (proteinuria or eGFR <30 mL/min/1.73 m2) and the presence of a major risk factors (Age >50 years, Hypertension, Dyslipidemia, Smoking, Obesity).

RESULTS

Of all patients 67% are women (sex ratio F/H=1.5), the median age is 52.4±8.2 years, mean duration of diabetes is 13.55±7.26 years, mean BMI is 29.87±4.28 Kg/m2. Dyslipidemia is noted in 70% of cases with 50% of hypertriglycidemia, 50% of LDL level >1g/l and 100% of HDL level < 0.4g/l. CVD risk is very high in 80% of cases, high in 20% and absence of moderate risk.

CONCLUSIONS

NAFLD is often associated with insulin resistance and strongly associated with DMT2. In addition to being at risk of advanced fibrosis and cirrhosis, NAFLD patients are also at higher risk of cardiovascular disease which is consistent with our results. Close follow-up diabetics with NAFLD may be indicated to prevent major vascular events. Risk stratification scores are needed that address both the risk for advanced liver disease and CV disease.

Diabetes, obesity, metabolic syndrome

P0880

IS DETECTION OF ISLET CELL ANTIBODIES (ICA) BY A NOVEL TOOLS: RSR 3 SCREEN ICATM MORE SENSITIVE IN COMPARISON WITH MEDIZYM® ICASCREEN IN TYPE 1 DIABETES (T1D) DIAGNOSTICS?

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BACKGROUND-AIM

Islet-cell antibodies (ICA) to glutamic acid decarboxylase 65 (GADA), islet antigen-2 (IA-2A), zinc transporter 8 (ZnT8A) and insulin autoantibodies (IAA) are specific serological markers of type 1 diabetes (T1D) and serve as important tools for clinicians to determine the clinical classification, prediction of the need of insulin treatment, to identify subjects at risk for developing T1D and as end-points in observational studies. There are two types of tests available on the market for laboratory assessment of ICA: 2 Screen - for combined measurements of GADA and IA-2A and 3 Screen - for combined measurement of GADA, IA-2A and ZnT8A. The study aim was to evaluate the RSR 3 Screen ICA™ and Medizym® ICAscreen for detection of islet cell autoimmunity in patients with suspected T1D.

METHODS

A total of 87 subjects (age 1–18 years) were recruited from Clinic of Endocrinology and Diabetology. Serum samples were tested by 3-Screen (RSR Ltd (Cardiff, UK), 2-Screen (MEDIPAN, Germany) and positive by tests for individual autoantibodies (GADA, IA2-A, ZnT8A, IAA - MEDIPAN, Germany).

RESULTS

Of the 87 samples, n=25 (28.7%) gave 3 positive screening results, n=17 (19.5%) 2 positive screening results. Testing of individual autoantibodies identified 15 children (17.2%) with multiple autoantibodies who were diagnosed with clinical diabetes. All 25 3-Screen positive samples were from subjects with symptoms of diabetes (i.e., hyperglycemia, decreased C-peptide, clinical signs). 3 Screen achieved 96% assay sensitivity and 97.5% specificity, while 2 Screen achieved 90% assay sensitivity and 94.5% specificity.

CONCLUSIONS

In conclusion, this study showed excellent performance for 3 Screen with high assay sensitivity and specificity better than the 2-Screen test used so far. Comparison of the results of the screening tests with the assessment of individual antibodies highlighted that there must probably be other unidentified antibodies specific to T1D.